UENAM01963

Operation & Maintenance Manual

PC228USLC-11E0

HYDRAULIC EXCAVATOR

SERIAL NUMBERS

PC228USLC-11E0 - K77001 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).

Table of Contents

Read This Manual

This manual gives details of the operation and methods of inspection and maintenance for this machine that must be obeyed 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 you do the operation and maintenance. Failure to do so can cause serious injury or death.

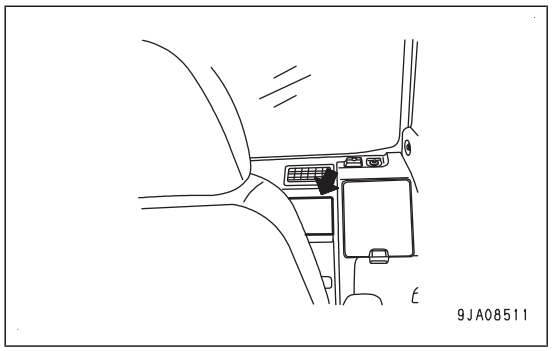
Komatsu cannot predict every situation when the machine is used. Therefore, the safety messages in this manual and on the machine cannot include all possible safety precautions.

If you do the operation, inspection, or maintenance in the situations that are not written in this manual, understand that it is your responsibility to take the necessary precautions for the safety. Also in that case, you must not do the operations which are prohibited in this manual. It is dangerous to do the incorrect operation and maintenance of the machine. It can cause serious injury or death.

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

Be sure to keep this Operation and Maintenance Manual in the storing location to let all the personnel read it.

Keep it in the magazine box rear inside the cab.



If this manual is lost, damaged, or unreadable, 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 the machine model name and the serial No., see the machine serial No. plate. To arrange the correct Operation and Maintenance Manual, you will need to tell 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 were used in the past are given in { }.

The explanations, values, and illustrations in this manual were prepared based on the latest information available as of the date of its publication. As a result of our continuous efforts to improve product quality, the contents of this manual are possibly different from the specifications of this machine. If there is a question or suggestion, consult your Komatsu distributor.

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

Komatsu supplies machines that agrees with all applicable rules and standards of the country to which it is supplied. If this machine was purchased in other countries, there is a possibility that it does not have some safety devices and specifications that are necessary for use in your country. If there is a question about whether your product satisfies the applicable standards and regulations of your country, consult your Komatsu distributor before you operate the machine.

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

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

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

KOMATSU Machine Operator Privacy Policy

This Privacy Policy governs the processing of personal data which takes place when operators based in the European Economic Area or EEA (which consists of the EU, Norway, Liechtenstein or Iceland) operate Komatsu machines equipped with Machine Monitoring Systems such as KOMTRAX, KOMTRAX Plus, K-plus 2, iMC or Smart Construction Cloud system (hereinafter together referred to as “Machine Monitoring Systems” or “MMS”), i.e. systems that allow the wireless monitoring of Komatsu machines.

The MMS are globally managed and maintained by Komatsu Limited, a Japanese corporation having its principal place of business at no. 3-6, Akasaka 2-Chome, Minato-Ku, Tokyo, Japan (**“Komatsu”**). MMS are made available in the EEA by Komatsu Europe International NV, a corporation organised and existing under the laws of Belgium, with registered office at 1800 Vilvoorde, Belgium, Mechelsesteenweg 586, registered in Brussels under number RPR/CER(0)404.968.268 (**“Komatsu Europe”**, together with the other Komatsu subsidiaries in the EEA referred to as “we” or “us”). Komatsu Europe acts as Komatsu's representative in the EU with respect to MMS.

1. Who is responsible?

Komatsu, Komatsu Europe, Komatsu distributors and dealers, as well as the owner of the machine and your employer (when your employer is not the owner) are all responsible for the processing of your personal data through MMS.

2. How are responsibilities allocated?

To arrange for the aforementioned shared responsibility, Komatsu, Komatsu Europe, the distributors, dealers, owners and your employer have put in place contractual arrangements between them which govern this shared responsibility.

The essence of these arrangements is that **you can always direct your questions and requests** regarding the processing of your personal data (i.e. storage, collection, transfer etc. of all information that relates to you as operator) **to the party with whom you have most direct relationship**.

In principle this means that you should first and foremost refer to **your employer (if you are an employee) or your customer (if you are an independent contractor)**. Komatsu, Komatsu Europe, Komatsu distributors and dealers, as well as the owner of the machine and your employer/customer (if he is not the owner) will liaise between each other to ensure that your questions, requests and rights regarding the processing of your personal data are given due regard.

To be clear:

- For staff members of Komatsu Europe or of other Komatsu subsidiaries in the EEA, the request can be directed directly to Komatsu Europe by sending an e-mail to PrivacyOffice@komatsu.eu
- For staff members or independent contractors of a distributor, a dealer or an owner, meaning you either work for or on behalf of a distributor, a dealer or an owner, you are to contact the distributor, the dealer or the owner with your questions or requests.
- For staff members or independent contractors of another entity than the ones referred to above, you are to contact first and foremost your employer or customer.

If you are unsure who to contact, please send an e-mail to Komatsu Europe at PrivacyOffice@komatsu.eu stating your full name, function title and entity you work for, and we will refer your request to the appropriate responsible party.

3. What sort of personal data is processed?

When you use a machine equipped with MMS, the following types of personal data are collected and processed:

- personal identification data (e.g. names)
- current employment (e.g. function title and employer details)
- details regarding:
    - your use and operation of the machine
    - machine location and position
    - usage times and statistics
    - error codes and frequency of those codes

- pictures, videos and sound recordings

4. Why is your personal data processed?

When you use Komatsu machines equipped with MMS, your personal data are processed for the following reasons:

(a) Safety and security

(b) Warranty

(c) Misuse and theft prevention

(d) To provide training and develop training materials

(e) To improve machine and operational efficiency

(f) To improve jobsite safety and efficiency

(g) To provide faster and more tailored support service

(h) To optimize jobsite layout, machine resource allocation and driving routes

(i) For real-time jobsite monitoring and management

(j) Where applicable: to follow-up on rental agreements

(k) To improve MMS and associated services

(l) To evaluate, analyse and report on machine usage

(m) To comply with a legitimate request from law enforcement or other authorities

We may also process your personal data to inform a third party in the context of a possible merger with, acquisition from/by or demerger by that third party, even if that third party is located outside of the EU.

Please note that your employer can also use MMS to process data to evaluate your performance as employee as well as for other purposes, but this is entirely between you and your employer.

5. What makes the processing of your personal data legitimate?

The data protection laws require us to precisely indicate to you which legal option we rely on to make the processing of your personal data legitimate. We need to clarify this for each of the purposes listed in section 4 above.

For the purposes (a) to (l) as indicated in section 4 above as well as for the purpose of informing a third party in the context of a possible merger, acquisition or demerger, the processing of your personal data is necessary for our legitimate interests, which in this case concern:

- ensuring the safe and secure deployment of the machines
- preventing misuse and theft
- commercial interests which include handling warranties, the need to be able to improve MMS, our machines and services and training materials and the need to be able to enter into corporate transactions.

For purpose (m) we need to process your personal data to comply with our legal obligations.

6. Recipients and transfers

Your personal data may be sent to the following categories of recipients:

- yourself
- your employer or business relations
- companies within the Komatsu group of companies, including our affiliates, as well as our service providers who help us to provide MMS
- governmental, judicial and other competent bodies in case of a justified yet legally binding request

Your personal data are transferred to Japan, for which model contract clauses on the basis of European Commission decision 2004/915/EC have been put in place between Komatsu and Komatsu Europe.

For more information, please address your questions to PrivacyOffice@komatsu.eu

7. How long will your personal data be stored?

Your personal data are only processed for as long as needed to achieve the purposes listed in section 4 above. We will de-identify your personal data when they are no longer necessary for the purposes outlined in the purpose for processing, unless there is:

- an overriding interest of Komatsu, Komatsu Europe or any third party in keeping your personal data identifiable
- a legal or regulatory obligation or a judicial or administrative order that prevents us from de-identifying them

8. Which rights do you have with regard to the processing of your personal data?

You have the right to request access to all personal data processed in MMS insofar it pertains to you. You can exercise this right first and foremost via most MMS directly. We reserve the right to refuse multiple requests for access that are clearly submitted for causing nuisance or harm to Komatsu, Komatsu Europe or other parties.

You have the right to ask that any personal data pertaining to you which are inaccurate, are corrected free of charge. Some personal data you can correct yourself if you have access to the MMS web portal. If a request for correction is submitted, such request must be accompanied of proof of the flawed nature of the data for which correction is asked.

You have the right to request that personal data pertaining to you will be deleted if they are no longer required in light of the purposes outlined above. However, you need to keep in mind that a request for deletion will be evaluated by us against:

- overriding interests of Komatsu, Komatsu Europe or any other third party
- legal or regulatory obligations or administrative or judicial orders which may contradict such deletion

Instead of deletion you can also ask that we limit the processing of your personal data if and when (a) you contest the accuracy of that data, (b) the processing is illegitimate or (c) the data are no longer needed for the purposes which are outlined above, but you need them to defend yourself in judicial proceedings.

You have the right to oppose the processing of personal data for the purposes (a) to (l) in section 4, but you are required to explain your particular circumstances on which your request for opposition is based.

As explained earlier, if you wish to submit a request to exercise one or more of the rights listed in this section, you must first and foremost contact your employer. Each request addressed to us can be sent via e-mail to PrivacyOffice@komatsu.eu for all data subject right matters.

An e-mail requesting to exercise a right will not be construed as consent with the processing of your personal data beyond what is required for handling your request. Such request should clearly state and specify which right you wish to exercise and the reasons for it, if such is required. It should also be dated and signed, and accompanied by a digitally scanned copy of your valid identity card proving your identity.

Without prejudice to the allocation of responsibilities as outlined in section 1, we will promptly inform you of having received this request. If the request proves valid, we will notify you as soon as reasonably possible and at the latest thirty (30) days after having received the request.

If you have any complaint regarding the processing of your personal data by Komatsu or Komatsu Europe via MMS, you may always contact us via the e-mail address mentioned in the first paragraph of this clause. If you remain unsatisfied with our response, you may file a complaint with the competent data protection authority.

Safety Information

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

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

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

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

⚠ DANGER

Shows a very dangerous situation which, if not avoided, will result in serious injury or death.

⚠ WARNING

Shows a possibly dangerous situation which, if not avoided, can result in serious injury or death.

⚠ CAUTION

Shows a possibly dangerous situation which, if not avoided, can result in injury, or damage to the machine or the surrounding area.

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

NOTICE

Failure to follow the precautions results in damage to the machine or a personal injury or death.

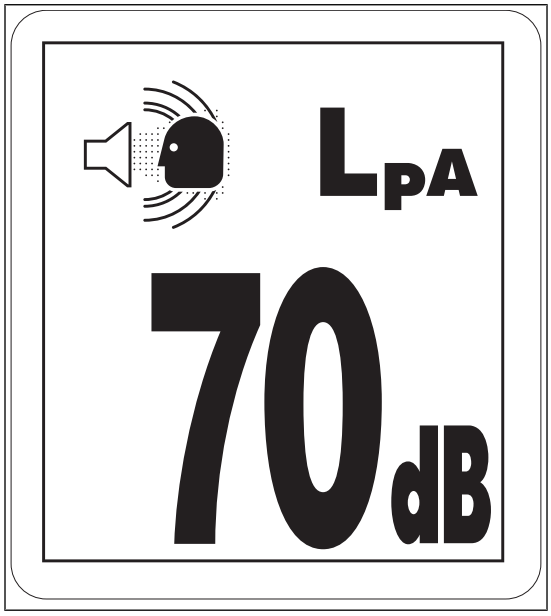
REMARK

Shows useful information.

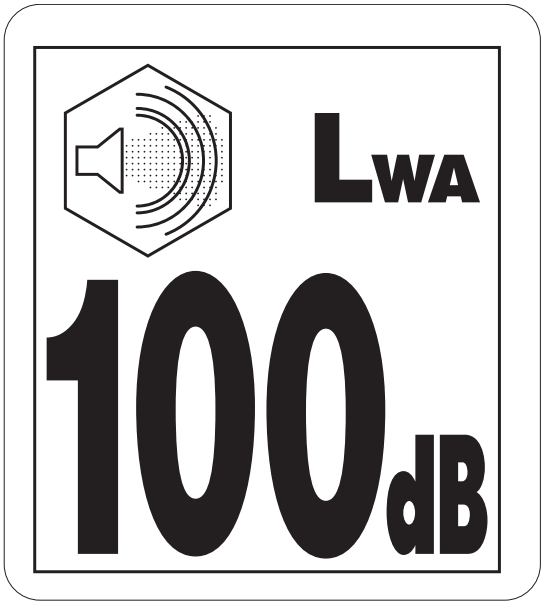
Noise

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

- The A-weighted emission sound pressure level (LpA) at the operator's station, measured according to ISO 6396 (Dynamic test method, simulated working cycle).
  The associated uncertainty KpA is 2.5dB (A).



- Sound power level emitted by the machine, measured according to ISO 6395 (Dynamic test method, simulated working cycle). This is the guaranteed value as specified in European directive 2000/14/EC.
  This value includes an uncertainty of 1.0 dB.



Vibration Level

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 PC228USLC-11

The actual acceleration value for the hands and arms is less than or equal to 2.5 m/s^2 , the uncertainty for this value is 0.51 m/s^2 according to EN12096:1997.

The actual acceleration value for the body is less than or equal to 0.5 m/s^2, the uncertainty for this value is 0.3 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
- Leveling work
- Demolition work

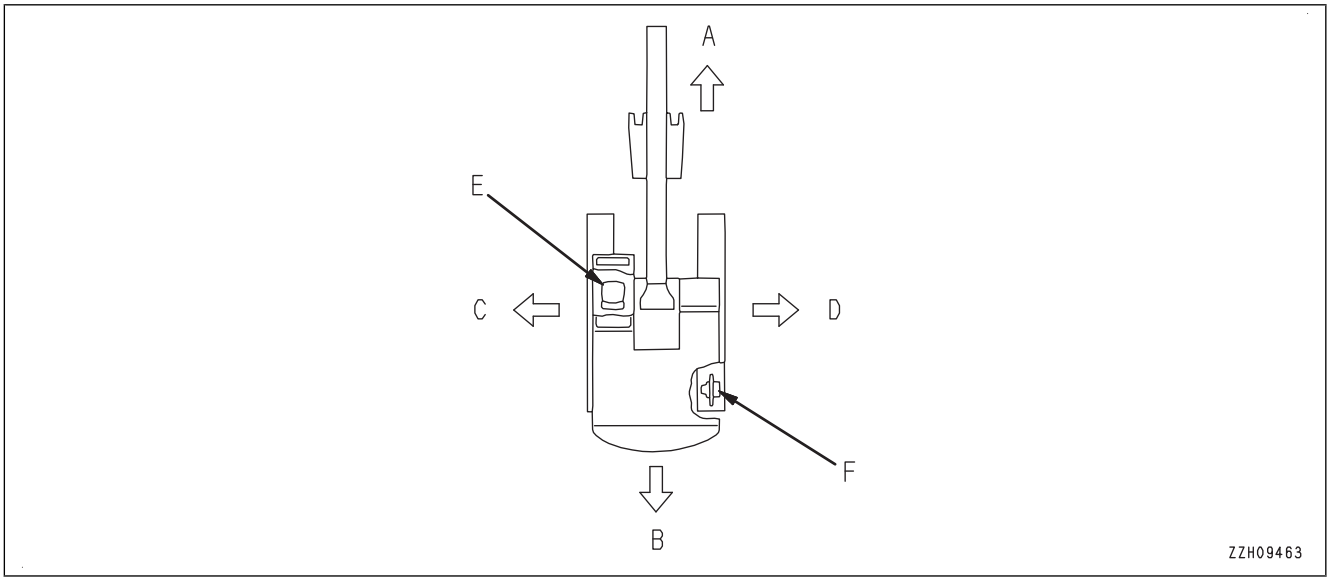
For details of work procedure, see MACHINE OPERATIONS AND CONTROLS “RECOMMENDED APPLICATIONS”.

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.**
- **All Komatsu machines that are specifically designed, and can be used for demolition work, will display the Komatsu demolition decal.**
- **If the machine does not display this decal and it is necessary to carry out demolition work, contact your distributor for information on demolition machinery compliant with the applicable standards.**

Directions of Machine



(A) Front (B) Rear

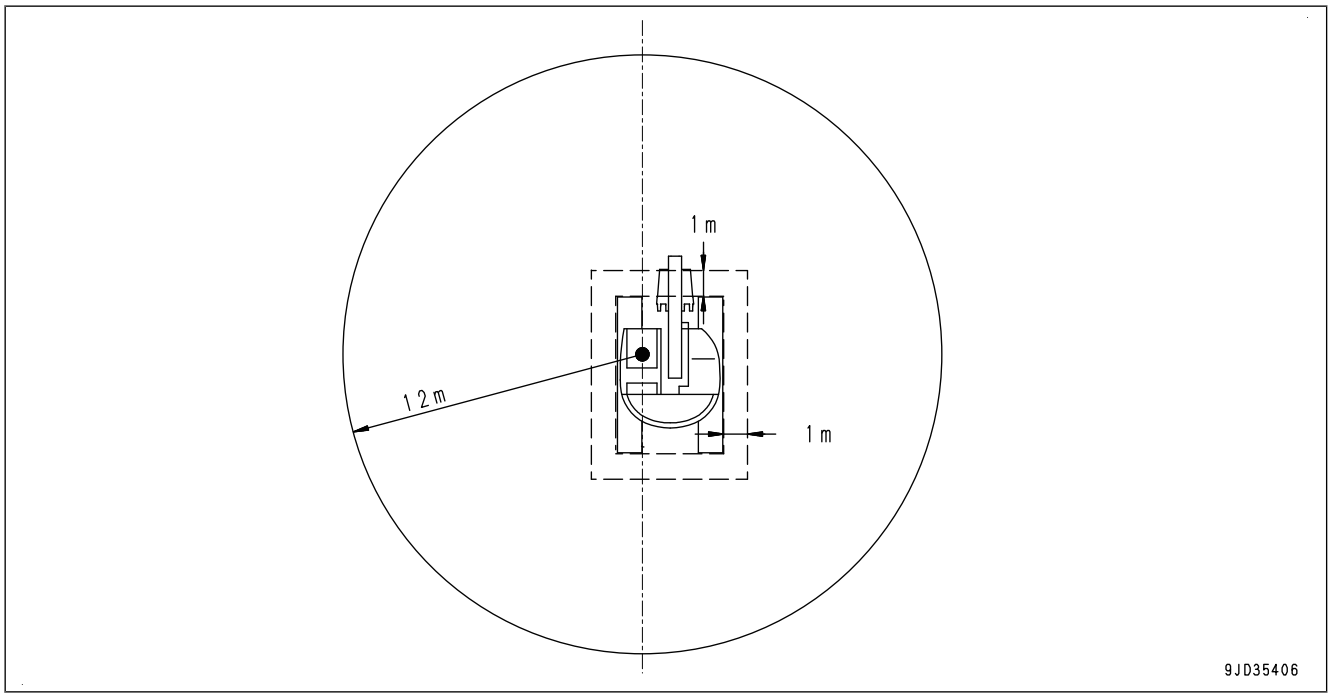
(C) Left
(D) Right
(E) Operator's seat
(F) Sprocket

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 1.2 m at a point 1 m away from the outside surface of the machine, and a visibility for a radius of 12 m .

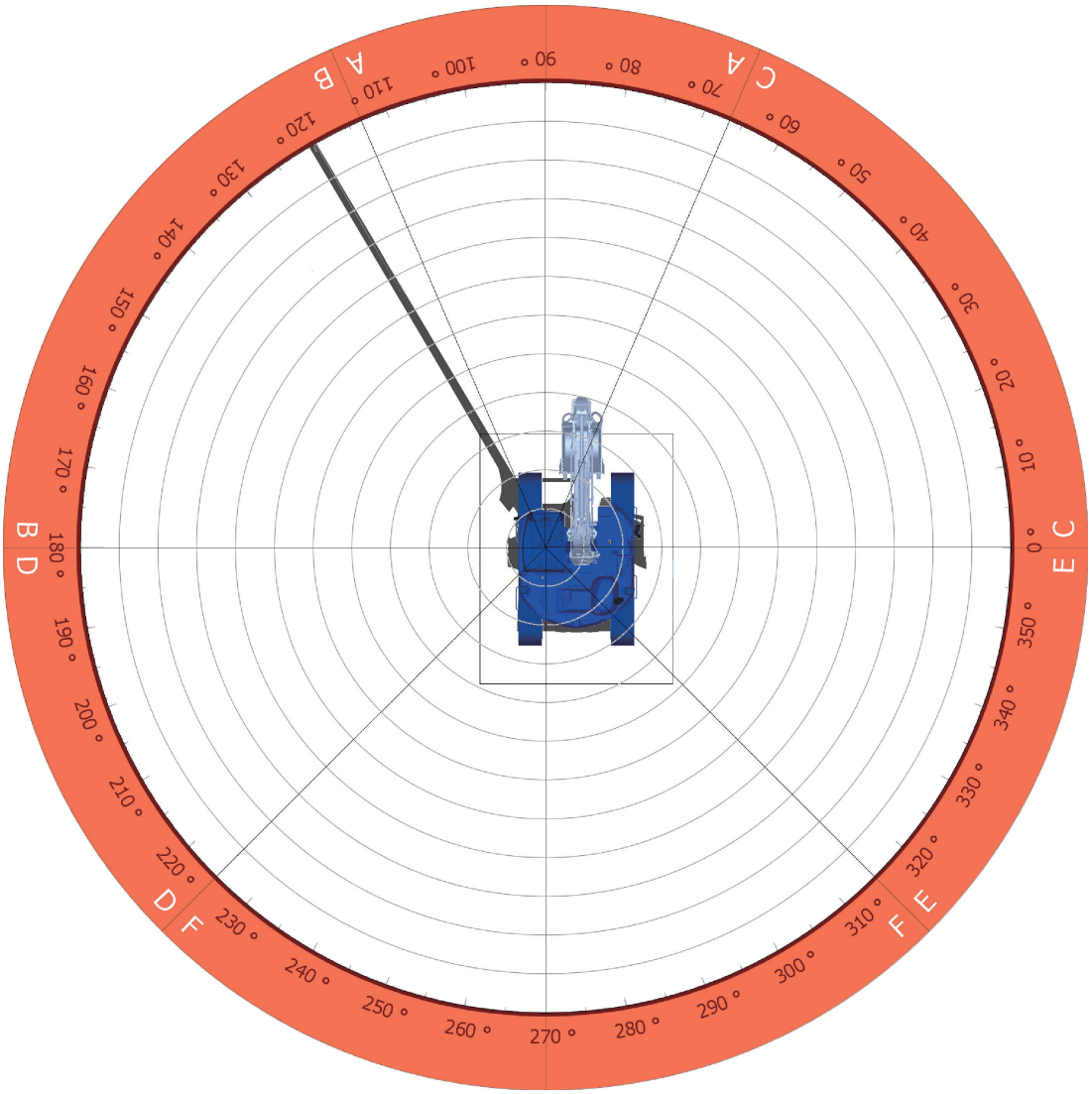


To assist with job site organisation during use of this machine, a visibility map is provided that shows an approximation of any masking to visibility between the 1 m rectangular boundary and the 12 m test circle.

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.

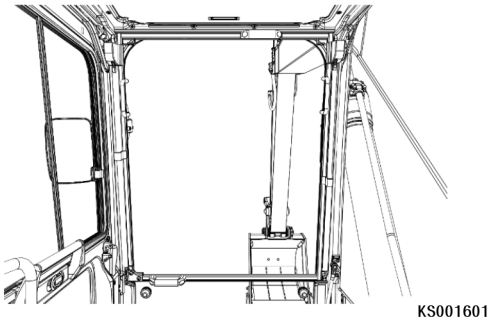
Specification of Visibility Map

- Working equipment specification : 5.7 m Boom + 2.9 m Arm
- Machine Posture : In accordance with ISO5006
- Evaluation height : 1.2 m above the ground
- Scale-interval of the circles is 1 m .



⚠ CAUTION

- **During operation the movement of the work equipment (boom/arm) will affect the operator's field of vision. This will be strongly influenced by the type and dimension of any attachment that may be installed.**



- **Pay attention to this and ensure that the working area is free of groundworkers or obstacles before starting the machine and during operation.**

Protective Structures

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

Engine Technology to Conform Exhaust Gas Emission

This engine complies with the EU Stage V emission regulation in the European Union.

REMARK

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

About Diesel Exhaust Fluid (DEF)

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

The Komatsu 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.

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

DEF is a colorless clear and aqueous urea solution made with 32.5 % urea (AUS32) and 67.5 % deionized water.

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).

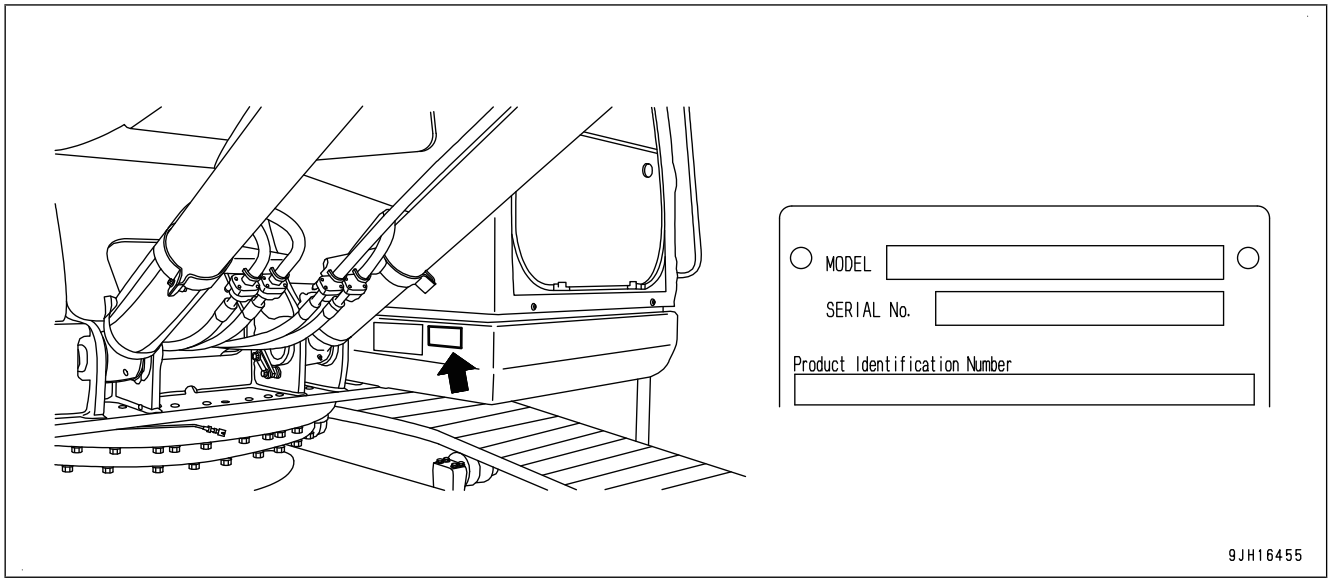
Product Information

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

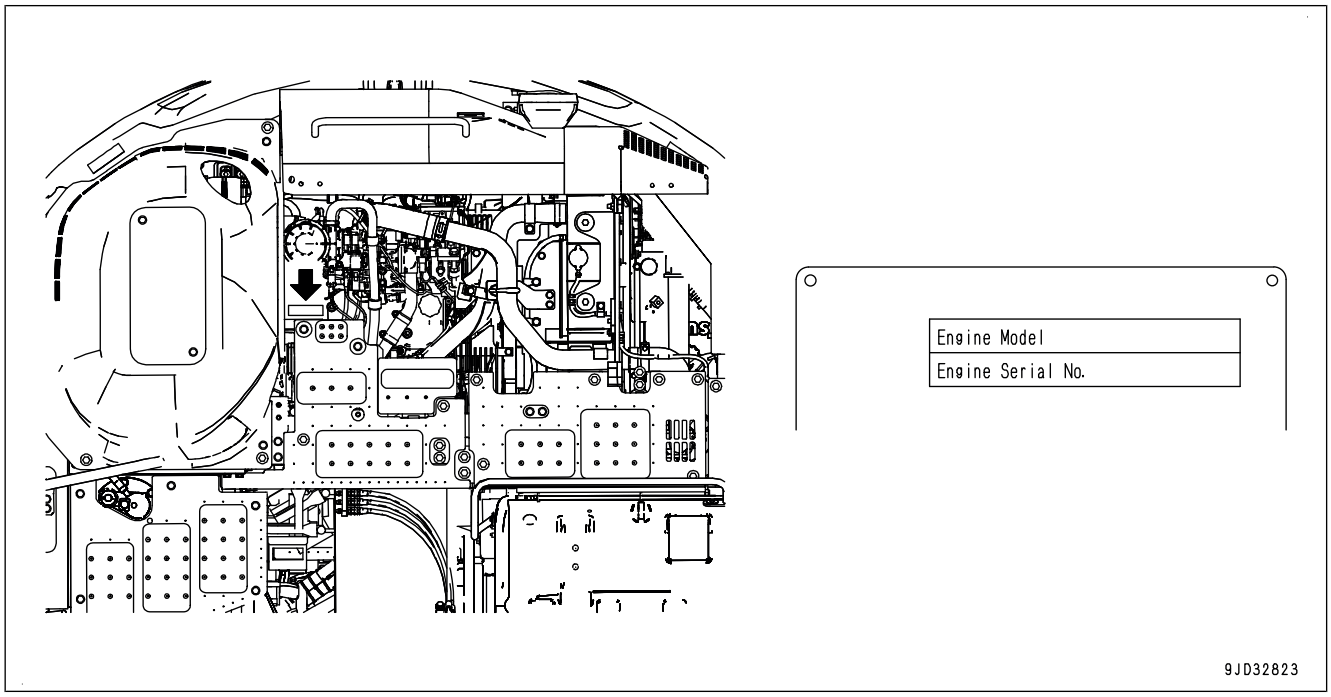
It is located on the right bottom of the operator's cab.

The design of the nameplate varies according to the district.



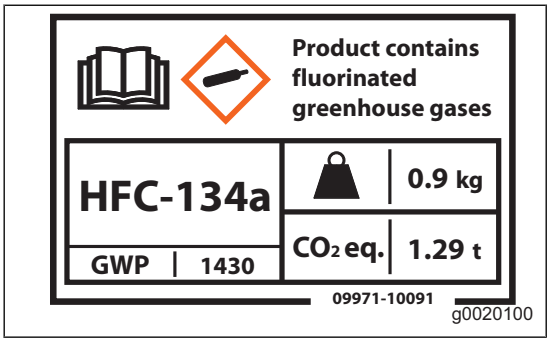
Location of Engine Number Plate

They are on top of the engine cylinder head cover.



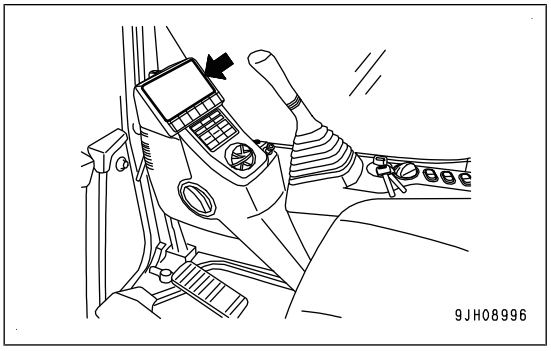
Fluorinated Greenhouse Gases

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
Authorised representative, for EU & NI: Address:	KOMATSU EUROPE INT. Mechelsesteenweg 586 B-1800 Vilvoorde Belgium
Authorised representative, for GB: Address:	N/A
Distributor name	
Address	
Service Personnel	
Phone/Fax	

Abbreviation List

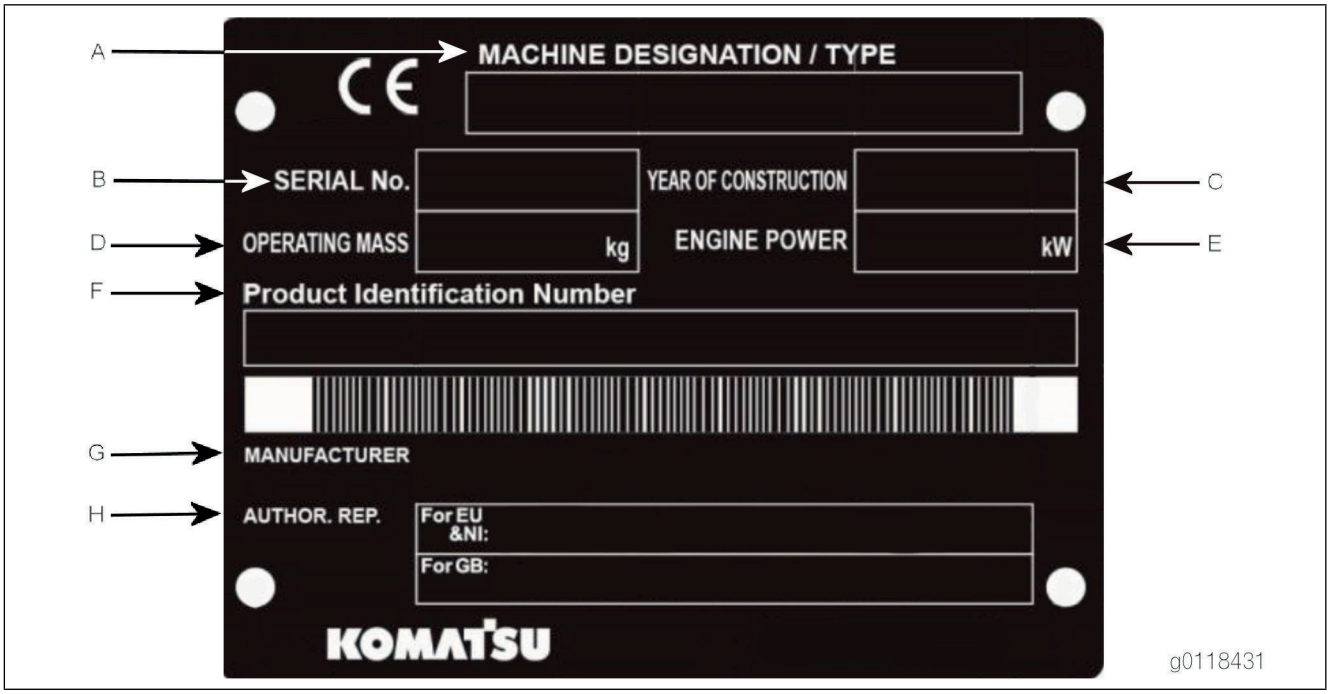
- This list of abbreviations includes the abbreviations for functions, devices, and parts which are used in the operation and maintenance manual.
- Commonly used abbreviations are not included.
- Special abbreviations which are not shown frequently are included in the text as additional information.

List of Abbreviations Used in the Text

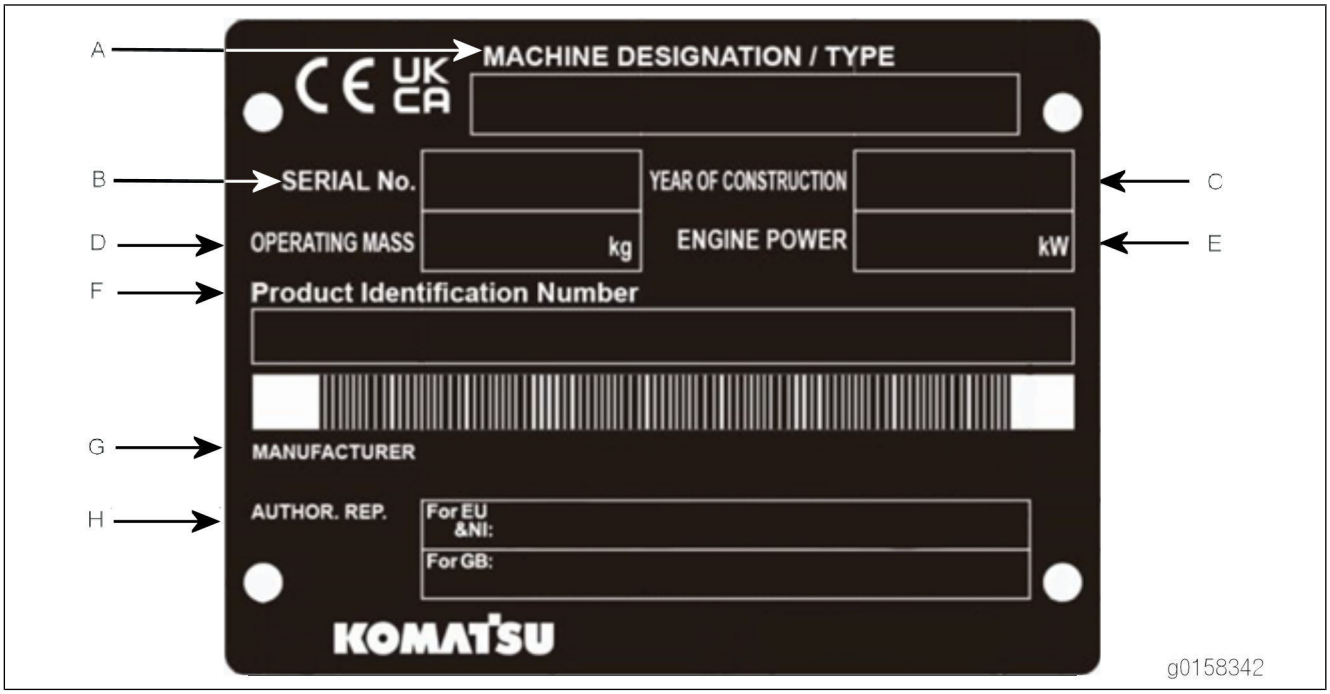
Abbreviation	Actual word spelled out	Explanation
API	American Petroleum Institute	API is the abbreviation for American Petroleum Institute.
BOC	Bolt-On Cutting edge	BOC is a cutting edge that is attached with bolts to the bucket.
CAN	Controller Area Network	CAN is one of networks that communicate between the machine monitor and controllers.
DEF	Diesel Exhaust Fluid	DEF is a urea solution that is used for the SCR system.
EGR	Exhaust Gas Recirculation	EGR is a function that recirculates part of exhaust gas to the intake side to control NOx emissions.
FOPS	Falling Object Protective Structure	FOPS is a structure that protects operators from falling objects.
GNSS	Global Navigation Satellite System	GNSS is a general term for satellite positioning systems.
GPS	Global Positioning System	GPS is one of satellite positioning systems.
IMU	Inertial Measurement Unit	IMU is a device that senses the angles (or angular velocity) and acceleration of the three axes.
KCCV	KOMATSU Closed Crankcase Ventilation	KCCV is a function that isolates oil from blowby gas in the engine and returns the blowby gas to the intake side.
KDOC	KOMATSU Diesel Oxidation Catalyst	KDOC is a device that purifies exhaust gas.
KDPF	KOMATSU Diesel Particulate Filter	KDPF is a device that is composed of the KCSF and KDOC, and catches soot (Particulate Matter, PM) in exhaust gas.
KOWA	Komatsu Oil and Wear Analysis	KOWA is a preventive maintenance service that collects and analyzes oil in the machine at the specified interval so that wear of the machine and other problems can be found at short time.
OPG	Operator Protective Guards	OPG is a structure that protects operators from falling objects.
PPC	Proportional Pressure Control	PPC is a function that controls the pressure of the hydraulic circuit in proportion to the degree of the lever operation.
PTO	Power Take Off	PTO is a mechanism that takes out the engine power.
ROPS	Roll-Over Protective Structure	ROPS is a structure that protects operators from falling objects or in the event of a machine roll-over.
SCR	Selective Catalytic Reduction	SCR is a device that purifies nitrogen oxides (NOx) in exhaust gas from the engine.
SOC	State Of Charge	SOC is the abbreviation for State Of Charge that is the charge rate to battery capacity shown on the liquid crystal panel of the battery charger.
TOPS	Tip-Over Protectuive Structure	TOPS is a protection structure that protects operators in the event of a machine tip-over.

Serial Plate

Machines that are CE marked have the serial plate shown below.



Machines that are CE and UKCA marked have the serial plate shown below.



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

Declaration of Conformity

The manufacturer/Authorised representative:

The Manufacturer:	Authorised representative:	
	for EU & NI:	for GB:
KOMATSU UK Ltd Durham Road Birtley Chester-le-Street County Durham DH3 2QX	KOMATSU EUROPE INT. Mechelsesteenweg 586 B-1800 Vilvoorde Belgium	N/A

Declares that this machine:

PC228USLC-11E0

Fulfils all the relevant provisions of following EC Directives:

Machinery 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

And, in the case where the machine bears the UKCA mark, fulfils all the relevant provisions of following UK:

Supply of Machinery (safety) Regulations 2008	UK SI 2008 No. 1597 and amendments
Electromagnetic Compatibility Regulations 2016	UK SI 2016 No. 1091 and amendments
Noise and Emission in the Environment by Equipment for Use Outdoors Regulations 2001	UK SI 2001 No. 1701 and amendments
Radio Equipment Regulations 2017	UK SI 2017 No. 1206 amendments

Safety

⚠ WARNING

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

Safety Labels

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

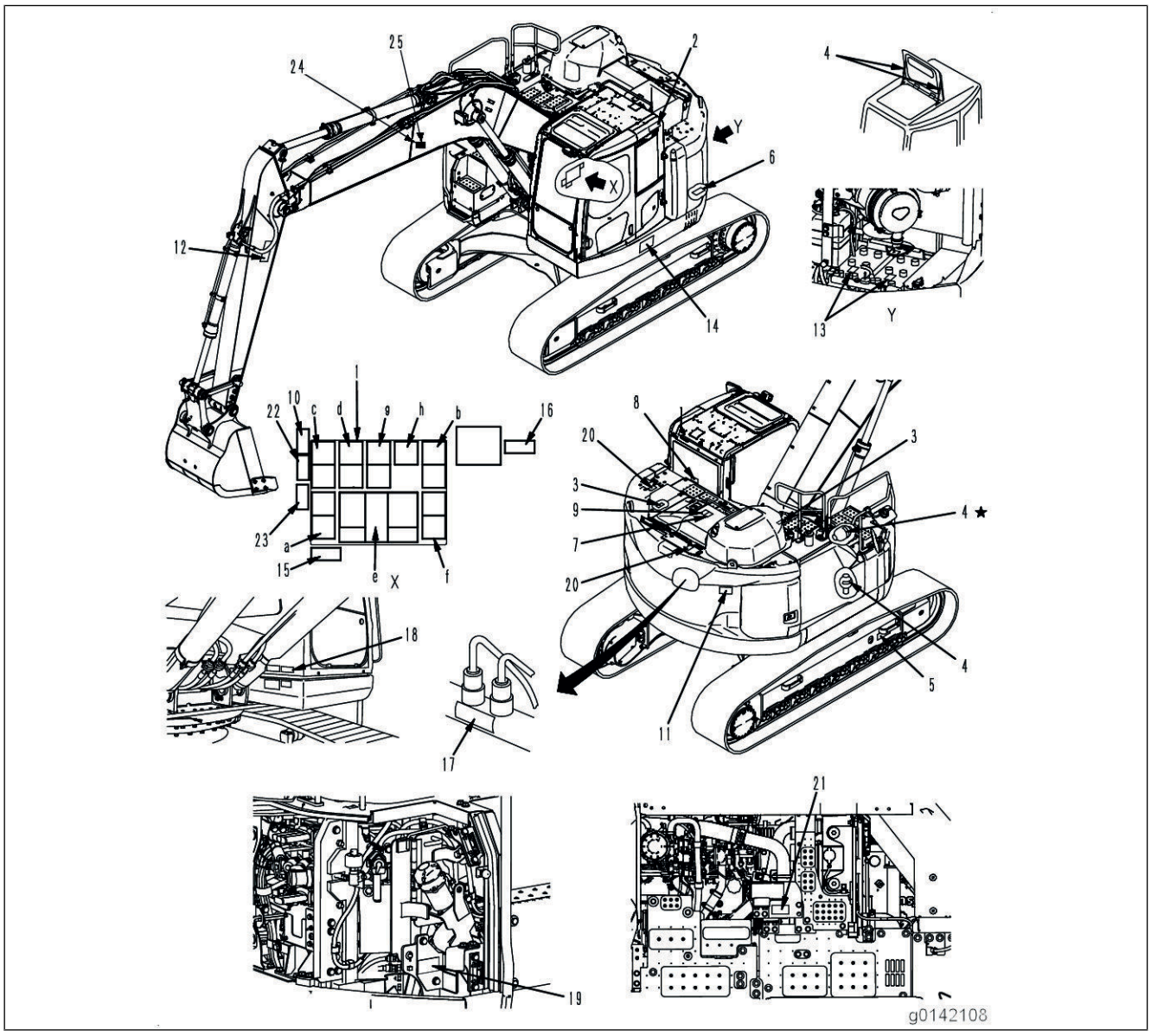
In no event should you engage in prohibited uses or actions described in this manual.

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.

Location of Safety Labels



Options are shown with ★ marks in the figure.

1. Caution regarding the operation, inspection, and maintenance

(a) Caution for operation, inspection and maintenance

(b) Caution before operating

(c) Caution when leaving operator's seat

(d) Caution for electric cables

(e) Caution for control pattern

(f) Caution when opening or closing front window

(g) Warning - Prohibition of getting on the machine

(h) Warning - Caution for falling object

2. Caution when stowing front window

3. Caution for high-temperature coolant and hydraulic oil

4. Caution for handling accumulator and gas spring

5. Caution for adjusting track tension

6. Caution for handling cable

7. Stop rotation during inspection and maintenance

8. Emergency escape

9. Caution against falling

10. Caution when swinging and traveling in reverse

11. Prohibition of entering within swing range

12. Caution for work equipment

13. Caution for handling battery

14. Prohibition of start by short-circuiting

15. Caution for blast site

16. Caution for operating hydraulic quick coupler piping system

17. Caution for high-pressure fuel

18. Caution for handling ROPS
19. Caution for handling DEF
20. Caution against falling
21. Caution against falling
22. Caution for using seat belt
23. Caution for operating attachment pedal
24. Anchor point for tie-off
25. Prohibition of lifting operation (anchor point for tie-off)

Contents of Safety Labels

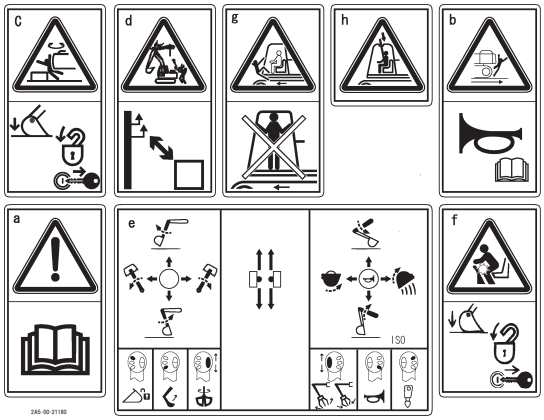
Warning regarding the operation, inspection, and maintenance

“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.

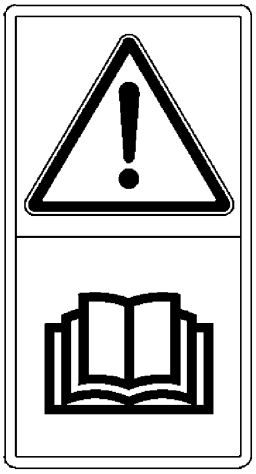
Follow instructions and warnings in manual and in labels on machine.

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



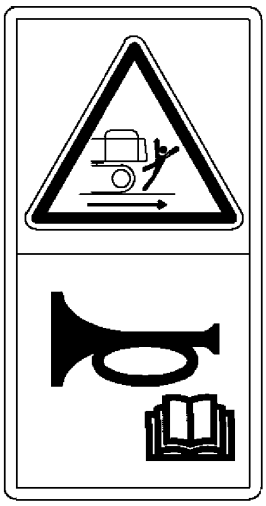
(a) Caution for operation, inspection and maintenance

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



(b) Caution before operating

- 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.

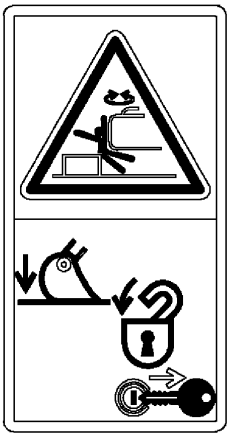


⚠ WARNING

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.

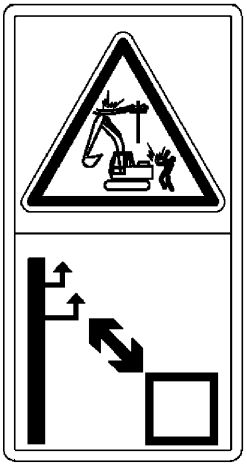
(c) Caution when leaving operator's seat

- 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.



(d) Caution for electric cables

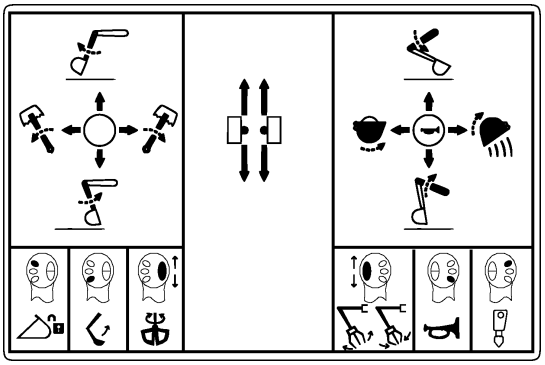
- An electrocution hazard if the machine is brought too near to electric power lines.
- Keep a safe distance from electric power lines.



(e) Caution for control 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.

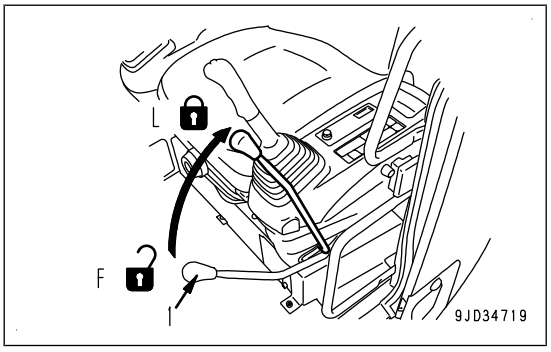
Pay attention to the circumference and operate slowly when confirming the machine motion.



(f) Caution when opening or closing front window

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.



(g) Warning - Prohibition of getting on the machine

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

(h) Warning - Caution for falling object

Do not operate where a danger of falling objects exists.

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

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 pin.

Caution for high-temperature coolant and hydraulic oil

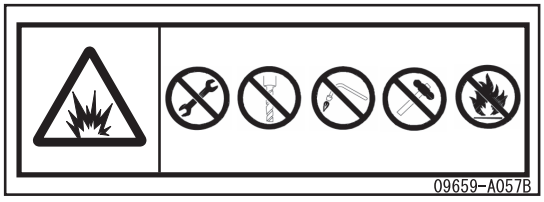
“09653-A0481”

- 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 when cooling water or hydraulic oil is at high temperatures.

Caution for handling accumulator and gas spring

“09659-A057B”

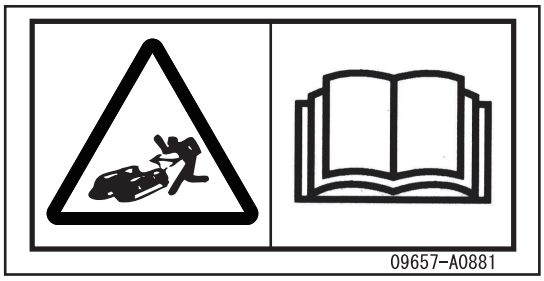
- There is the hazard of explosion causing injury.
- Do not disassemble the device, make holes in it, weld it, cut it, hit it, roll it or bring it near flame.



Caution for adjusting track tension

“09657-A0881”

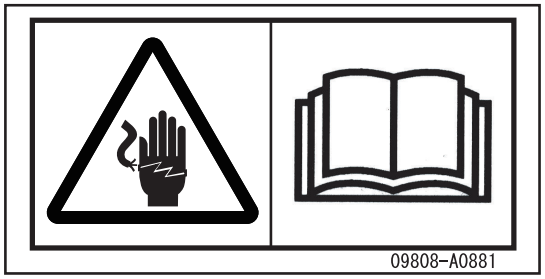
- Sign indicates a hazard of flying plug from track adjuster that could cause injury.
- Read manual when adjusting track for safe and proper handling.



Caution for handling cable

“09808-A0881”

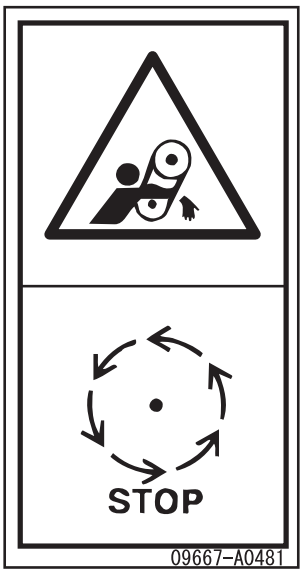
- Sign indicates an electric shock hazard from handling the cable.
- Read manual for safe and proper handling.



Stop rotation during inspection and maintenance

“09667-A0481”

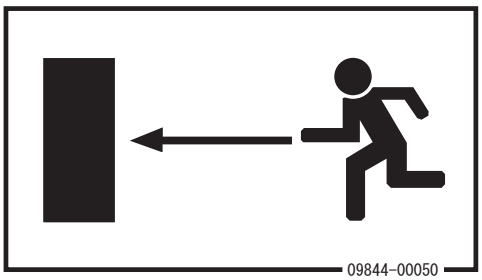
- Sign indicates a hazard of rotating parts, such as belt.
- Turn off before inspection and maintenance.



Emergency escape

“09844-00050”

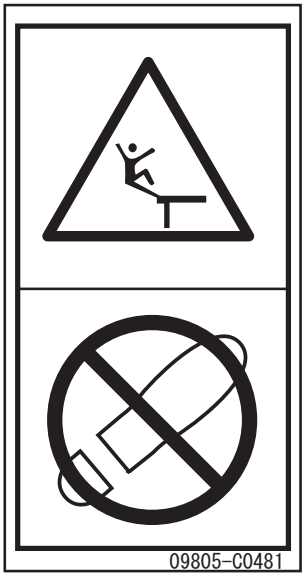
- This is an emergency exit when the cab door will not open. In emergency, smash the window pane with an equipped hammer and get through there.



Caution against falling

“09805-C0481”

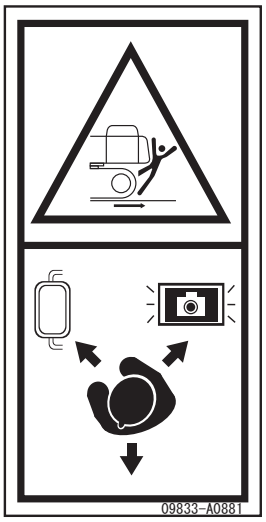
- Sign indicates a hazard of falling.
- Do not stand on this place here.



Caution when swinging and traveling in reverse

“09833-A0881”

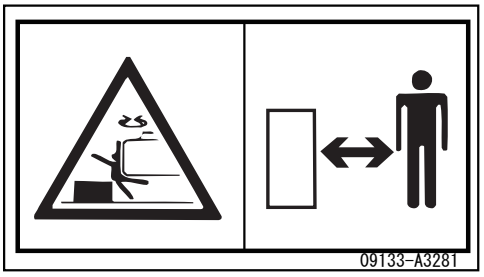
- When swinging or backing up excavator, press button to change display mode on monitor so you can see rear and side of machine.
  Before moving, look around and at mirror and monitor to confirm that no one is around the machine. Failure to do so can result in serious injury or death.



Prohibition of entering within swing range

“09133-A3281”

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



Caution for work equipment

“09134-A1681”

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

Caution for handling battery

“09664-60001”

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

(b) Always wear protective eyeglasses when working with batteries.

(c) Keep children away from batteries.

(d) Caution battery acid.

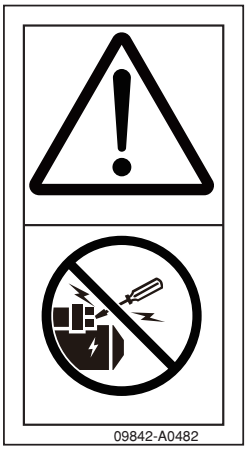
(e) Read the operator's manual before working with batteries.

(f) Caution - explosive gases.

Prohibition of start by short-circuiting

“09842-A0482”

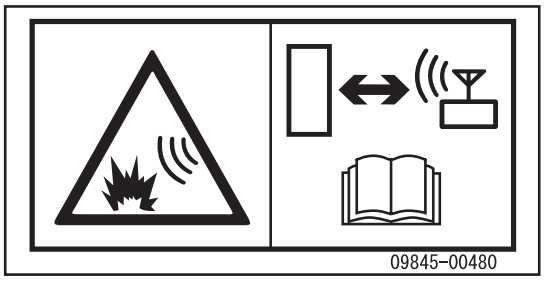
- Start the engine only after sitting down in the operator's seat.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious bodily injury or fire.



Caution for blast site

“09845-00480”

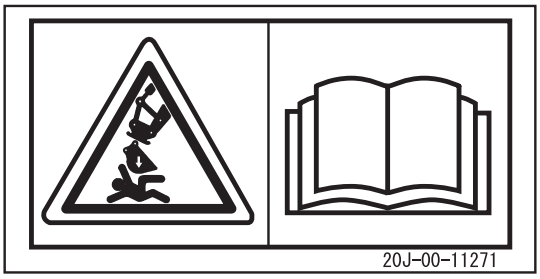
- Sign indicates an explosion hazard caused by active radio transmitter at a blast site.
- Keep machine at a safe distance from a blast site and detonator.



Caution for operating hydraulic quick coupler piping system

“20J-00-11271”

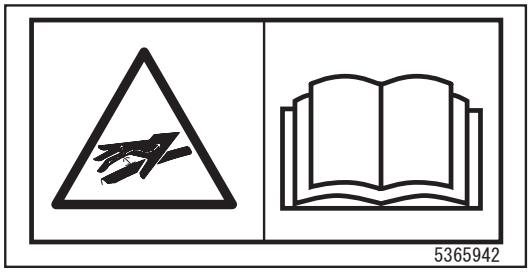
- There is a danger of an exposed person being killed by falling attachment.
- Read the manual for safe operation.



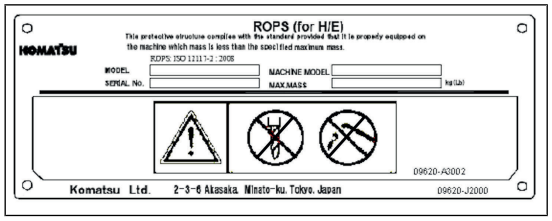
Caution for high-pressure fuel

“6754–71–1811”

- When the engine is running,high-pressure fuel is generated in the engine fuel piping.Do not remove or loosen fuel system piping when engine is running.
- When carrying out inspection or maintenance,stop the engine and wait at least 30 seconds to allowinternal pressure to go down.
- DO NOT RISK SEVERE INJURY OR DEATH.



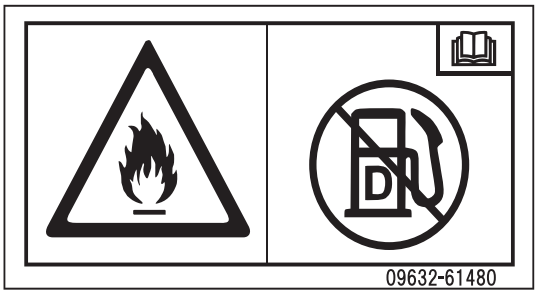
Caution for handling ROPS



“09620-J2001”, “09620-A3002”

- If some modification is applied to the ROPS, it may afect the strength and may not be comply with the standard. Consult Komatsu Distributor before altering.
- ROPS may provide less protection if it has been structurally damaged or involved roll-over.
  Consult Komatsu Distributor in that case.
- Alway wear seat belt when moving.

Caution for handling DEF



“09632-61480”

- DEF Only.
  To avoid engine damage or fire, fill with DEF only.
- Never use diesel fuel.

Caution against falling

“09805-A0641”

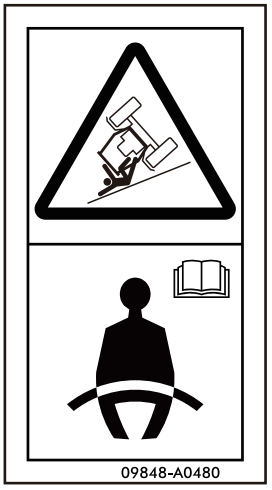
- There is the hazard of falling.
- Do not step here!

Caution against falling

“09805–C0481”

- There is the hazard of falling.
- Do not step here.

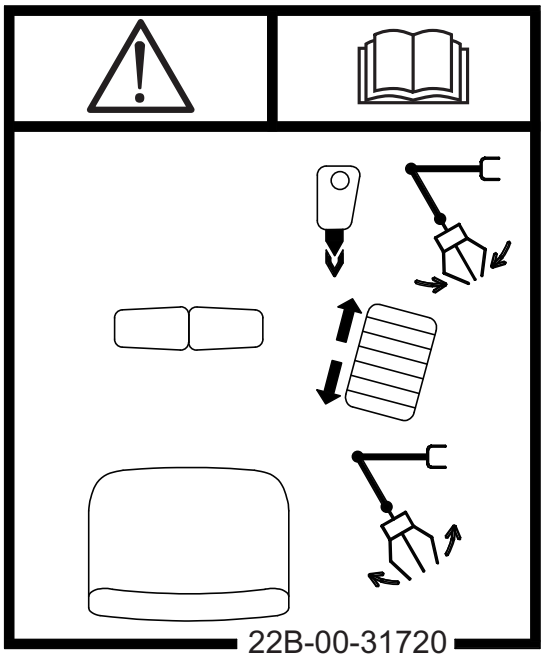
Caution for using seat belt



“09848–A0480”

- Always use seat belt when operating the machine to reduce risk of injury or death in case of a roll-over.
- Always check for damage or wear of the seat belt, damage of the connecting brackets, and tightness of bolts.
- Adjust seat position to allow full brake pedal travel with operator's back against seat back.
- After adjusting seat position, get off the seat and tighten the tether belts located between the floor and seat if equipped.
- Read Operation and Maintenance Manual.

Caution for operating attachment pedal



“22B-00-31720”

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.

Anchor point for tie-off

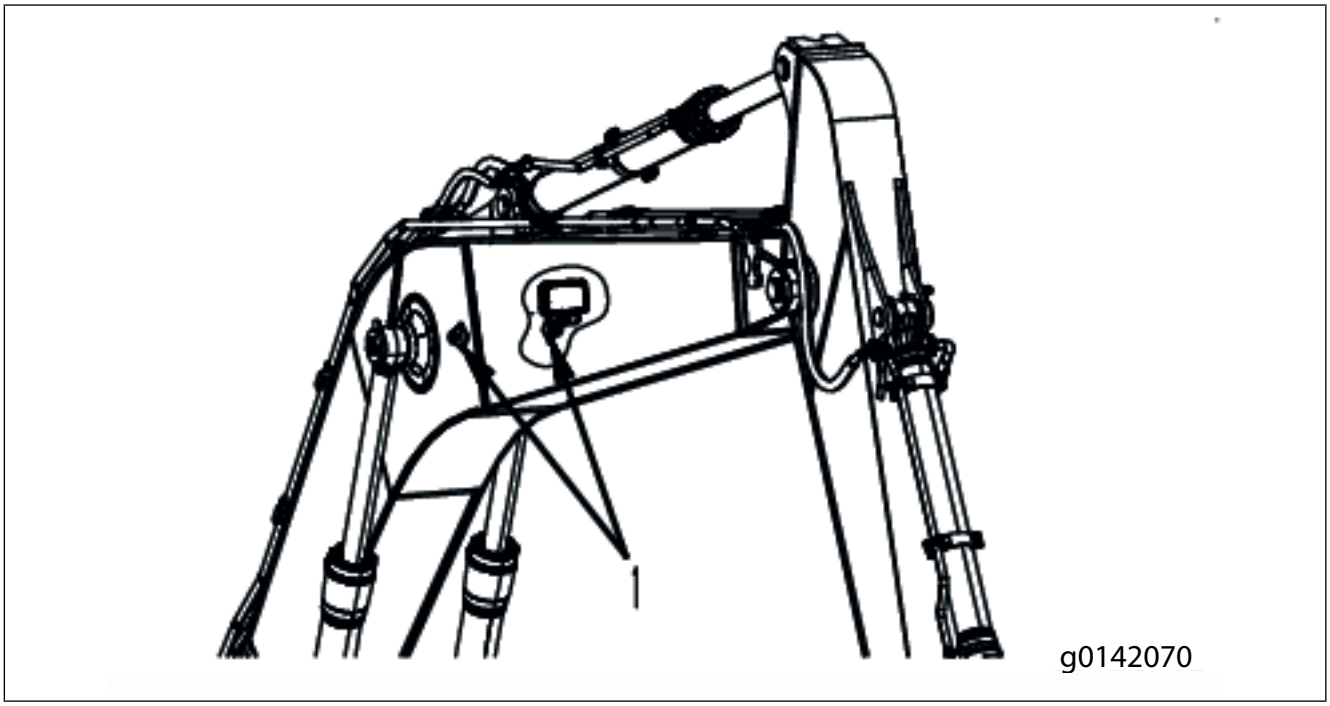
“09850-00881”

- Anchor point for personal fall-arrest equipment

Prohibition of lifting operation (anchor point for tie-off)

“09951-00401”

Handle Anchor Point for Tie-off



Personal fall arrest equipment may be attached to the anchor point for tie-off (1).

This may be utilised when carrying out maintenance, however, take care of the following:

- Never work alone when using personal fall arrest equipment. In the event of a fall you may become stranded, resulting in serious injury or death.
- Always ensure that suitable access equipment is used.
- Do not use the tie-off point for any other purpose.

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 You Start Operation

For Safety 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.

Prepare for Safety Operation

Precautions for Safety-related Equipment

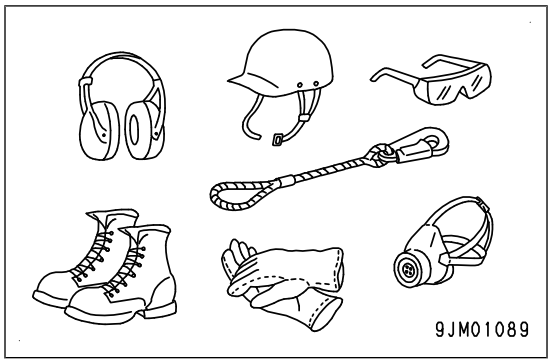
- Be sure that all guards, covers, cameras, and mirrors are in their proper position. Repair them immediately if they are damaged.
- Understand the using method of the safety related devices and use them properly.
- Never remove any safety related devices. Always keep them in good operating condition.

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.

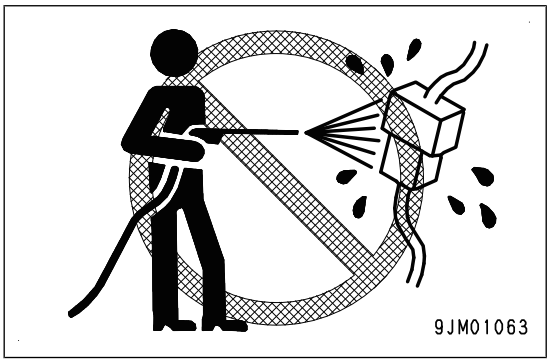
Wear Well-Fitting Clothes and Protective Equipment

- 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 personal fall-arrest equipment as appropriate for the work function.
- Long hair hanging out from the hard hat is dangerous that it may get caught up in the machine. Tie the hair up and be careful not to be caught.
- Check that all personal protective items function properly before using them.



Keep Machine Clean

- If you get on or off the machine or perform inspection and maintenance on the machine with mud or oil, you may slip and fall, and it is dangerous. Wipe off any mud or oil from the machine. Always keep the machine clean.
- If water gets into the electrical system, electric devices will cause malfunctions, and the machine will cause error. If the machine cause error, it may move unexpectedly and cause serious personal injury or death. When washing the machine with water or steam, do not allow the water or steam to come into direct contact with electrical components.
- If high-pressure water is sprayed directly onto camera, it may cause failure. Do not allow the high-pressure water to get into camera directly. When cleaning the camera, wipe off any dirt with soft cloth.



- When cleaning camera and mirror, 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 and mirror in secure posture.

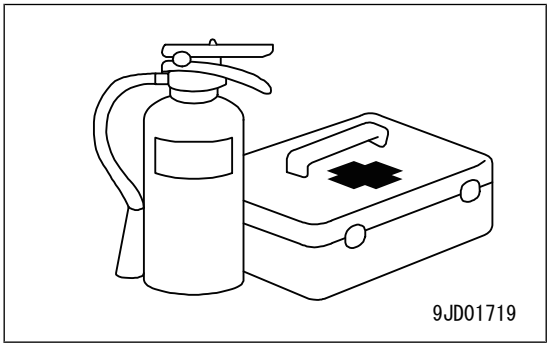
Precautions for Inside Operator's Compartment

- 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.

Supply 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 a 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

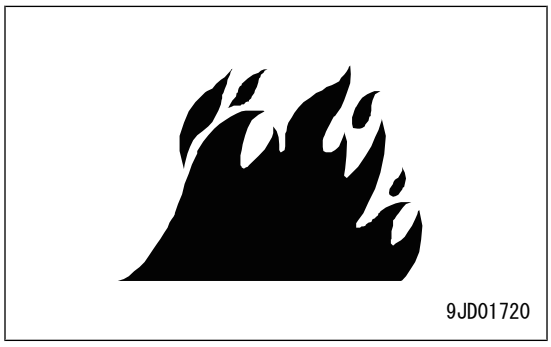
Procedures If Fire Occurs

- 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 aftertreatment 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)”.

Explosion Caused by Lighting Equipment

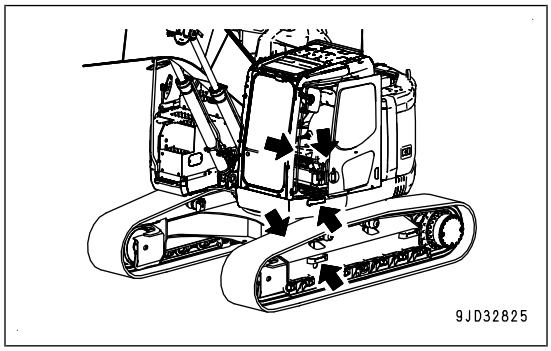
- When checking fuel, oil, battery electrolyte, or coolant, always use lighting with anti-explosion specifications.
- When taking the electrical power for the lighting equipment from the machine, see “Power Supply Outlet”.

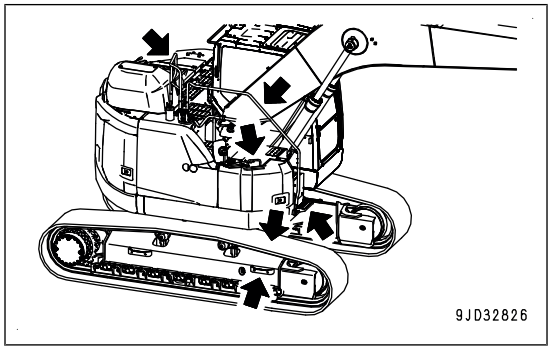
Precautions When You Get On or Off Machine

Use Handrails and Steps When Getting on or off Machine

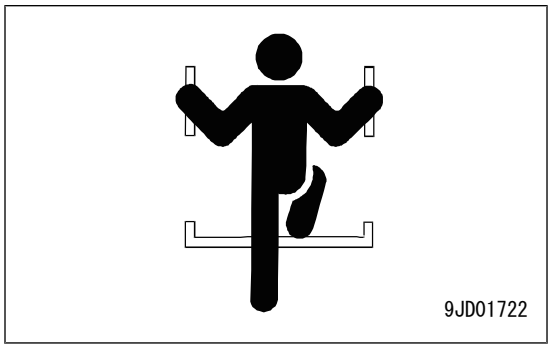
To prevent personal injury caused by slipping or falling off the machine, always observe the following.

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





- Always face the machine and maintain at least three-point contact (both feet and one hand, or both hands and one foot) with the handrails and steps to ensure that you support yourself.
- Before getting on and off the machine, check the handrails and steps if there is any oil, grease, or mud on them. Wipe it off immediately not to slip if any. If there is any loose bolt on the handrail and step, tighten it securely.
  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. When getting on and off the machine, be careful that your body or clothes do not touch the levers.
- 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 Jump 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.

Proscribed Lift of Personnel

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

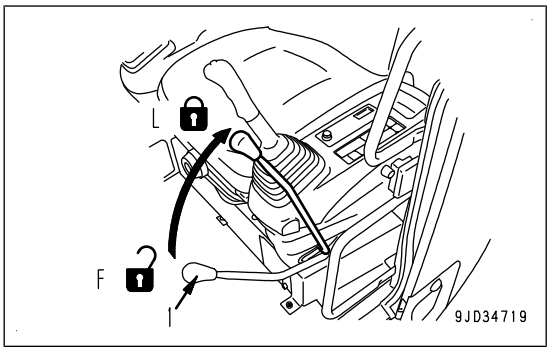
No People on Attachments

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 lower window, or adjusting the position of the seat, always lower the work equipment to the ground, operate the lock lever (1) by red portion on the top, securely set it to LOCK position (L), and stop the engine.

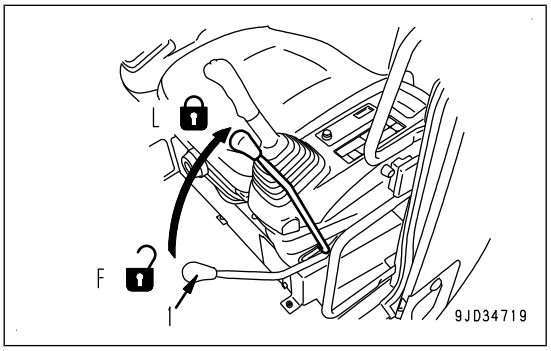
If the control levers are touched by mistake, there is danger that the machine may suddenly move and cause serious personal injury or death.

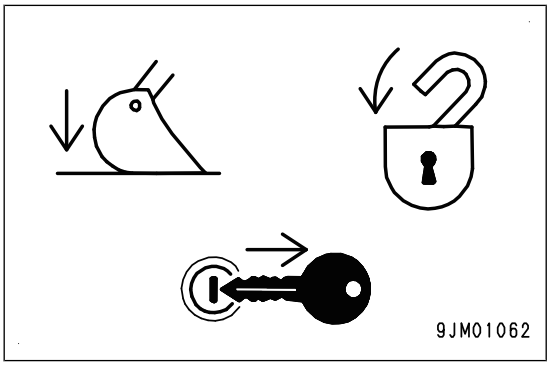


Precautions When Leaving Machine

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. Observe the following.

- When leaving the machine, be sure to make the undercarriage and upper structure point to the same direction, and lower the work equipment to the ground. Operate the lock lever (1) by red portion on the top, securely set it to LOCK position (L), and stop the engine. In addition, lock all the places and always take the key with you and keep it in the specified location.
- When the operator's seat and console are located in front, your body or clothes will easily touch the levers. Shift them backward to keep enough space, and then get off the machine.
- Lock all the places and always take the key with you and keep it in the specified place.





Emergency Exit from Operator 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.

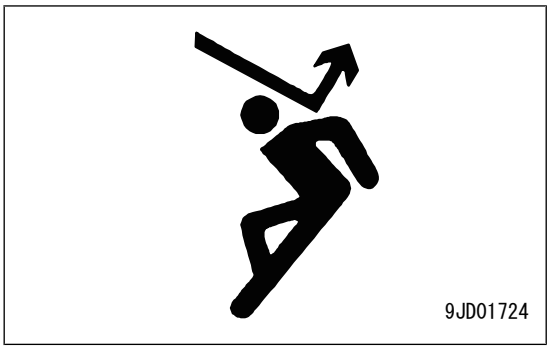
Do Not Get Caught

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.

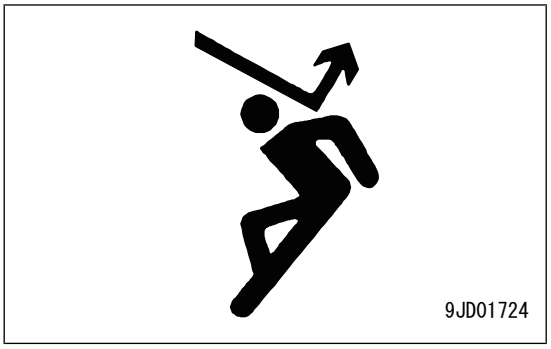


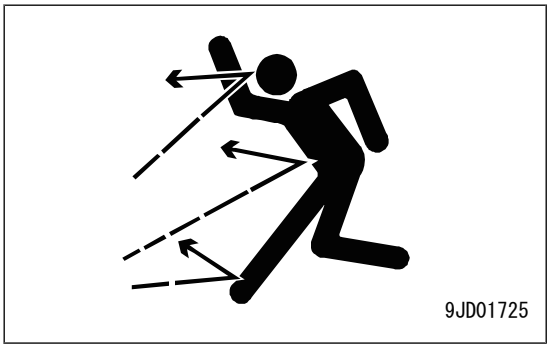
Also, if the function of the protective equipment is impeded, the protective equipment will not be able to protect the operator, and the operator may suffer injury. Always observe the following.

- 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.

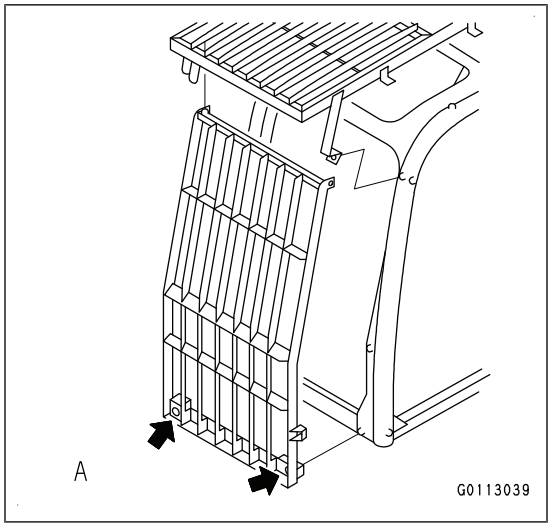
Protection Against Objects Which Fall, Fly, or Enter

On a jobsite where there is danger of falling objects, scattering fragments, or other objects that could intrude into operator's cab, installation of additional guarding to protect the operator that is appropriate for the working conditions is recommended.

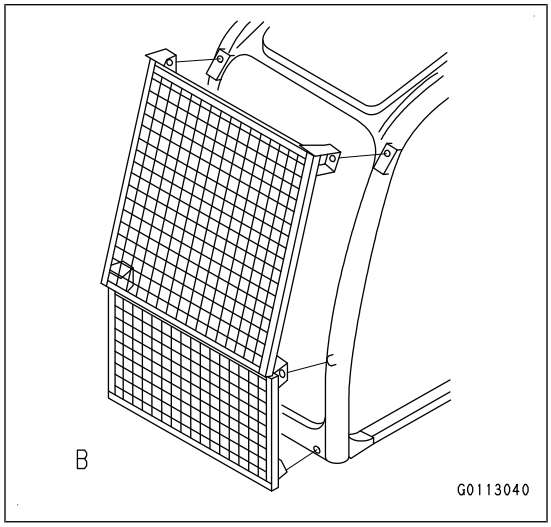




- When operating on jobsite, such as mines or quarries where there may be a hazard of falling rocks, installation of a falling object protective structure FOPS and a front guard (A) if recommended. Always keep all the windows and doors closed when operating. In addition, always check that there is no one except the operator in the surrounding area where there may be a danger of falling objects or scattering fragments.



- When using attachments that may create flying debris or scatter fragments, installation of a front window guard is recommended (B). The use of safety glasses by the operator is also recommended. For machines equipped with cabs, always keep the windows and door closed during operation. For machines equipped with open canopies, installation of a mesh front guard and polycarbonate protective sheet is recommended. In addition, always check that there is no one in the surrounding area where there could be a danger of falling objects or scattering fragments.
- Do not weld or drill holes in the machine cab protective structure when installing protective guards. Only use approved, existing mounting surfaces or bosses provided for guarding installation.



If any glass or polycarbonate protective sheets on the machine are broken or doors do not close properly, replace or repair them immediately.

Do not operate the machine without the necessary guards.

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

Contact your local distributor for information on safety guards and / or recommendations to reduce the danger of getting hit by objects that could strike the operator’s cabin.

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

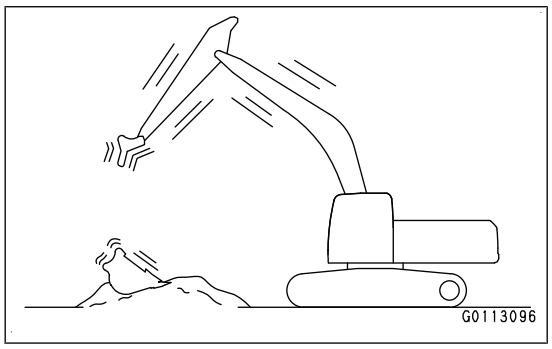
When installing optional parts or attachments, always check local regulations governing their use, contact your local Komatsu distributor before installing if you have any questions. Any injuries, accidents, or product failures resulting from the use of unauthorized attachments or parts will not be the responsibility of Komatsu. 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 if you have any questions.

- The machine weight should not exceed ROPS certification rating 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 the ROPS certification rating. Always contact your Komatsu distributor before installing.
- Installing certain attachment combinations may cause interference and possible damage to the operator's cab or other parts of the machine during operation and could cause serious personal injury or death. Before using unfamiliar attachments, always check for potential cab interference while operating the machine. Always ensure the operator's safety when working with unfamiliar work equipment.
- When installing and using optional attachments, read the instruction manual for the attachment, and the general information related to attachments in this manual.

Quick Coupler Attachment

- Inspect all quick couplers to determine if they are subject to unexpected release hazards. Determine whether a manually installed locking pin and installation procedures have been provided by the manufacturer.
- Follow the manufacturer recommendations for maintenance and inspection of the quick coupler to prevent a malfunction of the quick coupler that could result in an unintended release of the attachment.
- Follow the manufacturer's installation procedures and recommendations on testing quick coupler attachments.



- Train and require all personnel to use and follow manufactures installation, use, safety and maintenance procedures when using a quick coupler attachment.

Large Attachments and Combinations

When using attachments that are larger than the standard excavating bucket, always be aware of the possibility that these attachments may come in contact with the operators cab when the work equipment is retracted for travel purposes or positioned close to the machine cab.

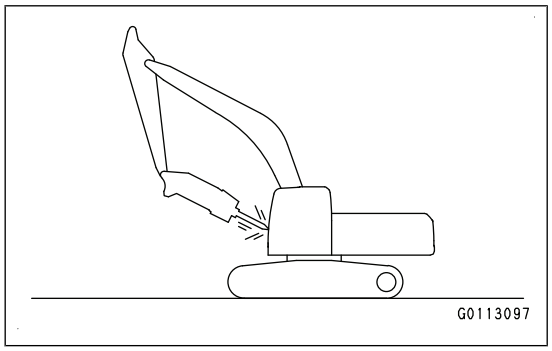
If you will be using a hydraulic breaker attachment, never dry fire or activate these attachments especially if they are oriented in the direction of the cab; the possibility of the tool bit ejecting from the breaker may damage the machine or injure the operator.

Depending on the type or combination of attachment, there is a danger that the work equipment may hit the cab or other parts of the machine.

Before using unfamiliar work equipment, review the manufacturer's work equipment safety and operation manuals and check for any potential operator cab interference and operate with caution.

Never operate attachment or bucket near cab of machine.

Always be aware when operating on slopes or traveling, that attachments may change the center of gravity on the machine and increase the possibility of a rollover situation.



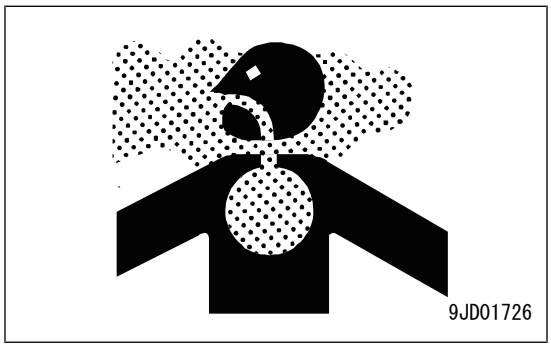
Precautions for CAB Glass

- 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 You Operate 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.



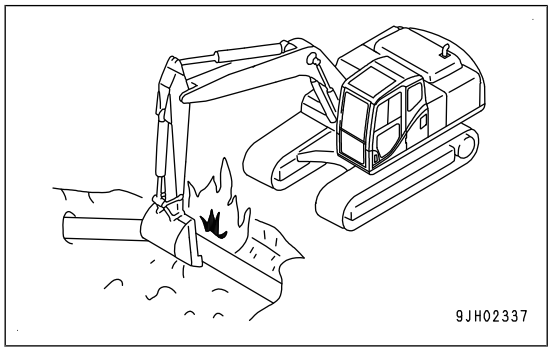
Precautions for Operation

Precautions for Jobsite

Examine 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.



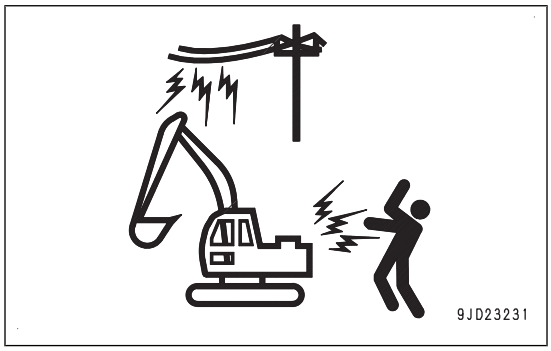
Precautions when Working on Loose Ground

- 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
187000 V	Min. 6 m
275000 V	Min. 7 m
500000 V	Min. 11 m

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

Ensure Good Visibility

Although this machine is equipped with mirrors and cameras 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.
- When cleaning the camera, wipe off any dirt with soft cloth. Make sure that a clear view is displayed on the monitor.
  When cleaning camera, if you stand on an unstable place, or take an unstable posture, you may fall and be injured. Put proper stepladder or step on the level and firm ground, and clean the camera in secure posture.

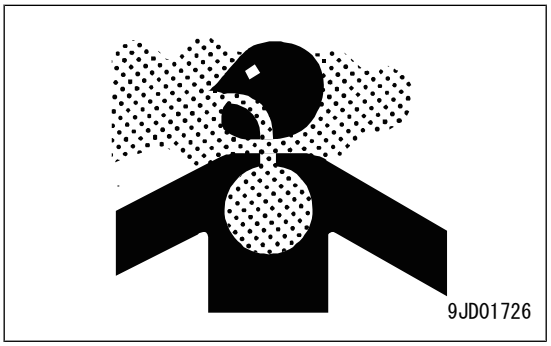
See Signs and Signalman's Signals

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.

Be careful of Asbestos Dust

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



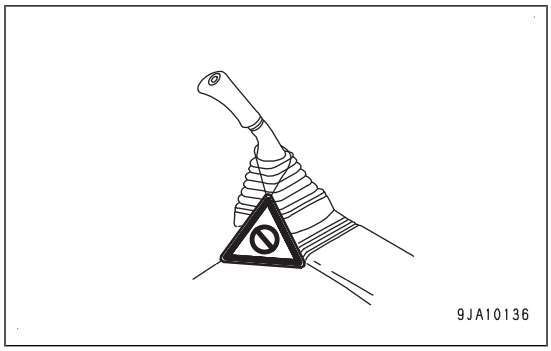
- Spray water to keep down the dust.
- Do not use compressed air.
- If there is danger that there may be asbestos dust in the air, always operate the machine from an upwind position, and make sure that all workers operate on the upwind side.
- All workers should use anti-dust masks.
- Prohibit other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

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

Start Engine

Use Warning Tags

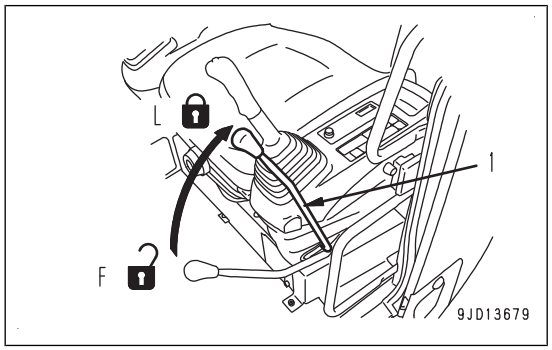
If there is a “DANGER! Do NOT operate!” warning tag displayed, it means that someone is performing inspection and maintenance of the machine. If the warning tag is ignored and the machine is operated, the person performing inspection or maintenance may be caught in the rotating parts or moving parts.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



Checks and Adjustment Before Starting Engine

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

- Remove all dirt from the surface of the window glass to ensure a good view.
- Perform the walk-around check securely.
- 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 and camera view 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 and a good view of surrounding area from the operator's seat.
  For the adjustment, see “How to Adjust Mirrors”
- Adjust the cameras to have a good rear view and a good view of surrounding area from the operator's seat.
  For the adjustment, see “How to Adjust Rearview Camera Angle”.
- 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.



- Check that there are no persons or obstacles above, below, or in the area around the machine.

Precautions When You Start Engine

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

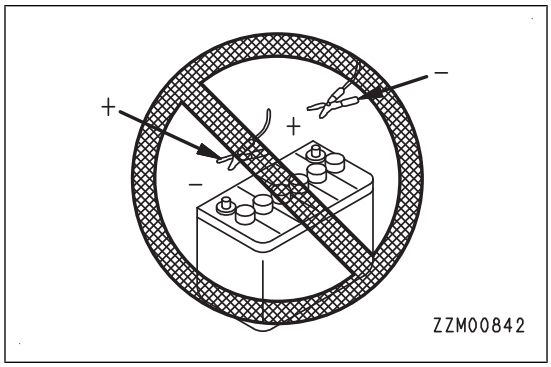
- Start the engine only while sitting down in the operator's seat.
- When starting the engine, sound the horn as a warning.
- Prohibit other personnel to get on the machine.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. This may cause fire, serious personal injury 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.
  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.

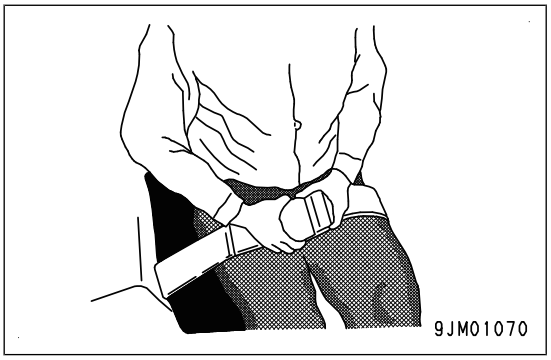
Precautions for Operation

Checks Before Operation

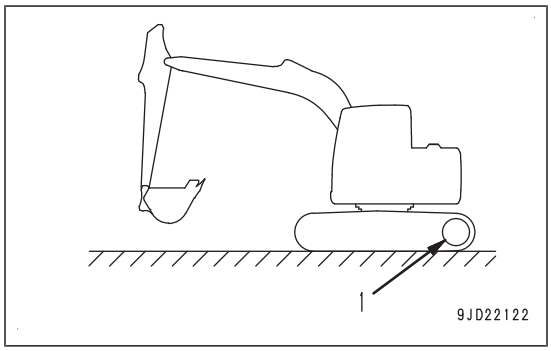
If the checks before starting are not performed properly, the machine will be unable to display its full performance. It is dangerous and may cause serious personal injury or death.

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

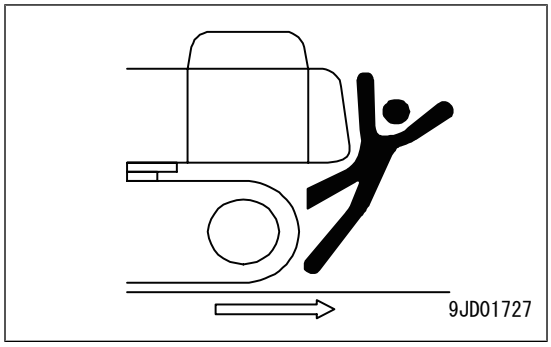
- Fasten the seatbelt. When the brakes are applied suddenly, the operator may be thrown out of the operator's seat. It is dangerous and may cause personal injury.
- Check that the movement of the machine matches the display on the control pattern card.
  If it does not match, replace it immediately with the correct control pattern card.
- Check the operating condition of the machine, work equipment, and travel and swing systems.
- Check for any problem in the sound, vibration, heat and smell of the machine, or abnormalities of instruments. Also check that there is no leakage of oil or fuel.
- If any problem is found, repair it immediately.

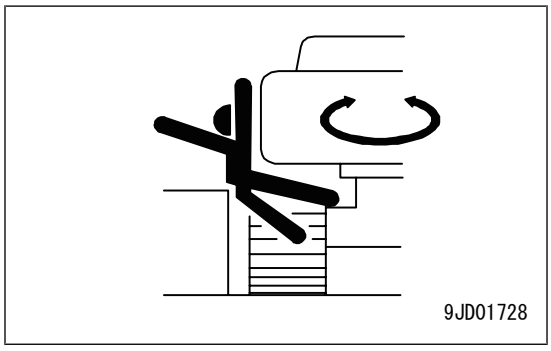


Precautions When Travelling in Forward or Reverse and Swinging



- 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 is no people or obstacle in the surrounding area.
  - Before moving, sound the horn to warn people in the surrounding area.
  - Check that the travel alarm and other alarms work properly.
  - If there is an area in the rear of the machine which cannot be seen, position a signalman. Be extremely careful not to hit any people or object, and drive or swing slowly.



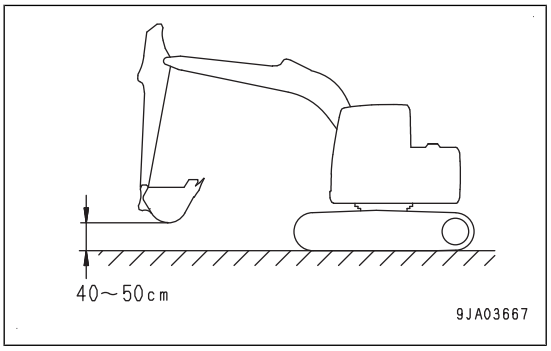


Always be sure to perform the above precautions even when the machine is equipped with mirrors and cameras.

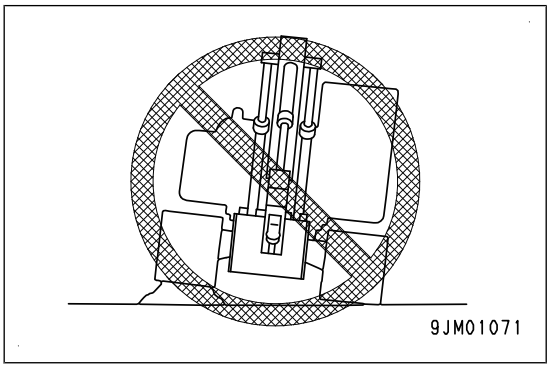
Precautions When Traveling

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

- When driving the machine or performing operations, always keep a safe distance from people, structures, or other machines to avoid coming into contact with them.
- When traveling on a level ground, keep the work equipment approximately 40 to 50 cm above the ground. If that height is not maintained between the work equipment and the ground, the work equipment may get stuck in the ground and the machine may tip over.
- If the view to the right side is poor, raise the boom to ensure better visibility.
- Always turn the auto-deceleration switch OFF (cancel) when driving the machine on rough ground or steep slopes. If the machine is operated with the auto-deceleration system ON (activated), the engine speed will rise and the machine travel speed may suddenly become faster.



- Try to avoid traveling over obstacles. If the machine has to travel over an obstacle, keep the work equipment close to the ground and travel at low speed. The machine tips over easily to the right or left. Do not drive it over obstacles which make the machine tilt largely to the right or left.
- When driving the machine on the rough ground, drive it at low speed and do not operate the steering suddenly. There is a danger that the machine may tip over. The work equipment may hit the ground, and the machine may lose its balance, or it may damage the machine or structures in the area.

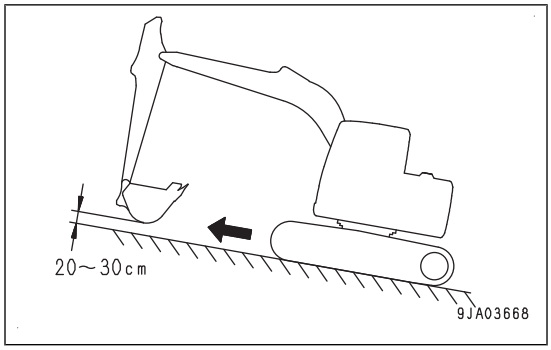


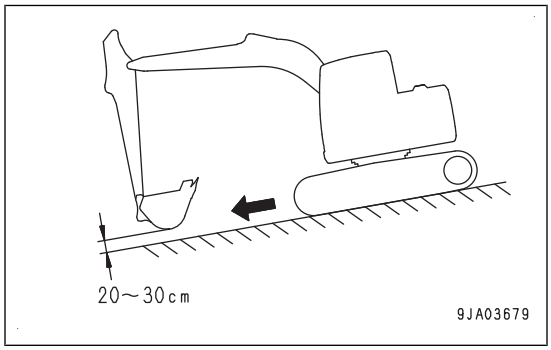
- When using the machine, to prevent serious personal injury or death caused by the work equipment or by the machine tipping over due to overloading, do not use the machine beyond the permitted performance of the machine such as the maximum permitted load for the structure of the machine.
- When passing over bridges or structures, check first that the structure is strong enough to support the weight of the machine.
- When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, operate slowly and be extremely careful not to let the machine body or work equipment hit anything.

Precautions When Traveling on Slopes

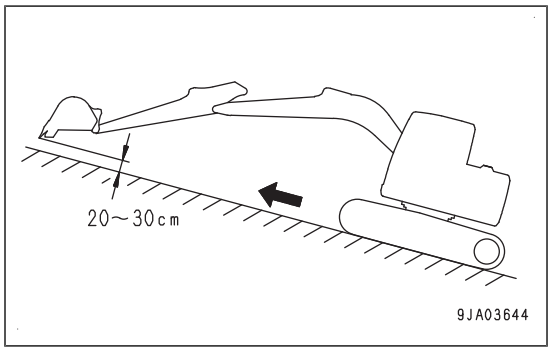
To prevent the machine from tipping over or slipping to the side, always observe the following.

- Keep the work equipment approximately 20 to 30cm above the ground. In case of emergency, lower the work equipment to the ground immediately to help stop the machine.
- When the machine goes uphill, let the work equipment point to the uphill side, and when it goes downhill, let it point to the downhill side. Make sure the condition of the ground below the undercarriage is safe, and move the machine carefully.

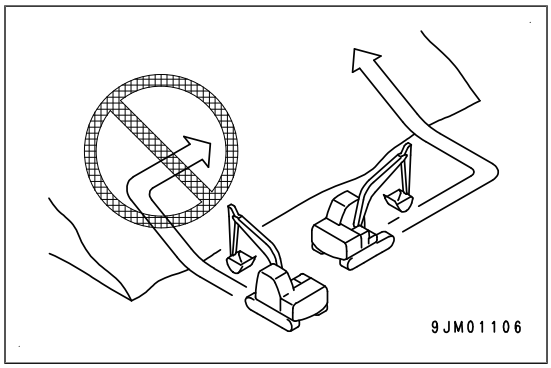




- When driving the machine up a steep slope, extend the work equipment to the front to improve the balance, keep the work equipment approximately 20 to 30cm above the ground, and drive it at low speed.



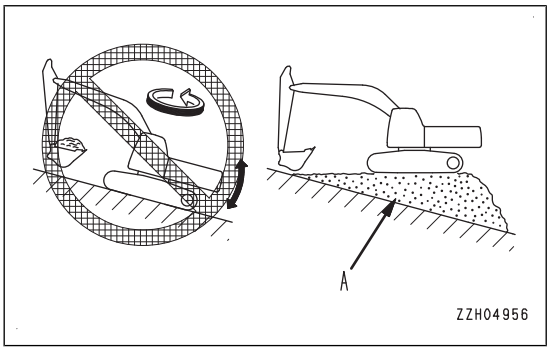
- When driving the machine downhill, lower the engine speed, keep the travel lever close to NEUTRAL position, and drive it at low speed.
- Always drive the machine straight up or down a slope. Driving the machine at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or drive across slopes. Always go down to a flat place to change the position of the machine, then drive it on to the slope again.



- Do not drive the machine on a slope covered with the steel plates. Even with slight slopes there is a hazard that the machine may slip.
- Even with slight slopes, there is a hazard that the machine may slip.
- If the engine stops, move the control levers immediately to NEUTRAL position, set the lock lever to LOCK position, and then start the engine.

Precautions When You Operate Machine on Slopes

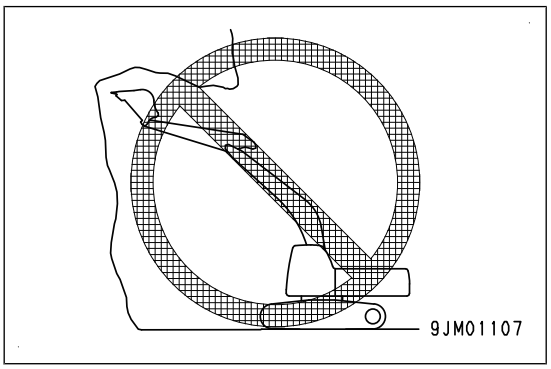
- When working on slopes, there is a hazard that the machine may lose its balance and turn over when performing swing or work equipment operations. This may lead to serious personal injury or death. Always provide a stable place when performing these operations, and operate carefully.
- Do not swing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



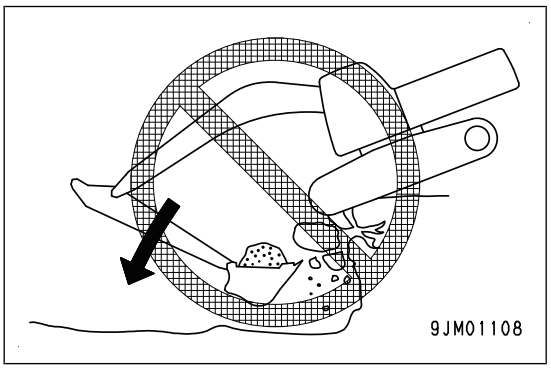
Prohibited Operations

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

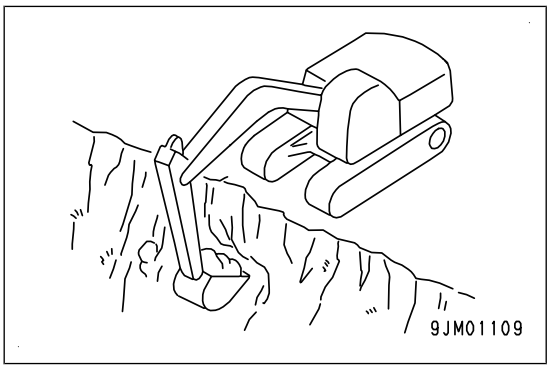
- It is dangerous to work under an overhang. Mudslide or rockfall may occur, or the overhang may collapse. Never perform digging under an overhang.



- 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.



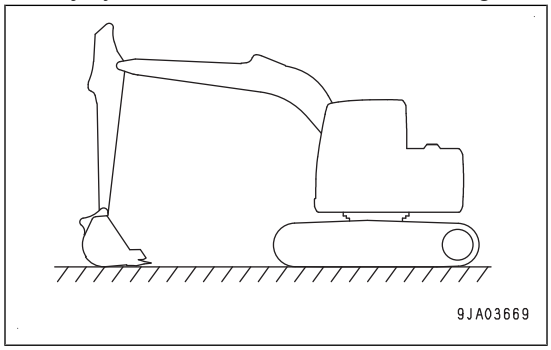
Precautions When Operating on Snow or Frozen Surfaces

- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not perform abrupt lever operation. Machine may slip even on a slight slope. Be particularly careful when working on slopes.
- Frozen road becomes soft when the temperature rises, and the machine may tip over or be not able to escape. Be particularly careful when working on frozen road.
- 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.

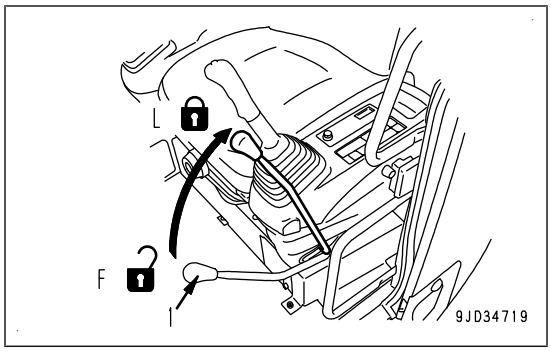
Precautions When Parking Machine

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

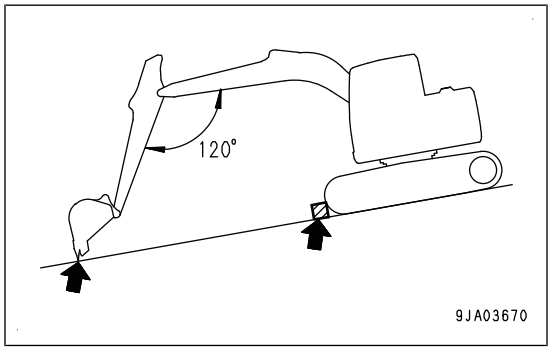
- Place the machine on a firm, level ground.
- Select a place where there is no hazard of landslides, falling rocks, or flooding.
- Lower the work equipment to the ground.



- When leaving the machine, be sure to make the undercarriage and upper structure point to the same direction, and lower the work equipment to the ground. Operate the lock lever (1) by red portion on the top, securely set it to LOCK position (L), and stop the engine.
- When the operator's seat and console are located in front, your body or clothes will easily touch the levers. Shift them backward to keep enough space, and then get off the machine.
- Close the operator's cab door, and lock all the places. Remove the key so that any unauthorized person cannot operate the machine, 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 to face the downhill side and thrust it in the ground.
  - In addition, block the tracks from movement.



Precautions for Transportation

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

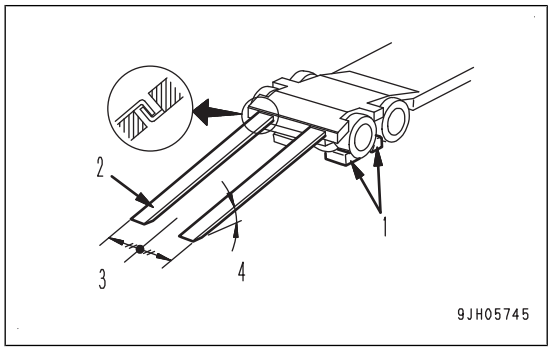
- Always check the machine dimensions carefully. Depending on the work equipment and optional devices installed, the machine weight, transportation height, and overall length differ.
- Check beforehand that all bridges and other structures on the transportation route are strong enough to withstand the combined weight of the transporter and the machine being transported.
- This machine may need to be divided into components for transportation depending on the regulation. When transporting the machine, consult your Komatsu distributor.

Precautions When You Load and Unload

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) Centre of ramp
  (4) Angle of ramp: Max. 15 °.



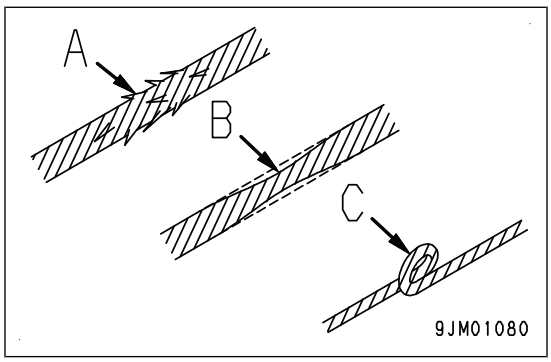
- Be sure the ramp surface and the platform of trailer are clean and free of grease, oil, ice, water and other loose materials. If any, remove them. Remove dirt around the undercarriage of the machine. On a rainy day, in particular, be extremely careful since the ramp surface is slippery.
- Always turn 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 centre 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 machines equipped with a cab, always lock the door after loading the machine. To prevent the door from opening during transportation.
- When it is necessary to remove handrails and steps, take care not to lose removed handrails and steps. Install the removed handrails and steps securely.

Towing and being Towed

Precautions for Towing and Being Towed

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

- 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.



How to Lift Objects with Buckets

Safety Rules for Lift 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).

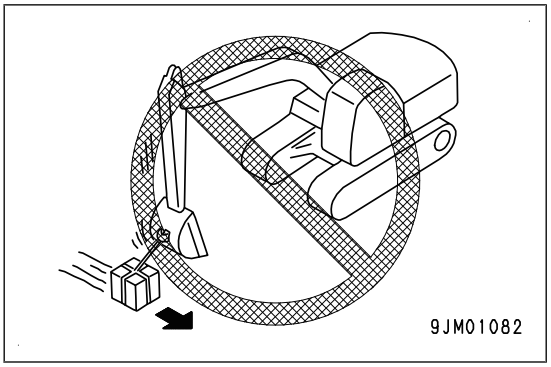
  NOTICE

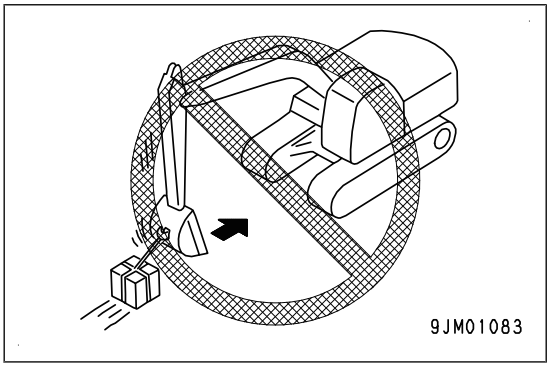
  RLL (Rated Lifting Load) for the bucket may not be the same as the lifting capacity of the machine. Always be sure to lift within relevant lifting limits.
- All components in the load line (eg. chains, shackles etc.) must be rated correctly for the load to be lifted.
- It is dangerous if the raised load 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 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.





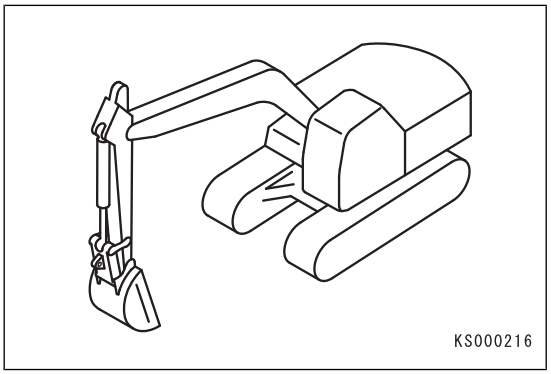
How to Lift Objects with Bucket Link Lifting Device (Optional Equipment)

Safety Rules for Lift 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

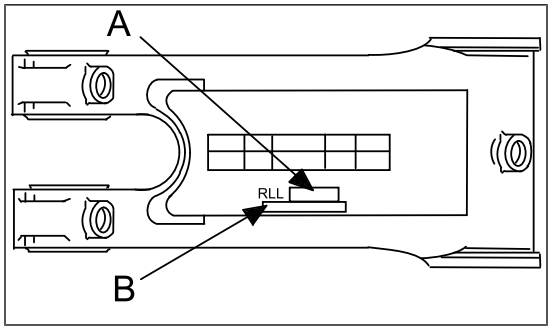
  RLL (Rated Lifting Load) for the link may not be the same as the lifting capacity of the machine. Always be sure to lift within the relevant lifting limits.
- The lifting link RLL (Rated Lifting Load) and part number are stamped on the link as shown below.
- All components in the load line (eg. chains, 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.

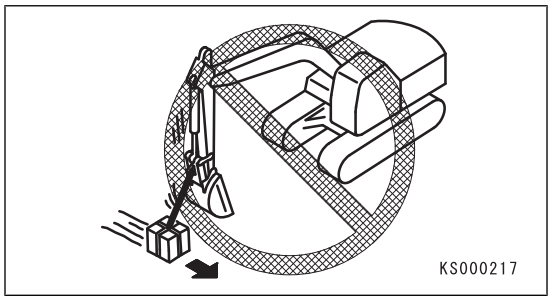
(A) RLL (Rated Lifting Load) number.

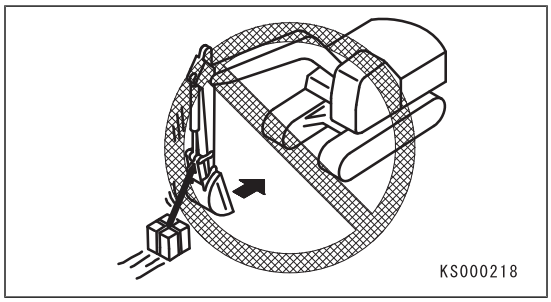
(B) Part number.



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

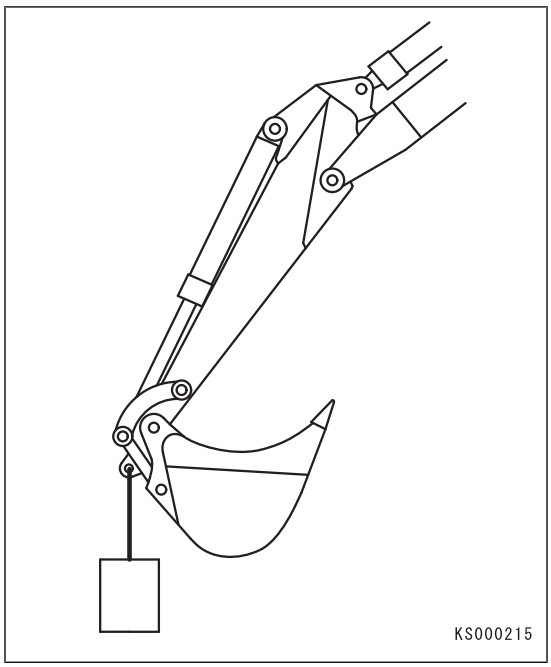
There is a danger that the lifting eye may be damaged due to abnormal loading making it unsafe to lift.



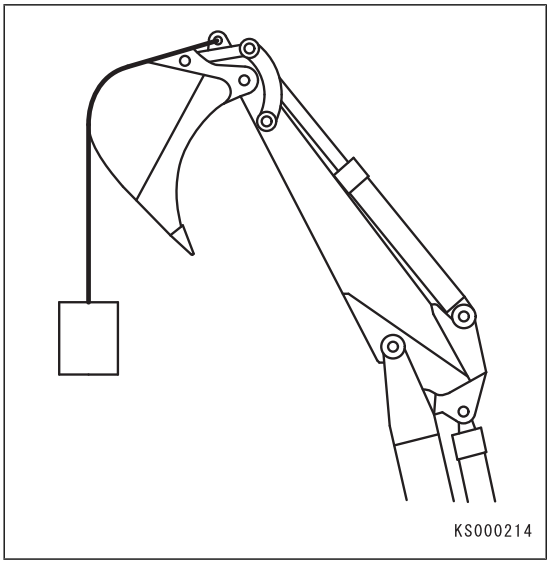


- The operator or person attaching the sling should inspect the bucket link lifting device and all the components in the load line (e.g. chains, shackles etc.) visually for damage or deformation before use to ensure that they are not damaged or worn.

  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.



Precautions for Maintenance

Precautions Before Inspection and Maintenance

Display Warning Tag During Inspection and Maintenance

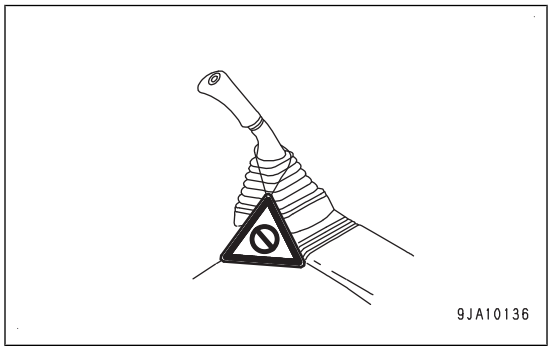
During inspection and maintenance, always display the “DANGER! Do NOT operate!” warning tag.

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

- 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 the 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 Correct Area 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 workplace. 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.

Assign Leader When You Work 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.

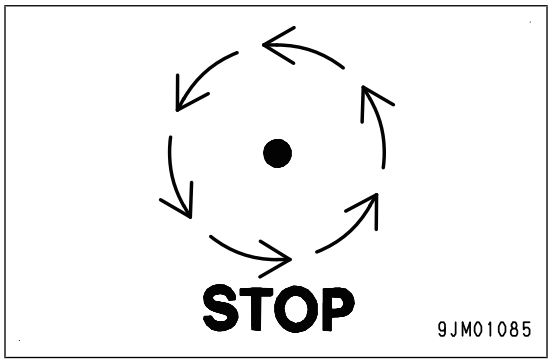
End of Service Life

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

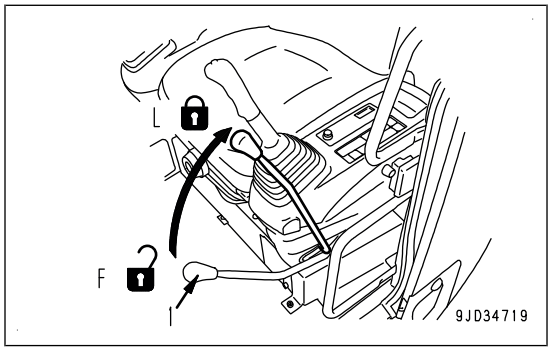
Stop Engine Before Carrying out Inspection and Maintenance

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.

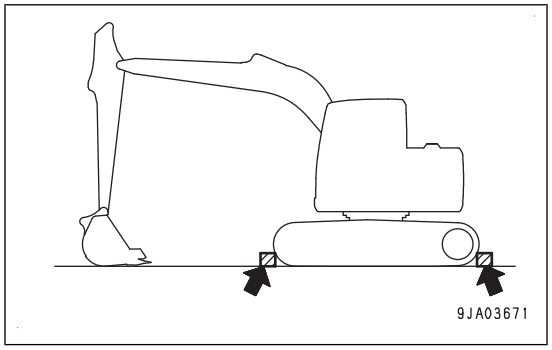
- Lower the work equipment to the ground and stop the engine before performing any inspection and maintenance.



- 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 operate the lock lever (1) by red portion on the top, set it 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.)



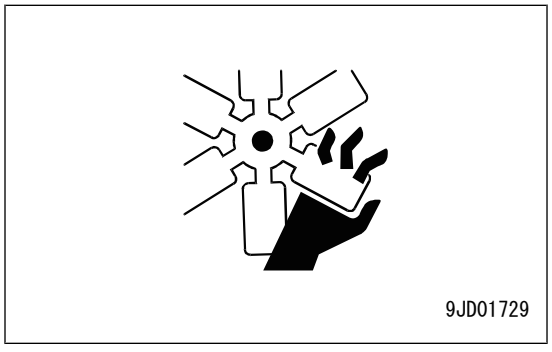
- Block the tracks from movement.



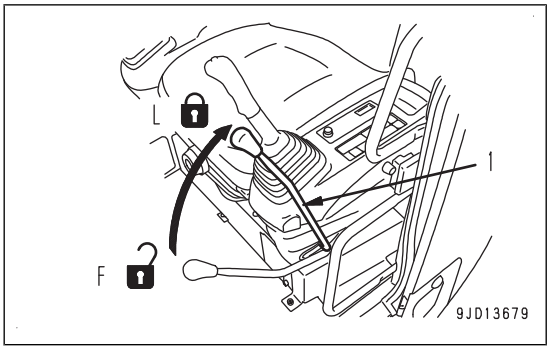
Two Workers for Maintenance When Engine is Running

To prevent an accident, do not perform the 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 on the operator's seat and be ready to stop the engine at any time. All workers must maintain contact with the other workers.
- Rotating parts such as the fan, fan belt are dangerous that they may easily catch a body part or an object someone wears. Be careful not to come close to the rotating part.
- Never drop or insert tools or other objects into the fan, fan belt, or other rotating parts. They may contact the rotating parts and break, and be scattered. It is dangerous.
- Stop the regeneration of the aftertreatment devices during the maintenance.

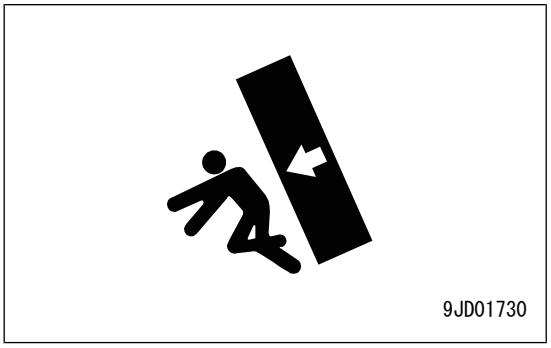


- Release the remaining pressure in the hydraulic system, and place the lock lever (1) to LOCK position (L).
- Do not touch the control levers or pedals. When it is necessary to operate the control levers or pedals, always give a signal to your fellow workers to evacuate them to a safe place.



Precautions When You Install, Remove, or Store 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.



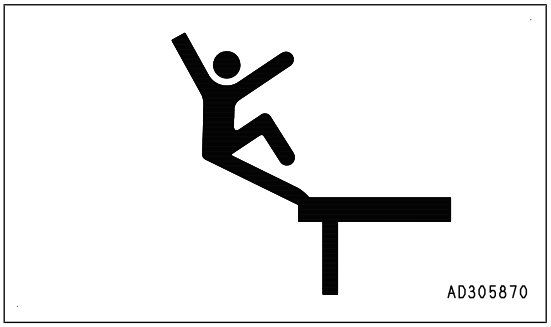
Precautions When You Work at High Places

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 You Work 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 You Work Under Machine or Work Equipment

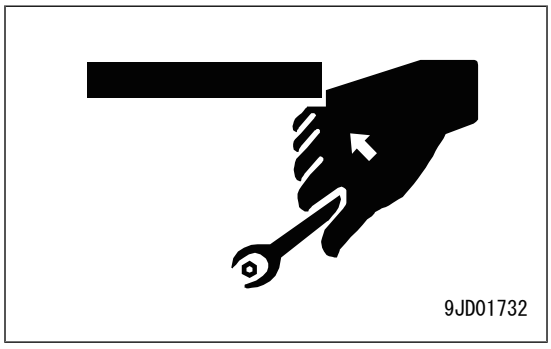
Machine or work equipment may fall, and it is dangerous that serious personal injury or death may occur. Always observe the following.

- 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 Applicable 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.

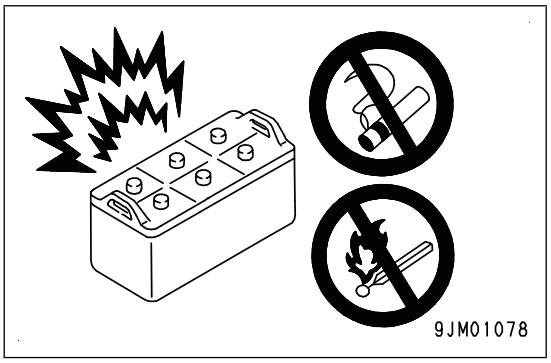
Handle Battery

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.

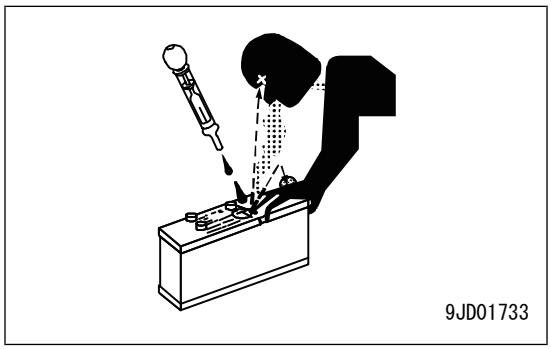
- Do not use or charge the battery if the battery electrolyte is below LOWER LEVEL line. It can cause an explosion. Be sure to do the periodic inspection of the battery electrolyte level. In the case of a liquid stopper type, add purified water (such as a commercial battery fluid) to UPPER LEVEL line. For Komatsu maintenance-free battery (if equipped), check the indicator display and follow instructions. See "Check Komatsu Maintenance-Free Battery Indicator" for how to read the indicator.
- Do not use a direct air blow or dry cloth to clean the battery. A wet cloth will prevent fire or explosion from static electricity.
- Do not 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 eyeglasses 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

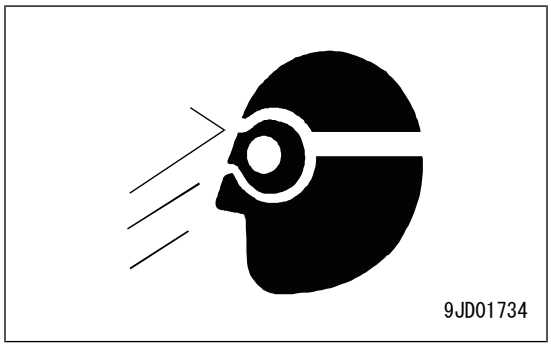
Sparks may be generated and they can cause a fire. Always observe the following.

- 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 You Use Hammer

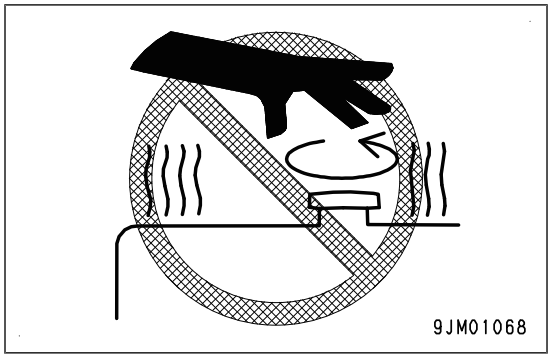
When using a hammer, pins may come out or metal particles may be scattered. It is dangerous and may cause serious personal injury or death. Always observe the following.

- 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.



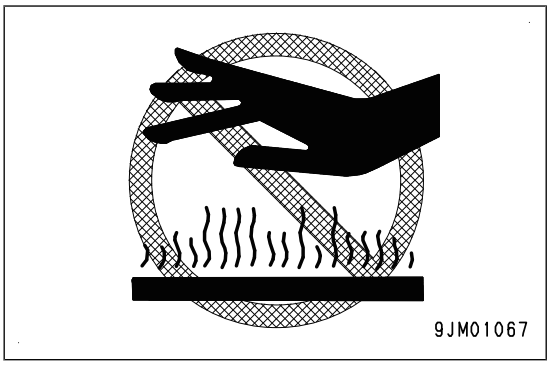
Precautions for High-Temperature Coolant

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.



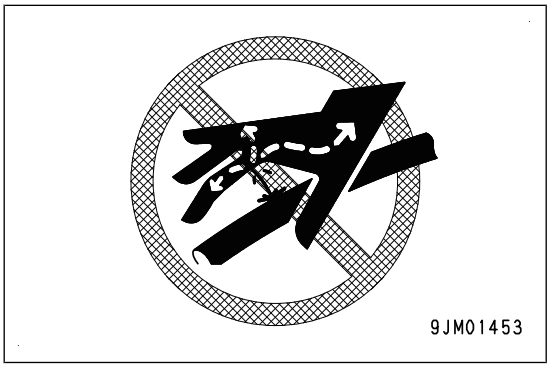
Precautions for High-Temperature Areas

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.

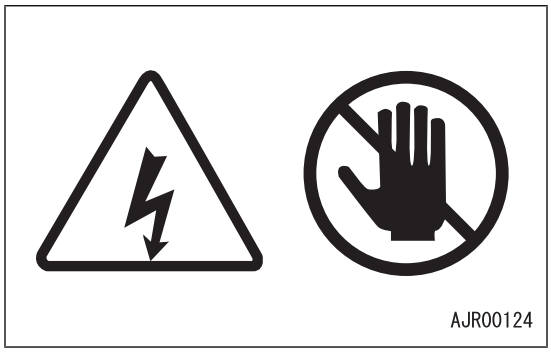
Replace the hose if any of the following problems are found.

- 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.



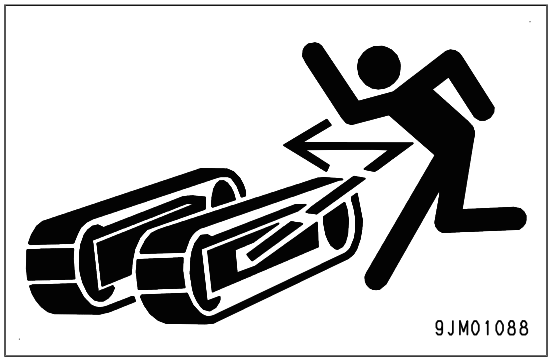
Precautions for Noise

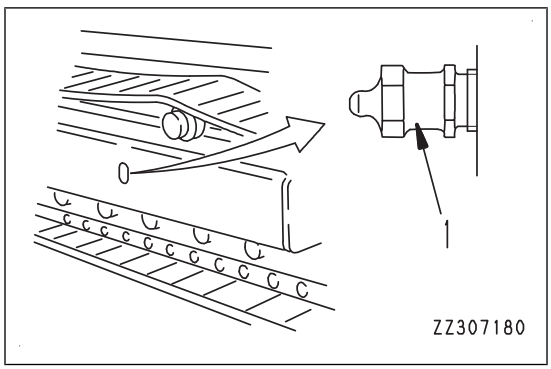
When performing maintenance of the engine and you are exposed to noise for long periods of time, wear ear covers or ear plugs while working.

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

Precautions for High-Pressure Grease During Track Tension Adjustment

- 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).

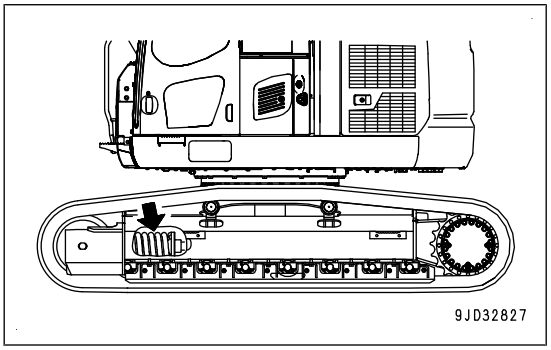




Do Not Disassemble Recoil Spring

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.

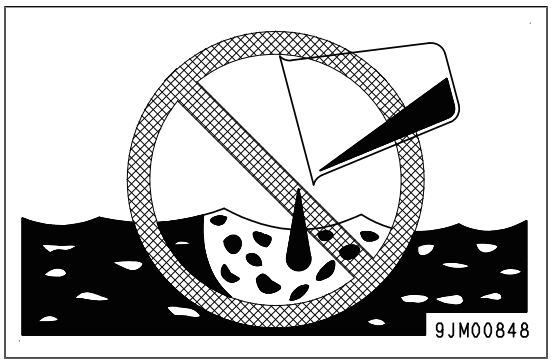
If any doubt exists, contact your Komatsu distributor.

See also “PRECAUTIONS FOR DISPOSING OF WASTE MATERIALS” and “MAINTENANCE OF AIR CONDITIONER”

Precautions When You Discard 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.

How to Select 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 Inspection of Defined Life Parts

- To use the machine safely for a long period, be sure to periodically inspect the defined life parts that have an especially close relation to safety, such as hoses and the seat belt. If an abnormality is found, replace it immediately.
- The material of these components naturally changes over time, and repeated use causes deterioration, wear, and fatigue. As a result, there is a hazard that these components can fail and cause serious personal injury or death. It is not easy to judge the remaining life of these components but inspect them as much as possible before work and at the regular maintenance.
- Replace or repair the defined life parts if a defect is found by the check.

Precautions for DEF

General Character and Precautions for Handling

DEF is a colourless 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 When You Add

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 vapour may escape. Keep your face away from the filler port during opening or refilling.

Precautions for Storing

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

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

Precautions for Fire Hazard and Leakage

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

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

Other Precautions

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

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

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

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

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

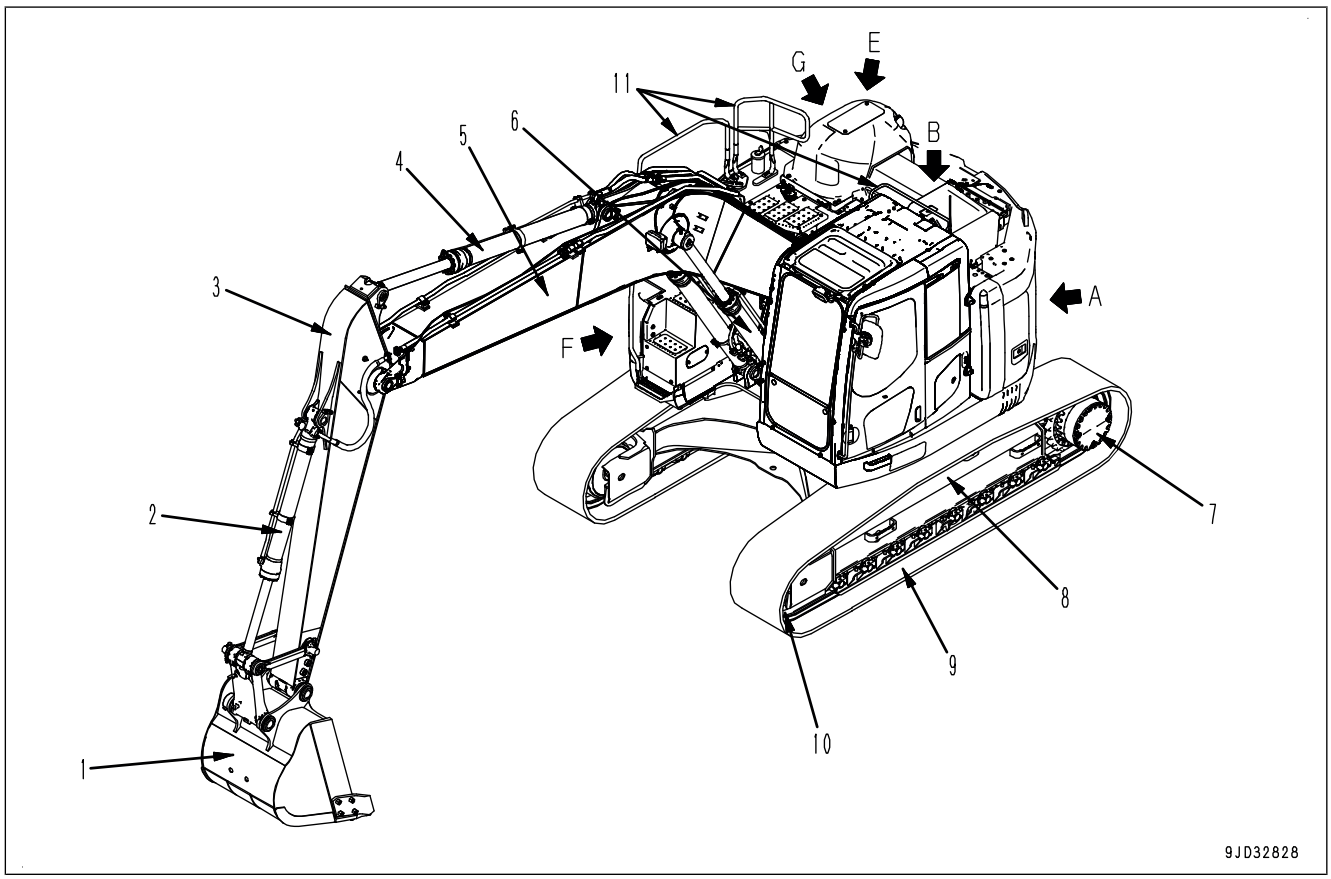
Operation

⚠ WARNING

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

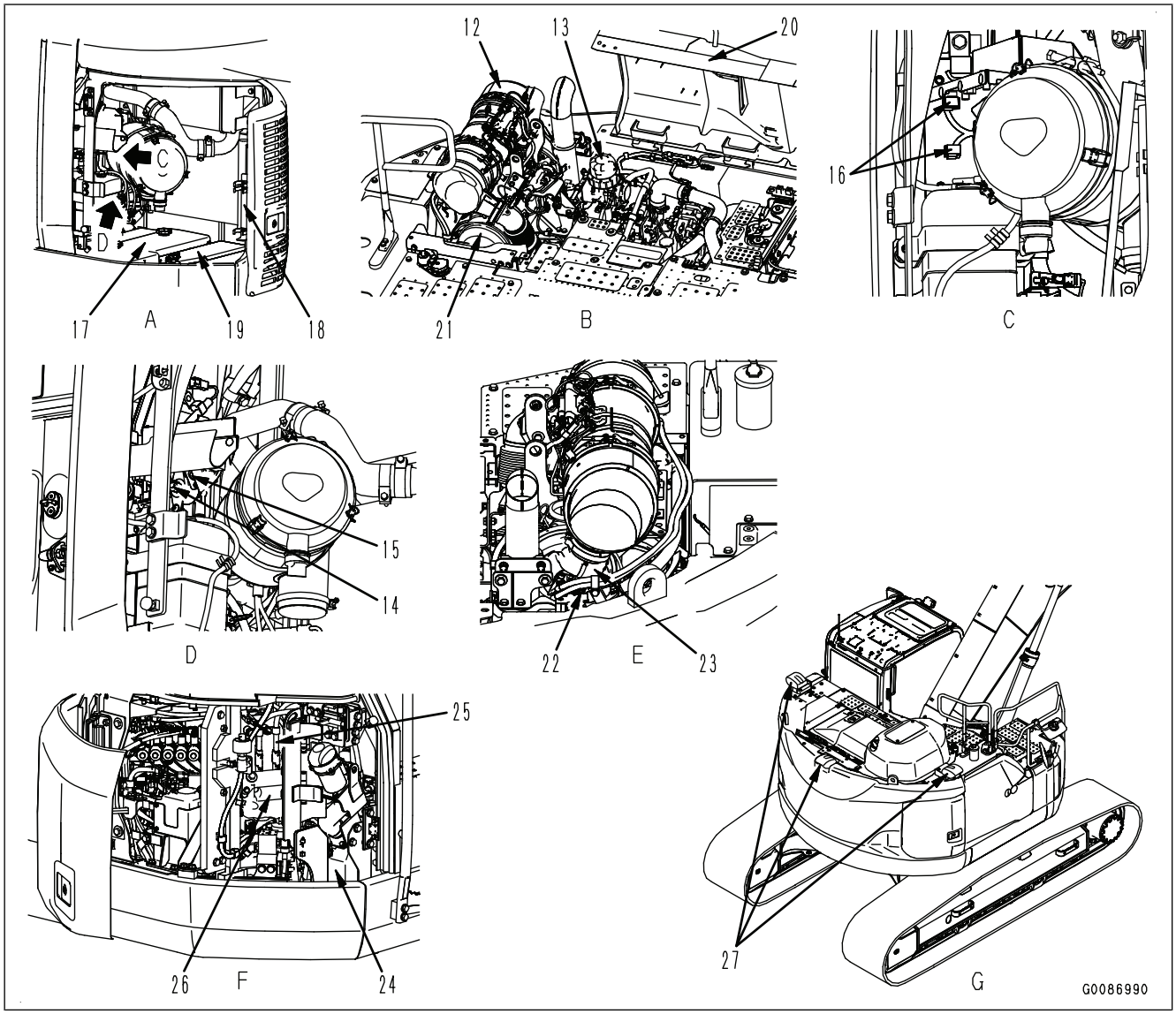
General View

Names of Machine Equipment



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

Details on Parts A , B , C , D , E , F , G



(12) Komatsu Diesel Particulate Filter (hereinafter KDPF)

(13) Komatsu Closed Crankcase Ventilation (hereafter KCCV) ventilator

(14) Disconnect switch

(15) System operating lamp

(16) Fusible link

(17) Battery

(18) Grease pump holder

(19) Toolbox

(20) Engine hood

(21) SCR

(22) DEF injector

(23) DEF mixing tube

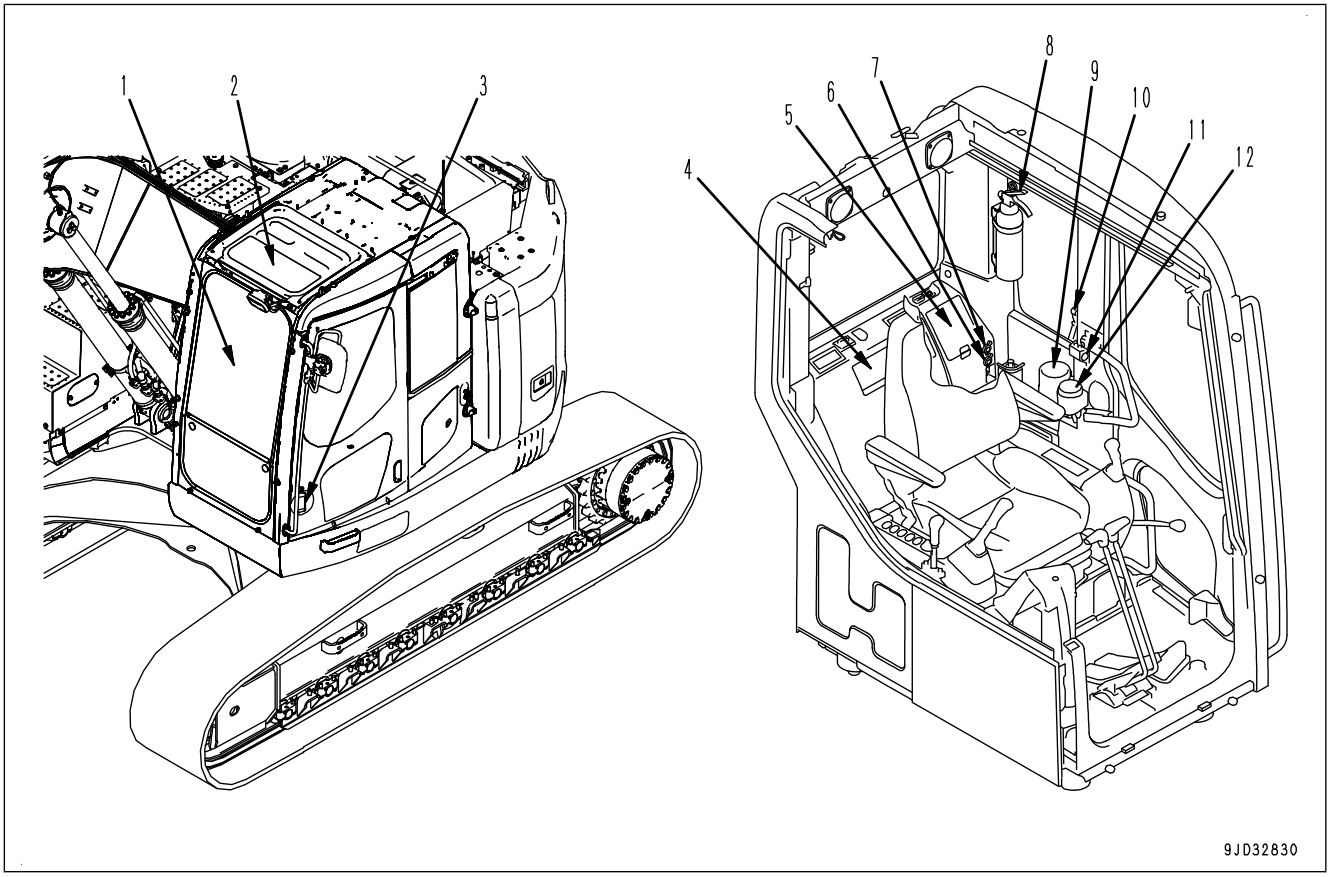
(24) DEF tank

(25) DEF hose

(26) DEF pump

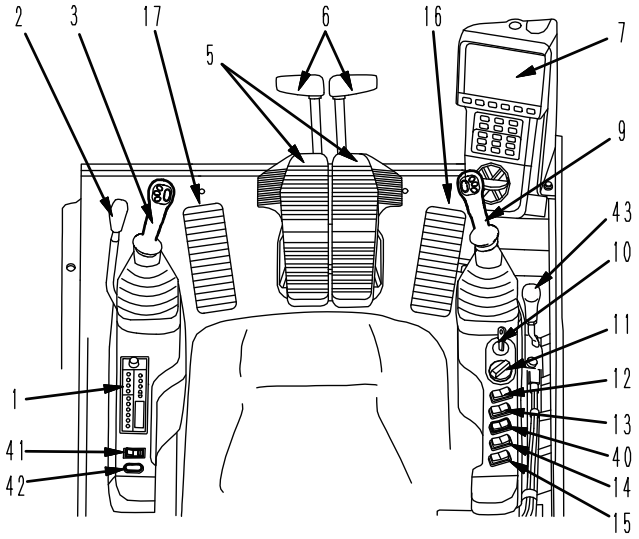
(27) KomVision camera

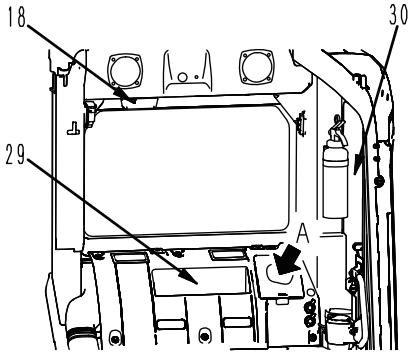
Names of Cab Devices

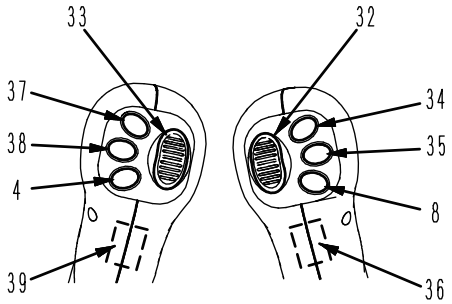


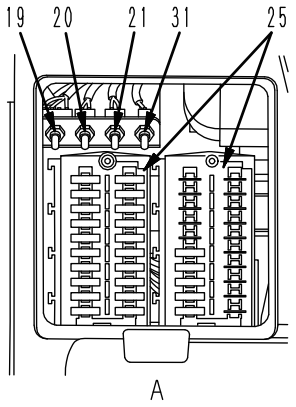
(1) Front window
(2) Ceiling window
(3) Door handle
(4) Magazine box
(5) Fuse
(6) 12 V power supply 1
(7) 12 V power supply 2
(8) Fire extinguisher (if equipped)
(9) Cup holder
(10) Emergency escape hammer
(11) AUX
(12) Ashtray

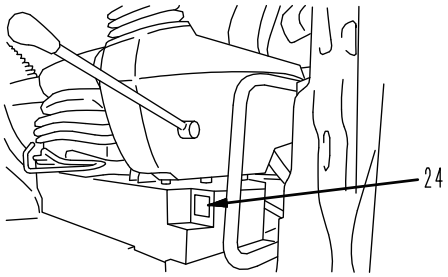
Control Levers and Pedals

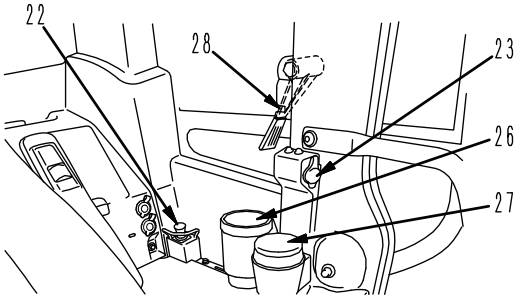










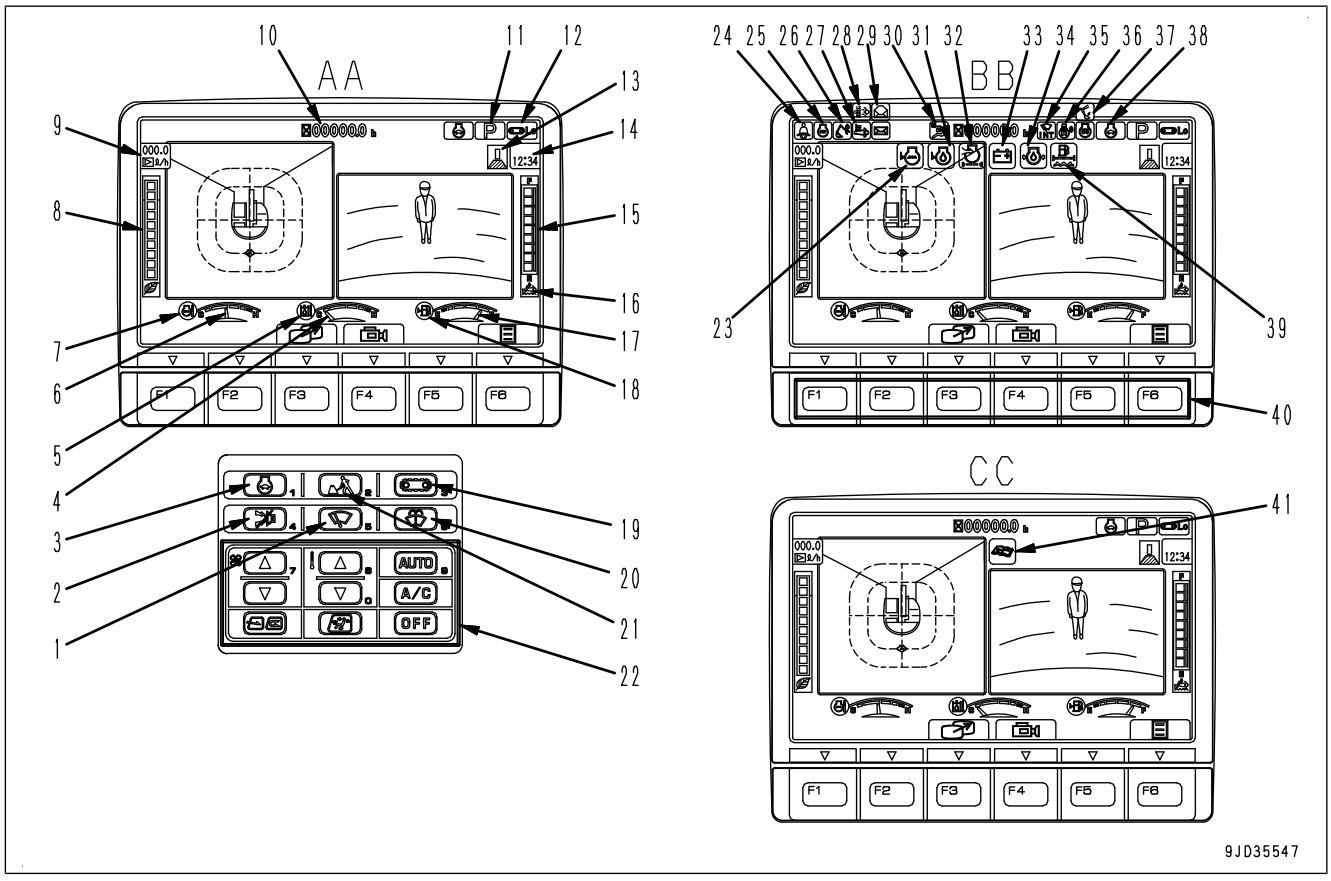


G0154899

(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) Machine monitor
(8) Horn switch
(9) R.H. work equipment control lever
(10) Starting switch
(11) Fuel control dial
(12) Lamp switch
(13) Swing lock switch
(14) Additional lamp switch (if equipped)
(15) Lower wiper switch (if equipped)
(16) Attachment control pedal (if equipped)
(17) Attachment control pedal (if equipped)
(18) Room lamp switch
(19) Pump secondary drive switch
(20) Swing parking brake cancel switch
(21) Emergency work equipment control switch
(22) Cigarette lighter
(23) AUX
(24) Engine shutdown secondary switch
(25) Fuse
(26) Cup holder
(27) Ashtray
(28) Emergency escape hammer
(29) Magazine box
(30) Fire extinguisher (if equipped)
(31) Lock lever automatic lock cancel switch
(32) Attachment 1 proportional control switch
(33) Attachment 2 proportional control switch (if equipped)
(34) Breaker mode switch
(35) Spare switch
(36) Spare switch
(37) Quick coupler operation switch
(38) Spare switch
(39) Spare switch
(40) Revolving lamp switch (if equipped)
(41) Quick coupler operation switch
(42) Seat heater switch
(43) Blade control lever (blade specification)

Names of Machine Monitor Equipment



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) Hydraulic oil temperature gauge
(5) Hydraulic oil temperature caution lamp
(6) Engine coolant temperature gauge
(7) Engine coolant temperature caution lamp
(8) ECO gauge
(9) Fuel consumption gauge
(10) Service meter
(11) Working mode display
(12) Travel speed display
(13) Camera switch display
(14) Clock
(15) DEF level gauge
(16) DEF level caution lamp
(17) Fuel gauge
(18) Fuel level caution lamp
(19) Travel speed selector switch
(20) Window washer switch
(21) Working mode selector switch
(22) Air conditioner control switch
(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) Engine oil level caution lamp
(32) Air cleaner clogging caution lamp
(33) Charge level caution lamp
(34) Engine oil pressure caution lamp
(35) Wiper pilot lamp
(36) Swing lock pilot lamp
(37) Engine preheating pilot lamp or One-touch power maximizing pilot lamp
(38) Auto-deceleration pilot lamp
(39) Water separator caution lamp
(40) Function switches (F1 to F6)
(41) Maintenance time caution lamp

REMARK

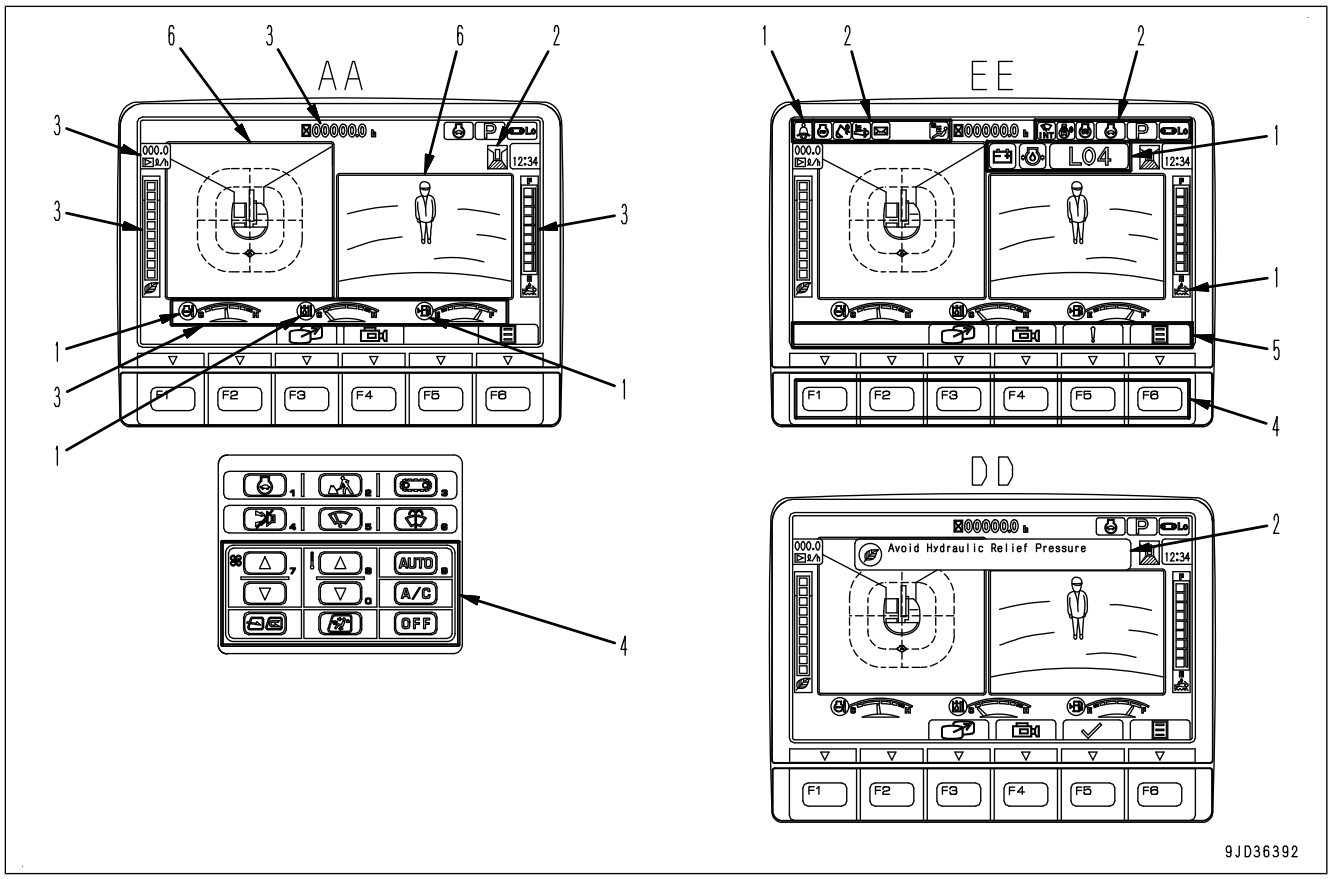
The above figure does not show all of the caution lamp symbols.

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.

Machine Monitor Equipment



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

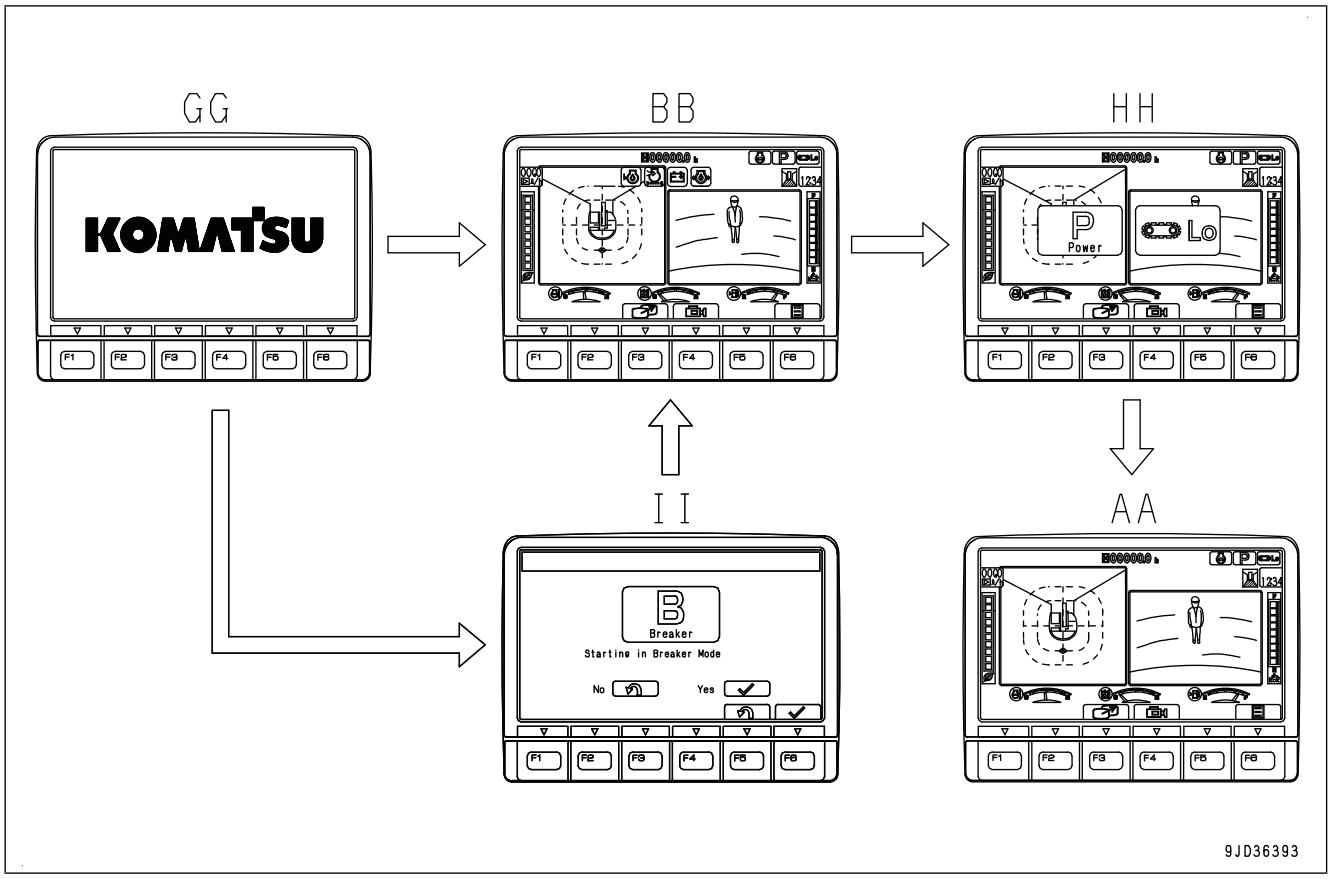
(1) Warning display
(2) Pilot display
(3) Meter display
(4) Monitor switch part
(5) Guidance icon display
(6) Camera image display

REMARK

- Intensity or color of the objects may change on the screen because of the automatic adjustment function of the camera.
- If environmental temperature of the machine monitor is high, brightness will be automatically reduced to protect the liquid crystal.

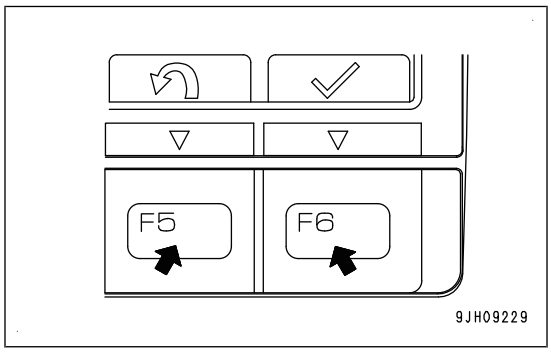
Basic Operation of Machine Monitor

Basic Operation of Machine Monitor When You Start Engine in Normal Situation



- 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.



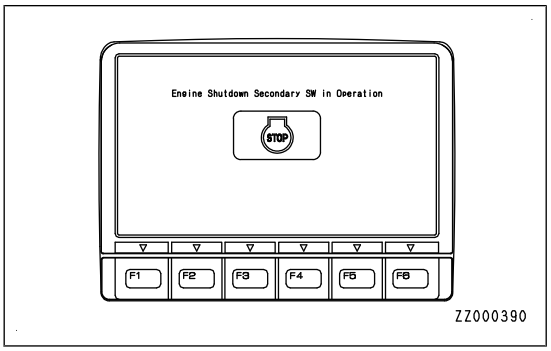
REMARK

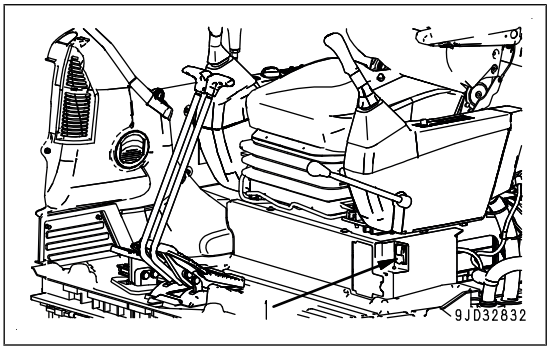
When the engine is started, the battery voltage may suddenly drop depending on the temperature and the battery condition. If this happens, the machine monitor may restart, but this does not indicate any abnormality.

Basic Operation of Machine Monitor When You Start Engine While Engine Shutdown Secondary Switch is on

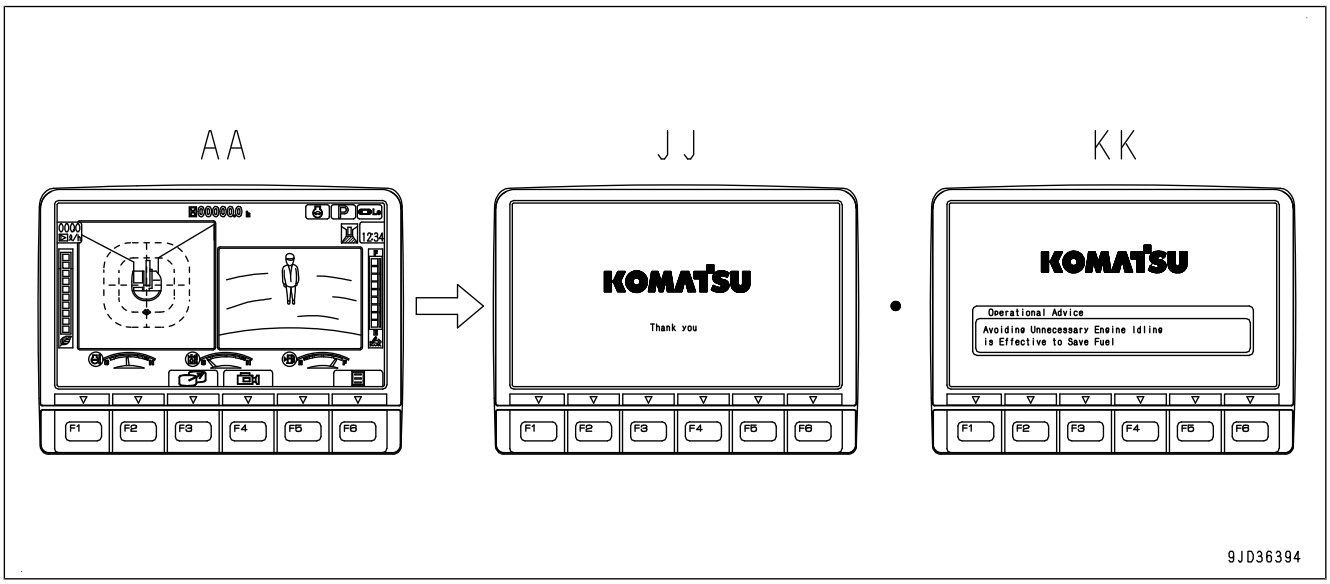
While the engine shutdown secondary switch (1) is turned on (engine is stopped), when the starting switch key is turned to ON position, the screen shown in the figure is displayed and engine does not start.

If the 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 You Stop Engine in Normal Situation

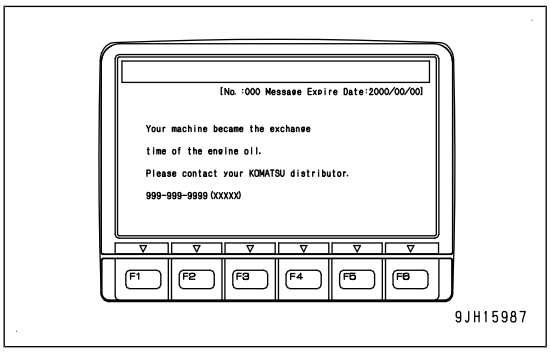


When the starting switch is turned to OFF position, end screen JJ or KK is displayed for 5 seconds, then the display goes out.

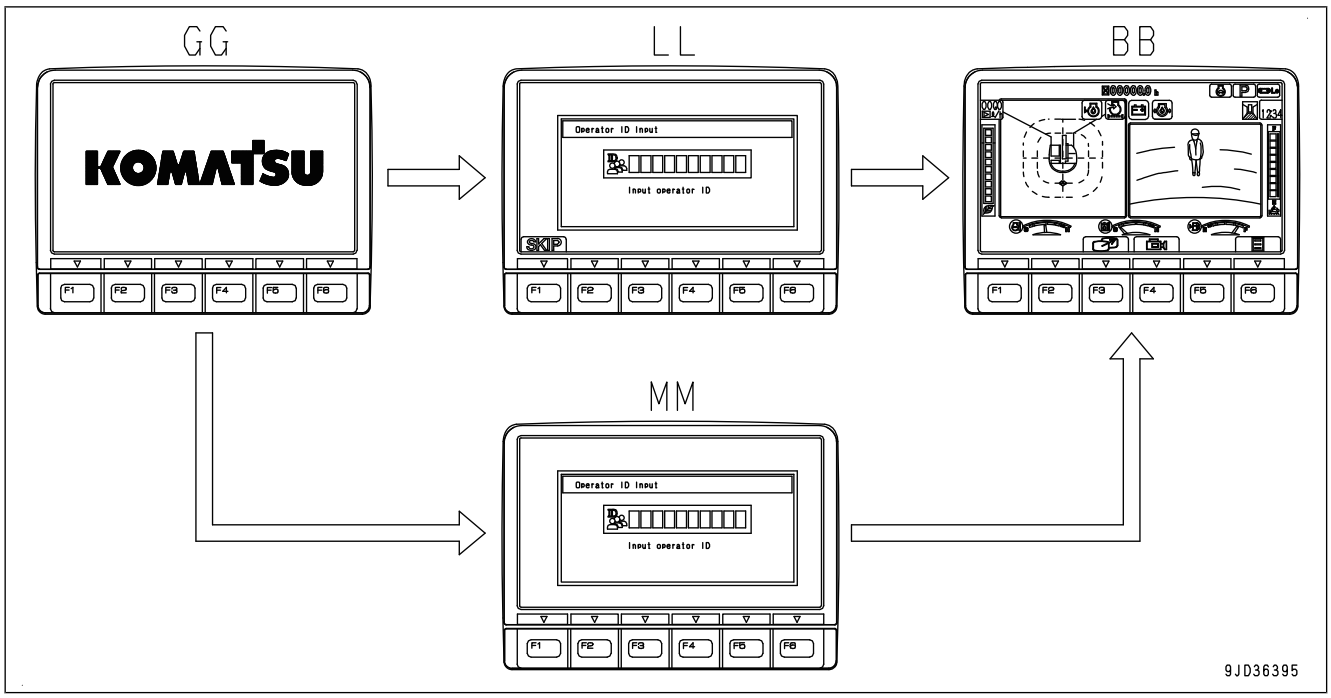
End Screen When a Message is Received

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

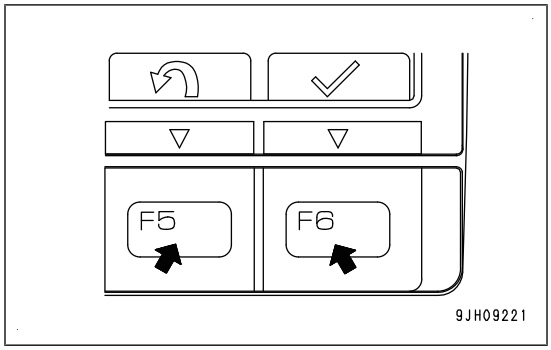
In this case, turn the starting switch to ON position to re-check the message, and if the message is requesting a response, make a reply to it.



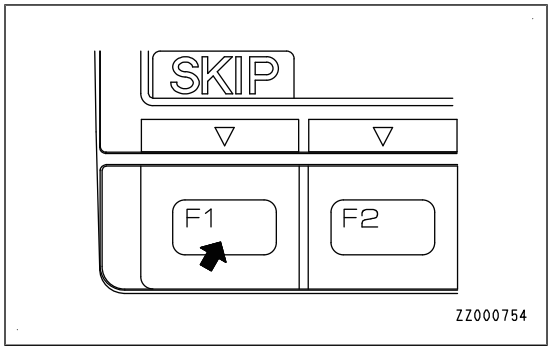
Basic Operation of Machine Monitor When Starting Switch is ON While Operator ID Input is Set



- 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.

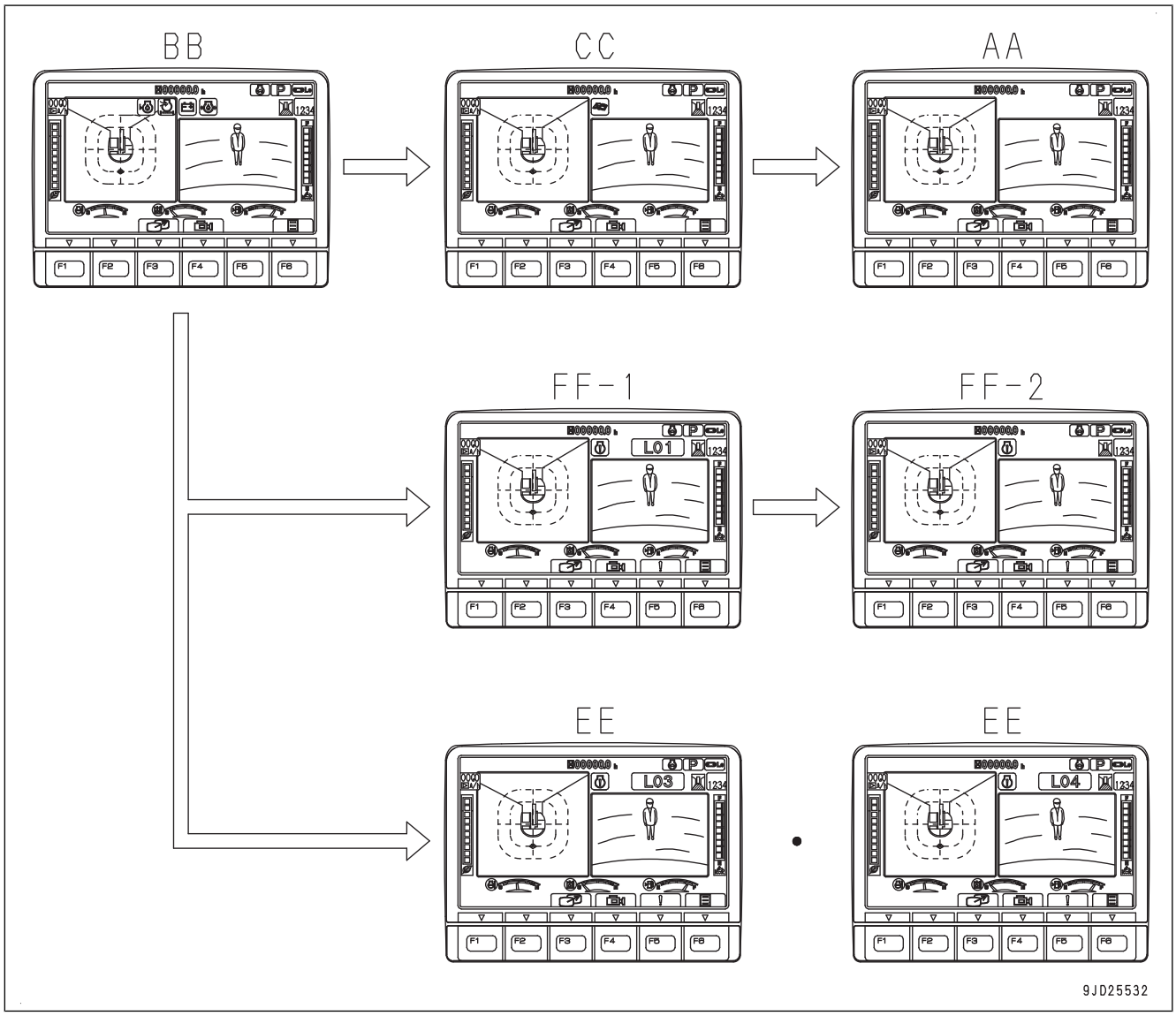
If inputting incorrect ID number for 3 times continuously, you cannot input ID number for 5 minutes. Wait for more than 5 minutes, try inputting ID number again.

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.

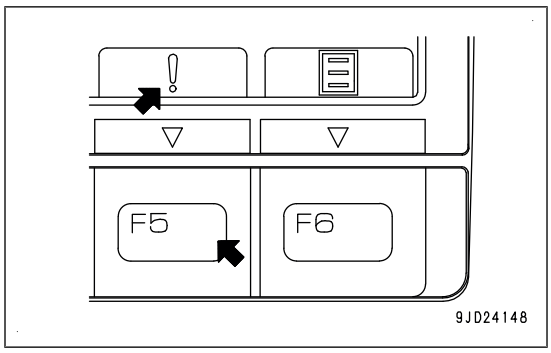
Basic Operation of Machine Monitor When You Start Engine in Abnormal Situation

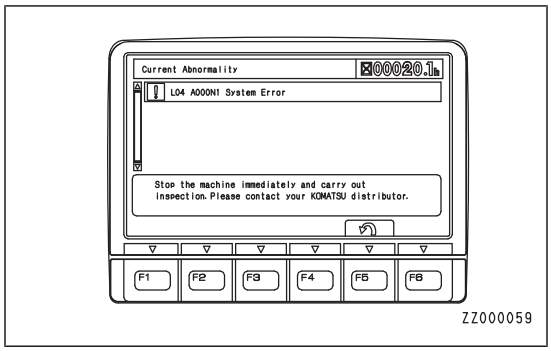


- If there is any abnormality when starting the engine, the check before starting screen BB changes to the maintenance time warning screen CC, warning screen FF, or error screen EE.
- After displaying the check before starting screen BB for 2 seconds, the screen changes to the maintenance time warning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

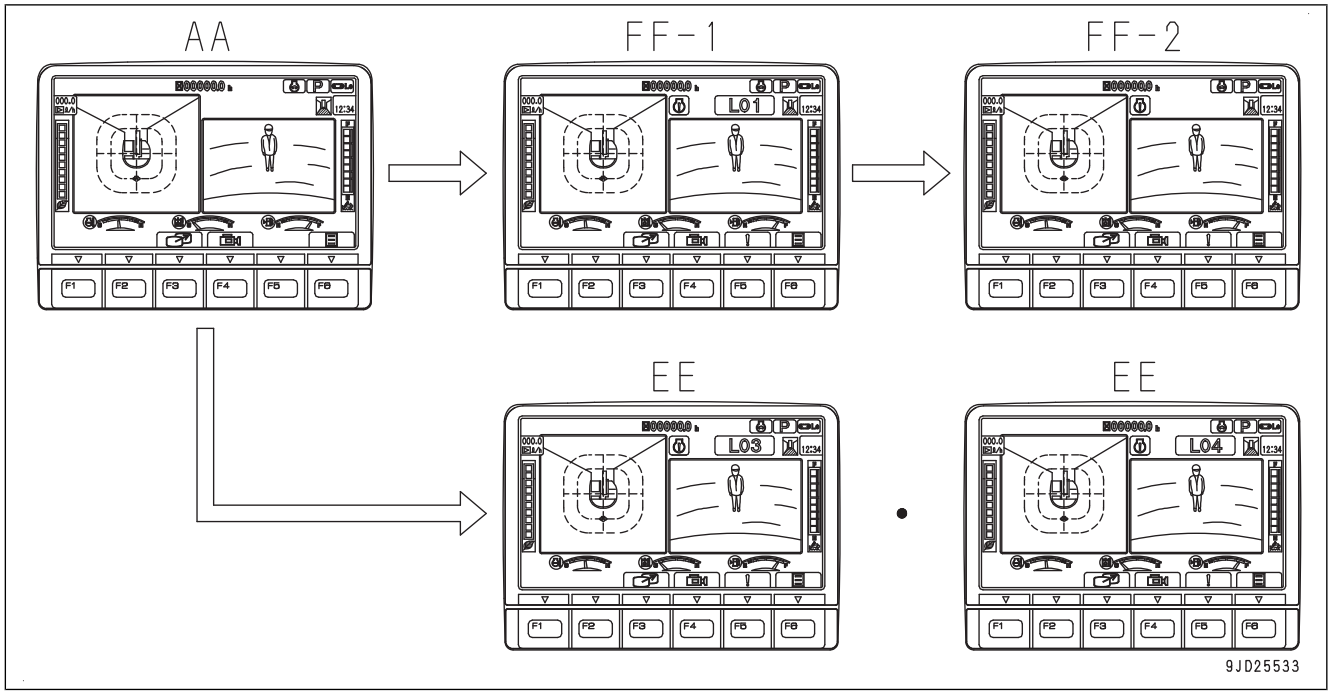
If there is any error existing, “ ! ” is displayed on top of switch F5. switch F5.

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





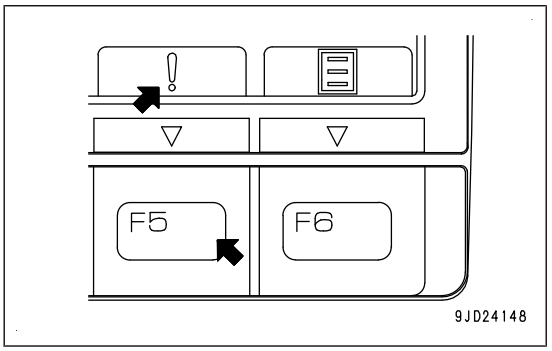
Basic Operation of Machine Monitor When Trouble Occurs While You Operate Machine

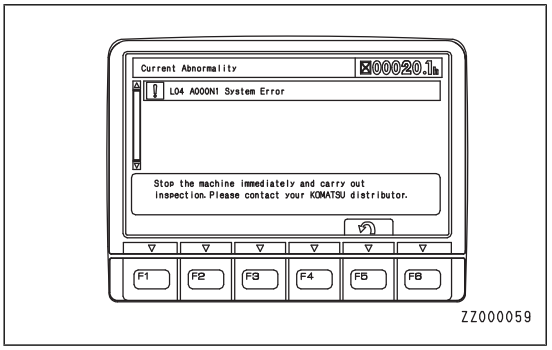


- If any abnormality occurs during operation, the standard screen AA changes to warning screen FF-(1) or the error screen EE.
- After displaying warning screen FF-(1) for 2 seconds, the screen automatically changes to warning screen FF-(2).

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

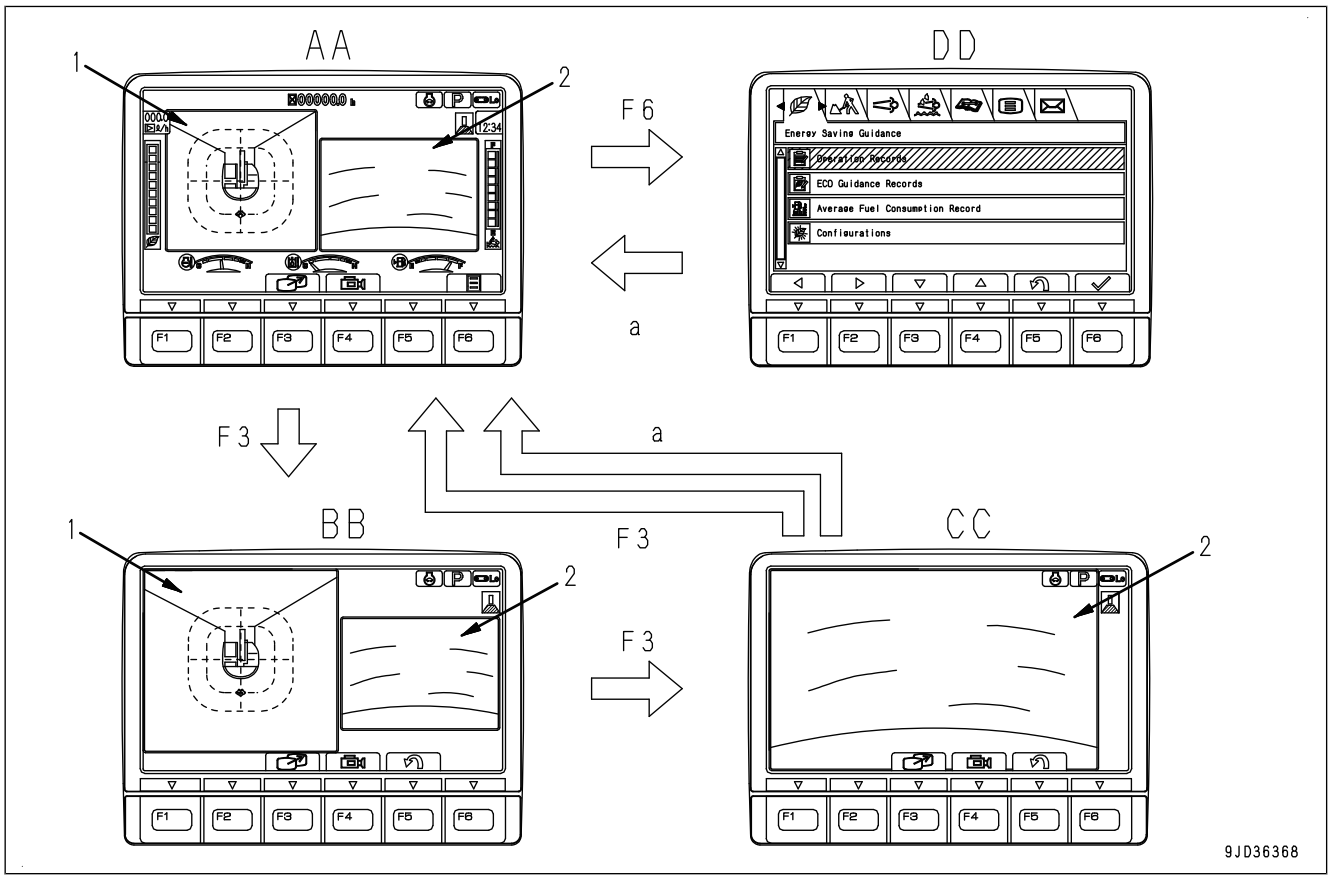
Press switch F5 to check the detail of the error. Current Abnormality screen is displayed.





Basic Operation of Machine Monitor When You Operate Work Equipment, Swing, Travel, and Attachments

Machine monitor screen automatically changes to the screen which displays the bird's eye view display of Kom-Vision when operating work equipment, swing, travel and attachment.



AA: standard screen BB: enlarged screen of bird's eye view display CC: camera image screen DD: no camera image screen (user menu, etc.)

(1) Bird's eye view display (2) Camera image (selected camera image)

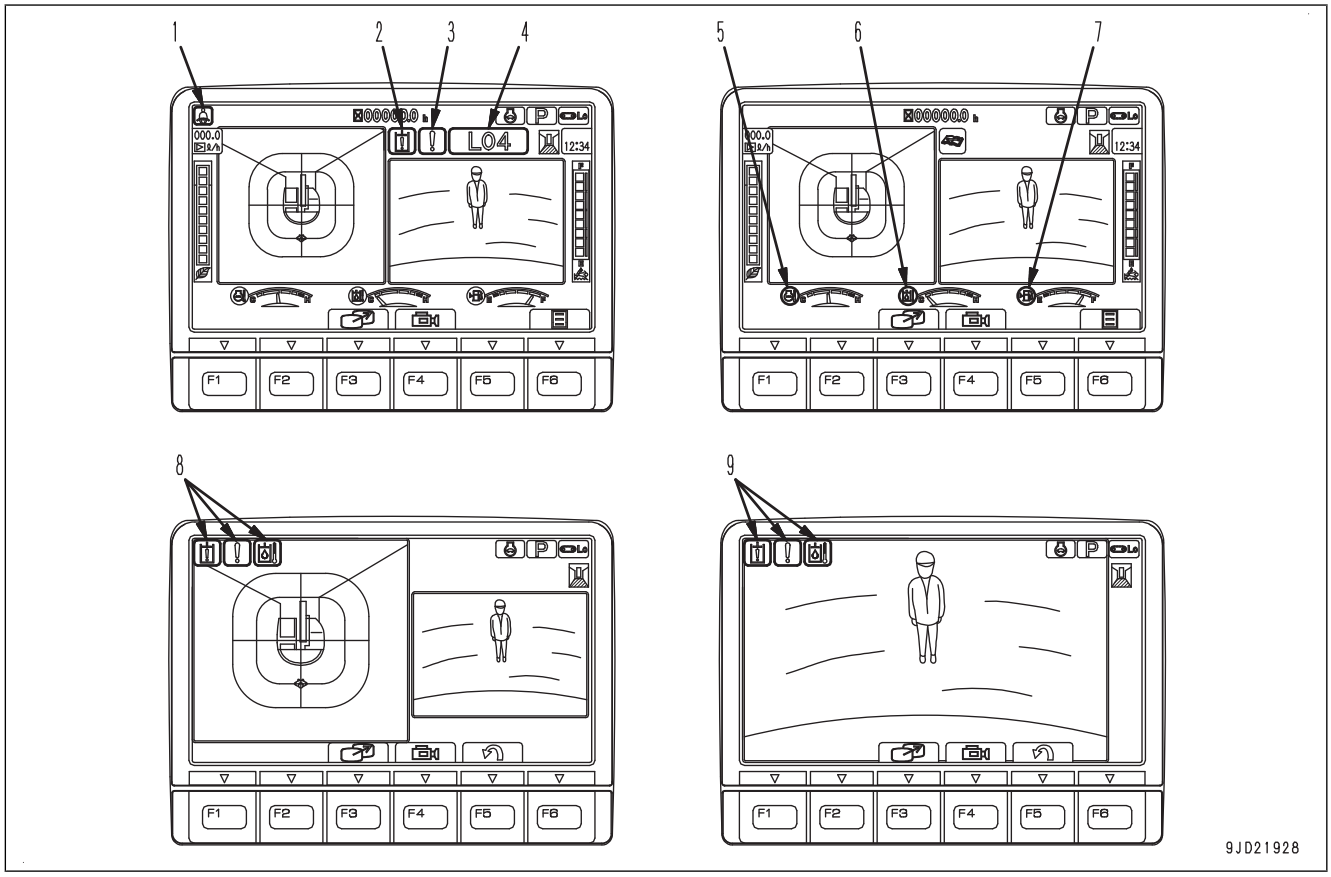
(A) Starting operation of work equipment, swing, travel and attachment

- The screen at starting operation does not change to another screen while standard screen AA or enlarged screen of bird's eye view display BB is displayed even when operating work equipment, swing, travel and attachment.
- The screen automatically changes to the standard screen AA while the camera image screen CC is displayed when operating work equipment, swing, travel and attachment.
- The screen automatically changes to the standard screen AA while the no camera image screen DD is displayed when operating work equipment, swing, travel and attachment.
- The screen does not change to the camera image screen CC and the no camera image screen DD while operating work equipment, swing, travel and attachment.
- To change the screen to the camera image screen CC and the no camera image screen DD, finish the operation of work equipment, swing, travel and attachment.

Warning Display

NOTICE

The machine has a trouble if any of the action levels “L01” to “L04” is displayed on the machine monitor.
Take appropriate actions following the list of action level displays and required actions.
The caution lamp that lights up in red when an action level is displayed warns operator to stop the machine urgently, stop or pause the current operation.
If no action is taken, the machine can be seriously affected. Take necessary actions immediately.



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

Standard screen (camera display and meter display)

If there is one activated warning, it is displayed in the location of caution lamp (2).

If there are two activated warnings, they are displayed in the location of caution lamps (2) and (3).

If there are three or more activated warnings, they are displayed in the location of caution lamps (2) and (3) alternately every two seconds.

Entire camera image display screen

The activated warning is shown by flashing of caution lamp (9).

If multiple warnings are activated, they are displayed in order from the left end of the screen.

Action Level Display

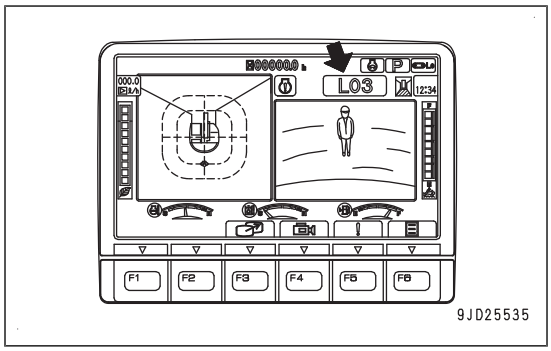
Action level display indicates the degree of urgency of the abnormality currently generated on the machine by “L01” to “L04”.

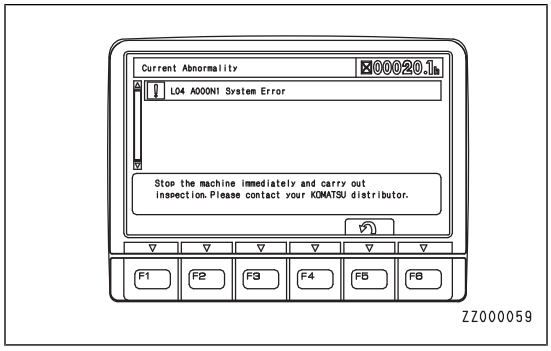
The larger the number in the table is, the more serious effects the abnormality may have on the machine if it is left with no action.

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 Procedure Level Display and Required Procedures

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. Or stop the operation and move the machine to a safe place, then perform the inspection and maintenance. If the condition is not improved, ask your Komatsu distributor for inspection and maintenance.
	L01	Does not sound	Lights up in yellow	Some functions may be restricted from use, but the machine can operate. When you finish the operation, always 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 Lamp and Color

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)	-	-

Symbol	Type of caution lamp	Display color/Machine condition (Action level)			
		Red	Yellow	White	Blue
 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)	-	-	-
 9JC01165	Engine oil level caution lamp	-	Low oil level (L01)	-	-
 9JC01162	Radiator coolant level caution lamp	Low coolant level (L02)	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)	-	-
 9JC01175	Air conditioner system caution lamp	-	Abnormal (L01)	-	-
 9JH16433	Overload caution lamp	Overload	-	-	-
 9JD26188	Quick coupler caution lamp	Abnormal (L03)	-	-	-
 9JC01168	Maintenance time caution lamp	Due time is over	Notice	-	-

Symbol	Type of caution lamp	Display color/Machine condition (Action level)			
		Red	Yellow	White	Blue
 ZZ000489	Seat belt caution lamp	Seat belt is not fastened	-	-	-
 9JC01174	Engine overrun caution lamp	Abnormal (L02)	-	-	-
 A4P14875	Auto idle stop sudden stop caution lamp	Excessive frequency (L03)	Excessive frequency (L01)	-	-
 9JD23345	Camera caution lamp	Abnormal (L03)	Abnormal (L01)	-	-
 9JD23346	Camera system caution lamp	-	Abnormal (L01)	-	-

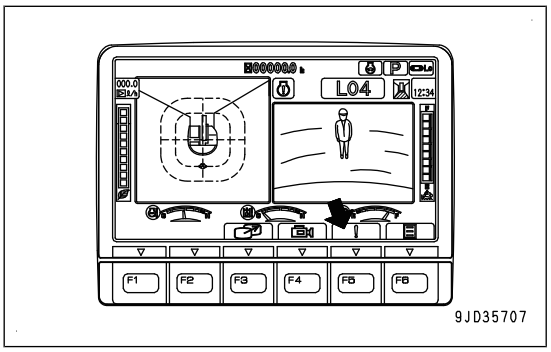
For the meaning of each caution lamp and the action to take for it, see the section of each caution lamp.

Current Abnormality Display Switch

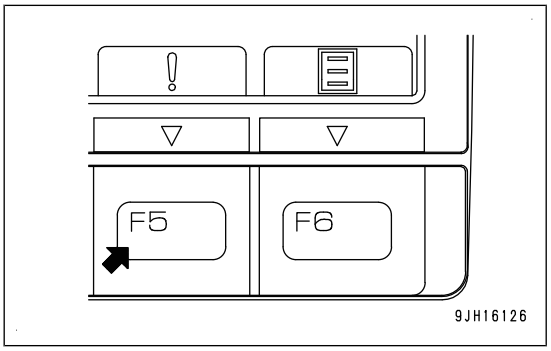
If there is any abnormality currently generated, “!” is displayed on top of switch F5

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.



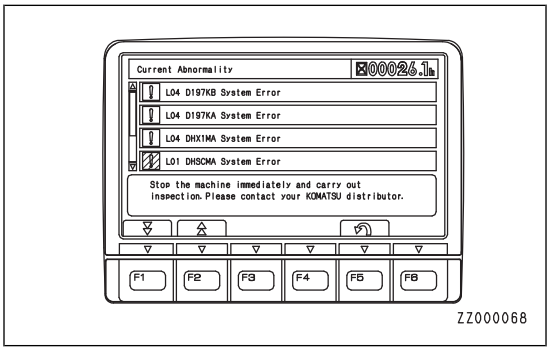
9JD35707



9JH16126

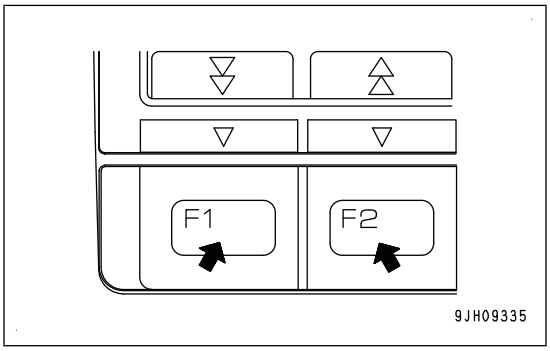
Operations on the Current Abnormality Screen

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

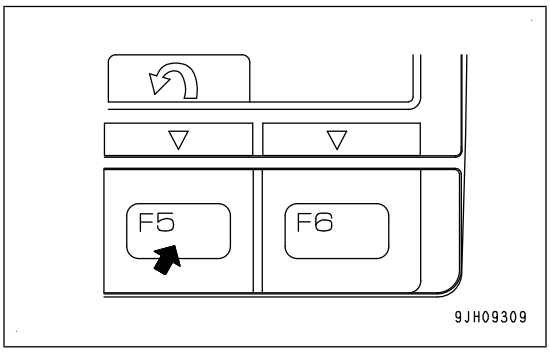


F1: Displays next page. When on the last page, it displays the first page.

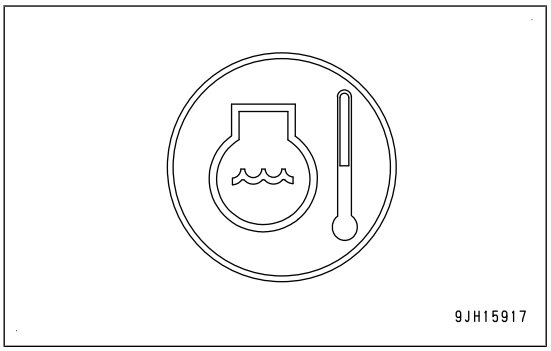
F2: Displays the previous page. When on the first page, it displays the last page.



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 an proper temperature.

When temperature is low

The caution lamp lights up in white.

The engine coolant temperature is low.

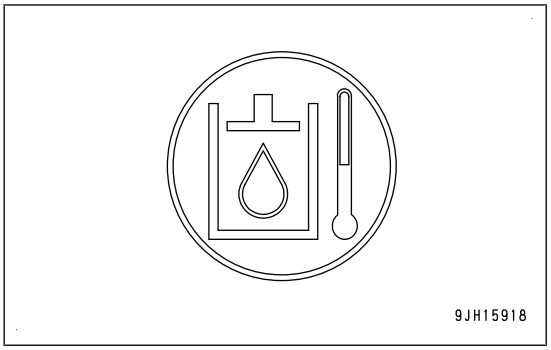
The engine needs to be warmed up.

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

When temperature is correct

The caution lamp lights up in blue.

Hydraulic Oil Temperature Caution Lamp



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

When abnormal

The caution lamp lights up in red and 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 an proper temperature.

When temperature is low

The caution lamp lights up in white.

The hydraulic oil temperature is low.

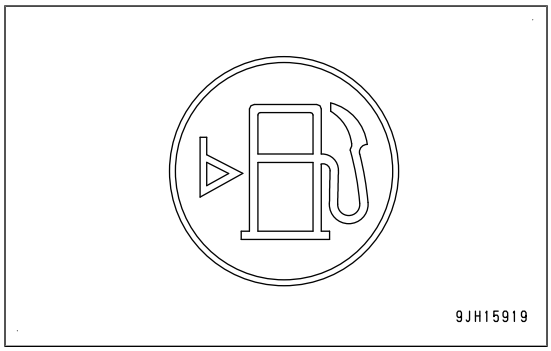
It is necessary to warm up the hydraulic component.

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

When temperature is proper

The caution lamp lights up in blue.

Fuel Level Caution Lamp



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

When the fuel level is low

The caution lamp lights up in red.

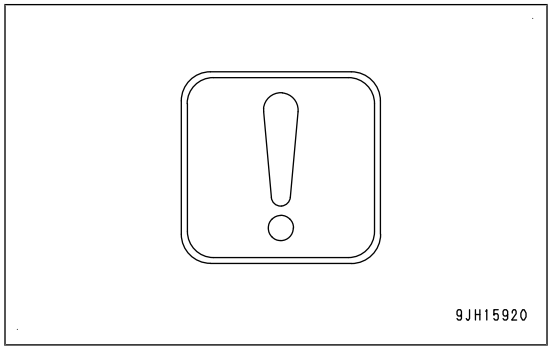
The remaining fuel amount is approximately 41 ℓ or less.

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.

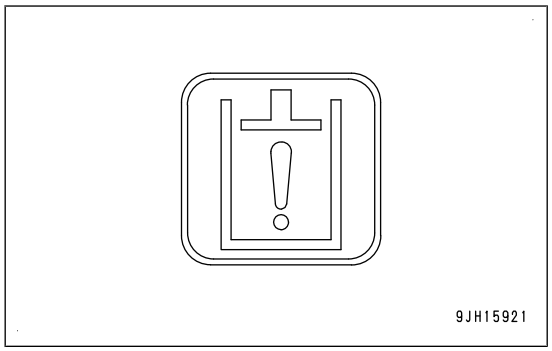
Some functions may be restricted for use, but the machine can operate.

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.

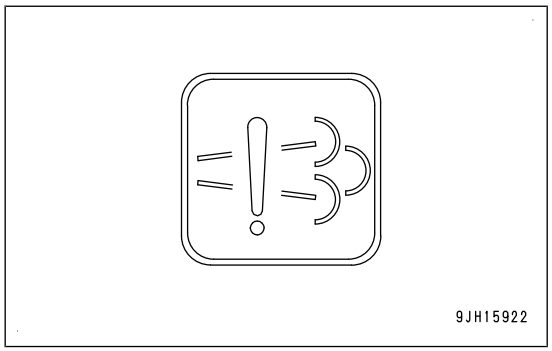
Some functions may be restricted for use, but the machine can operate.

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

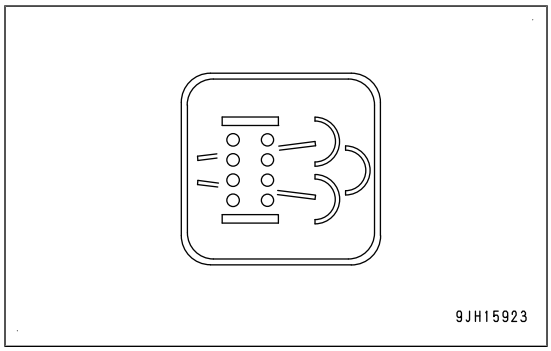
The caution lamp lights up in yellow.

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.

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.

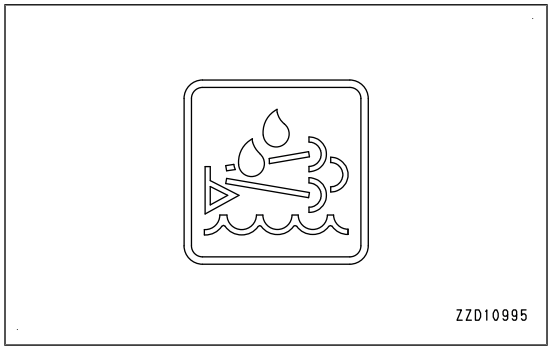
When soot is accumulated

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.

DEF Level Caution Lamp



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

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

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

When Lightning in red,

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

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

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

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

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

When Lightning in white

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

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

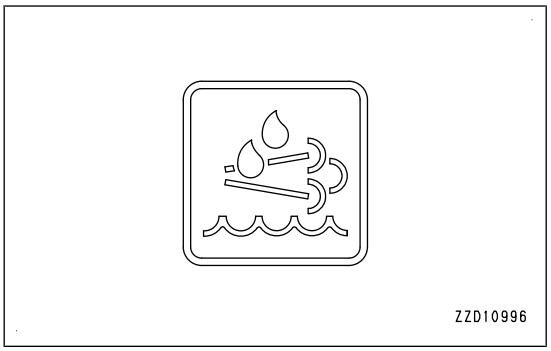
When DEF tank level sensor is defective.

DEF System Caution Lamp

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

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

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



Lighting in red

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

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

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

Lighting in yellow

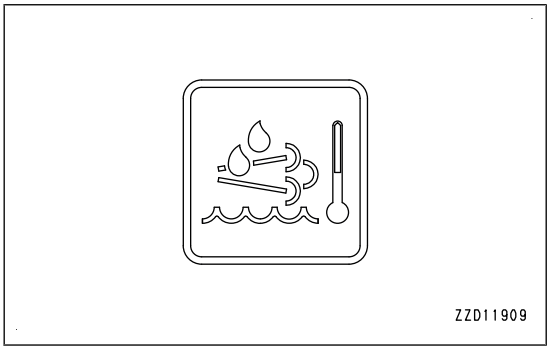
With Action level “L01”, Inducement status is “ Warning” or “Escalated Warning”.

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

DEF System High Temperature Stop Caution Lamp

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

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

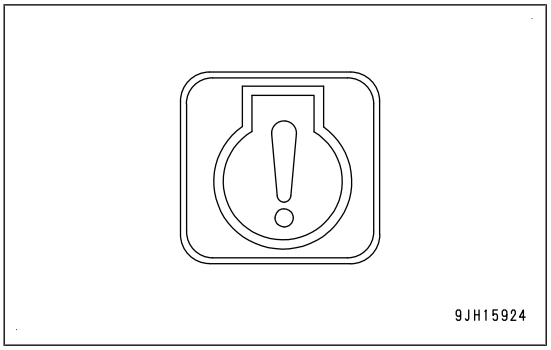


Engine System Caution Lamp

⚠ 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.

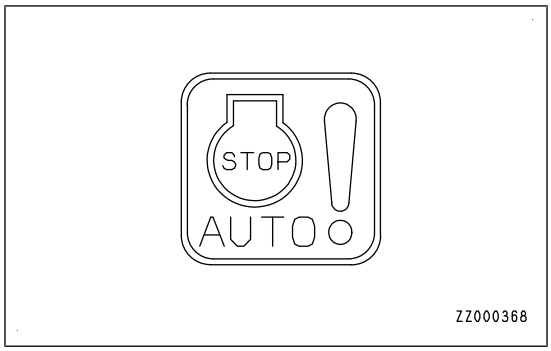
Some functions may be restricted for use, but the machine can operate.

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

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

Engine Sudden Stop by Auto Idle Stop Caution Lamp

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



When action level “L03” is displayed

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

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

When action level “L01” is displayed

The caution lamp lights up in yellow.

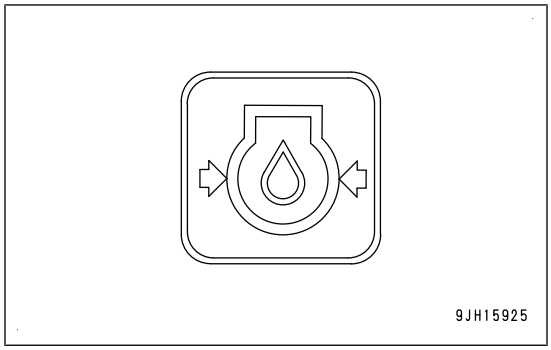
The engine durability may be lower but the machine can operate.

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

Ask your Komatsu distributor for inspection and maintenance as needed.

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”.

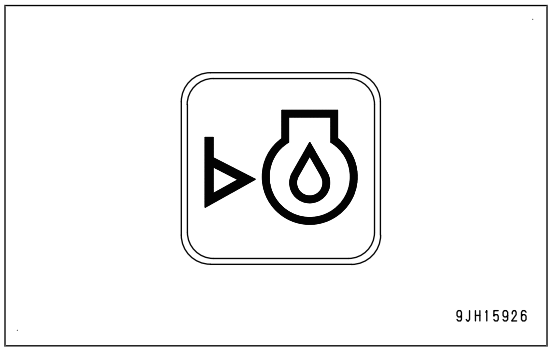
The alarm buzzer sounds intermittently.

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.

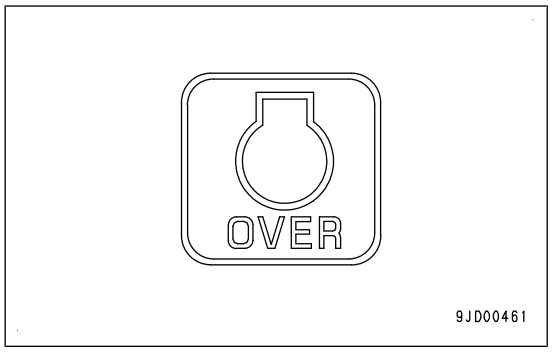
For detail, see “How to Examine Oil Level in Engine Oil Pan, Add Oil”.

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

For the inspection and maintenance, ask your Komatsu distributor.

Engine Overrun Caution Lamp

The engine overrun caution lamp warns about the overspeed of engine.



When engine overspeeds

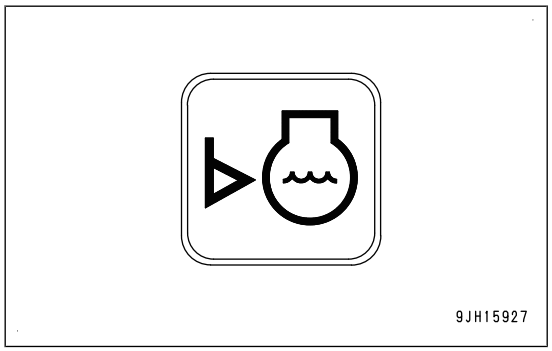
The caution lamp lights up in red, and action level “L02” is displayed.

The alarm buzzer sounds intermittently.

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

Radiator Coolant Level Caution Lamp

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



When the coolant level is continuously low

The caution lamp lights up in red, the alarm buzzer sounds, and the action level “L02” is displayed.

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

For details, see “METHOD FOR CHECKING COOLANT LEVEL, ADDING COOLANT”.

When the coolant level is low

The caution lamp lights up in yellow, and the action level “L01” is displayed.

The radiator coolant is insufficient.

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

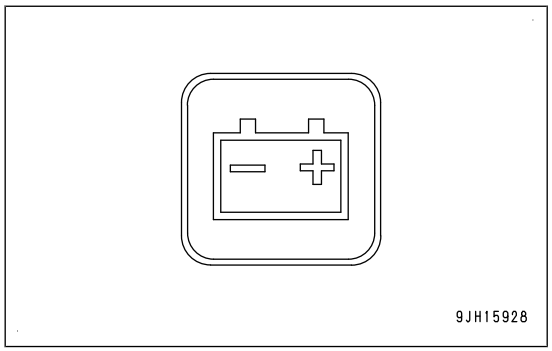
For details, see “METHOD FOR CHECKING COOLANT LEVEL, ADDING COOLANT”.

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

Ask your Komatsu distributor for the inspection and maintenance.

Charge Level Caution Lamp

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



When abnormal

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

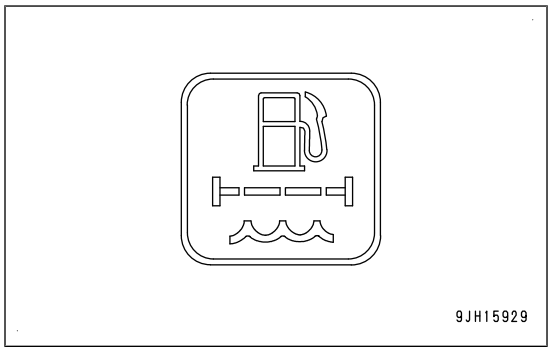
The alarm buzzer sounds intermittently.

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.

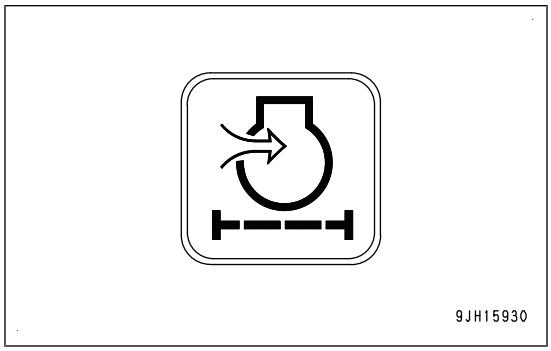
For detail, see “How to Examine Water Separator, Drain Water and Sediment”.

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”.

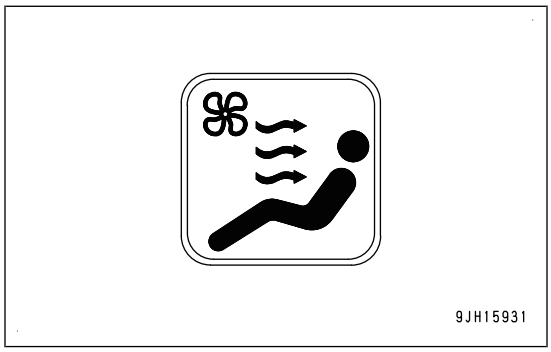
The air cleaner is clogged.

Stop the engine and check and clean the air cleaner.

For detail, see “How to Examine, Clean and Replace Air Cleaner”.

Air Conditioner System Caution Lamp

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



When abnormal

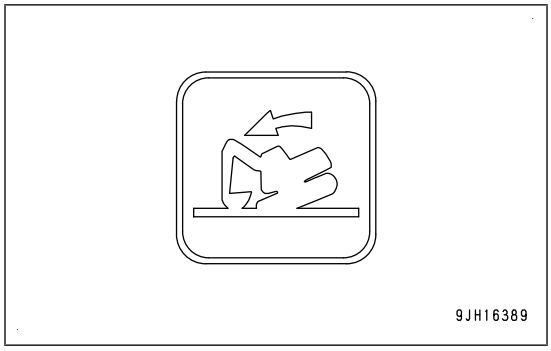
The caution lamp lights up in yellow and indicates action level “L01”.

The air conditioner system has abnormality.

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

Overload Caution Lamp

This caution lamp warns that the machine is about to tip over due to the overload (alarm buzzer also sounds).



When overload

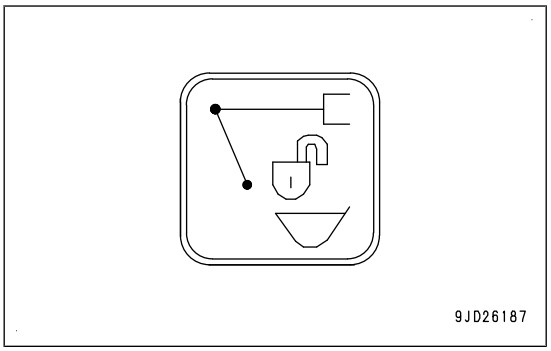
The caution lamp lights up in red.

If this caution lamp is displayed, reduce the load applied to the work equipment.

Check that the load is within the capacity limit shown in the lifted load capacity chart inside the cab.

Quick Coupler Caution Lamp

The quick coupler caution lamp indicates the state of the quick coupler.



When abnormal

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

The alarm buzzer sounds intermittently.

The oil pressure in the quick coupler system is dropped.

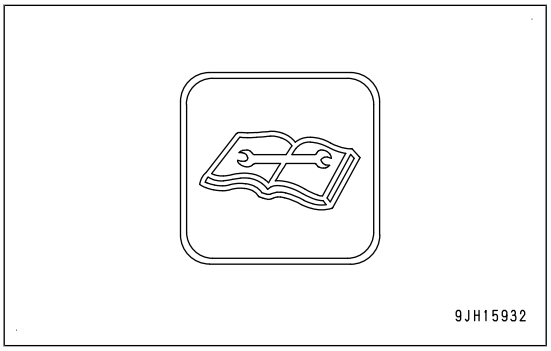
Stop the machine immediately and ask your Komatsu distributor for the inspection and maintenance.

During normal operation

The lamp lights up when the quick coupler is enabled.

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

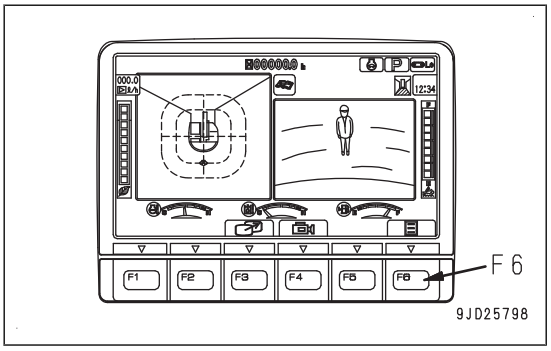
The warning lamp lights up in yellow.

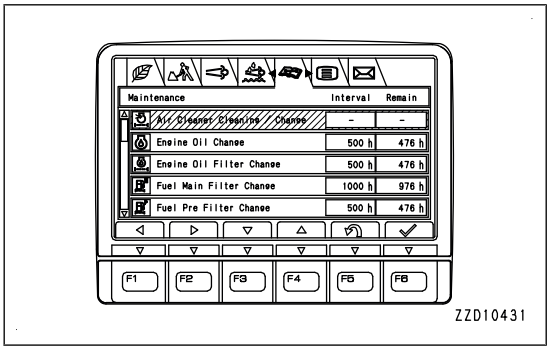
The maintenance time is approaching.

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”.

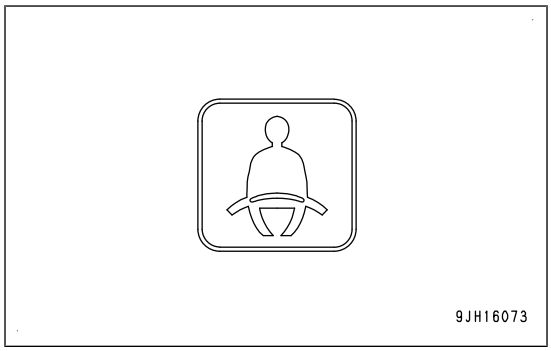




Seatbelt Caution Lamp

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 “How to Fasten and Unfasten Seat Belt”.



Camera System Caution Lamp

Camera system caution lamp warns about the signal trouble caused by such as breakage in cables, loose and disconnected connectors.

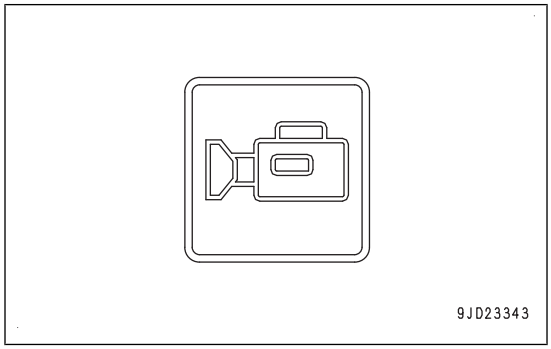
When the action level “L03” is displayed

The rear camera signal has abnormality.

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

If the caution lamp is lit, the camera image is not displayed on the machine monitor.

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



⚠ WARNING

Do not move the machine when camera image is not displayed on the machine monitor.
Arrange a conductor always when moving the machine to the safe place. Operator should pay careful attention to the label when there is any labels. Follow the instructions from the conductor.

When the action level “L01” is displayed

The caution lamp lights up in yellow.

If the caution lamp is lit, the camera image is not displayed on the machine monitor.

Visually check the safety around the machine always when operating the machine.

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

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

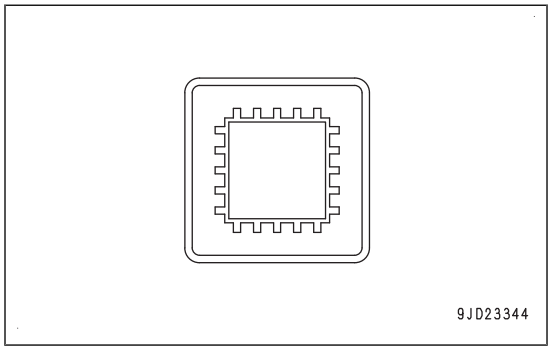
Camera System Caution Lamp

When an abnormality occurs in KomVision system controller, the caution lamp lights up in yellow, and the action level “L01” is displayed.

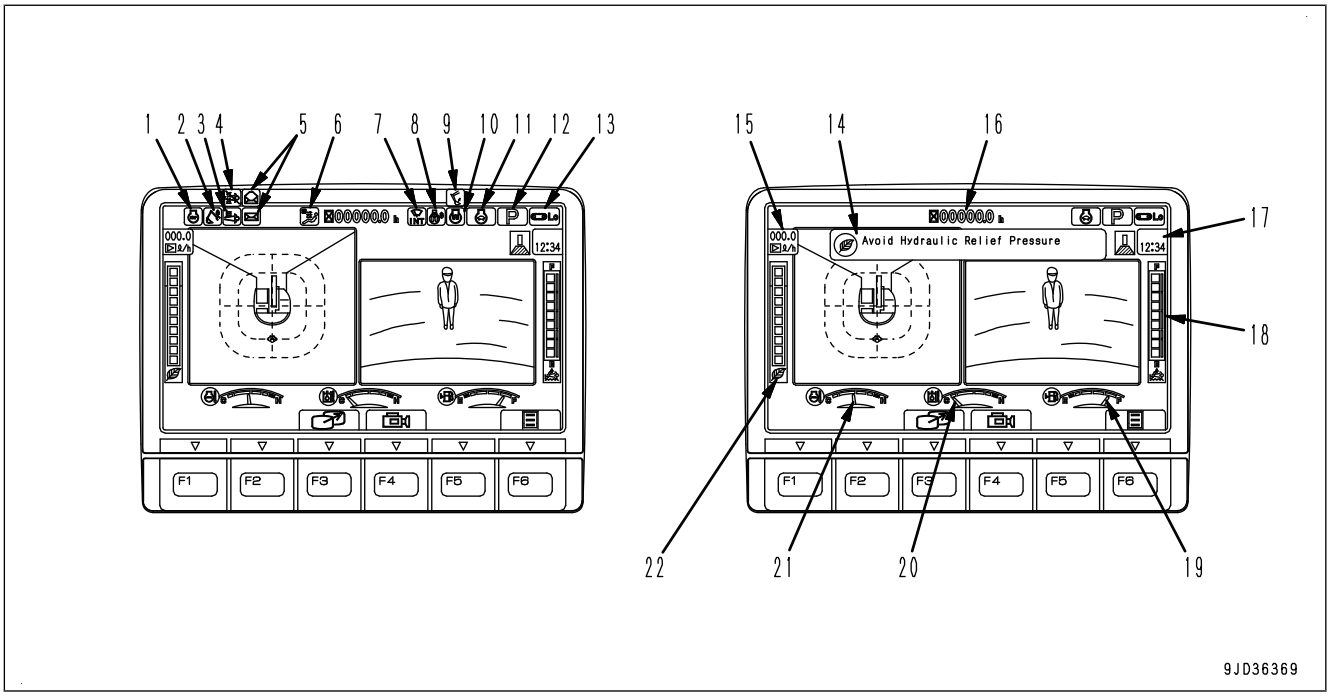
If the caution lamp is lit, the camera image is not displayed on the machine monitor.

Visually check the safety around the machine always when operating the machine.

Ask your Komatsu distributor for the inspection and maintenance.



Pilot Display and Meter Display



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) Fuel consumption gauge
(16) Service meter
(17) Clock
(18) DEF level gauge
(19) Fuel gauge
(20) Hydraulic oil temperature gauge
(21) Engine coolant temperature gauge
(22) 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.

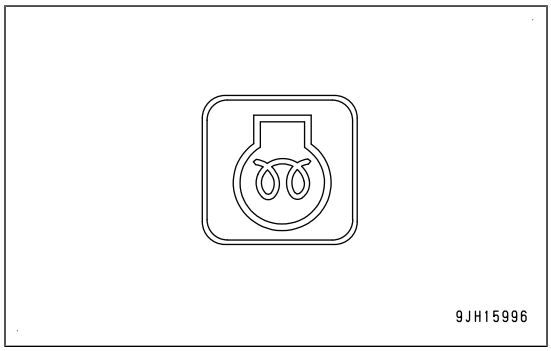
When the starting switch is turned on and the display items are functioning, the pilot lamps light up.

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.



Swing Lock Pilot Lamp

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

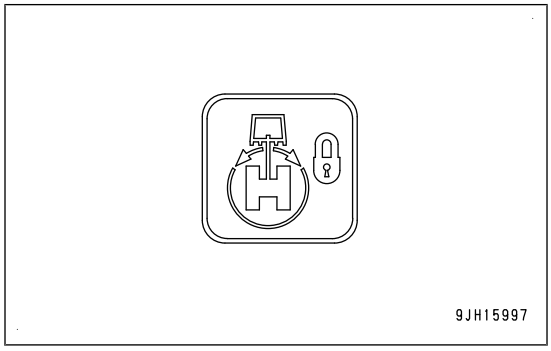
Lights up: The swing lock is being actuated.

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.

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

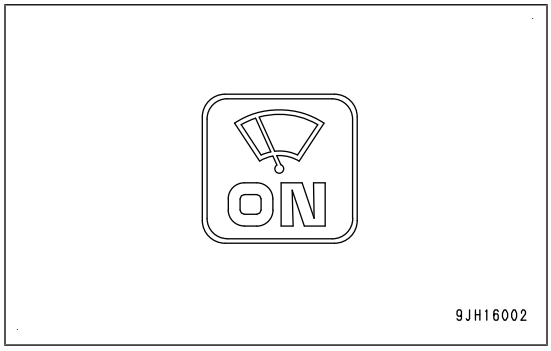
The wiper pilot lamp shows the operating state of the windshield wiper.

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

INT lights up: Windshield wiper operates intermittently

ON lights up: Windshield wiper operates continuously

nothing lights up: Wiper stops



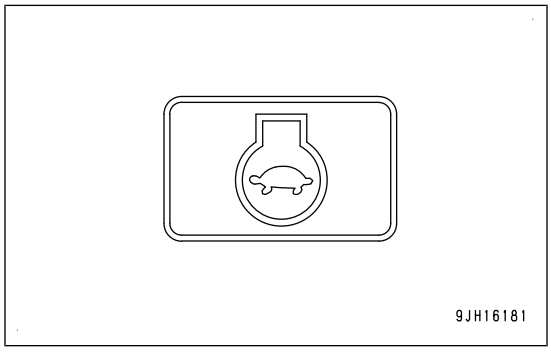
Auto-Deceleration Pilot Lamp

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

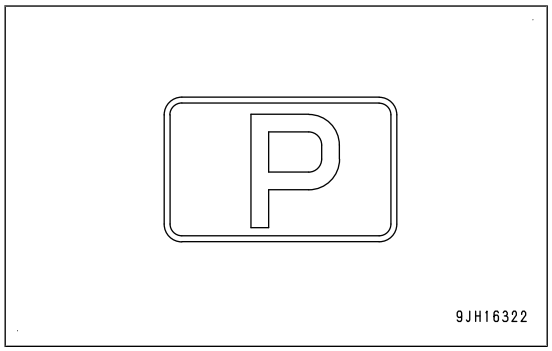
The pilot lamp display when the auto-deceleration switch is operated is as follows.

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

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



Working Mode Display



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

The pilot lamp displays as follows according to the operation of the working mode selector switch.

P: P mode (for heavy-load operations)

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

L: L mode (for fine control operations)

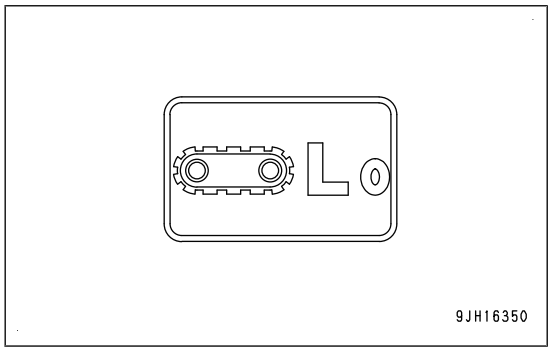
B: B mode (for breaker operations) (For machines ready for installation of attachments)

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

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

- When E mode is selected, E0 to E3 are displayed.

Travel Speed Display



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

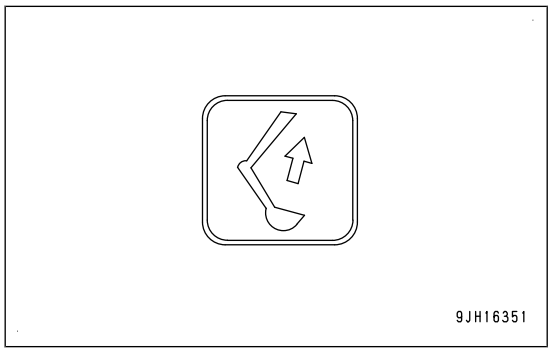
The travel speed is indicated as follows according to the setting of the travel speed selector switch.

Lo: Low-speed travel

Mi: Mid-range speed travel

Hi: High-speed travel

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

REMARK

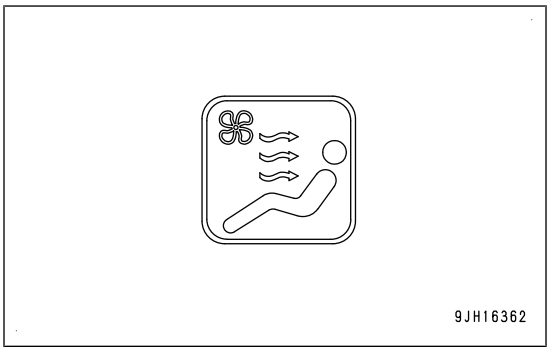
Only when the working mode is P, E, ATT/P, and ATT/E mode, the power is increased while the knob switch is being pressed. Even if the knob switch continues to be pressed, the power increase is finished after 8.5 seconds.

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

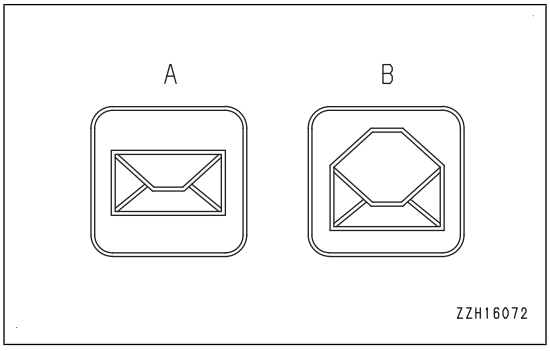
The message display lights up when there is a message from Komatsu.

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

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

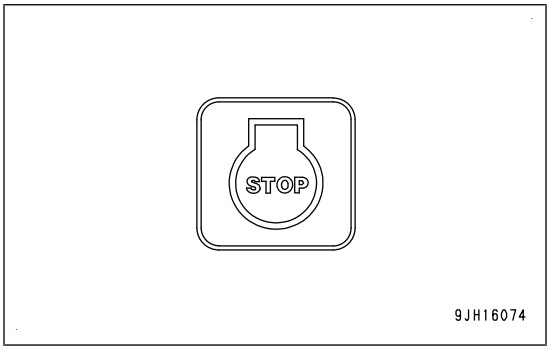
Lights up in blue (B): There is any read message to which no reply is made.

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.

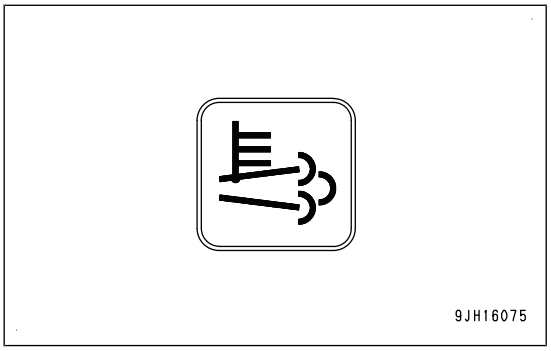


Aftertreatment Devices Regeneration Pilot Lamp

⚠ 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.**

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

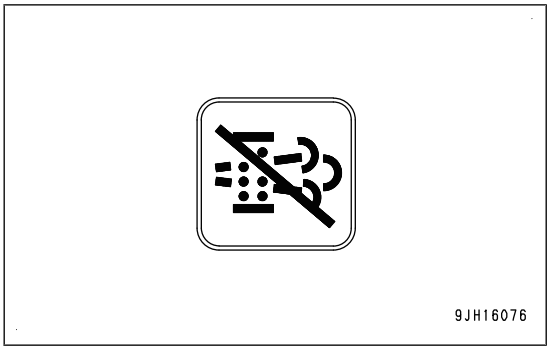


Aftertreatment Device Regeneration Disable Pilot Lamp

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

REMARK

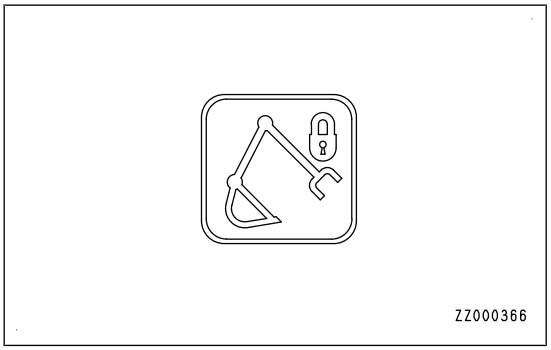
Even if the aftertreatment devices regeneration is disabled, when the manual stationary regeneration is necessary, KDPF soot accumulation caution lamp lights up. If KDPF soot accumulation caution lamp lights up, cancel the regeneration disable setting and perform manual stationary regeneration.



Lock Lever Pilot Lamp

The lock lever pilot lamp lights up when the lock lever is in LOCK position.

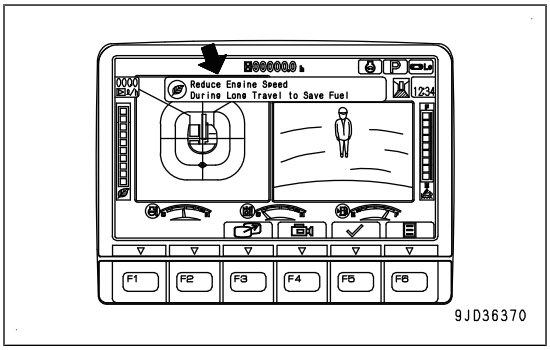
It goes out when the lock lever is set in FREE position.



ECO Guidance

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

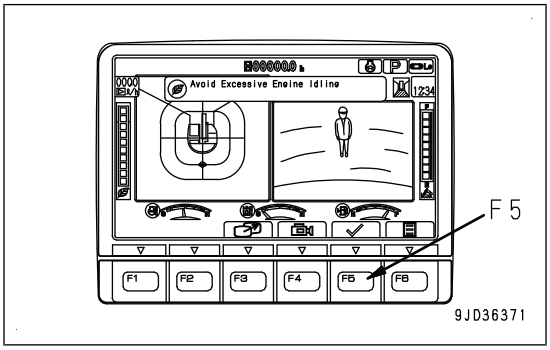
The details of the guidance are as follows:



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.

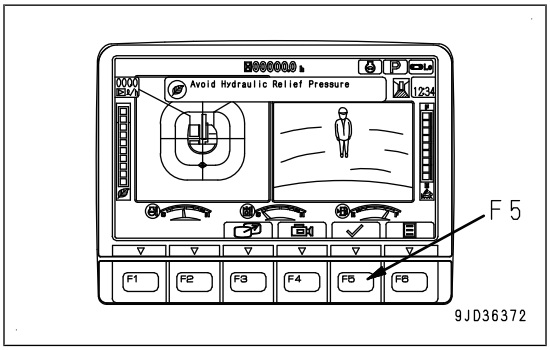
The idling stop message goes out if any lever is operated again or switch F5 is pressed.



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.

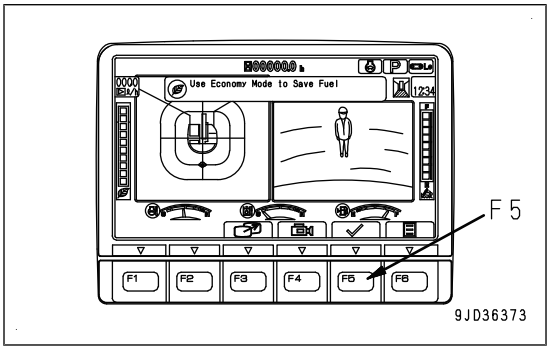
The hydraulic relief deterrence message goes out 10 seconds later or when switch F5 is pressed.



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.

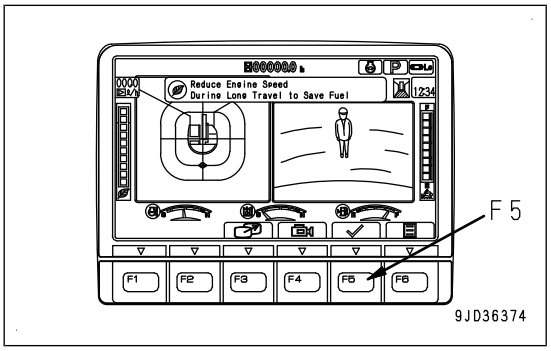
E mode recommendation message goes out more than 10 seconds after or when switch F5 is pressed.



Travel Partial Mode Recommendation 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.

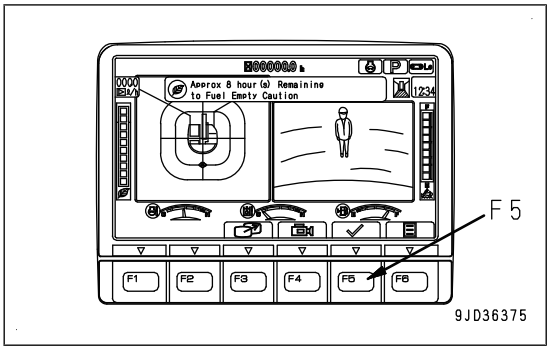
The travel partial mode recommendation message goes out more than 10 seconds after or when switch F5 is pressed.



Fuel Low 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.

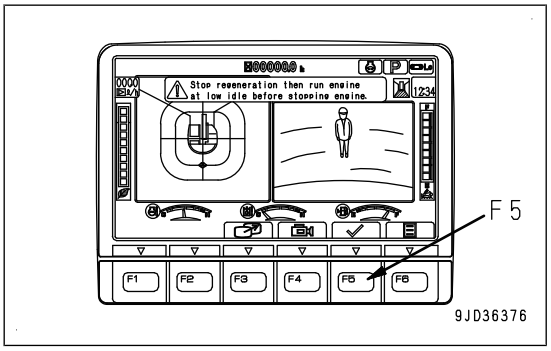


Guidance of Engine Stop Operation During Aftertreatment Device Regeneration

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 regeneration of the aftertreatment devices, stop the regeneration first, then stop the engine after running it at low idle for approximately 5 minutes.

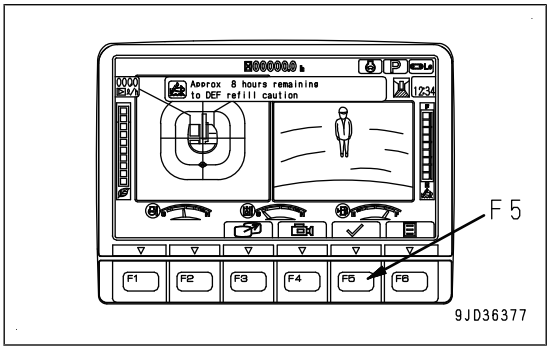
The information about engine stop operation during the aftertreatment devices regeneration goes out 10 seconds later or when switch F5 is pressed.



AdBlue® 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

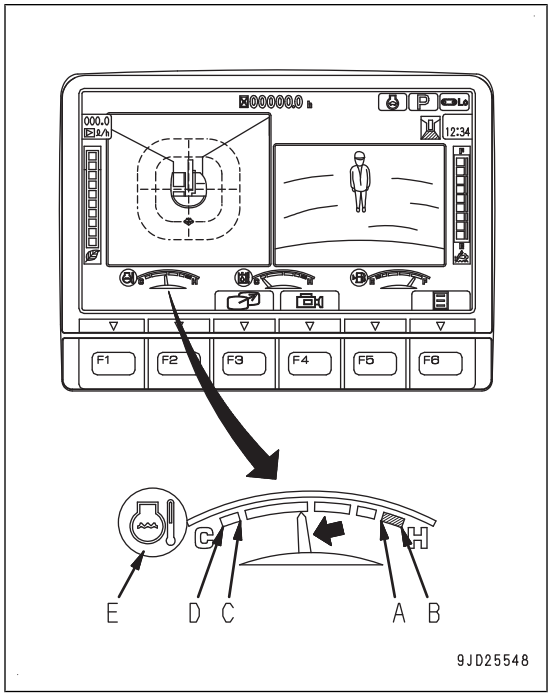
(A) to (C): Green range

(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.

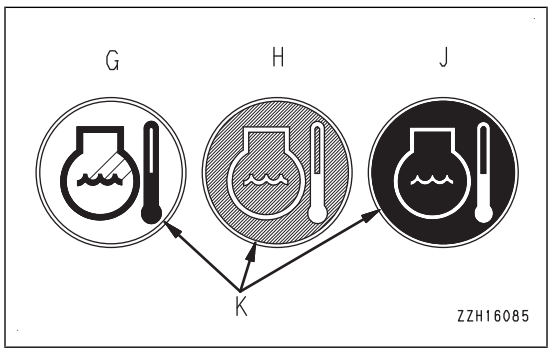
When the engine is started, if the indicator is at position (D), engine coolant temperature caution lamp (E) shows the low-temperature display.

In this case, perform warm-up operation.

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

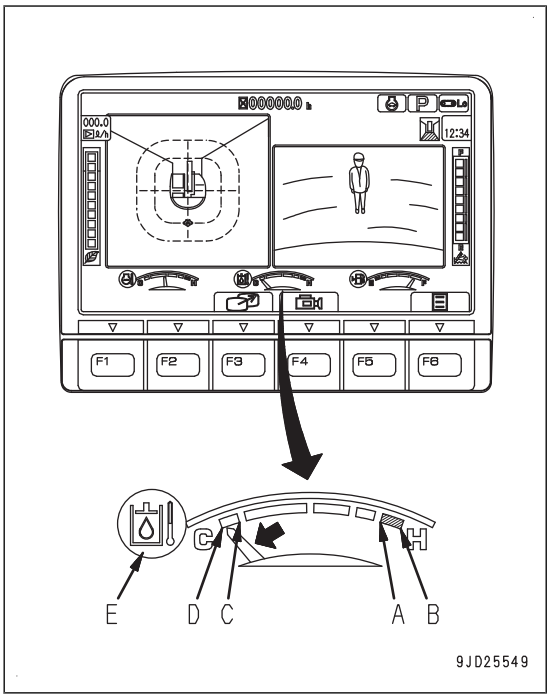
Red range (B) position: 105 °C or more

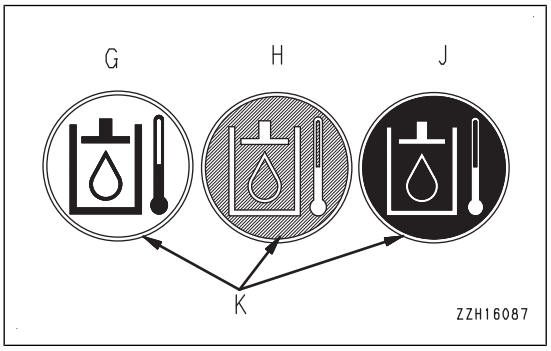
When the indicator is in red range (A) to (B), hydraulic oil temperature caution lamp (E) indicates abnormality.
When the engine is started, if the indicator is at position (C), the hydraulic oil temperature is below 20 °C and hydraulic oil temperature caution lamp (E) indicates low temperature. In this case, perform warm-up operation.

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





Fuel Gauge

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

The indicator should be in the green range during operation.

When the indicator comes close to red range during operation, the remaining fuel is 50 ℓ or less, so check and add fuel.

(A) to (B): Red range

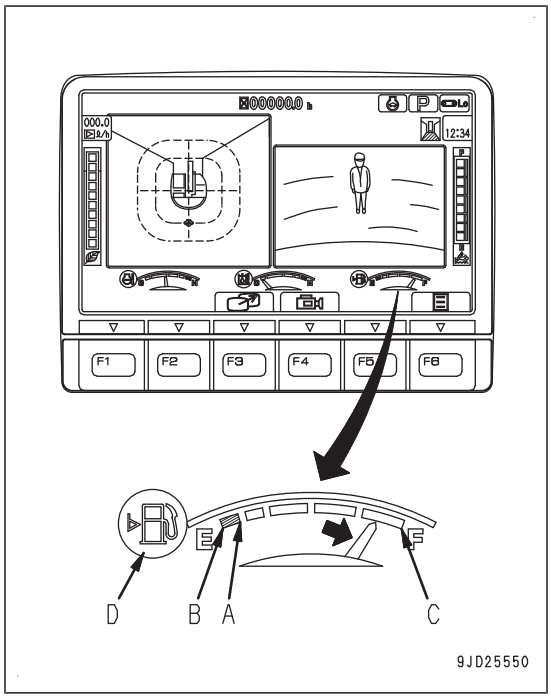
(A) to (C): Green range

REMARK

When the indicator reaches red range (B), the remaining fuel is 39 ℓ or less.

When the indicator is in (B) of the red range, the fuel level caution lamp (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 a problem.

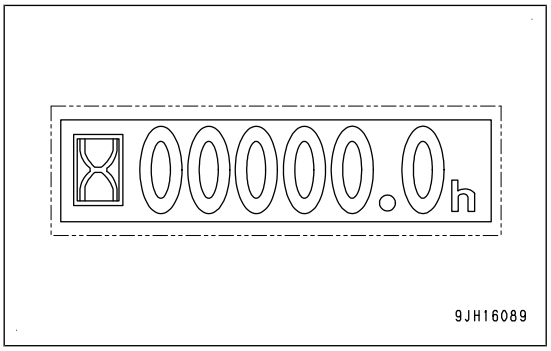


Service Meter/Clock

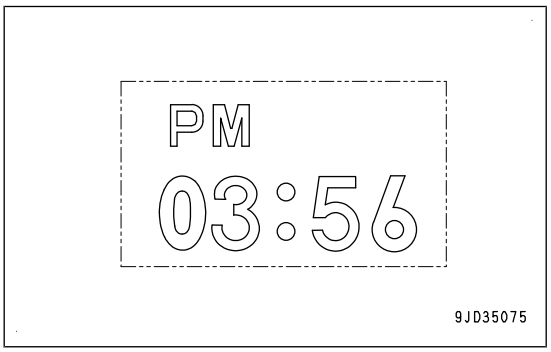
The service meter/clock shows the total hours of operation of the machine or the present time.

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

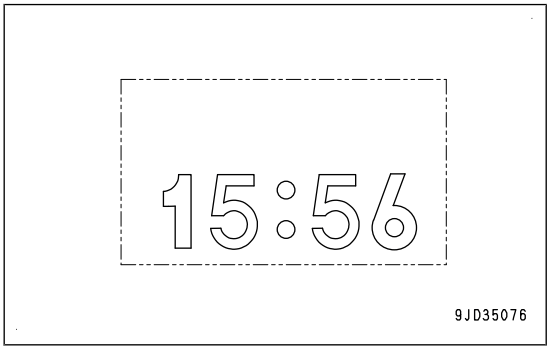
- Service meter display



- Clock display (12-hour display)



- Clock display (24-hour display)



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 the setting and correction of time, see “Clock Adjustment”.

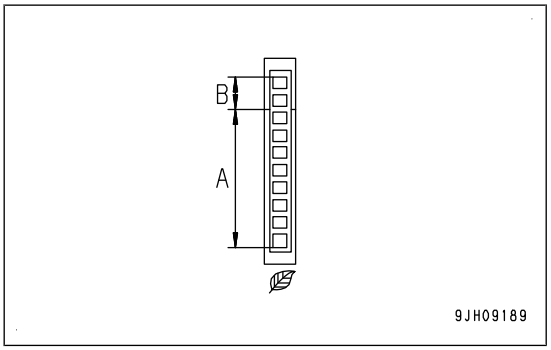
ECO Gauge

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.

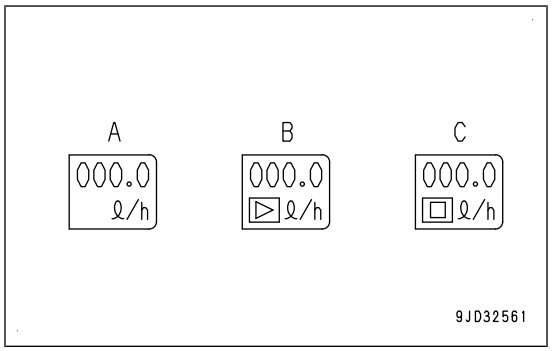
Fuel Consumption Gauge

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.

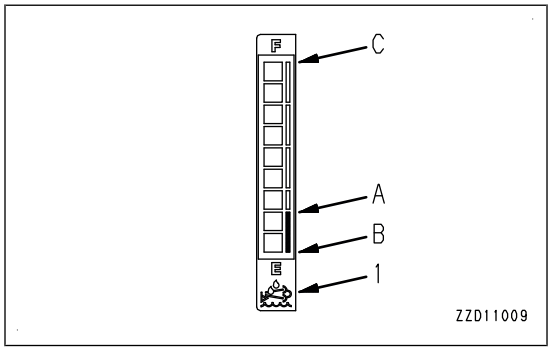
If the indicator comes close to (A) of red range during operation, check and add DEF.

(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 lamp lights up in red, the engine power is derated.



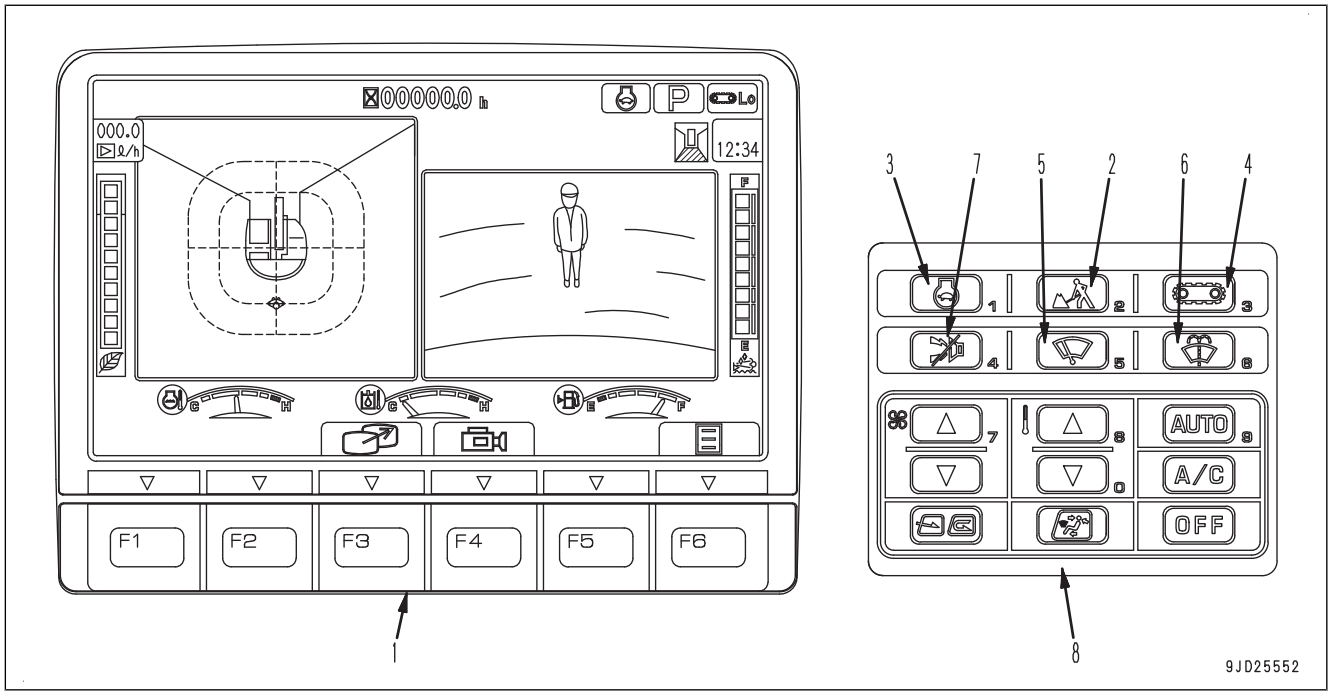
When remaining level of DEF cannot be detected, DEF level caution lamp (1) lights up in white.

REMARK

- Immediately after turning the starting switch to ON position and during the engine is running, DEF level caution lamp (1) lights up in white. However, this does not indicate abnormality.
- In cold weather, DEF level cannot be detected and DEF level caution lamp (1) lights up in white for approximately 1 hour. However, this does not indicate abnormality.
- Even if DEF level caution lamp (1) is not lit in white, it may take a long time for DEF level gauge to display the correct position.
  Note that the following cases are not abnormal:
  - When DEF is added while the starting switch is kept at ON position.
  - When the starting switch is turned to ON position immediately after adding DEF (within approximately 30 seconds).

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

Monitor Switch



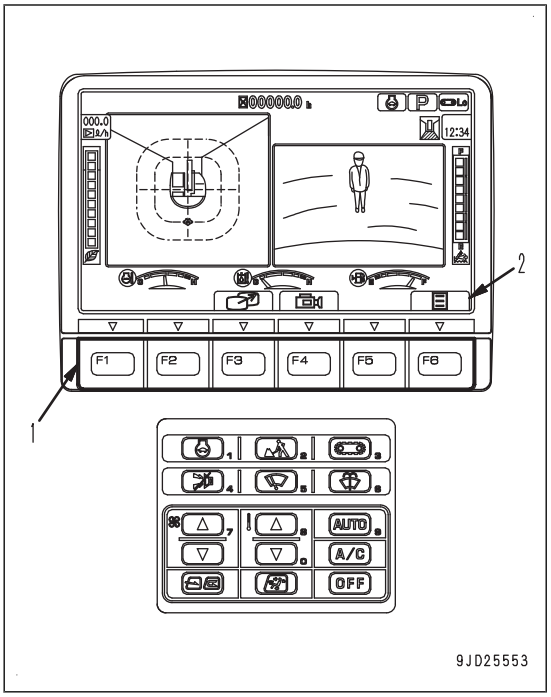
(1) Function switch
(2) Working mode selector switch
(3) Auto-deceleration switch
(4) Travel speed selector switch
(5) Wiper switch
(6) Window washer switch
(7) Buzzer cancel switch
(8) Air conditioner switch

Function Switches and Guidance Icons

- There are 6 function switches (1) (F1 to F6) at the bottom of the machine 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 above the switch.
- While the guidance icon (2) is not displayed, the function switch (1) does not function even if it is pressed.
- Even if the guidance icon (2) is pressed, it does not function. Press the function switch (1) directly under the guidance icon (2) to operate the function.

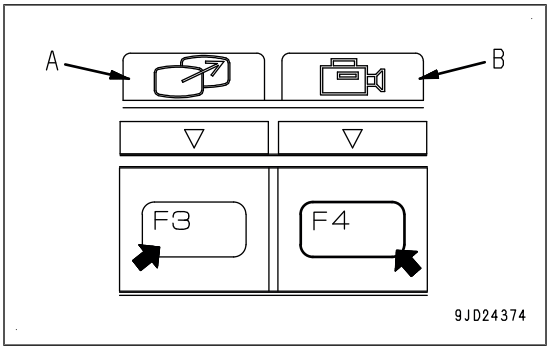
When the machine monitor display shows the standard screen, the types of guidance icons and functions of function switches are as follows.

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



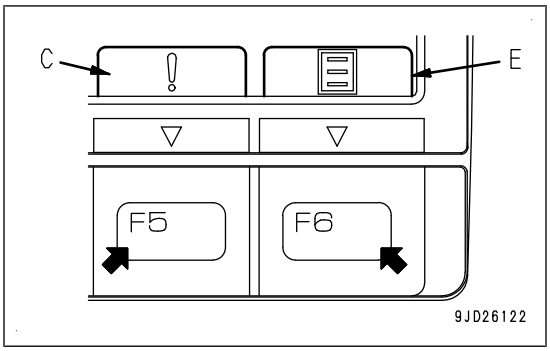
(A) Switch F3: Monitor screen selector switch

(B) Switch F4: Camera image selector switch



(C) Switch F5: Current Abnormality display switch

(only while caution lamp is lit)

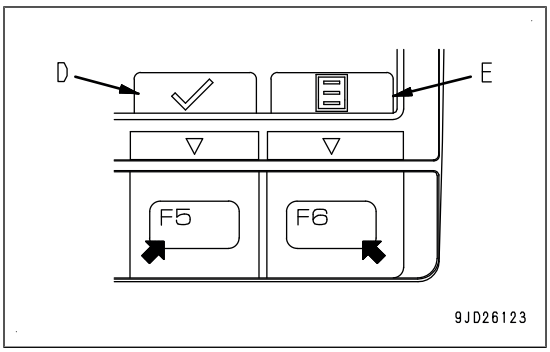


(D) Switch F5: ECO guidance erase switch

(only while ECO guidance is displayed)

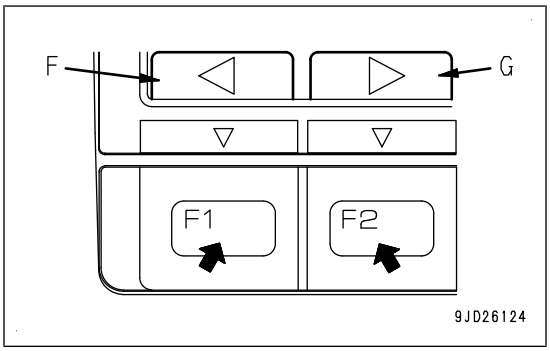
(E) Switch F6: User menu display switch

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.



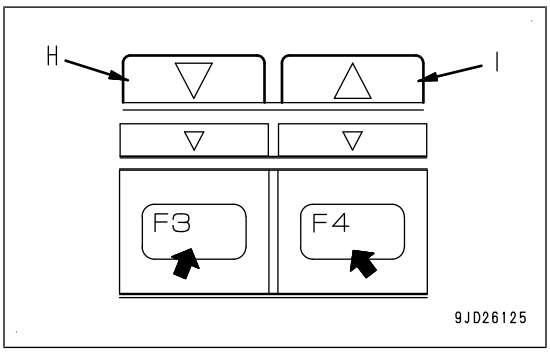
(F) Switch F1: Moves to the left item. (When on the left end, it moves to the right end.)

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



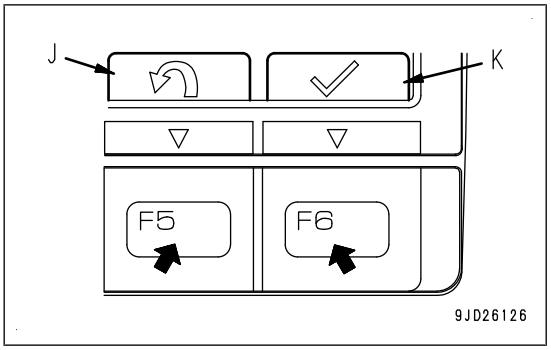
(H) Switch F3: Moves to the item below (forward). (When on the last line, it moves to the first line.)

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



(J) Switch F5: Cancels any change and returns the screen to the previous screen.

(K) Switch F6: Enters the selection and contents to change, and proceeds the screen to the next screen.



REMARK

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

Working Mode Selector Switch

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

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

P mode: For heavy-duty operations

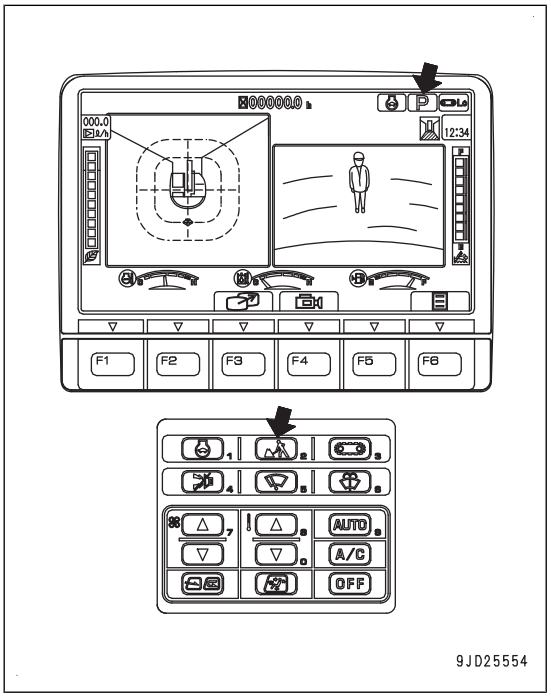
E mode: For operations with emphasis on fuel consumption

L mode: For fine control operations

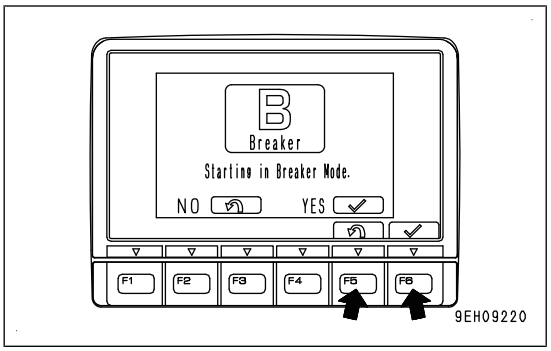
B mode: For breaker operations

ATT/P mode: For operations of 2-way attachments like crusher (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)



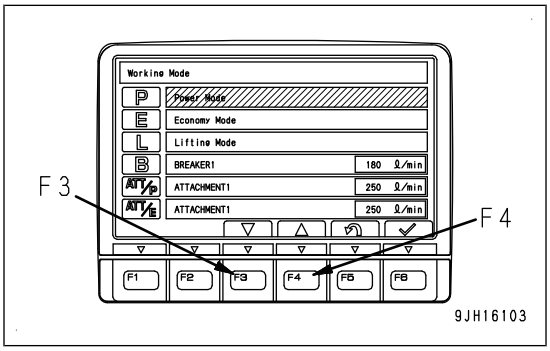
- When the monitor is turned ON, it is automatically set to the mode used when the starting switch was turned to OFF position last.
- Press the switch to display the working mode selection screen (2). For each set mode, P, E, L, B, ATT/P, ATT/E are displayed at the top right of the monitor display.
- For machines ready for installation of attachment, the attachment mode is added to the display.
- 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 switch F6.
  If you press F5, the system starts up in E mode.



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

How to Use the Working Mode Selection Function

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

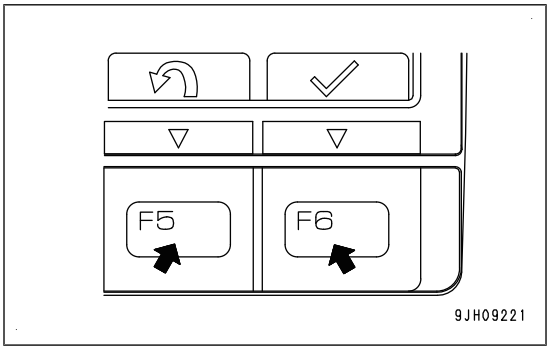


2. Press switches F3 or F4 at the bottom of the screen or working mode selector switch (1) to change the mode selection one at a time.

   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

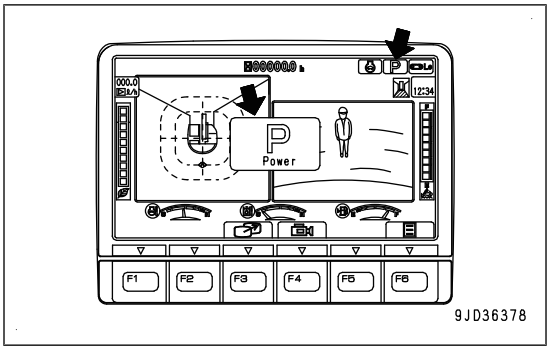
   To return to the standard screen without changing the working mode, press switch F5.



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

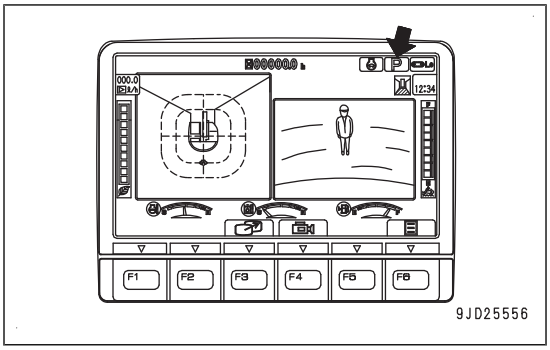
   (Example: When the power mode is selected: P)

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



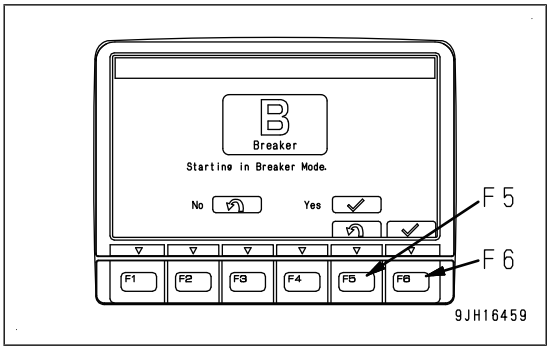
5. After 2 seconds, the screen returns to the standard screen.

   The working mode display highlighted in yellow in step 4 returns to blue.



REMARK

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



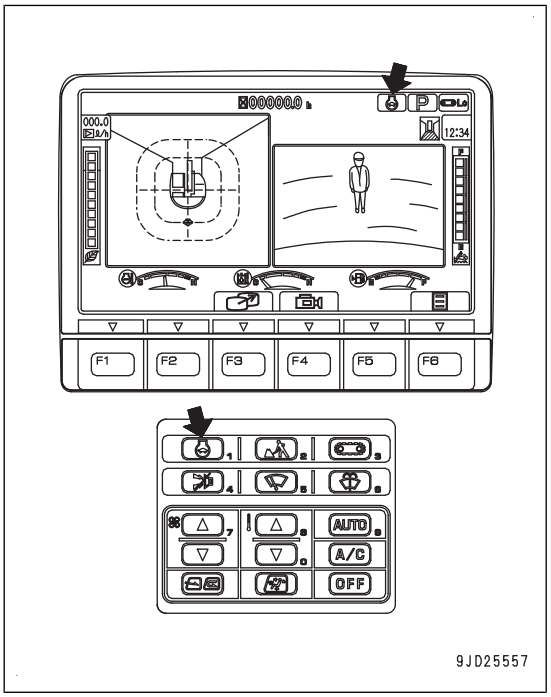
Auto-Deceleration Switch

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.



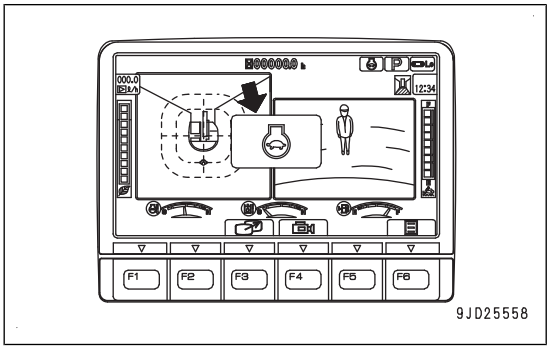
Function of Auto-Deceleration

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.

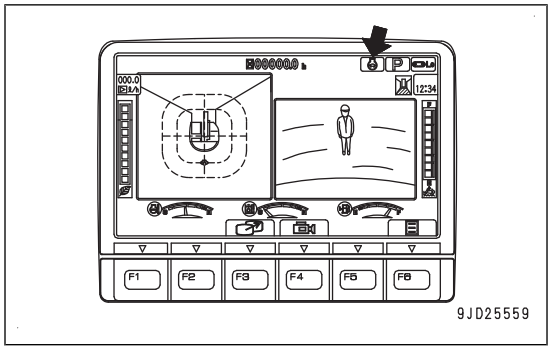
If any lever is operated in this condition, engine speed will return to the previous operating speed, and you can perform the operation.

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.



2. On the standard screen, auto-deceleration pilot lamp lights up.

   (When the auto-deceleration is OFF, the indication lamp goes out.)



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 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. 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

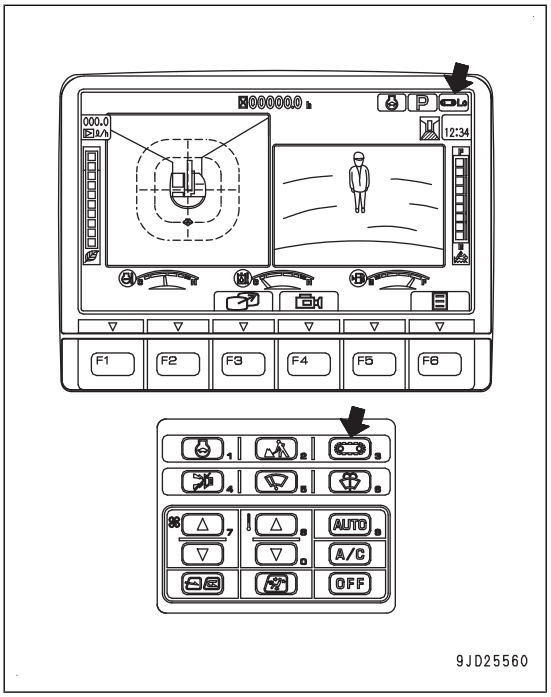
Mi lights up: Mid-range speed travel

Hi lights up: High-speed travel

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

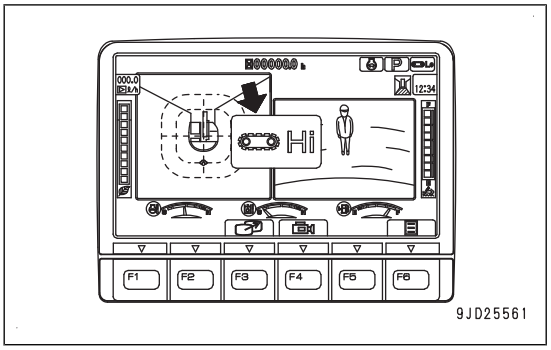
Each time that the switch is pressed, the display changes Lo → Mi → Hi → Lo in turn.

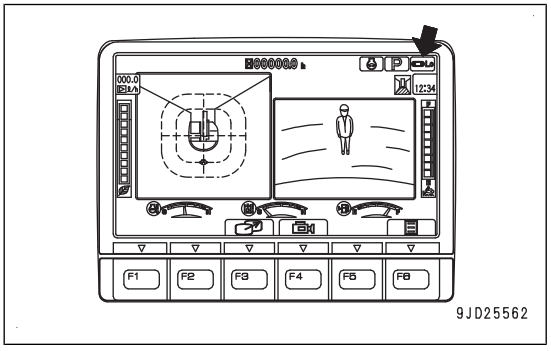
Even if the travel speed is set to high-speed (Hi) or a mid-range speed (Mi), when traveling on soft ground or uphill, and travel power is needed, the system automatically shifts down to low-speed travel (Lo). There is no need to operate the switch. In this case, the travel speed on the monitor display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



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

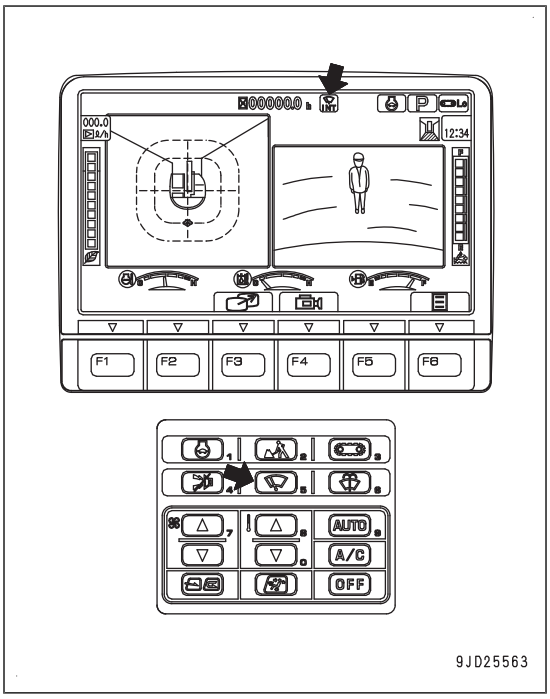
Wiper switch actuates the front window windshield wiper.

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

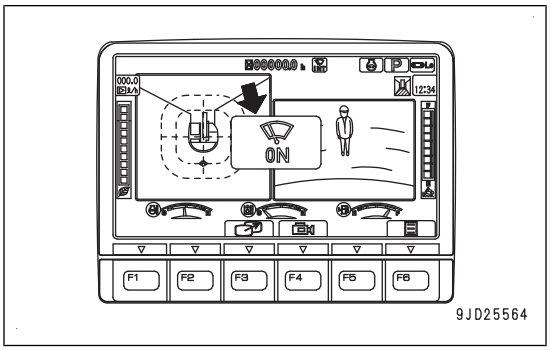
Windshield wiper pilot lamp ON lights up: Windshield wiper operates continuously

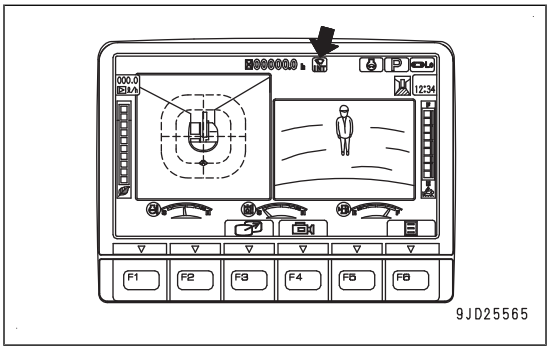
Windshield wiper pilot lamp off: Windshield wiper stops



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 screen.

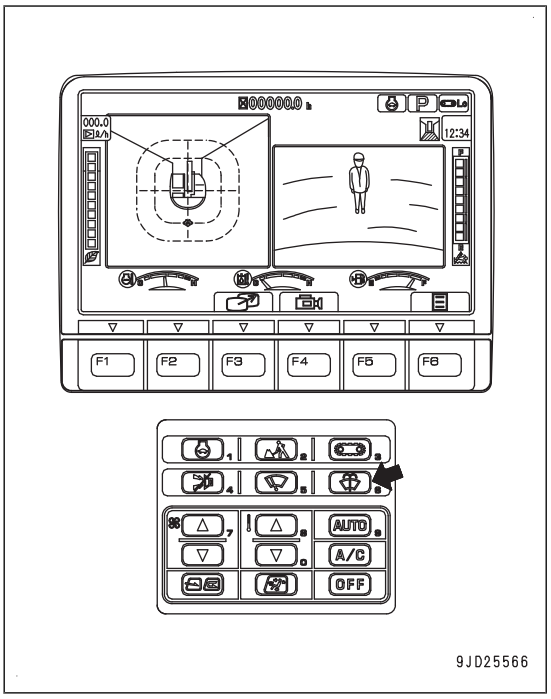




Window Washer Switch

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

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

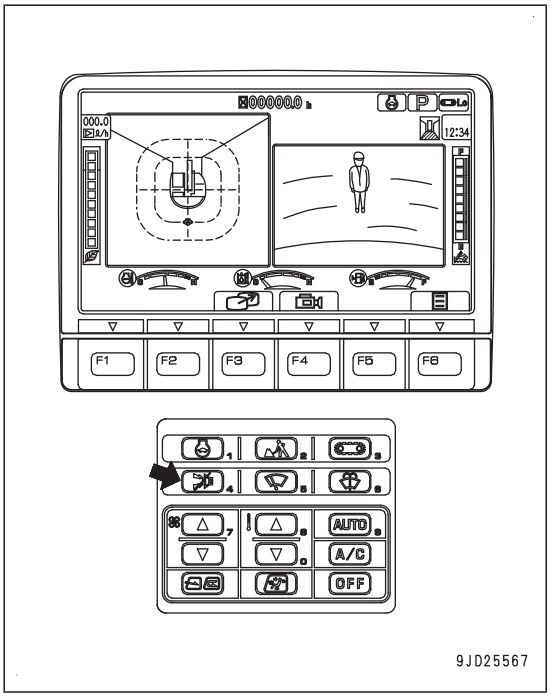


Buzzer Cancel Switch

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

REMARK

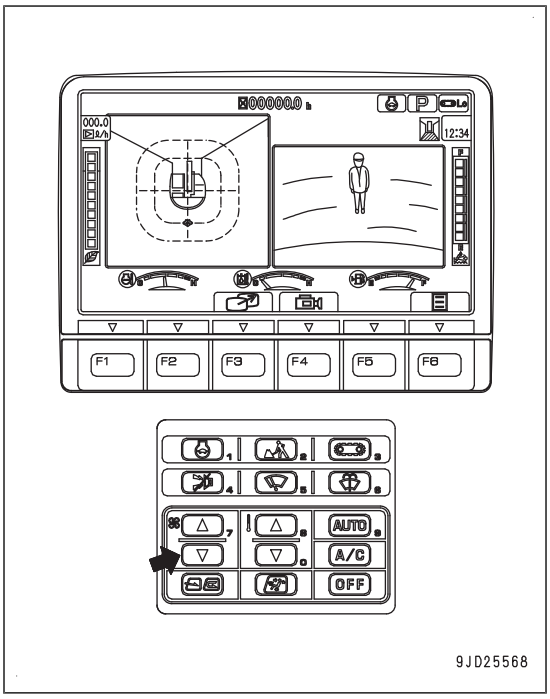
The buzzer cannot be stopped according to the content of the warning.



Air Conditioner Switch

The air conditioner switch consists of 9 switches.

For explanation of each switch, see “Handle Air Conditioner”.

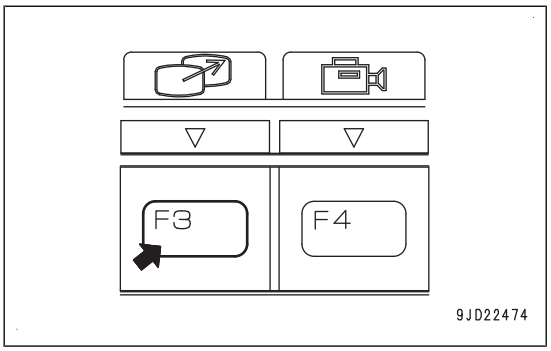


Function Switches

The operation of the function switches in the standard screen

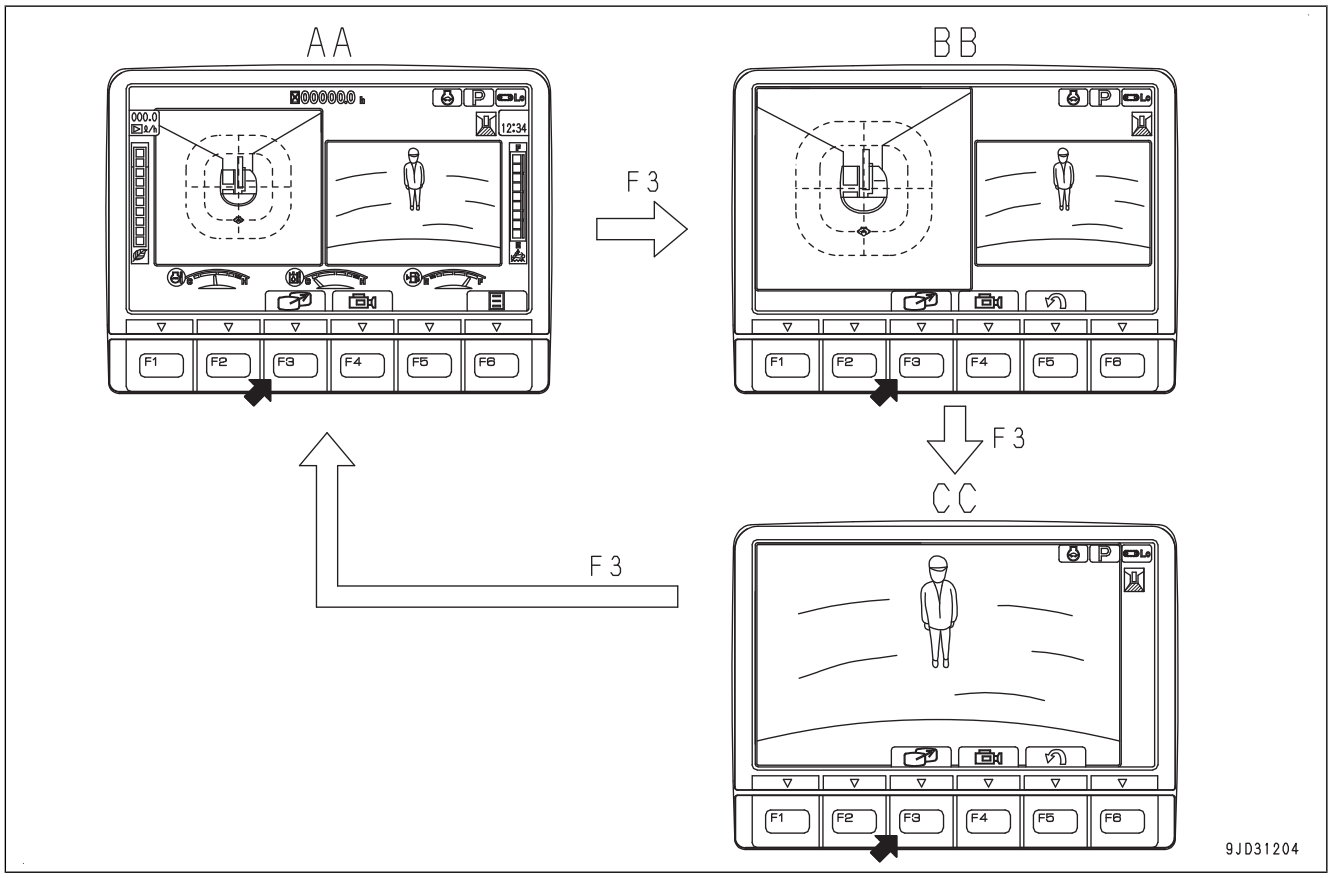
Monitor Display Selector Switch

By pressing the switch F3 on the standard screen, you can enlarge the bird's eye view display, switch to the camera image screen.



Operation on the Camera Image Display Screen

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



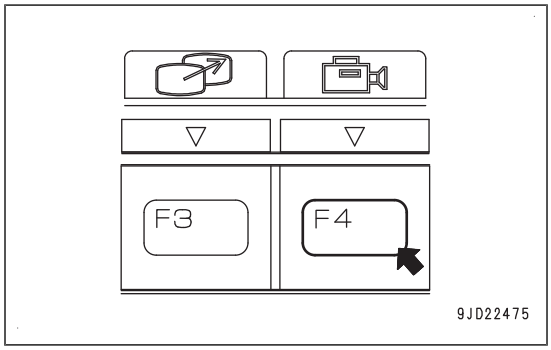
AA: Standard screen, BB: Enlarged bird's eye view display, CC: Camera image screen

- On the standard screen AA, the synthesized image to show the area around the machine from above and the image of the camera loaded into the machine are displayed on the left and right sides of the machine monitor, respectively.
- On the standard screen AA, when the switch F3 is pressed, the enlarged bird's eye view display BB is displayed.
- If the switch F3 is pressed on the enlarged bird's eye view display BB, the camera image screen CC is displayed. On the camera image screen CC, the camera image is displayed in the entire monitor.
- If the switch F3 is pressed on the camera image screen CC, the standard screen AA is displayed.

- The screen automatically changes to the standard screen AA while the camera image screen CC is displayed when operating work equipment, swing, travel and attachment.

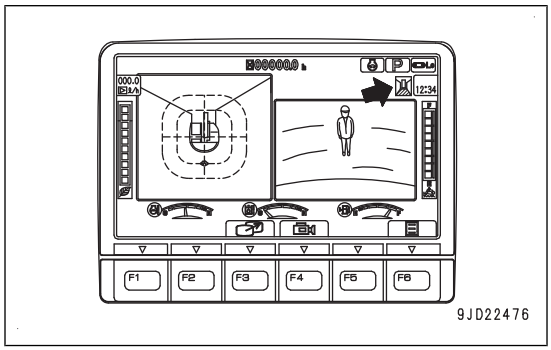
Camera Image Selector Switch

- By pressing the switch F4, you can switch the camera image between the images from the right, left, and rear cameras of the machine.
- Machine monitor screen automatically changes to the screen which displays the bird's eye view display of KomVision when operating work equipment, swing, travel and attachment.



On the start screen, the camera image switch display flashes in the position shown in the figure.

The green range of the camera image switch display shows of which camera the image is displayed.



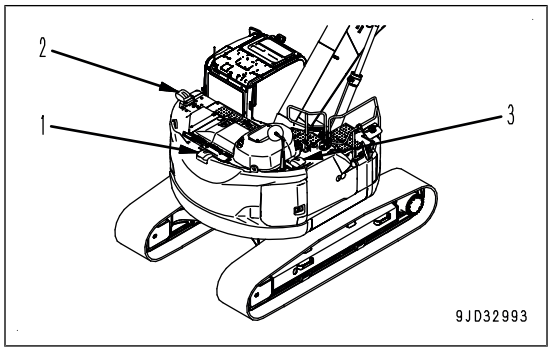
Camera image switch display	Displayed camera position
 9JD22411	Rear camera
 9JD22412	Right rear camera
 9JD22413	Left rear camera

The shooting direction of the camera loaded into the machine is as follows:

(1) Back of the machine

(2) Left of the machine

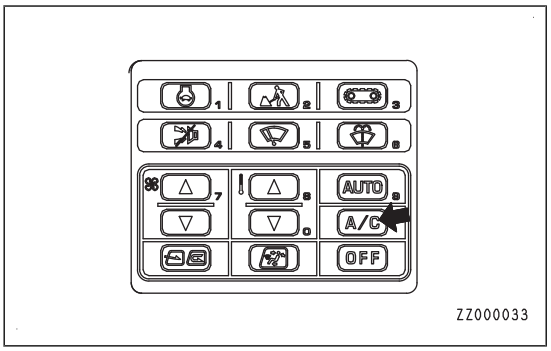
(3) Right of the machine



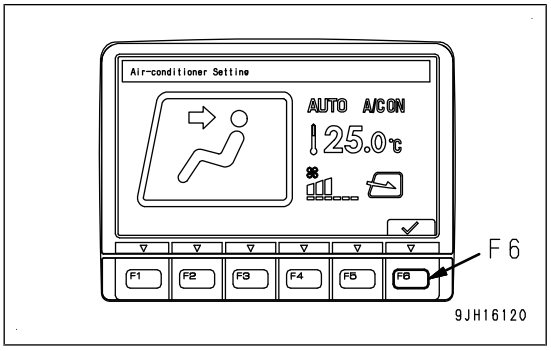
Other Mode Operations While Camera Image is Shown

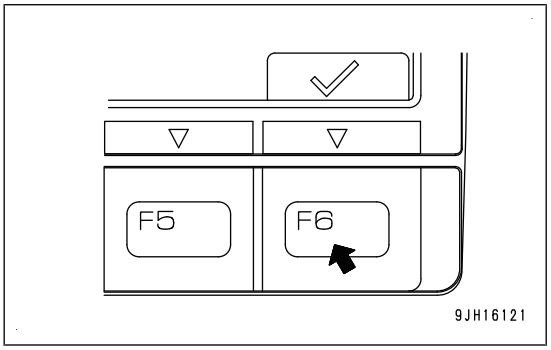
Even when the camera image is displayed, it is possible to operate the following modes.

But operation of air conditioner and working mode cannot be changed while operating work equipment, swing, travel and attachment. Finish the operation, and set the directional lever to NEUTRAL position.



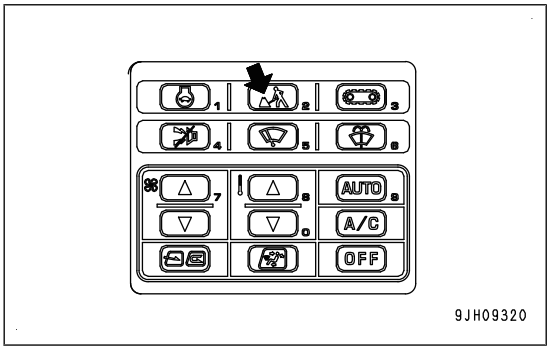
- The air conditioner can be operated.
  If the air conditioner switch is operated, the screen switches to the air conditioner operation screen. When the screen switches to the air conditioner operation screen, press the switch F6 to return to the camera image screen. In addition, if no operation is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





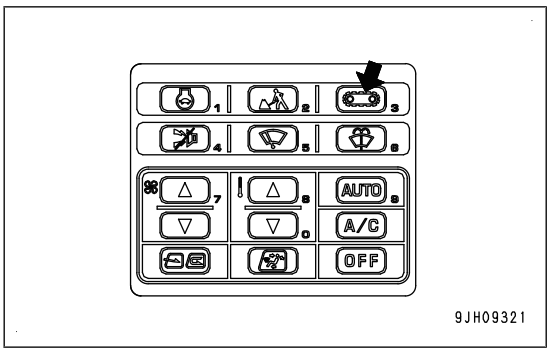
- It is possible to change the working mode by pressing the working mode selector switch.

  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 machine monitor display is highlighted in yellow for 2 seconds, then returns to blue.



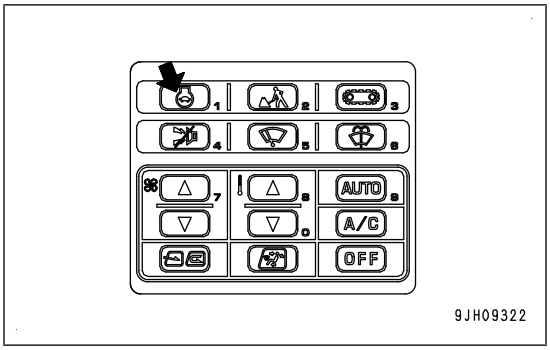
- Press the travel speed selector switch to change the travel speed.

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



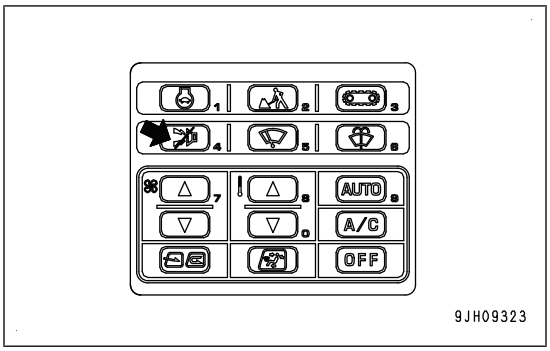
- Press the auto-deceleration switch to turn on or off the auto-deceleration function.

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



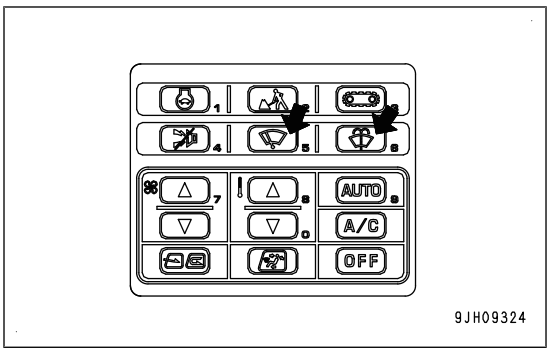
- Press the buzzer cancel switch to stop the alarm buzzer for the warning item where there is an abnormality.

  Even if the buzzer cancel switch is pressed, the camera image display screen neither switches to another screen nor returns to the standard screen.
  Depending on the warning, alarm buzzer does not stop sounding by pressing the buzzer cancel switch.



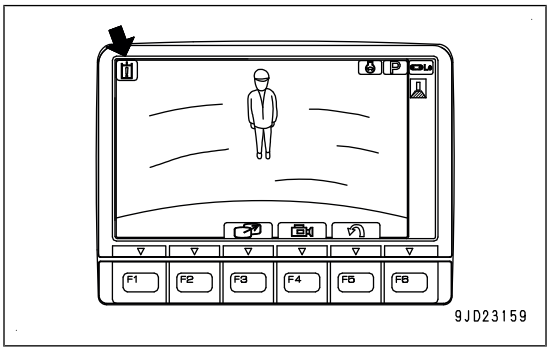
- Press the wiper switch and washer switch to operate the wipers and washer.

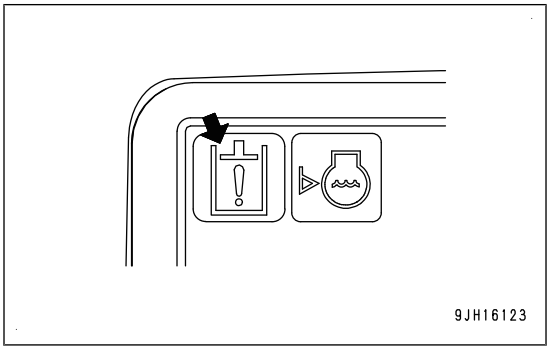
  Even if the wiper switch or washer switch is pressed, the camera image display screen neither switches to another screen nor returns to the standard screen.



Procedures Against Warning During Camera Image Display

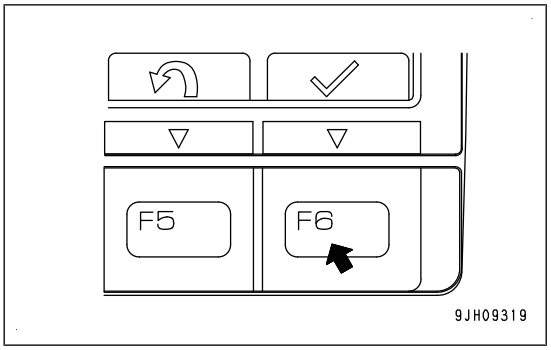
- If any abnormality is generated on the machine while the camera image is displayed, the caution lamp flashes at the top left of the screen.





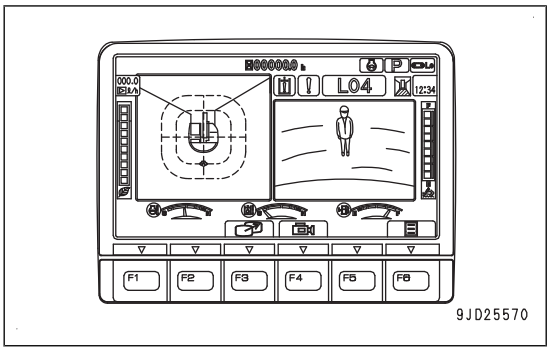
- If the caution lamp is displayed, press the switch F6 to return to the standard screen, and check the content of the abnormality or warning display.

  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.

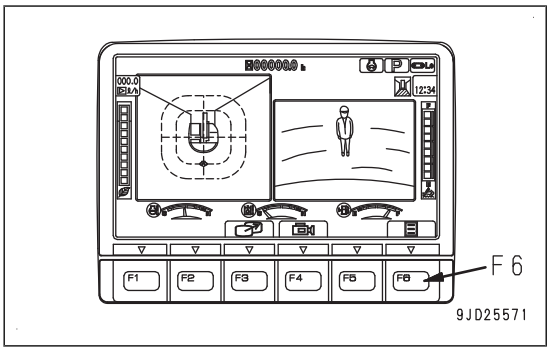


User Menu Display Switch

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

Machine monitor screen automatically changes to the screen which displays the bird's eye view display of KomVision when operating work equipment, swing, travel and attachment while the user menu screen is displayed.

Screen cannot be shifted to the user menu screen while operating work equipment, swing, travel and attachment.



User Menu

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

(a): “Energy Saving Guidance”

(b): “Machine Setting”

(c): “Aftertreatment Devices Regeneration”

(d): “SCR Information”

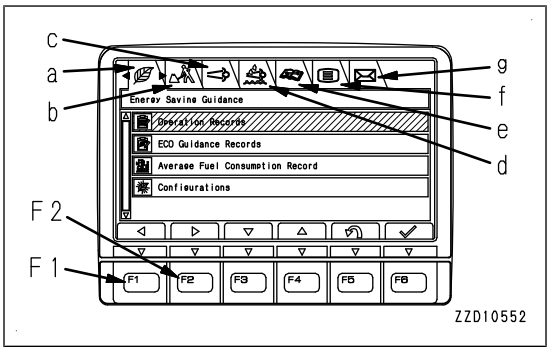
(e): “Maintenance”

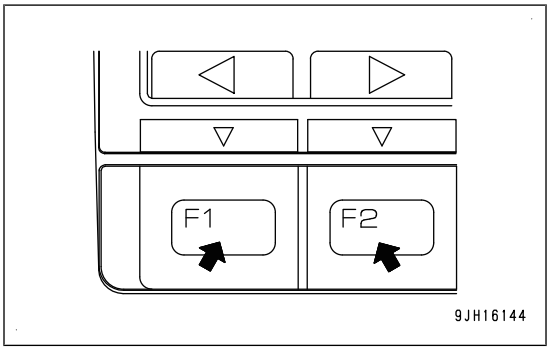
(f): “Monitor Setting”

(g): Mail Check

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

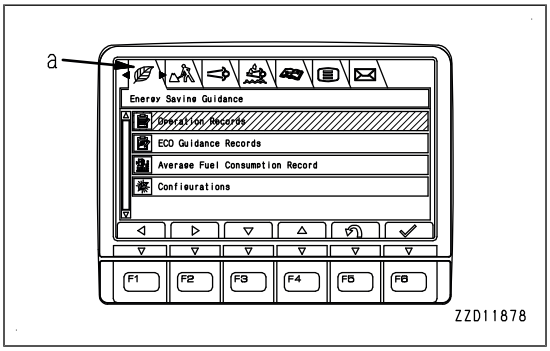
For operations in each menu, see the detailed explanation pages of respective items.





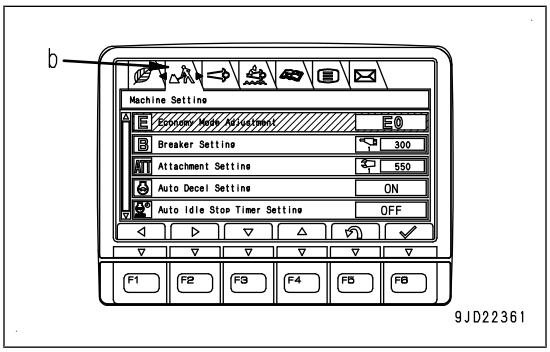
(a) “Energy Saving Guidance”

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



(b) “Configurations”

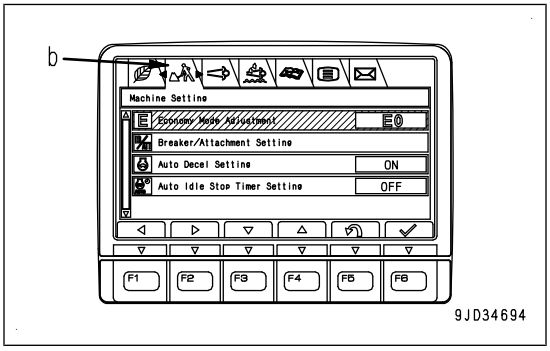
- “Economy Mode Adjustment”
- “Breaker Setting” (if equipped)
- “Attachment Setting” (if equipped)
- “Auto-deceleration Setting”
- “Auto Idle Stop Timer Setting”



When the attachment control setting is effective

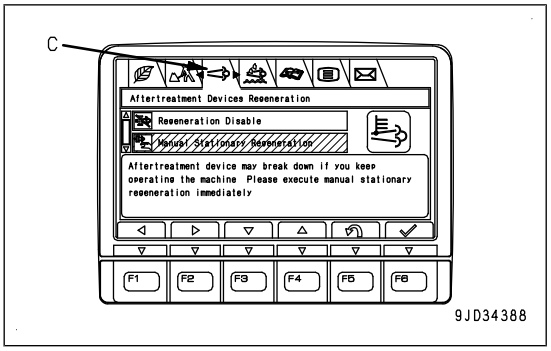
(if equipped)

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



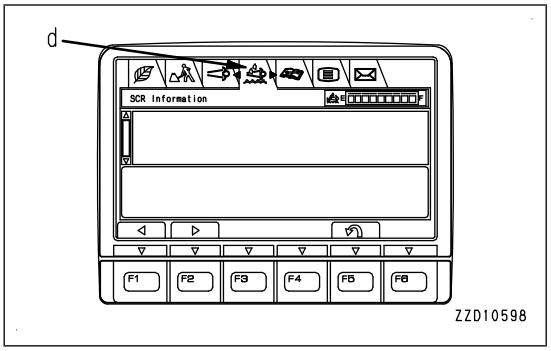
(c) “Aftertreatment Devices Regeneration”

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



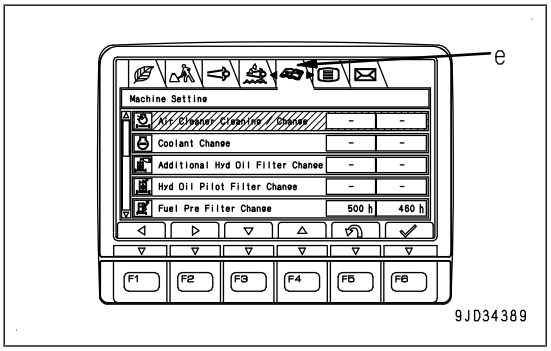
(d) “SCR Information”

- Check of DEF level
- Urea SCR system information



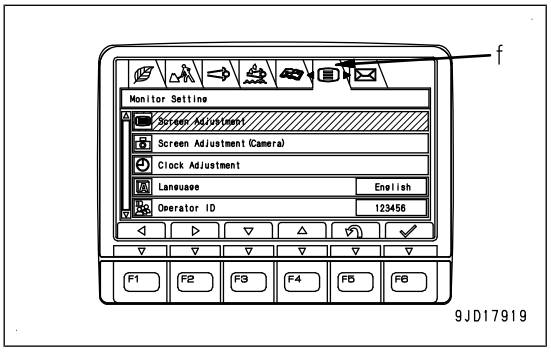
(e) “Maintenance”

- Check and resetting of various Maintenance Times



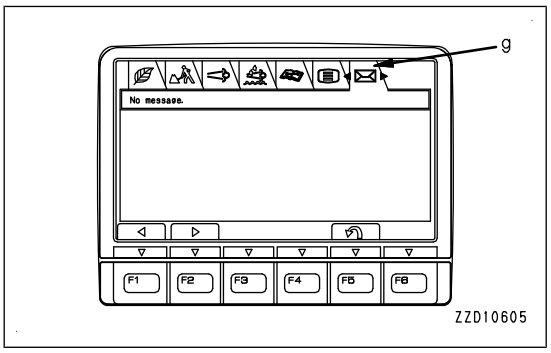
(f) “Monitor Setting”

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

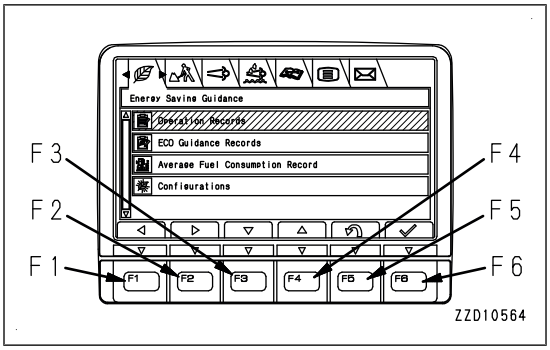


(g) Mail check

- Check of mail contents and reply to mail

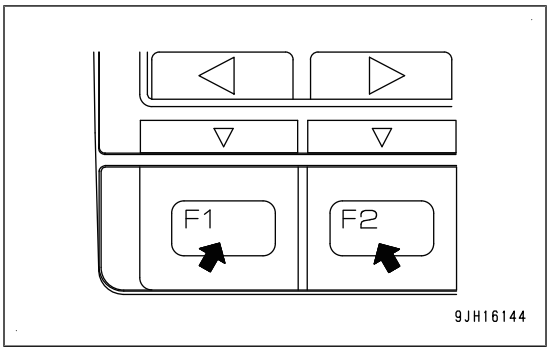


On the user menu screen, you can perform the following operations with switches F1 to F6.



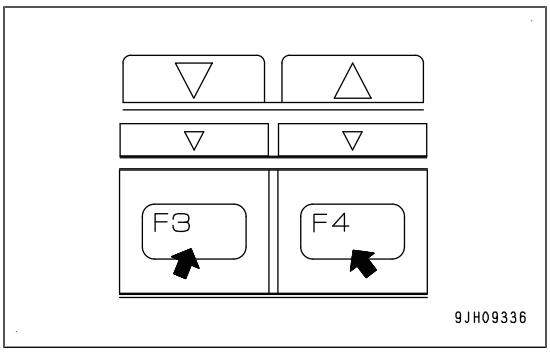
F1: Moves to the left menu. When it is on the left end menu, it moves to the right end menu.

F2: Moves to the right menu. When it is 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.

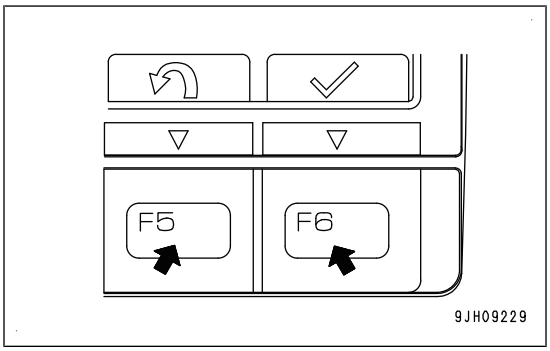
F4: Moves to the previous item (1 line above). When it is on the first line, it moves to the last line.



F5: Returns the screen to the standard screen.

F6: Displays the setting screen for selected item.

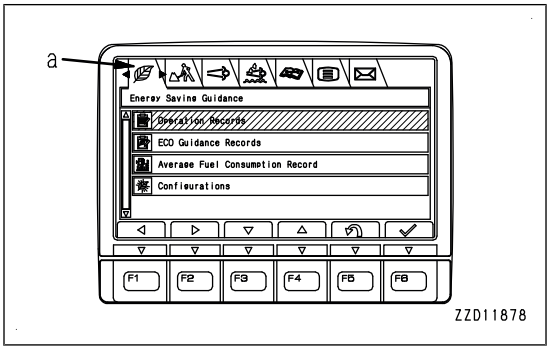
- If no switch is operated for 30 seconds on the user menu screen, the screen automatically returns to the previous screen.



ECO Guidance

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

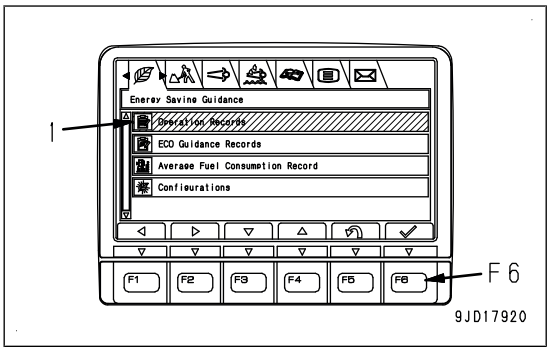
- “Operation Records”
- “Eco Guidance Records”
- “Average Fuel Consumption Record”
- “Configurations”



See Operation Records

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.



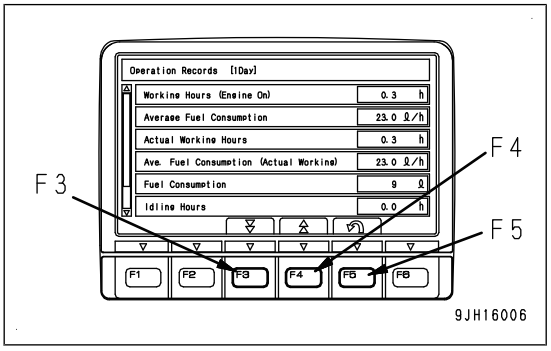
Operation on the Operation Records Screen

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.

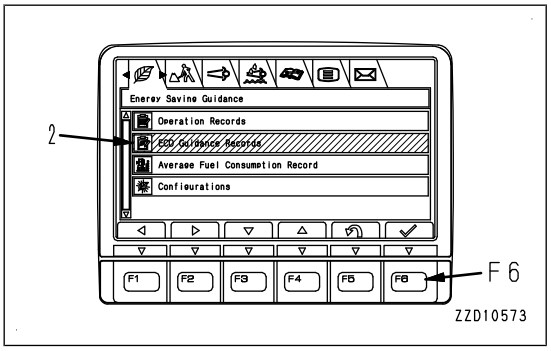
F5: Returns the screen to the Energy Saving Guidance menu screen.



Examine ECO Guidance Record

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

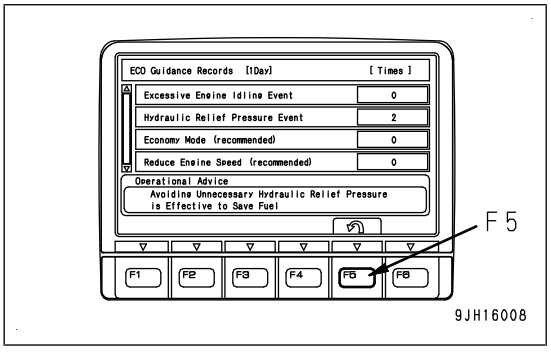
On the ECO Guidance Records menu, display the frequency of display of the ECO guidance on a daily basis or during the split measurement period.



Operations on ECO Guidance Records Screen

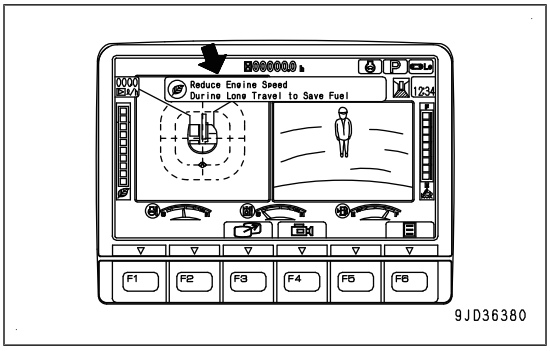
Press switch F5 to perform the following operation on the ECO Guidance Records screen.

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



REMARK

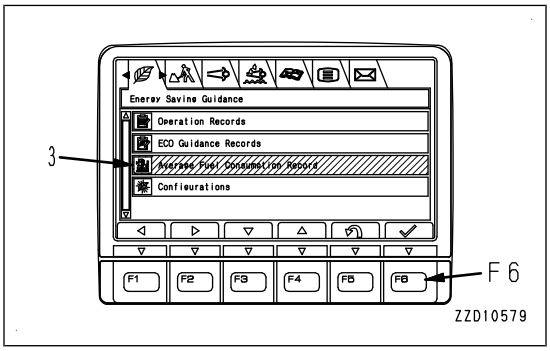
ECO guidance denotes displaying the guidance for energy saving operation. This display may appear on the standard screen while the machine is in operation.



See 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.



Operations on Average Fuel Consumption Record Screen

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

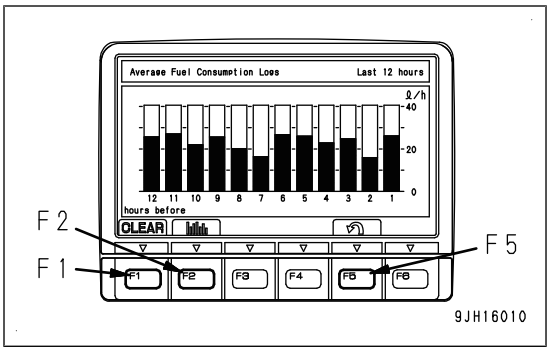
F1: Clears the graph data.

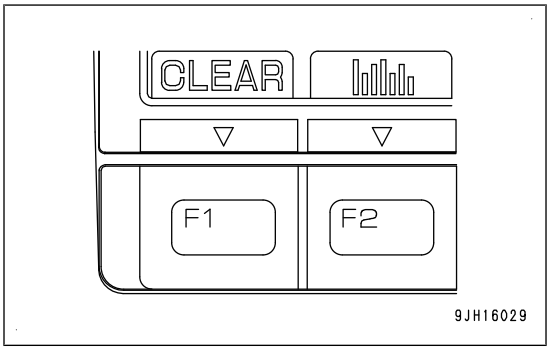
F2: Switches graphical displays of the average fuel consumption.

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.).



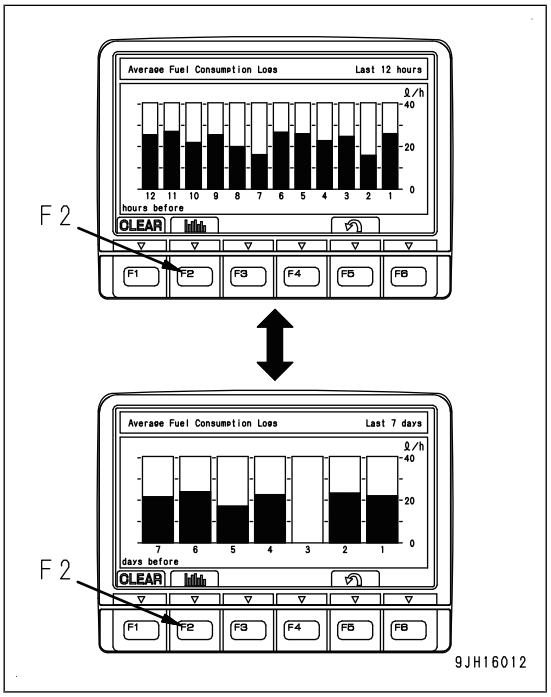


Changes of the Graph Shown

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.

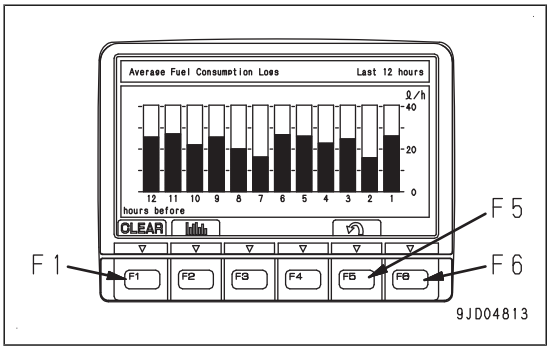


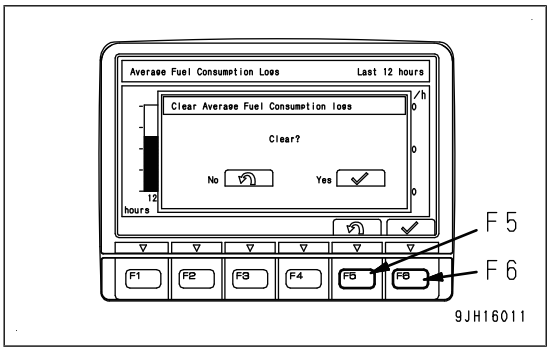
Delete “Average Fuel Consumption Record”

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.



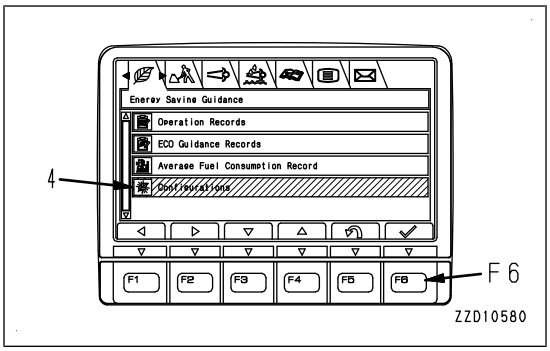


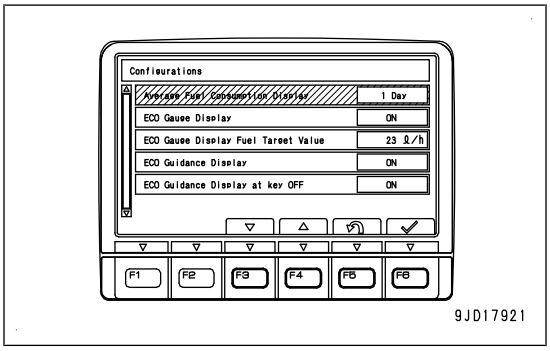
Change Display Setting

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 Configurations Screen

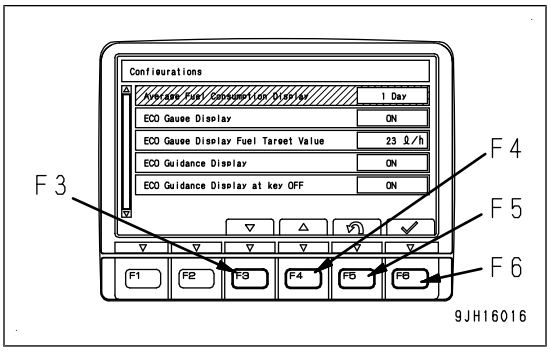
Press switches F3 to F6 to perform the following operations on the Configurations screen.

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.

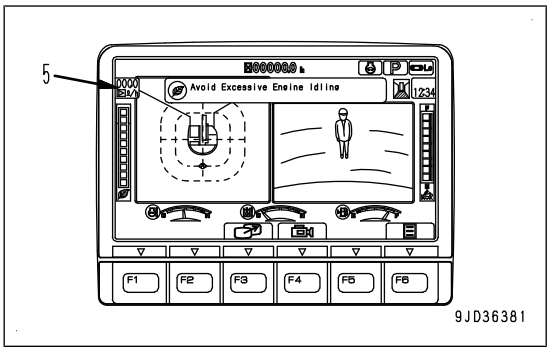
F5: Returns the screen to the Energy Saving Guidance menu screen.

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.

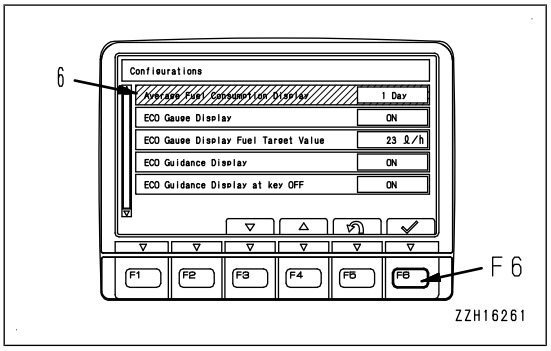
   On this screen, it is possible to perform the following operations with switches F3 to F6.

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

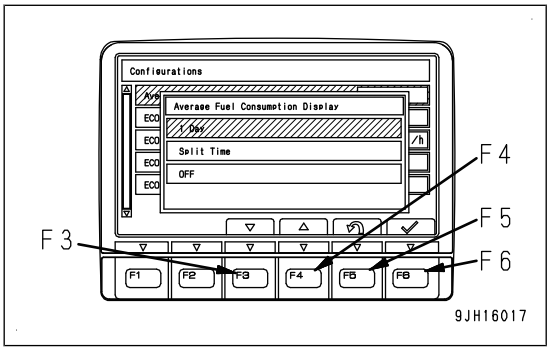
   F4: Moves to the previous item (1 line above). When on the first line, it moves to the last line on the previous page.

   F5: Cancels the setting and returns to Configurations screen.

   F6: Changes the setting and returns to Configurations screen.

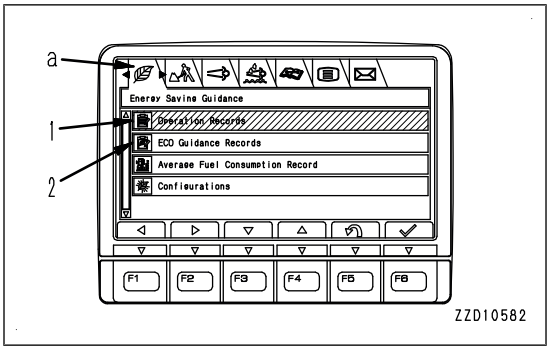


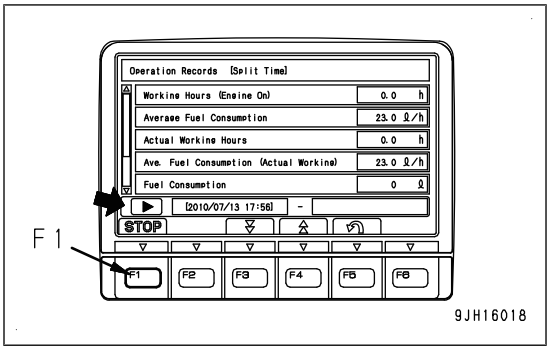
2. The Average Fuel Consumption Display screen appears.
   - 1 Day
     Displays the average fuel consumption from 0:00 a.m. of the day to 0:00 a.m. of the next day.
   - Split Time
     Displays the average fuel consumption during the split measurement period.
     Select the split to start the automatic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

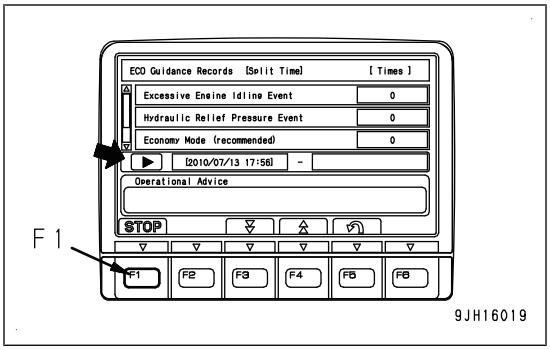


REMARK

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).

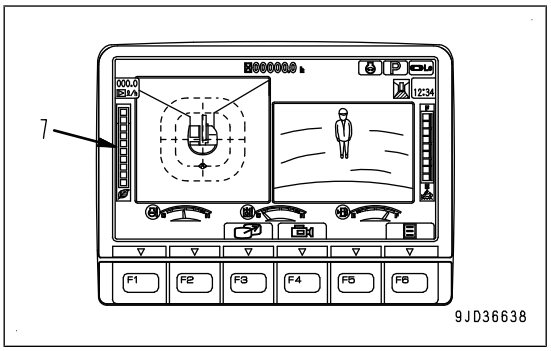






Switch Display/Non-Display of ECO Gauge

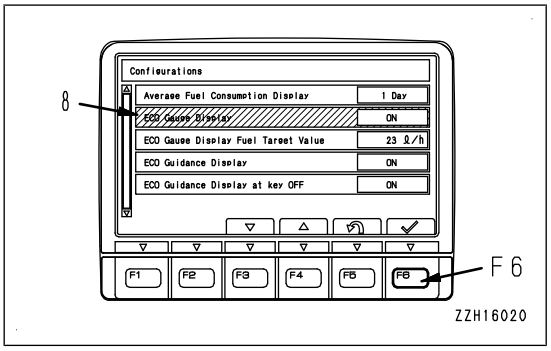
It is possible to change the setting of Display/Non-display of ECO gauge (7).



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.



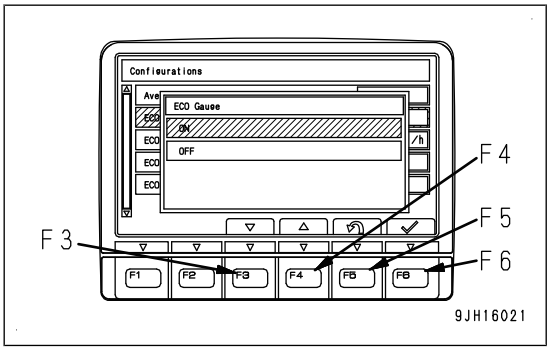
On the Configurations screen, it is possible to perform the following operations with switches F3 to F6.

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.

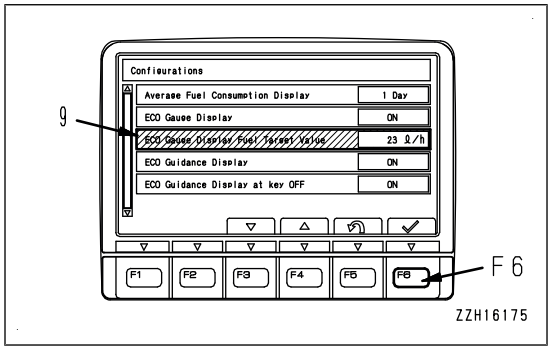
F6: Changes the setting and returns to Configurations screen.



Target Fuel Consumption Value in ECO Gauge Setting

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 ECO Gauge Target Value (9) from the Configurations screen, then press switch F6.



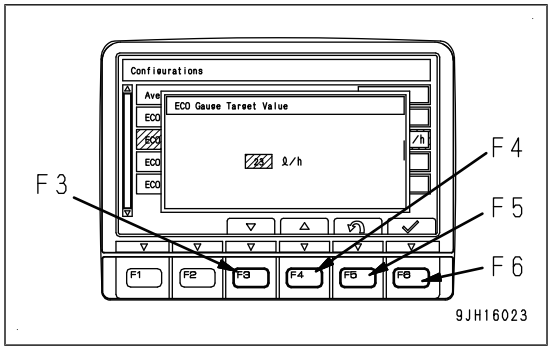
2. ECO Gauge Display Fuel Target Value appears.
   On this screen, it is possible to perform the following operations with switches F3 to F6.

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

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

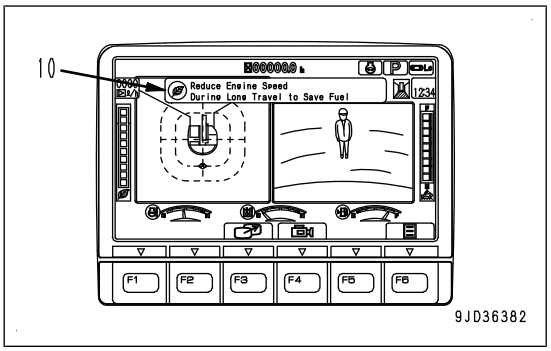
   F5: Cancels the setting and returns to Configurations screen.

   F6: Changes the setting and returns to Configurations screen.

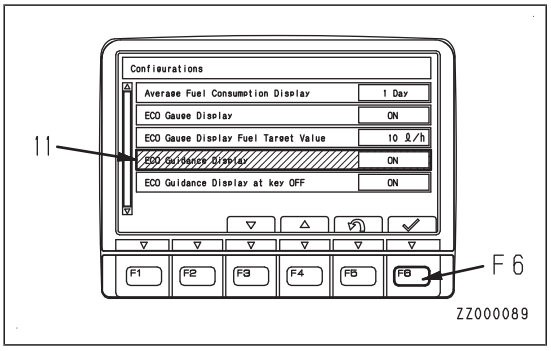


Change Display/Non-Display of ECO Guidance

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



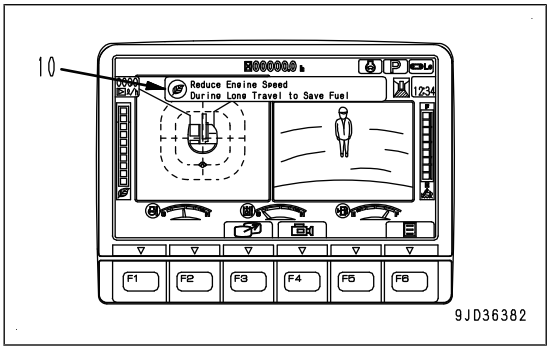
1. Select ECO Guidance display (11) from the Configurations screen, then press switch F6.



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.



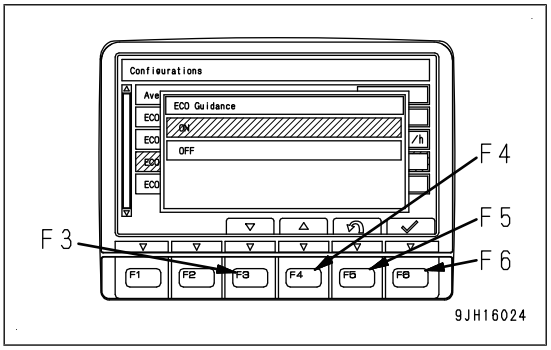
On this screen, it is possible to perform the following operations with switches F3 to F6.

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.

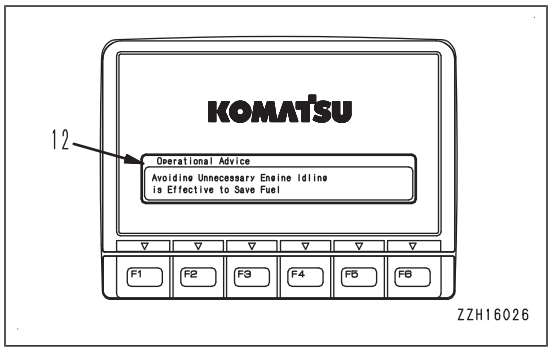
F5: Cancels the setting change and returns to Configurations screen.

F6: Changes the setting and returns to Configurations screen.

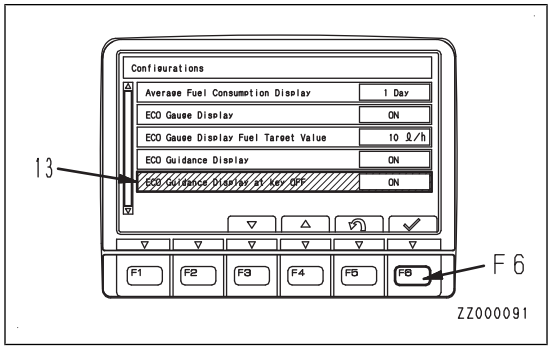


Change Display/Non-Display of Guidance When Key is Off

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



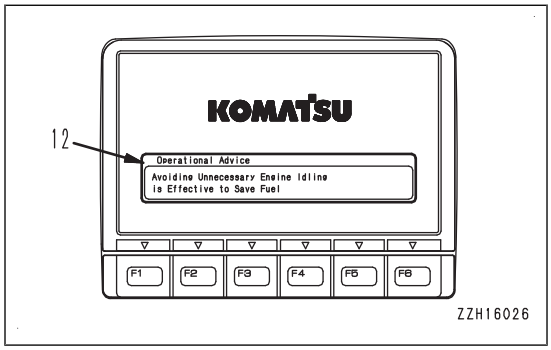
1. Select ECO Guidance at Key OFF (13) from the Configurations screen, then press switch F6.



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.



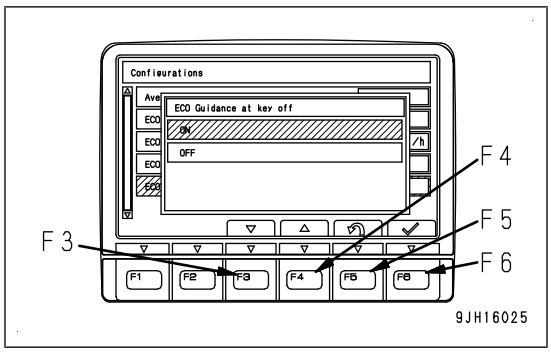
On this screen, it is possible to perform the following operations with switches F3 to F6.

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.

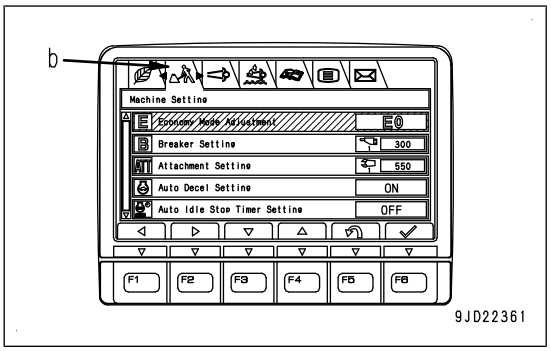
F6: Changes the setting and returns to Configurations screen.



Machine Settings

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

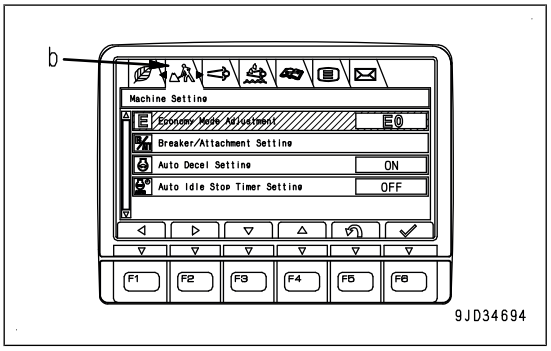
- “Economy Mode Adjustment”
- “Breaker Setting”
- “Attachment Setting”
- “Auto-deceleration Setting”
- “Auto Idle Stop Timer Setting”



When the attachment control setting is effective

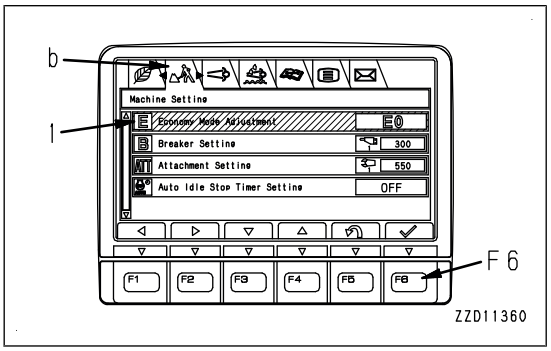
(if equipped)

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



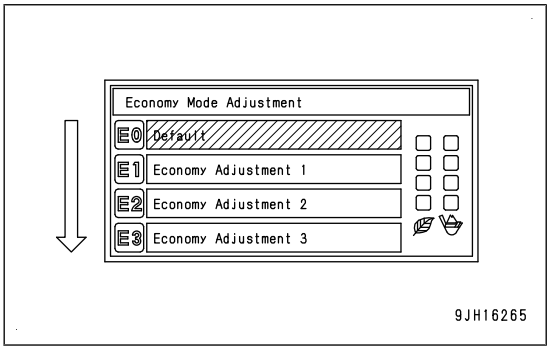
Adjust Economy Mode

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



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

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



Operation on Economy Mode Adjustment Screen

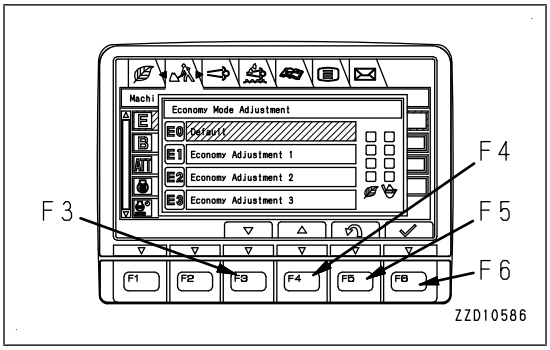
On the Economy Mode Adjustment screen, you can perform the following operations with switches F3 to F6.

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.

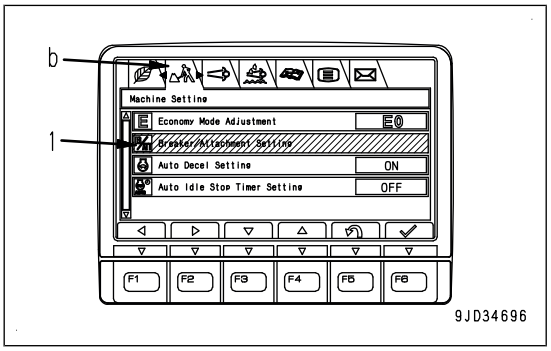


Breaker/Attachment Setting

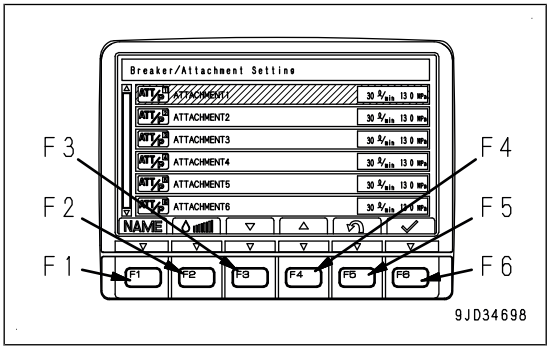
On “Breaker/Attachment Setting”, you can change the name of attachment displayed on the monitor and the attachment oil flow rate setting.

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

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



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



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

F1: Changes the name of the selected attachment setting.

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

F3: Moves to the next item (1 line below). When 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: Cancels the selection and returns the screen to “Machine Setting” menu screen.

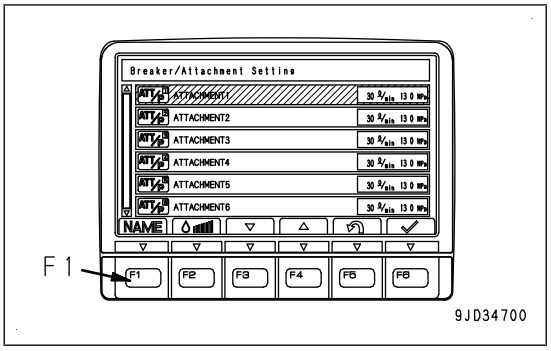
F6: Allocates the selected setting to that of ATT/P or ATT/E mode.

Changing Attachment Setting Name

You can change the name for the attachment setting to desired name.

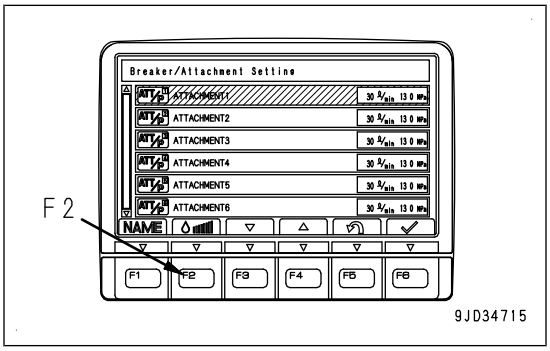
You can use alphabet letters (A to Z), Arabic numerals (0 to 9), symbols (#, *, +, -, and /), and the blank (space).

1. Select a setting to change on the “Attachment Setting” screen, then press the switch F6.
   - When working mode is set to B mode
     Change the name by referring to “Changing the Breaker Setting name”.
   - When working mode is set to ATT/P mode or ATT/E mode
     Change the name by referring to “Changing the Attachment Setting name”.



Changing the Flow Rate of “Breaker/Attachment Setting”

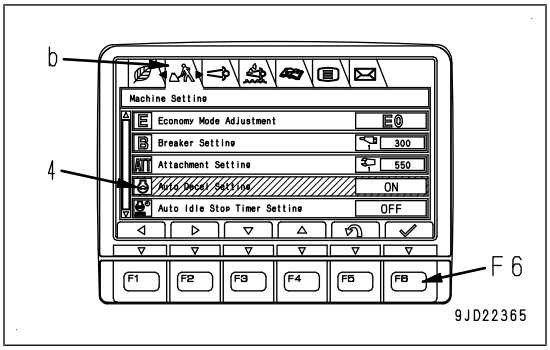
1. Select an attachment setting to change its oil flow rate on the “Attachment Setting” screen, then press the switch F2.
   - When working mode is set to B mode
     Change the flow rate by referring to “Changing the flow rate of Breaker Setting”.
   - When working mode is set to ATT/P mode or ATT/E mode
     Change the flow rate by referring to “Changing the flow rate of Attachment Setting”.



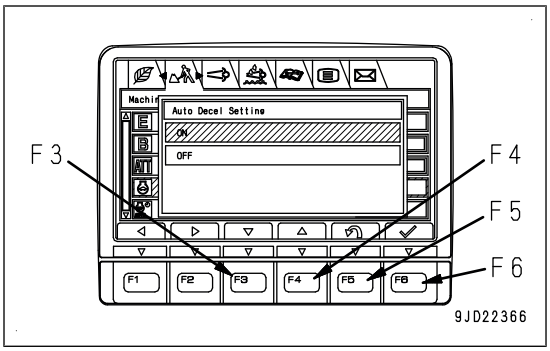
Set Auto-Deceleration

On “Auto Deceleration Setting”, you can configure the auto-deceleration function.

1. Select “Auto Deceleration Setting” (4) on “Machine Setting” menu (b) screen, then press the switch F6.



2. The screen changes to “Auto Deceleration Setting” selection menu screen.
   - ON: Use the auto-deceleration function
   - OFF: Not use the auto-deceleration function



On this setting screen, it is possible to perform the following operations with switches F3 to F6.
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: Cancels the setting change and returns the screen to the Machine Setting screen.
F6: Changes the setting and returns the screen to the Machine Setting screen.

Auto Idle Stop Timer Setting

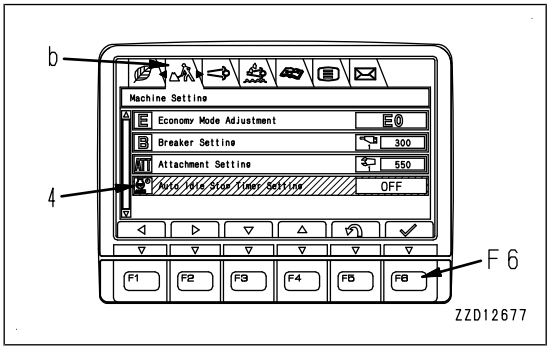
The auto idle stop function stops the engine automatically when the engine is operated continuously at idle with the lock lever in LOCK position for a set time.

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

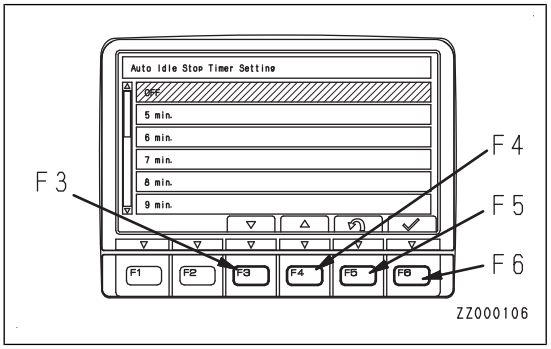
- The engine is running normally.
- The lock lever is in LOCK position.
- The engine coolant and hydraulic oil are not overheating.
- The engine is not in warm-up operation.
- The machine is not in L mode.

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.

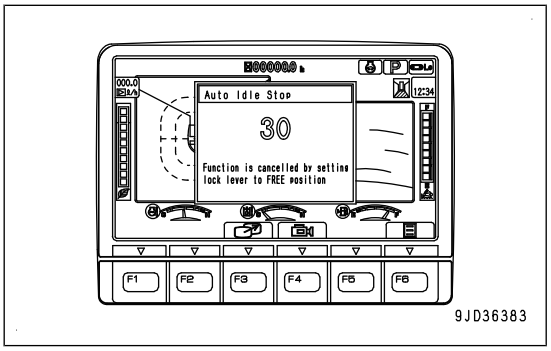
F6: Allocates the selected setting to that of the Auto Idle Stop Timer Setting.

REMARK

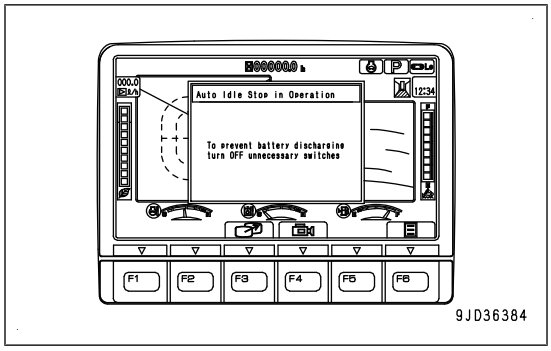
- Choosing “OFF” disables operation of the auto idle stop function.
- You cannot select a time longer than that specified in the Service Menu.

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.



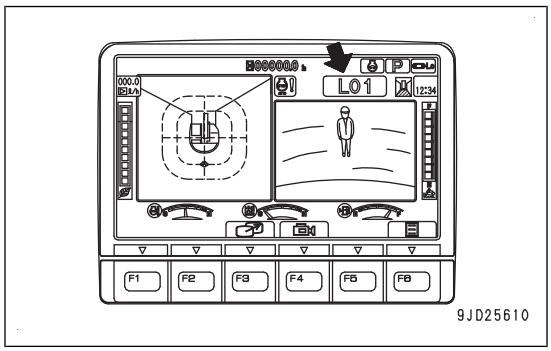
REMARK

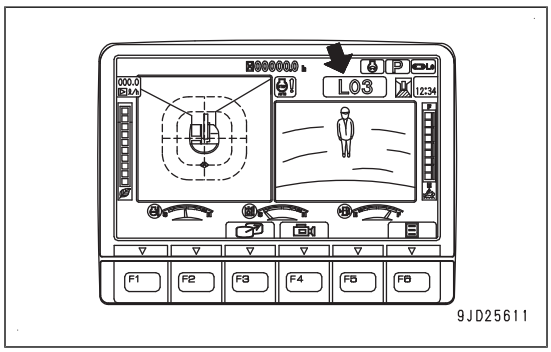
While the auto idle stop is activated, only the engine is stopped and the machine monitor, inverter, etc., as well as the electrical components including the air conditioner, radio, lamps, and wipers keep their states before the engine is stopped.

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

REMARK

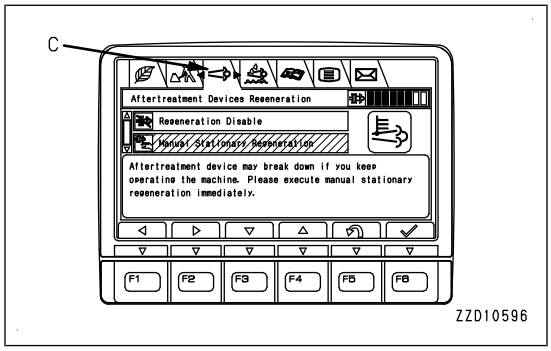
While the auto idle stop function is ON, the number of the times that the engine was stopped when it was not at low idle (the engine speed is 1400 rpm or higher) is displayed as “L01” at and after 1000 and as “L03” at and after 2000 on the monitor.





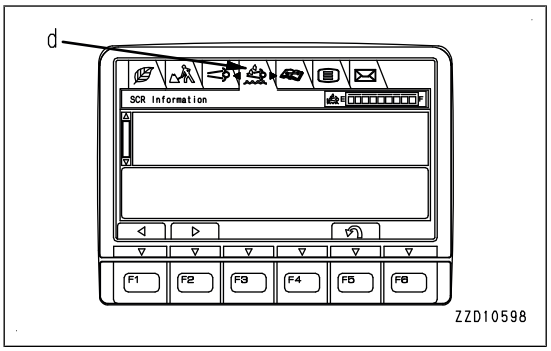
Aftertreatment Devices Regeneration

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



SCR Information

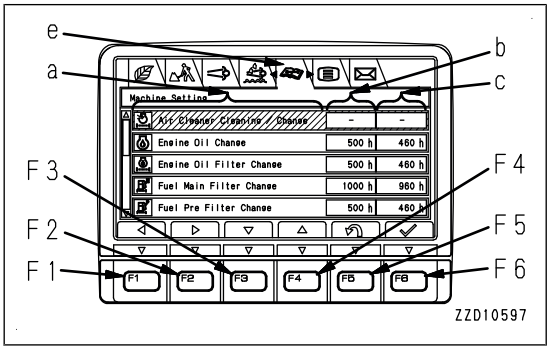
Each item in “SCR Information” menu (d) is for displaying information related to SCR and DEF.



Maintenance Screen Setting

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

The items on 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 the engine oil for cold district, the maintenance interval setting must be changed.

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

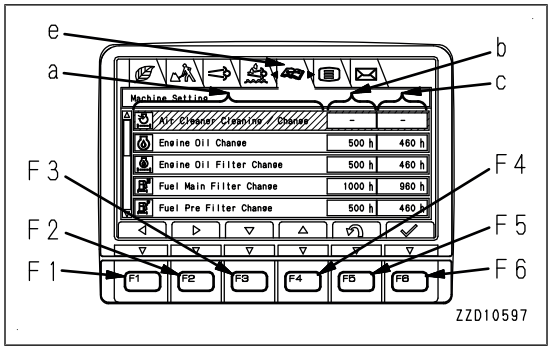
F1, F2: Moves to the right and left menus.

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.

Operation on “Maintenance Due Time Reset” Screen

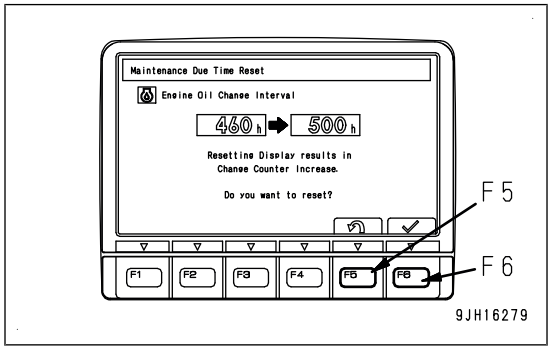
On the “Maintenance” menu screen, if switch F6 is kept pressed for at least 1.5 seconds, the screen changes to the “Maintenance Due Time Reset” screen.

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.

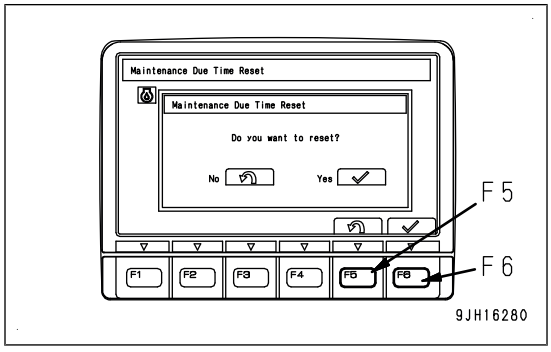


2. The reconfirmation screen is displayed.

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

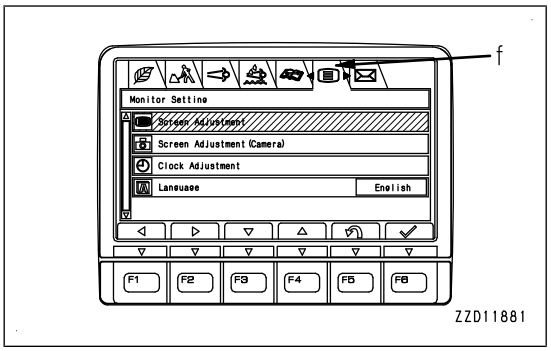
   REMARK

   - 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 Setting

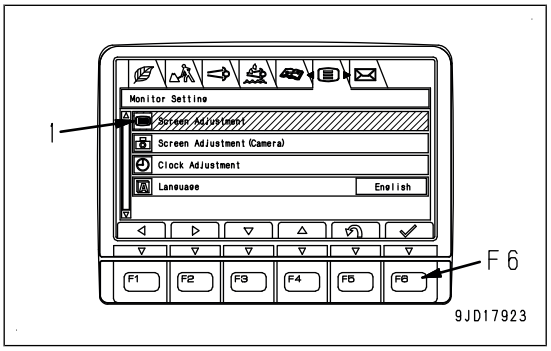
Each item of “Monitor Setting” menu (f) is to make settings for the monitor.



Screen Adjustment

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

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



2. Use the switches F2 to F6 to adjust the brightness of the screen.

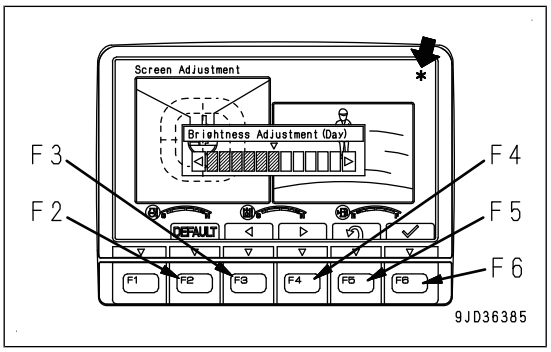
   F2: Resets an adjusted value to default value.

   F3: Moves the indicator to the left by one level.

   F4: Moves the indicator to the right by one level.

   F5: Cancels the change and returns the screen to the Monitor Setting menu screen.

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



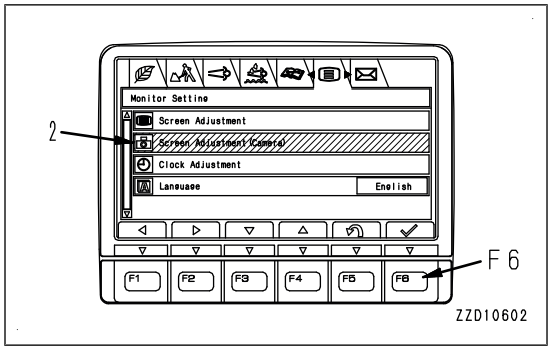
REMARK

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

Screen Adjustment (Camera)

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

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



2. Use the switches F2 to F6 to adjust the brightness of the screen.

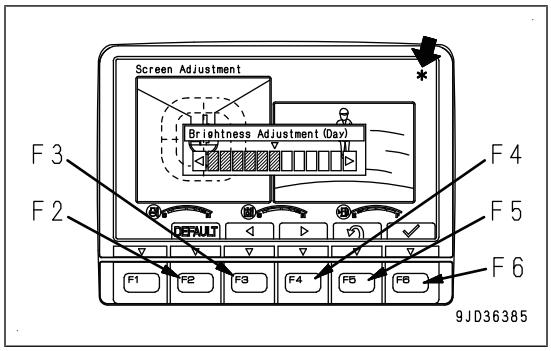
   F2: Resets an adjusted value to default value.

   F3: Moves the indicator to the left by one level.

   F4: Moves the indicator to the right by one level.

   F5: Cancels the change and returns the screen to “Monitor Setting” 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"

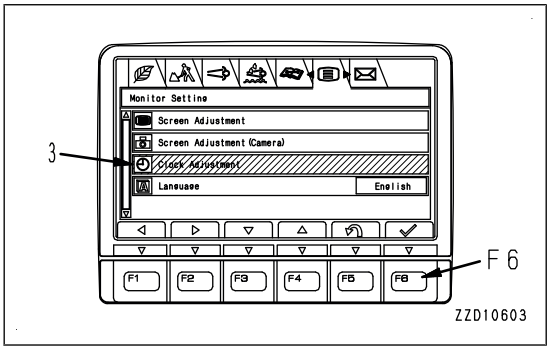
   (d): "12h/24h Mode"

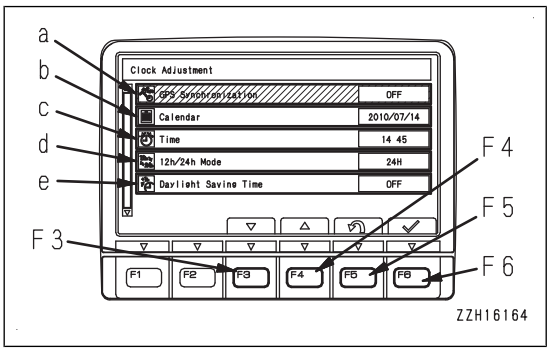
   (e): "Daylight Saving Time"

   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.

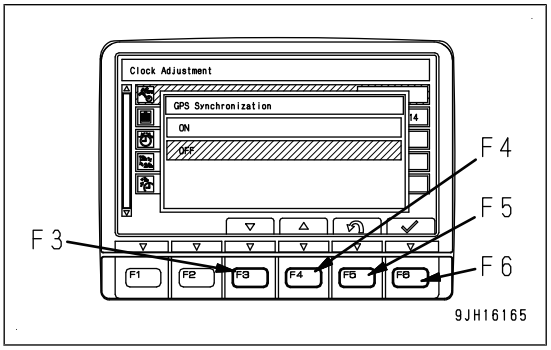
F4: Moves to the previous item (1 line above). Moves to the bottom line when on the top line.

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.



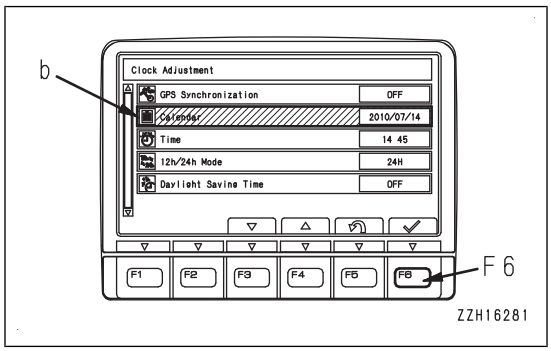
Calendar Setting

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.

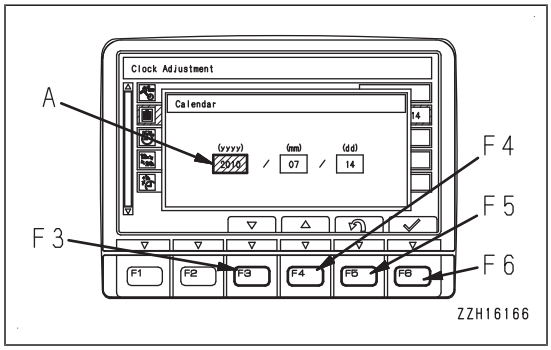
   When year display (A) is highlighted in yellow, operate the switches as follows to change year display (A). If it is not necessary to change the year setting, press switch F6.

   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



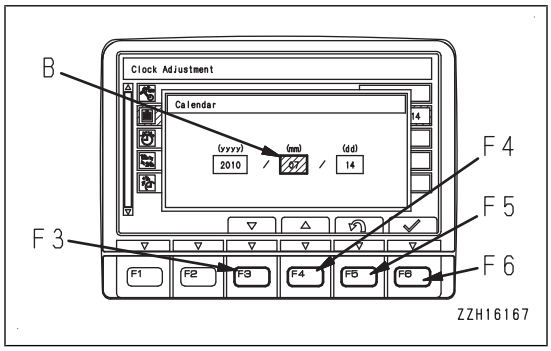
3. When month display (B) is highlighted in yellow, operate the switches as follows to change month display (B). If it is not necessary to change the month, press switch F6.

   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.



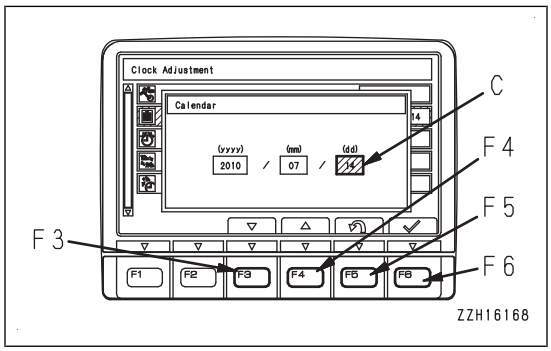
4. When date display (C) is highlighted in yellow, operate the switches as follows to change day display (C). If it is not necessary to change the day, press switch F6.

   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.



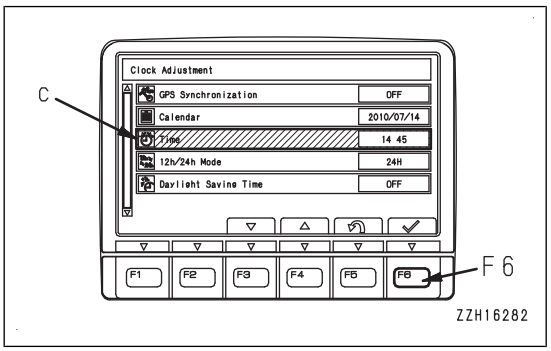
Time Setting

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.

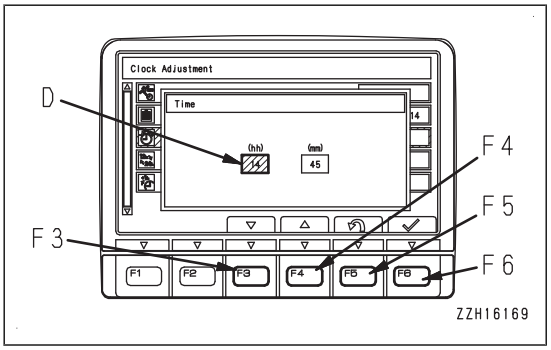
   When the hour display (D) is highlighted in yellow, operate the switches as follows to change hour display (D). If it is not necessary to change the hour setting, press switch F6.

   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.



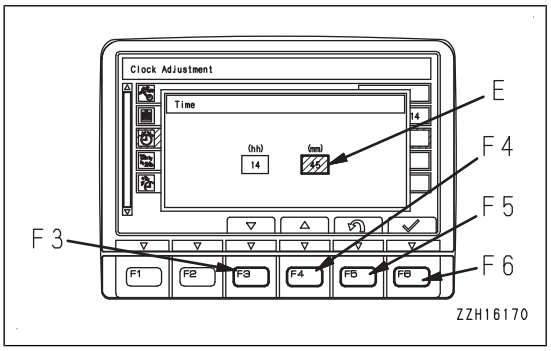
3. When minute display (E) is highlighted in yellow, operate the switches as follows to change minute display (E). If it is not necessary to change the minute, press switch F6.

   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.

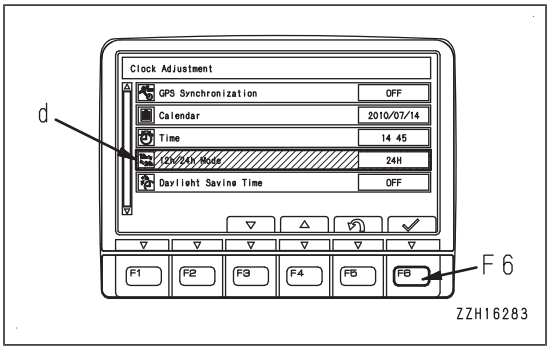


Change 12H/24H Display Mode

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.



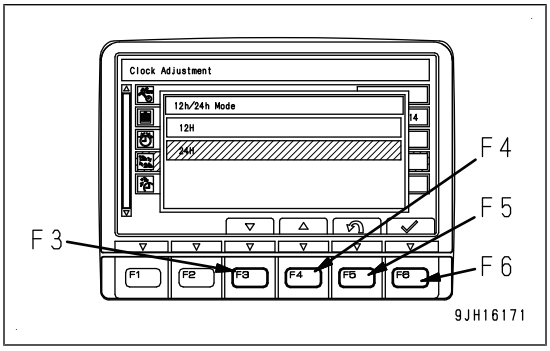
2. “12h/24h Mode” screen appears.

   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.

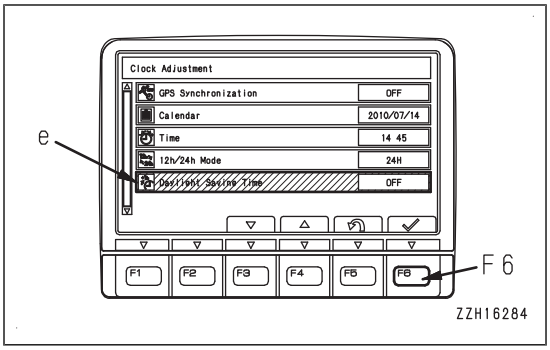
   F6: Accepts change and returns to “Clock Adjustment” screen.



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.



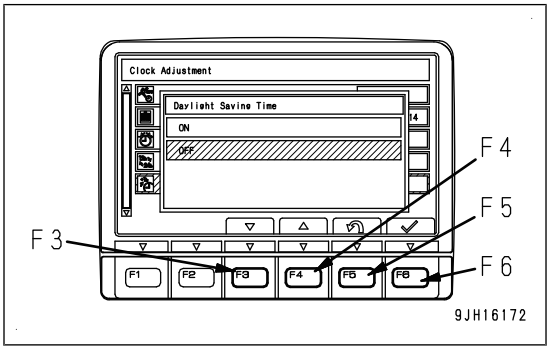
2. The “Daylight Saving Time” screen is displayed.

   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.

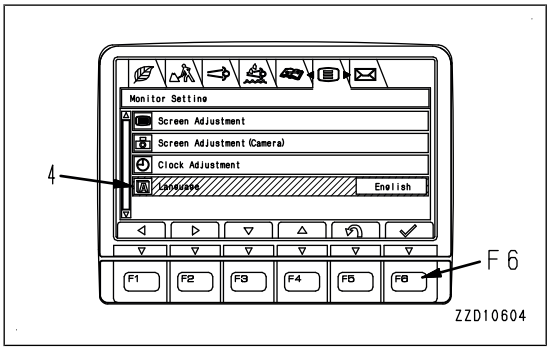
Language Settings

On “Language Setting” menu, you can select the language used on the monitor display.

The languages that can be selected are as follows.

English, Japanese, French, Spanish, Portuguese, Italian, German, Swedish, Dutch, Danish, Norwegian, Finnish, Icelandic, Czech, Hungarian, Polish, Slovak, Slovene, Romanian, Croatian, Estonian, Latvian, Lithuanian, Bulgarian, Greek, Turkish, Serbian

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



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

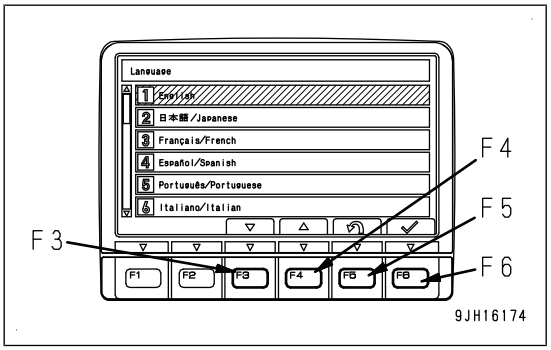
   On “Language” screen, you can perform the following operations with the switches F3 to F6.

   F3: Moves to the item below.

   F4: Moves to the item above.

   F5: Cancels the change and returns to “Monitor Setting” screen.

   F6: Validates the change and returns to “Monitor Setting” screen.



Operator ID

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

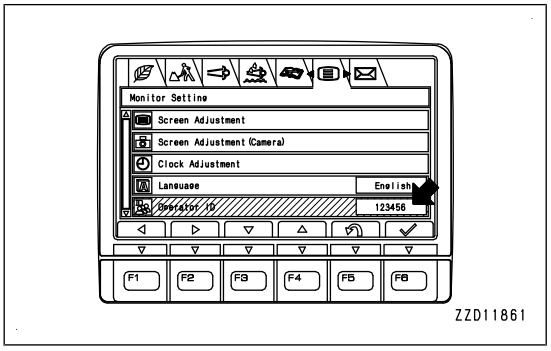
The “Operator ID” menu is not displayed when the operator identification function is disabled.

REMARK

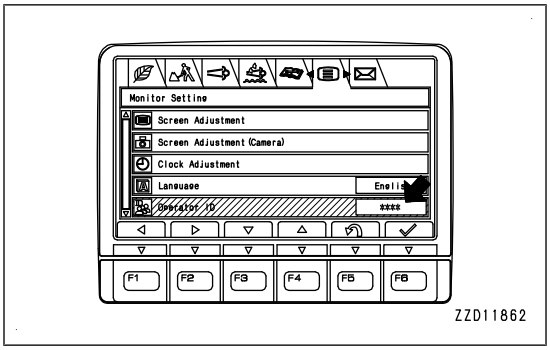
Contact your Komatsu distributor for details of the method of setting, changing, or cancelling the operator identification function.

When Operator Identification Function is Available with SKIP

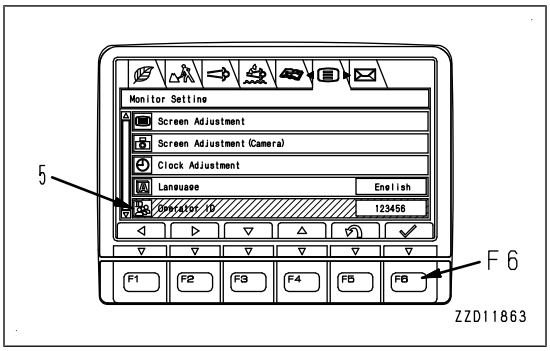
When the starting switch is ON and ID is inputted, the identified ID is displayed in the column of “Operator ID” on the “Monitor Setting” menu screen.



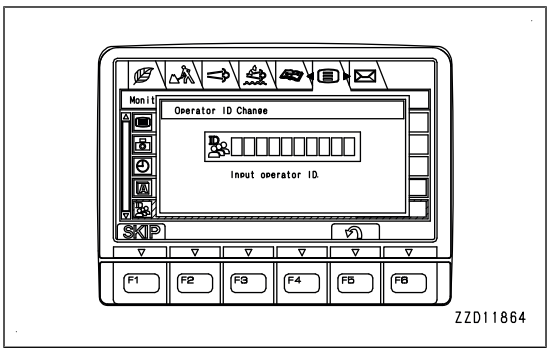
When the starting switch is ON and “SKIP” is selected, “****” is displayed in the column of “Operator ID” on the “Monitor Setting” menu screen.



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

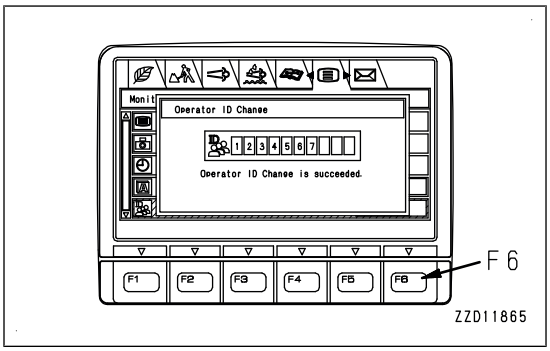


2. The “Operator ID Change” screen is displayed.



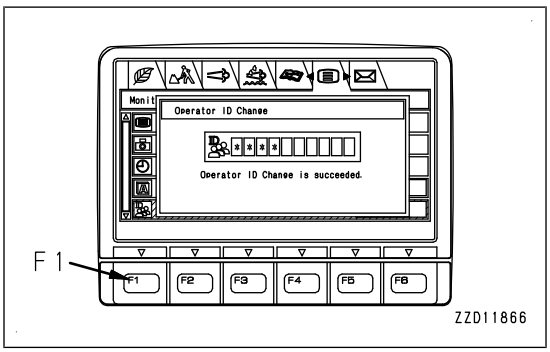
- Input the already registered ID on the “Operator ID Change” screen and press F6. Then, the identified ID can be changed.

  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”.



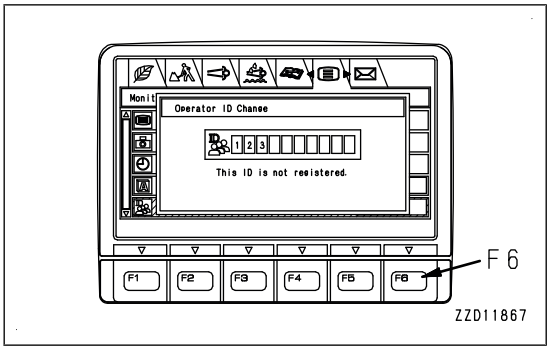
- When you press switch F1 on the “Operator ID Change” screen, a message is displayed below and the screen returns to the “Monitor Setting” menu screen.

  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.



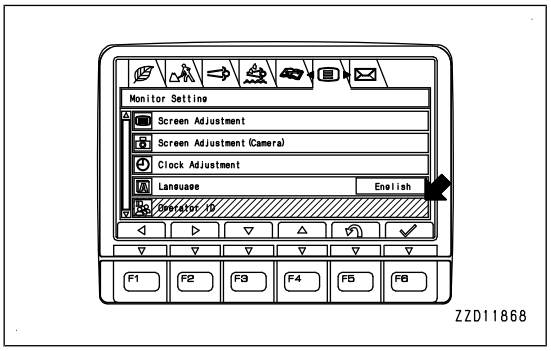
- When you press switch F6 after inputting the ID which is not registered to the “Operator ID Change” screen, a message is displayed below and the screen returns to the “Monitor Setting” menu screen.

  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.

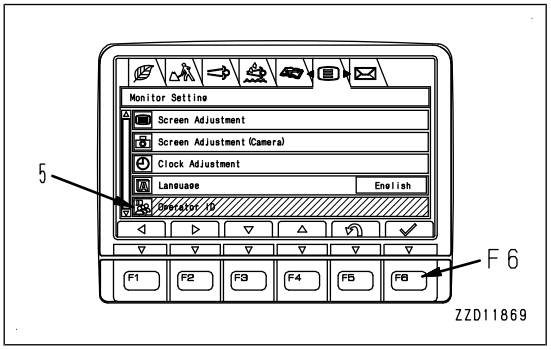


When Operator Identification Function is Available Without SKIP

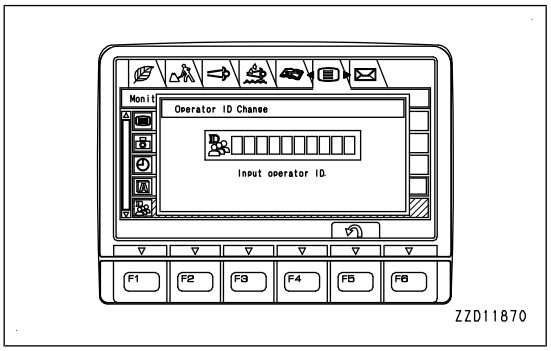
When the operator identification function is available without SKIP, the identified ID number is not displayed in the “Operator ID” column of “Monitor Setting” screen.



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

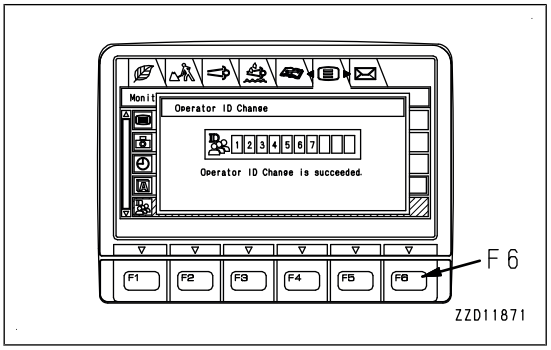


2. The “Operator ID Change” screen is displayed.



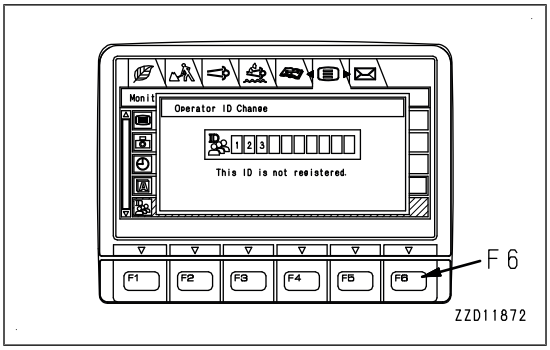
- Input the already registered ID on the “Operator ID Change” screen and press F6. Then, the identified ID can be changed.

  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.

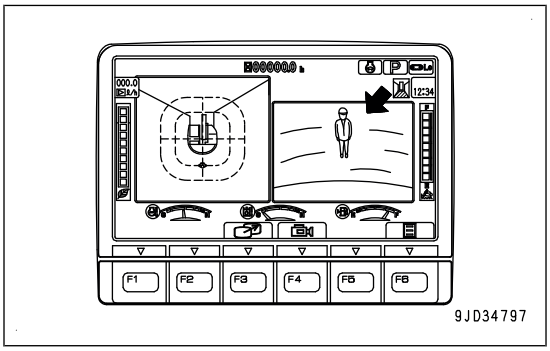
  In this case, the identified ID is not changed.
- On the “Operator ID Change” screen, if no switch is operated for more than 30 seconds, the screen automatically changes to the “Monitor Setting” menu screen.
  In this case, the identified ID is not changed.



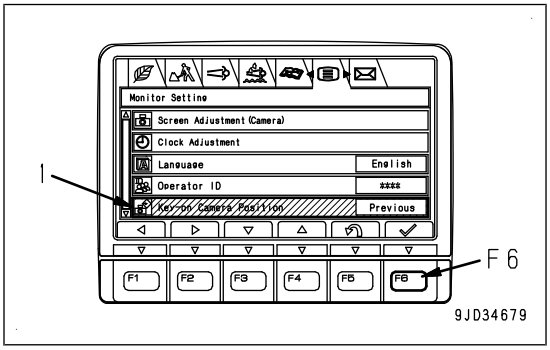
Key-on Camera Position

On “Key-on Camera Position” menu, you can select the camera image which will be displayed on the right side on the screen when starting up the machine monitor.

- You can select one of three camera images from rear camera, rear right camera, and rear left camera.
- Previous camera image which was displayed at the last key-off is displayed when “Camera at Previous Key-off” is selected.



1. Select “Key-on Camera Position”(1) on “Monitor Setting” menu screen, then press the switch F6.



2. Select one camera position to be displayed on the right side on the machine monitor, and press the switch F6, then the camera position o be displayed at key-on is set.

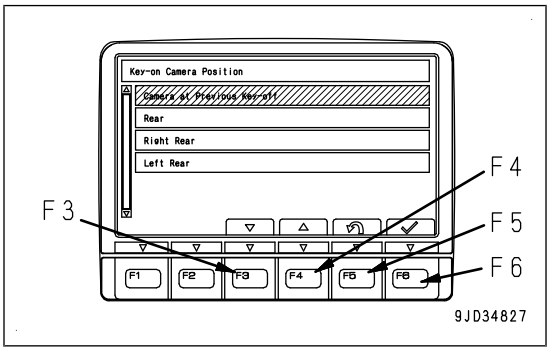
   The following operations are available with switches F3, F4, F5, and F6 on “Key-on Camera Position” screen.

   F3: Moves to the item below.

   F4: Moves to the item above.

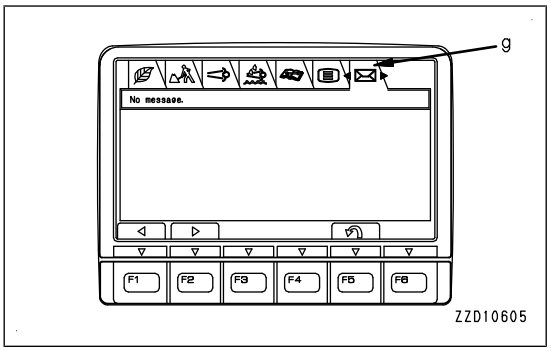
   F5: Cancels the change and returns the screen to “Monitor Setting” menu screen.

   F6: Accepts change and returns the screen to the “Monitor Setting” screen.



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.

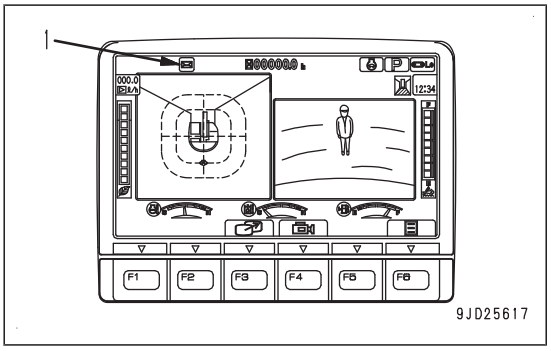


Message is distinguished as follows according to the lighting states of message display (1).

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

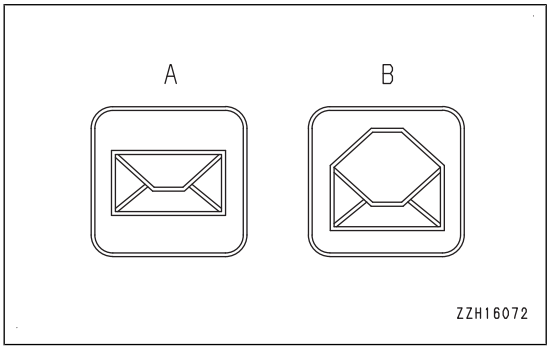
Lights up in blue (B): There is any read message to which no reply is made.

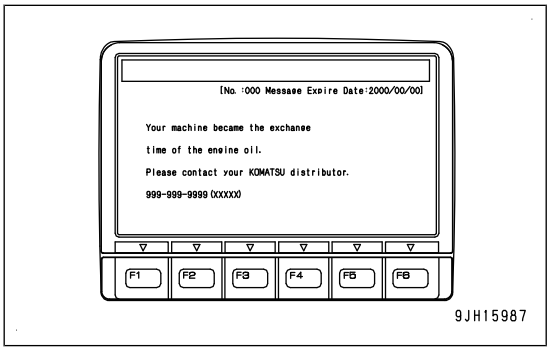
OFF: No messages



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.

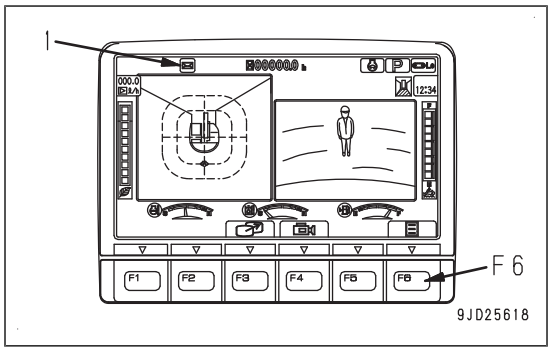




See Message

1. Press switch F6 on the standard screen.

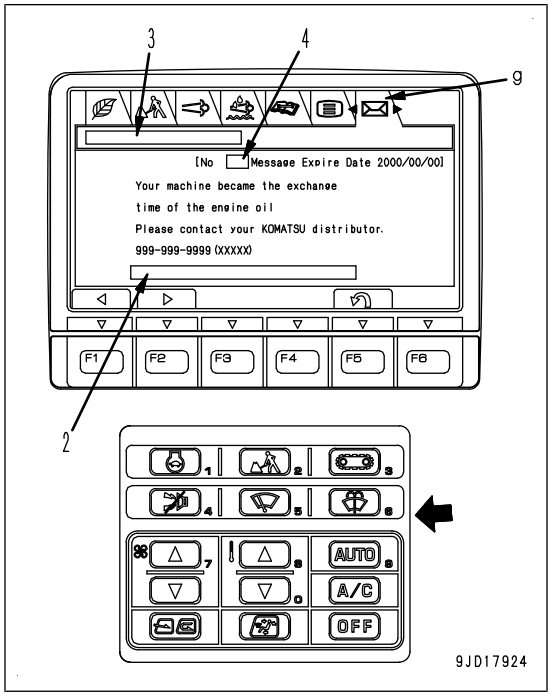
   When there is any message, message display (1) lights up.
   While message display (1) is lit, press switch F6, and the mail confirmation menu (g) directly opens.
   Select the mail confirmation menu (g), and you can read the received message.



2. 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.

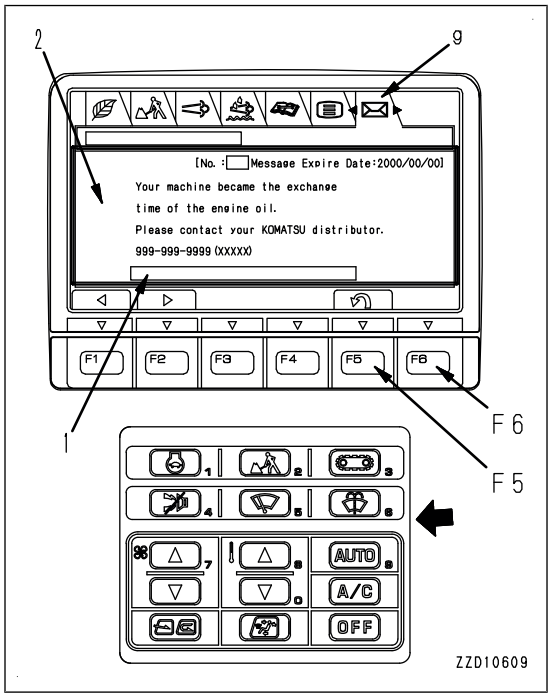
   REMARK

   - (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.

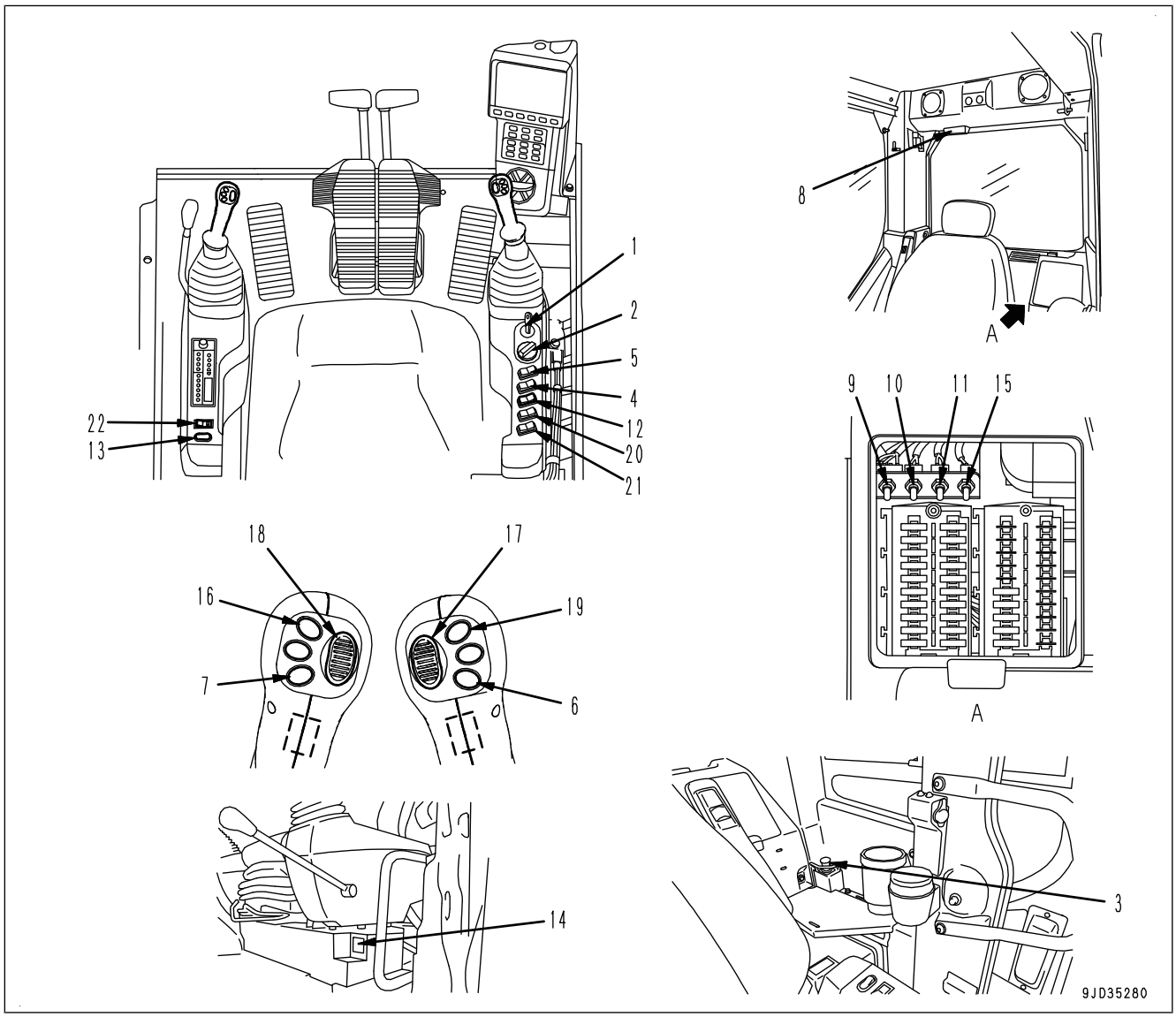


Reply Message

1. 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.
2. After inputting a selected item number, press switch F6.
3. 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.



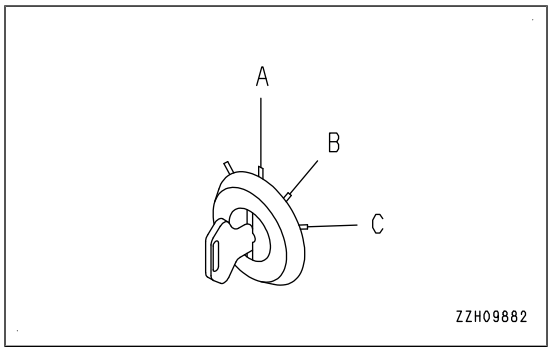
Switches



(1) Starting switch
(2) Fuel control dial
(3) Cigarette lighter
(4) Swing lock switch
(5) Lamp switch
(6) Horn switch
(7) One-touch power maximizing switch
(8) Room lamp switch
(9) Pump secondary drive switch
(10) Swing parking brake cancel switch
(11) Emergency work equipment control switch
(12) Revolving lamp switch (if equipped)
(13) Seat heater switch
(14) Engine shutdown secondary switch
(15) Lock lever automatic lock cancel switch
(16) Quick coupler operation switch
(17) Attachment 1 proportional switch
(18) Attachment 2 proportional switch (if equipped)
(19) Breaker mode switch
(20) Additional lamp switch (if equipped)
(21) Lower wiper switch (if equipped)
(22) Quick coupler operation 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.

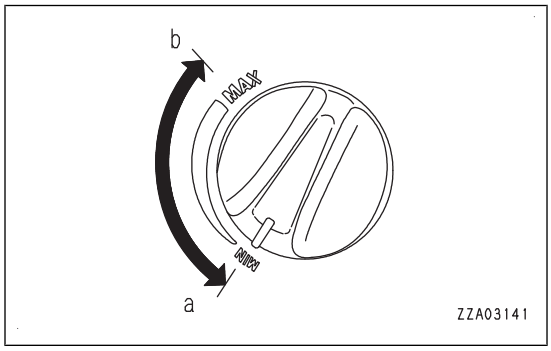
(C): START position

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)

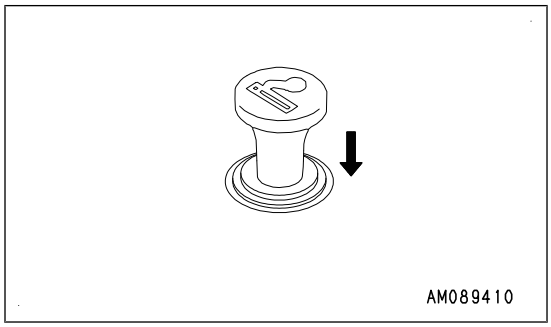
The position where the dial is turned fully to the right.

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 this as a power supply for 12 V equipment.

If the heating part of cigarette lighter hits any protrusion and is deformed, the electrical circuit may shorts or fuse may be blown.

Swing Lock Switch

⚠ WARNING

- **When not using the swing operation, e.g. when travelling, 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.**

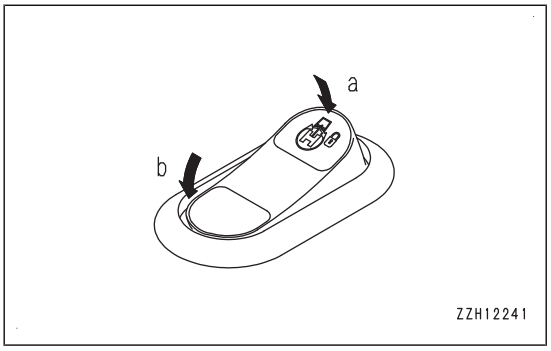
Swing lock switch is used to lock the upper structure so that it cannot swing.

(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 cancelled allowing the upper structure to swing when operating the swing control lever.



Lamp Switch

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

(a) Night position

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

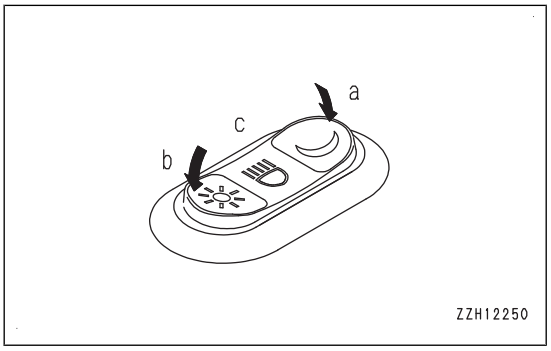
(b) Day position

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

(c) OFF position

Lamps go out.

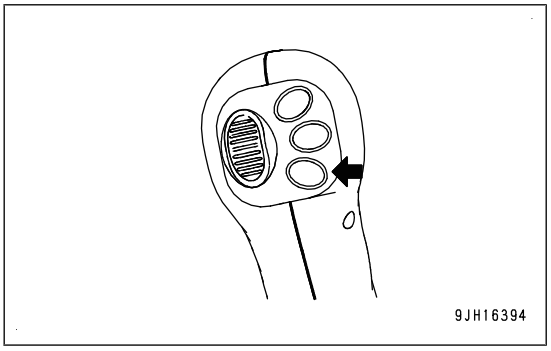
(The monitor illumination is set to day mode.)



Horn Switch

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

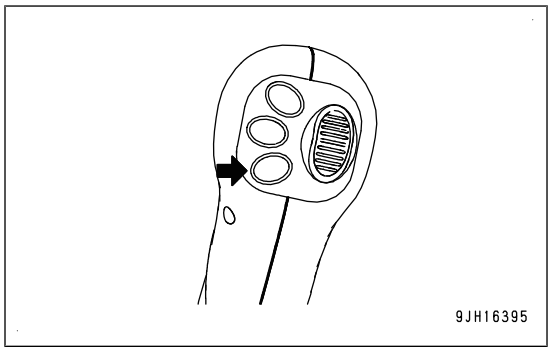
When switch is pressed, the horn sounds.



One-Touch Power Maximizing Switch

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

Press it 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.



Room Lamp Switch

NOTICE

If the room lamp is left lit 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.

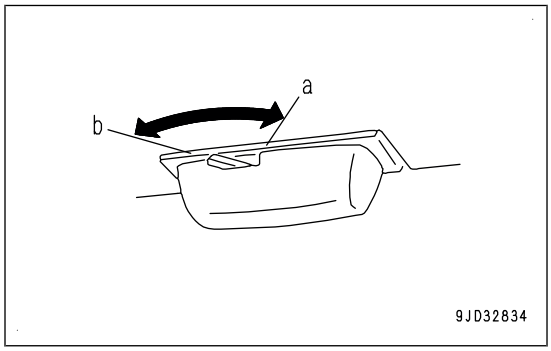
(a) ON position

Lights up

(b) OFF position

Not lit

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



Pump Secondary Drive Switch

NOTICE

- **The pump secondary drive switch enables you to 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 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.

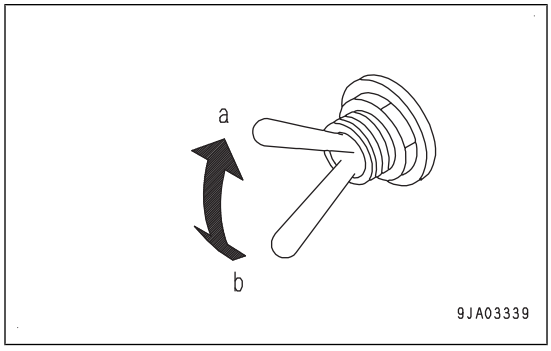
The pump secondary drive switch enables you to perform operation temporarily when any problem occurs on the pump control system.

(a) In an emergency

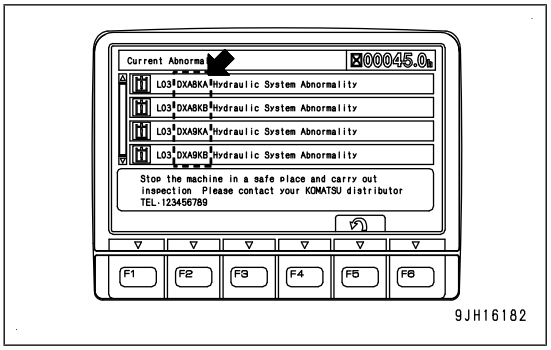
When abnormal (switch is set to upper position)

(b) Normal

When normal (switch is set to lower position)



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



Swing Parking Brake Cancel Switch

NOTICE

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

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

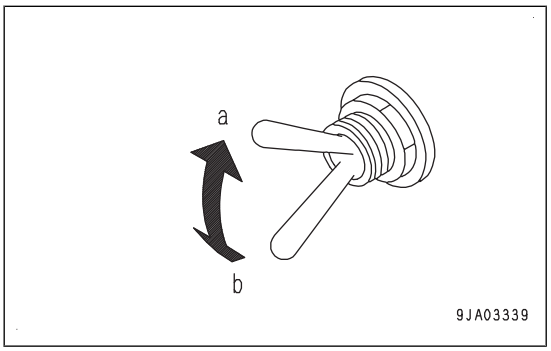
(a) Cancel

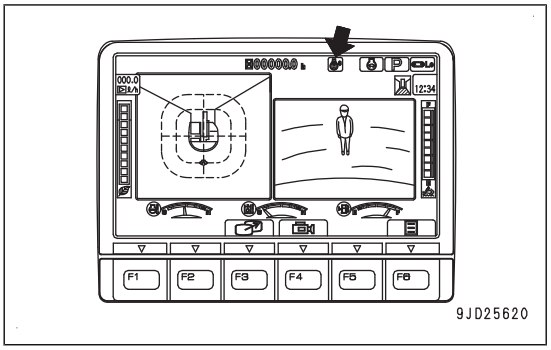
When abnormal (switch is set up)

(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.



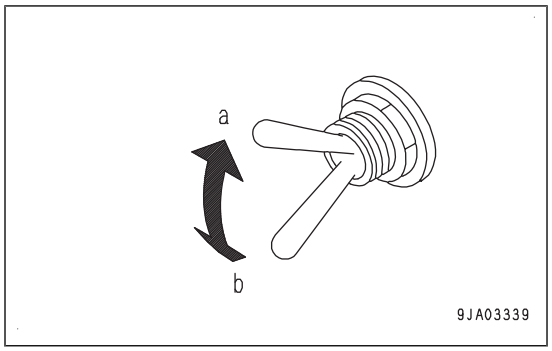


Lock Lever Automatic Lock Cancel Switch

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.

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).



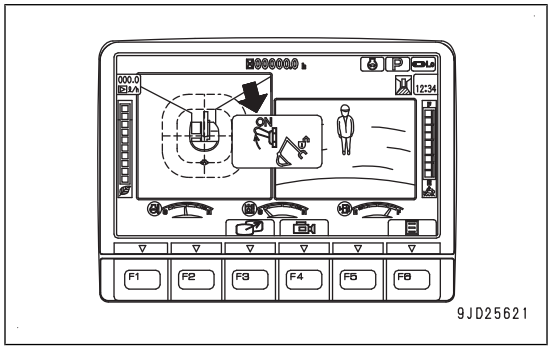
(a) Cancel

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.



Emergency Work Equipment Control Switch

NOTICE

Emergency work equipment control switch is used to make it possible to perform the work equipment (boom) operations temporarily if any abnormality should occur in the work equipment (boom) control system.
Do not use it except in emergencies. Repair the problem part as soon as possible.

Emergency work equipment control switch is used to make it possible to operate the work equipment temporarily if any abnormality should occur in the electrical system and the work equipment (boom) stops.

When you need to operate the work equipment, use this switch.

(a) In an emergency

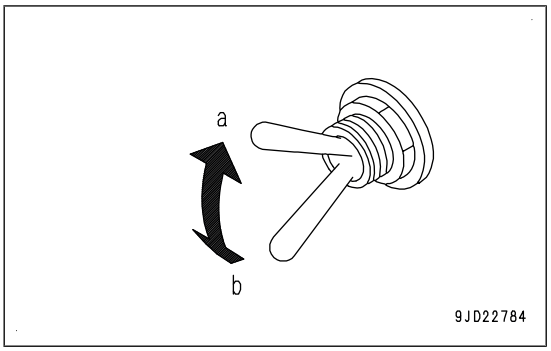
When abnormal (switch is set to upper position)

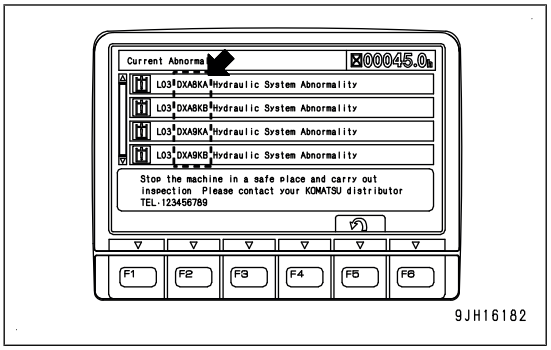
(b) Normal

When normal (switch is set to lower position)

When releasing your hand from the switch while it is at Emergency position (a), it returns automatically to Normal position (b).

If the current failure code includes the hydraulic system error “DXW4GKA” or “DW4GKB”, set this switch to Emergency position (a), and the operation can be performed.





Revolving Lamp Switch

(if equipped)

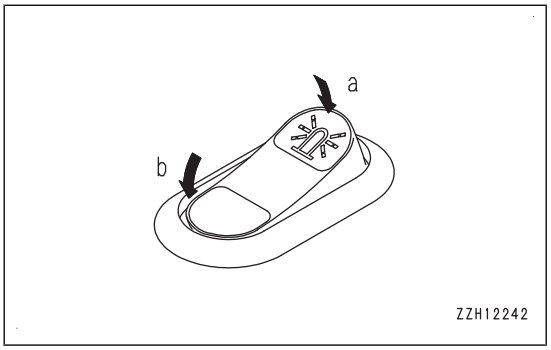
Revolving lamp switch is used to light up the yellow revolving lamp on top of the cab.

(a) ON

Lights up

(b) OFF

OFF



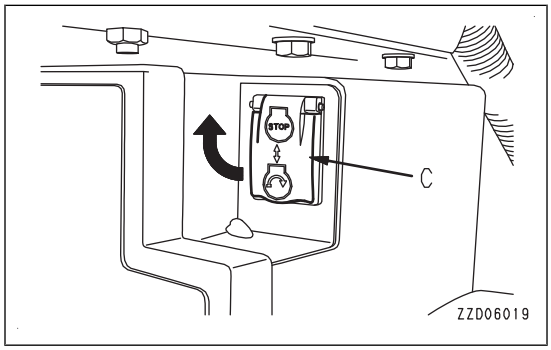
Engine Shutdown Secondary Switch

NOTICE

The engine shutdown secondary switch is used to stop the engine when the engine does not stop even if the starting switch is turned to OFF position.

- **Use the engine shutdown secondary switch only in an emergency.**
  Contact your Komatsu distributor for repair immediately when there is any abnormality on this switch.
- **If the engine shutdown secondary switch is moved to "ENGINE STOP" position by mistake while the machine is operating normally, "Engine Shutdown Secondary SW in Operation" is displayed on the machine monitor.**
  If "Engine Shutdown Secondary SW In Operation" is displayed on the machine monitor, check that the switch cover is closed and the switch is in "normal" position. If not, set it to "normal" position.

1. Raise the cover (C) and open it.



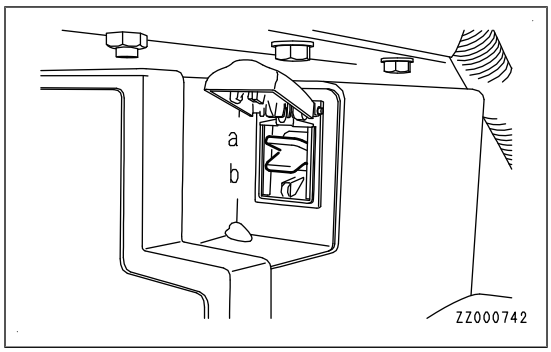
2. Turn the engine shutdown secondary switch to upper position (a) and the engine stops.

   (a) ENGINE STOP

   When abnormal (switch is set to upper position)

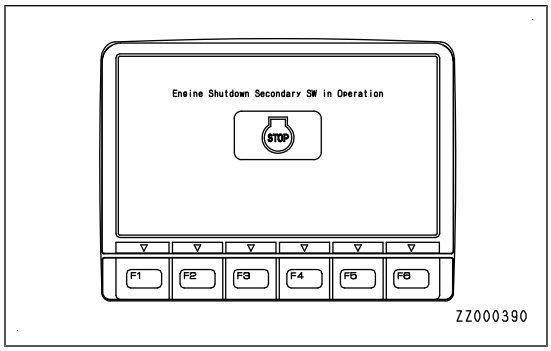
   (b) Normal

   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 "ENGINE STOP" position (a), "Engine Shutdown Secondary SW in Operation" is displayed on the machine monitor.

  If this screen is displayed, return the engine shutdown secondary switch to NORMAL position (b).



Lower Wiper Switch

(if equipped)

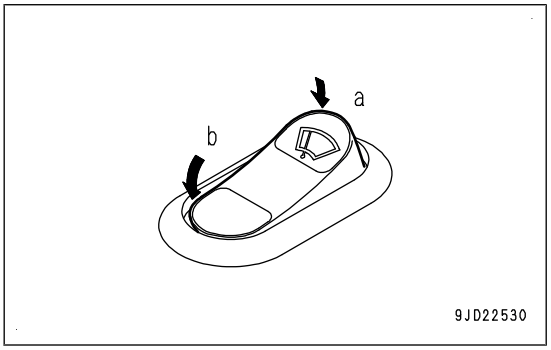
The lower wiper switch actuates the cab front lower wiper.

(a) Wiper position

It actuates the lower wiper.

(b) Stop position

The lower wiper stops.



Seat Heater Switch

⚠ CAUTION

- **Do not use it in the following cases to prevent low temperature burn or excessive cooling.**
  - **When a person's ability to perceive the temperature is decreased**
  - **When a person's ability to feel pain is decreased**
  - **When a person has a delicate skin**
- **Do not put a heavy object on the seat cushion. Do not stick the seat cushion with needles or nails.**
- **When you use it, do not put objects which retain heat such as blankets or floor cushions on the seat. The seat heater will overheat and it can cause burn injury or failure.**
- **Do not use it while the seat is wet. If water or beverage is spilled, immediately wipe it off with a dry cloth and dry it well. Do not use the seat heater to dry the seat.**

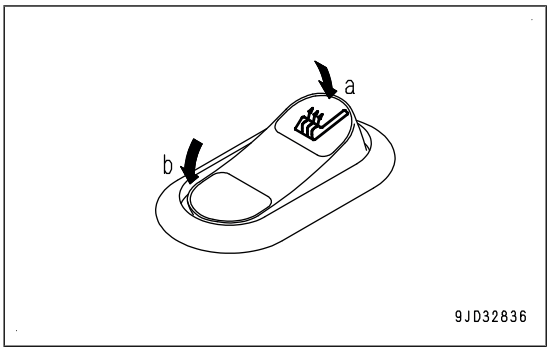
This seat heater switch is used to warm the seat.

(a) OFF

Stops the seat heating.

(b) ON

Start the seat heating and the seat becomes warm.



When the seat heater switch is turned ON, the heater in the seat operates. When the seat surface temperature exceeds approximately 20 °C {68 °F} , the heater is turned OFF automatically. When the temperature decreases below approximately 10 °C {50 °F} , the heater is turned ON automatically.

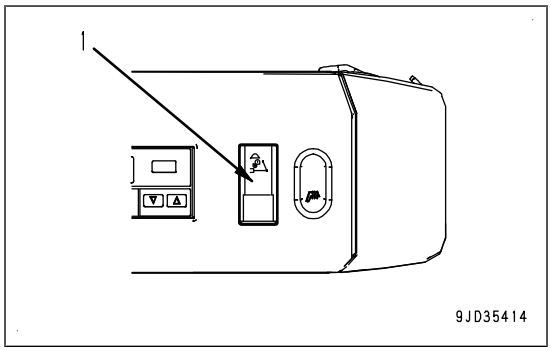
REMARK

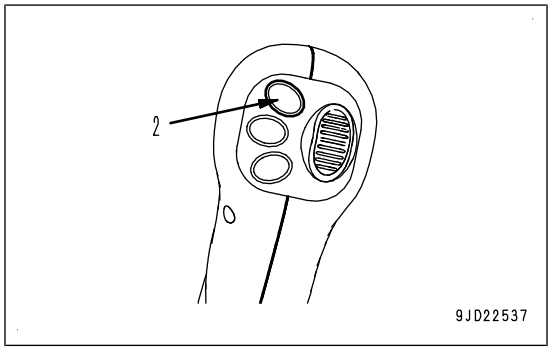
When the seat surface temperature is above approximately 20 °C {68 °F} , the heater does not operated even if switch is turned ON.

Quick Coupler Switch

The switch (1) on the L.H. console and the switch (2) on the L.H. work equipment control lever are the switches to operate the quick coupler.

For details, see ATTACHMENTS AND OPTIONS, “HANDLE QUICK COUPLER”.

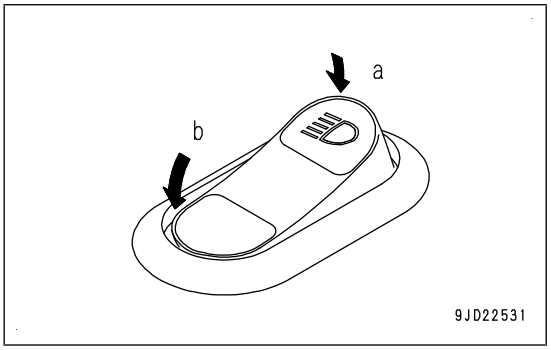




Additional Lamp Switch

(if equipped)

The additional lamp switch is used to turn on the lamps which are additionally installed to the front of the cab, to the rear of the cab, or to the boom.



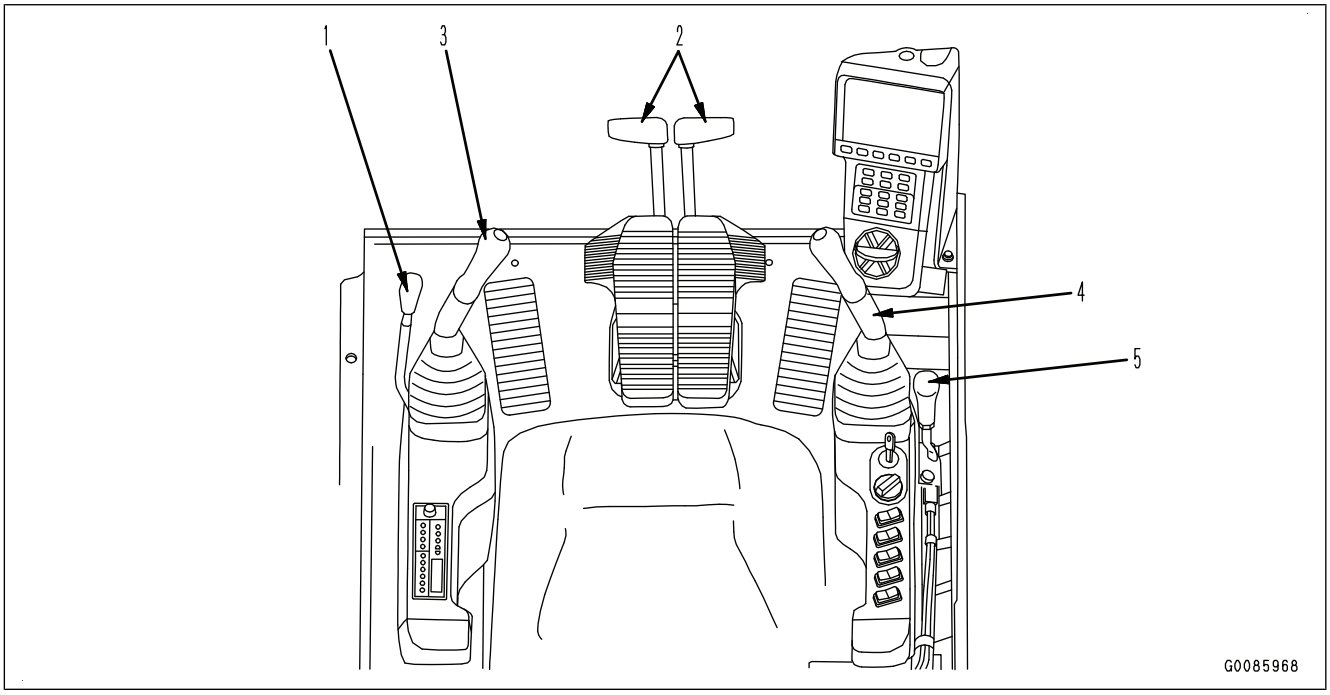
(a) ON position

Lights up

(b) OFF position

OFF

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)

(5) Blade control lever(blade specification)

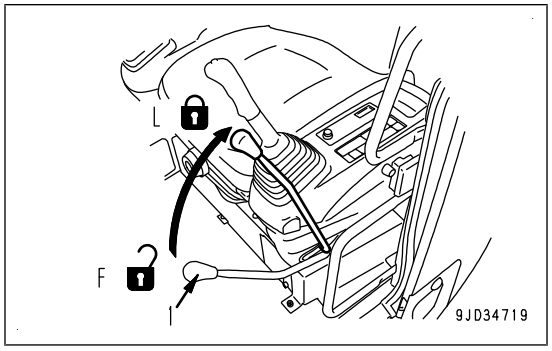
Lock Lever

⚠ WARNING

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

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

Be sure to operate the lock lever (1) by the red portion on the top.



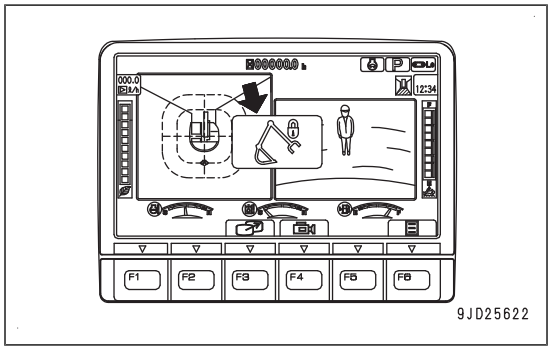
(L) LOCK position

Even if the control levers or attachment control pedals are operated, the machine does not move.

(F) FREE position

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

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



REMARK

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

Automatic Lock Function of Lock Lever

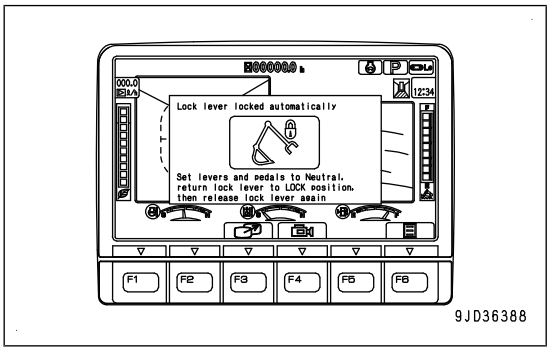
⚠ WARNING

- **The lock lever automatic lock function assists the operator in judgment to reduce damage caused by accident. It is not a device to 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. Do not rely on it too much.**
  - **When the hydraulic oil temperature is low (When the hydraulic oil temperature caution lamp indicates low temperature)**
  - **When the viscosity of the hydraulic oil used is higher than that of the genuine hydraulic oils which Komatsu recommends**
  - **When the system has a failure**
- **Before setting the lock lever to FREE position, make sure that all levers and pedals are set to NEUTRAL position. If any of them is out of NEUTRAL position, the work equipment or machine may move suddenly and cause a serious personal injury or death.**

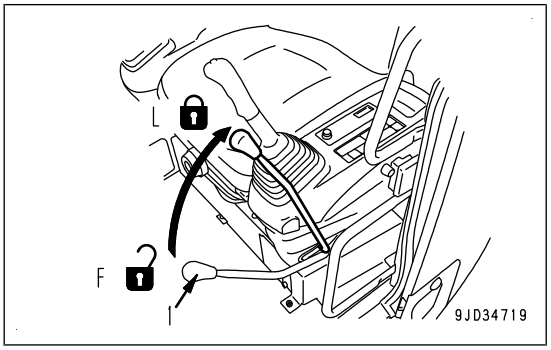
The lock lever automatic lock function automatically sets the lock lever in the locked state to prevent the work equipment or machine from operating continuously when the lock lever is released while the work equipment control lever or travel lever is operated.

When this function works, the operations of the work equipment, swing, travel, and attachment are locked automatically and the message shown in the figure is displayed.

While this function is in operation, the machine does not move even if the control levers or attachment control switches are operated while the lock lever is in FREE position (F).



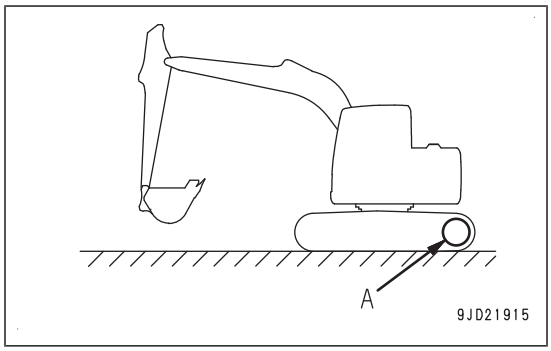
To cancel the lock, return the lock lever to LOCK position (L), check that each control lever and the attachment switch are in neutral, and then release the lock lever again.



Travel Lever

⚠ WARNING

- **If you perform operations with your foot on the pedal, the machine may suddenly start if you depress the pedal by mistake, and this may lead to serious personal injury or death. Be extremely careful when using the pedal for travel and steering operations, and do not put your foot on the pedal when it is not necessary.**
- **When the track frame is facing the rear, the direction of operation of the steering lever is the opposite to the direction of movement of the machine (forward/reverse, right/left turn).**
  When operating the travel lever, always check if the track frame is facing the front or the rear. (When the sprocket (A) is at the rear, the track frame is facing the front.)



The travel lever is used to change the direction of travel between forward and reverse. ( ) shows the pedal operation.

(a) FORWARD

The lever is pushed forward

(Depress the front side of pedal.)

(b) REVERSE

The lever is pulled back

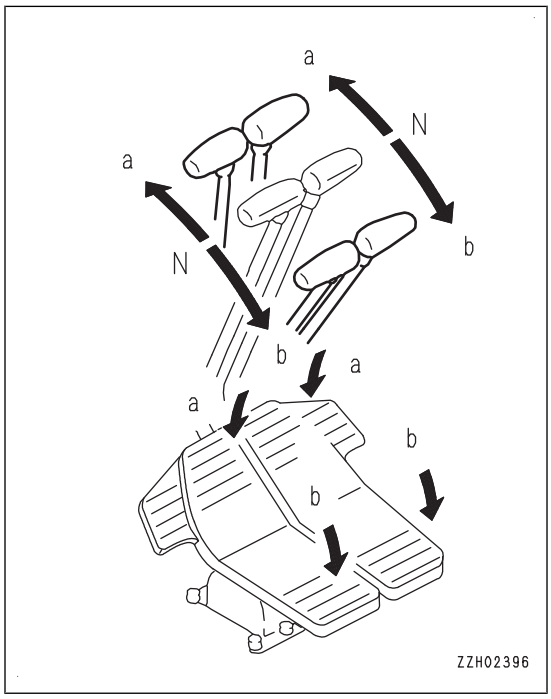
(Depress the rear side of pedal.)

(N) NEUTRAL

The machine stops.

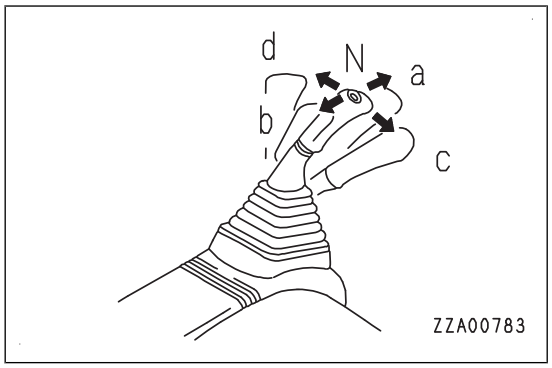
REMARK

If the lever is shifted to FORWARD or REVERSE position from NEUTRAL position, the alarm sounds to warn that the machine is starting to move.



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

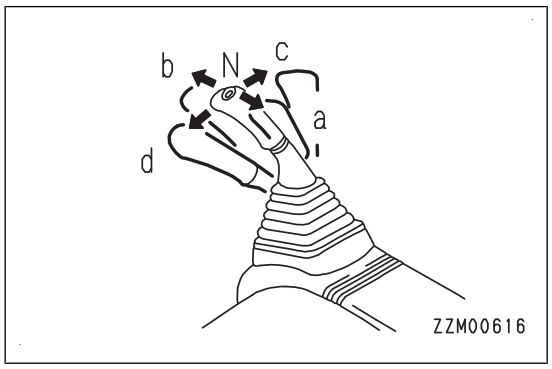
(c): Swing RIGHT

(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

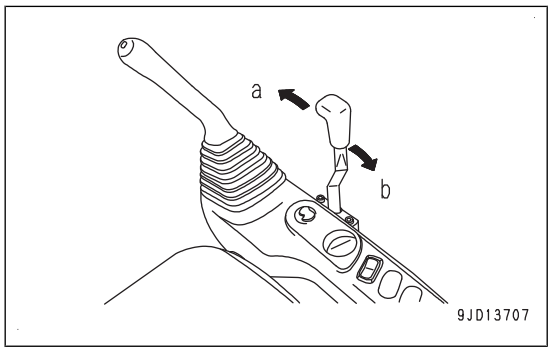
N (NEUTRAL)

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

Blade Control Lever

(blade specification)

The blade control lever is used to control the blade.



(a): LOWER

(b): RAISE

Other Equipment

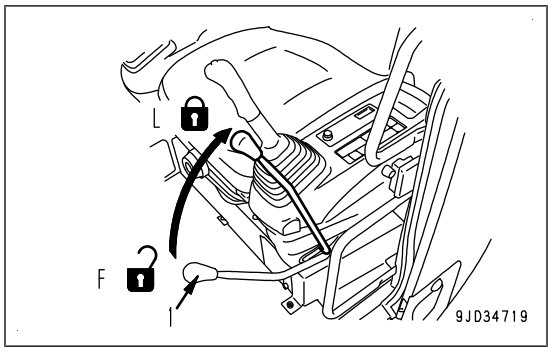
How to Open and Close Ceiling Window

⚠ WARNING

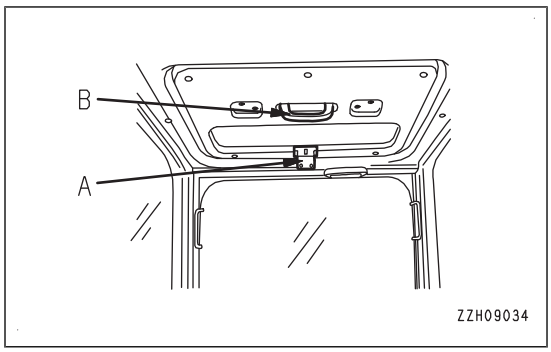
When leaving the operator's seat, set the lock lever securely to LOCK position.
If the lock lever is at FREE position and the control lever, control pedal, or control switch is touched by mistake, it may cause serious personal injury or death.

When You Open

1. Operate the lock lever (1) by the red portion on the top, then securely set it to LOCK position (L).



2. Push up lock (A) in the front centre of the ceiling window and check that the lock is released. Then hold grip (B) and push up the ceiling window.



When You Close

Hold the grip (B), lower the ceiling window, and apply the lock (A). If the lock cannot be applied, “open” the ceiling window, then pull it in again and apply the lock.

How to Open and Close Cab Front Window

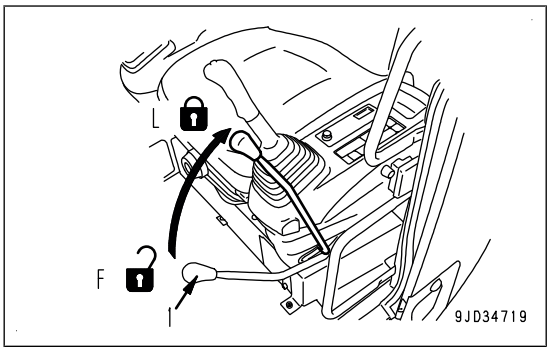
⚠ WARNING

- **Set the lock lever in LOCK position always when opening or closing the front window, lower window, or door.**
  If the lock lever is at FREE position and the control lever, control pedal, or control switch is touched by mistake, it may cause serious personal injury or death.
- **When opening or closing the front window, stop the machine on a level ground, lower the work equipment to the ground, stop the engine, and then perform the work.**
- **When opening the front window, hold the handle securely with both hands to pull up, and do not release your hands until the front window is locked by the lock catch.**
- **Hold the handles securely with both hands when closing the front window otherwise it may drop under its own weight.**

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

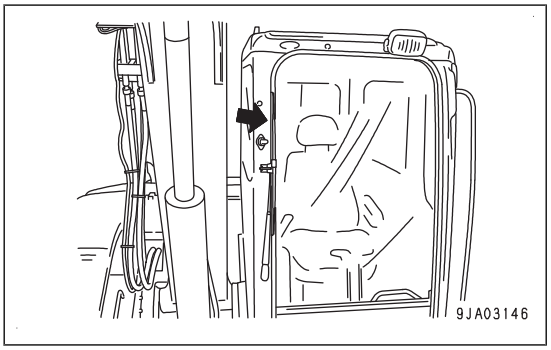
When You Open

1. Stop the machine on a level ground, lower the work equipment to the ground, then stop the engine.
2. Operate the lock lever (1) by the red portion on the top, then securely set it to LOCK position (L).



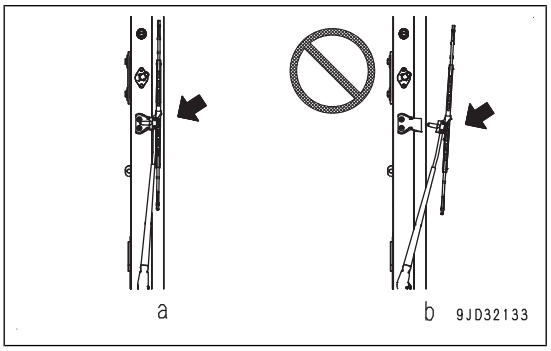
3. Check that the wiper blade is stowed in the right stay.

   If the wiper blade is in wrong stowing position (b), lift it to move to the correct stowing position (a). If the wiper blade cannot be returned to the correct stowing position, ask your Komatsu distributor for repair.

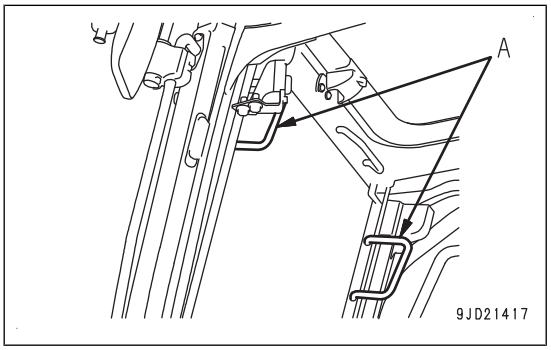


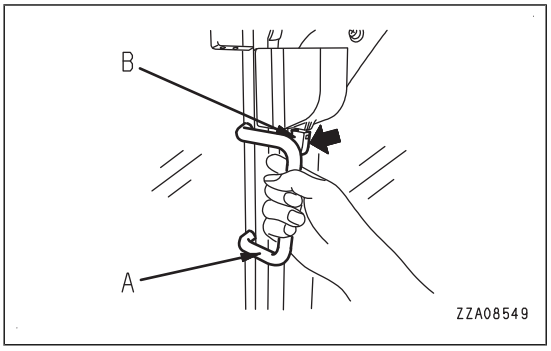
   (a) Correct stowing position

   The wiper blade is on the cab.
   (b) Wrong stowing position
   The wiper blade is on the glass.



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

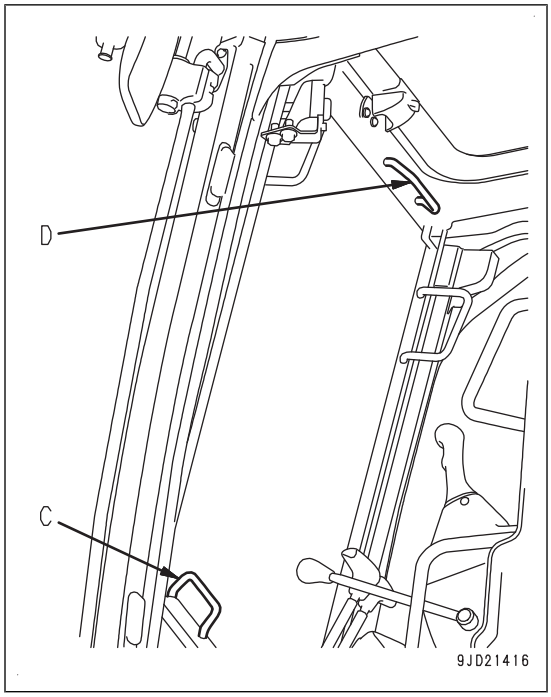


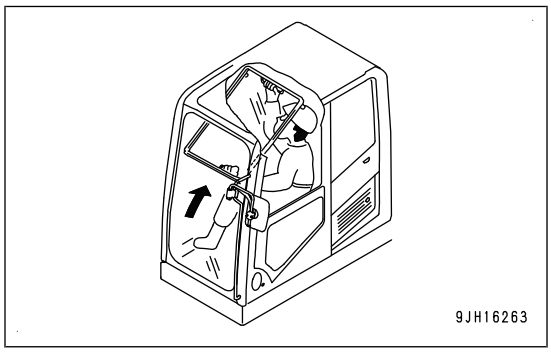


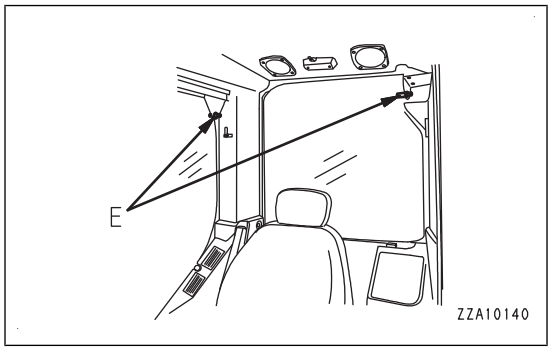
5. Hold lower handle (C) with your left hand from inside the operator's cab, and with your right hand, grip top handle (D), pull it up, and push it against lock catch (E) at the rear of the cab securely to lock the window.

REMARK

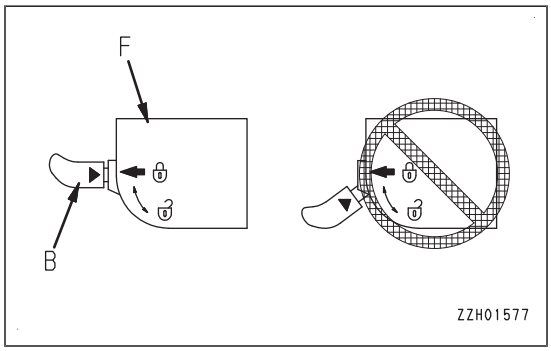
Handles (A) on the right and left top sides of the front window are not for pulling up the front window. Do not pull up the front window with the handles (A).







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



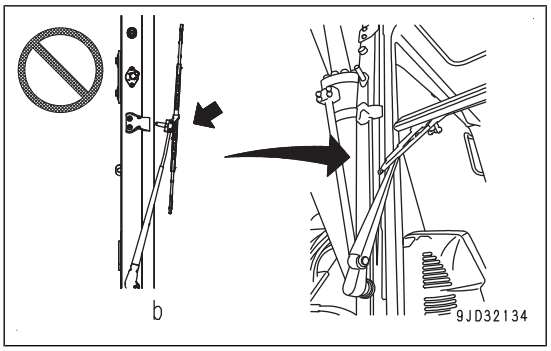
When You Close

⚠ CAUTION

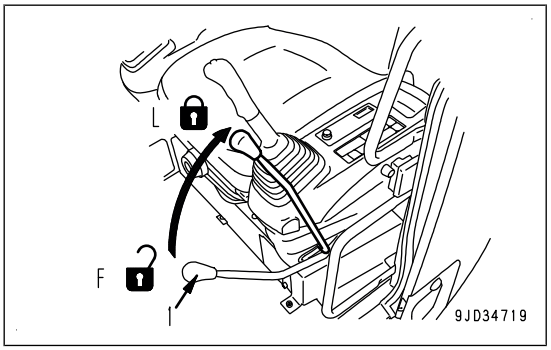
When closing the cab front window, lower it slowly and be careful not to get your hand caught.

NOTICE

Check that the wiper blade is stowed at the correct position (a), and close the front window.
If the front window is closed when the wiper blade is being stowed at the wrong position (b), the wiper blade may break. Take care.

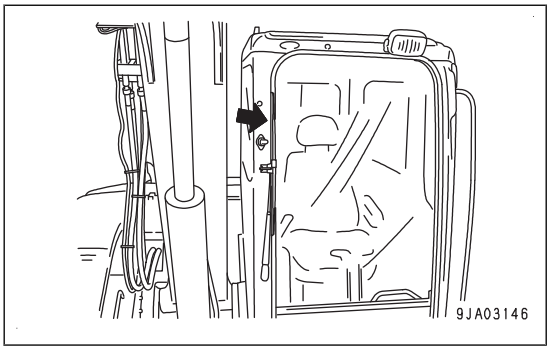


1. Stop the machine on a level ground, lower the work equipment to the ground, then stop the engine.
2. Operate the lock lever (1) by the red portion on the top, then securely set it to LOCK position (L).



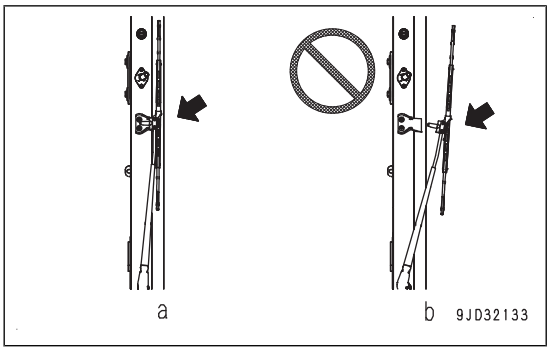
3. Check that the wiper blade is stowed in the right stay.

   If the wiper blade is in wrong stowing position (b), lift it to move to the correct stowing position (a). If the wiper blade cannot be returned to the correct stowing position, ask your Komatsu distributor for repair.

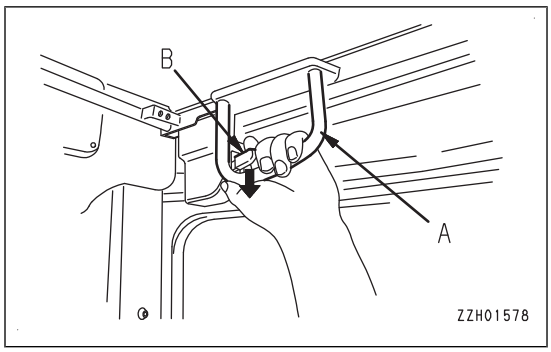


   (a) Correct stowing position

   The wiper blade is on the cab.
   (b) Wrong stowing position
   The wiper blade is on the glass.



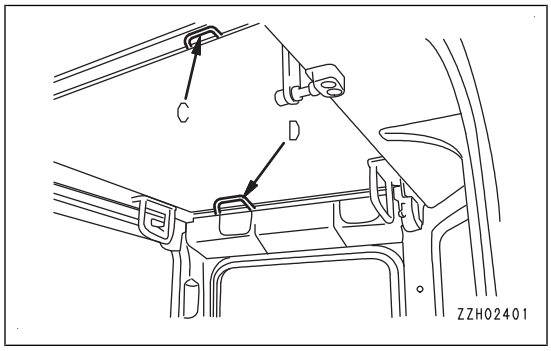
4. Grip right and left handles (A), and pull down lever (B) to release the lock.

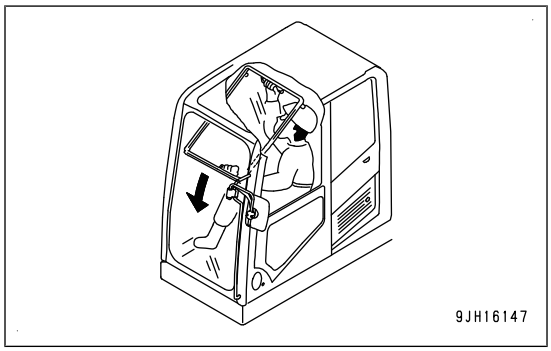


5. Grip the handle (C) at the bottom of the front window with your left hand and the handle (D) at the top with your right hand, push the window to the front, then lower it slowly.

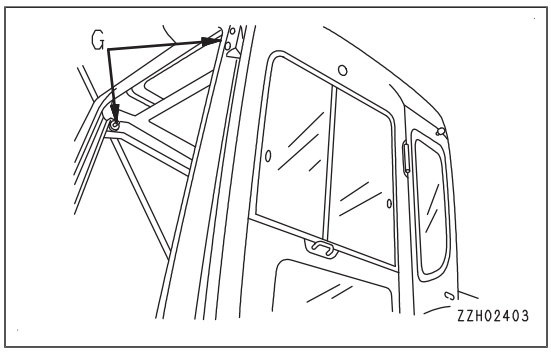
REMARK

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

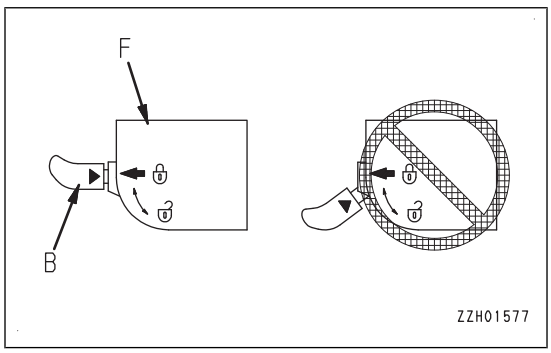




6. When the bottom of the window reaches the top of lower side window, push the top of the window to the front to push it against right and left lock catches (G) and engage the lock.

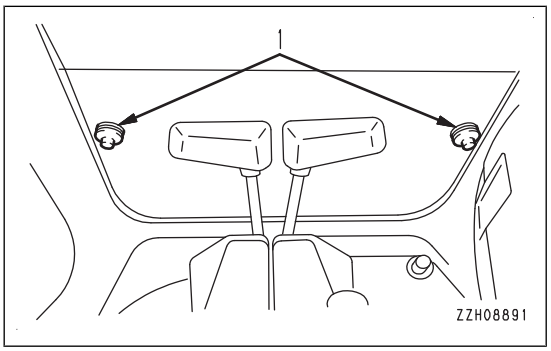


7. Check that lever (B) is securely in LOCK position.
   - The lock is engaged if the arrow on lock case (F) matches the position of the arrow on lever (B). Check visually.
   - The lock is not engaged if the arrow on the lock case (F) does not match the position of the arrow on the lever (B). Repeat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



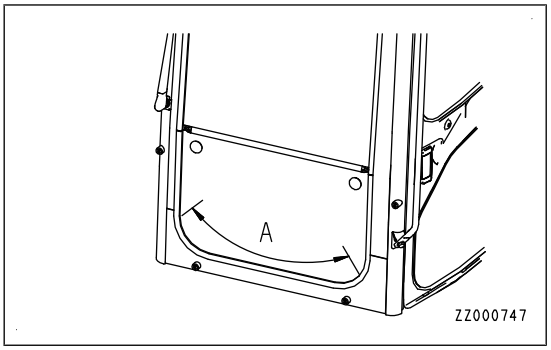
Removal of the Front Window (Lower Side)

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

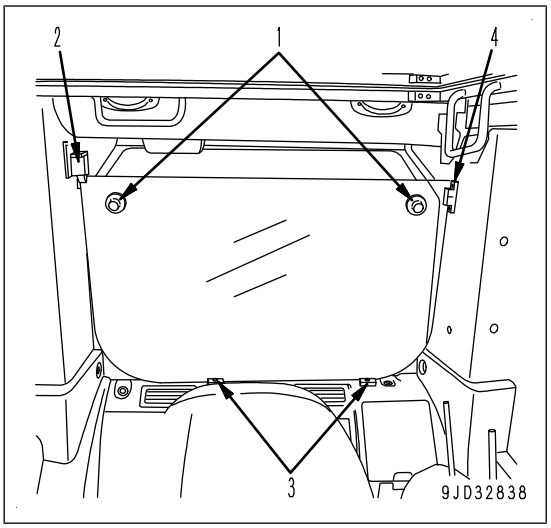


REMARK

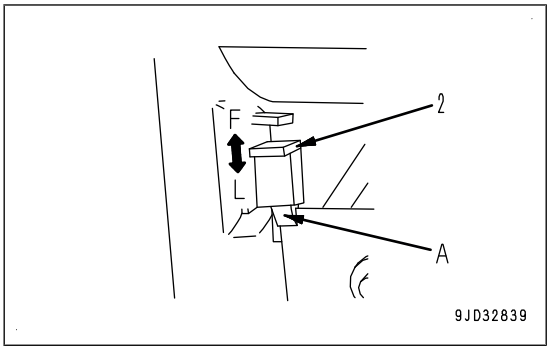
If sand or dust is collected at the bottom of the front window (lower side), it will be difficult to remove the window. In addition, when stowing, the sand and dust stuck to the glass will be carried inside the cab. To prevent this, clean the area (A) before removing.



2. After removing the lower window, store it at the rear of the operator's cab and lock it securely with lock (2). The procedure for stowing is as follows.
   1) Set it with the protruding part of grip (1) on the glass on the inside and insert the bottom of the glass into the groove in seat (3).
   2) Insert the top right of the glass into the groove in seat (4).



   3) Push the lock (2) to the free position (F). Tooth (A) will come up, so push the glass against it, then release the lock (2) and secure the top of the glass.
   When the lock (2) is released, it will return to LOCK position (L) and tooth (A) will go down.



   NOTICE

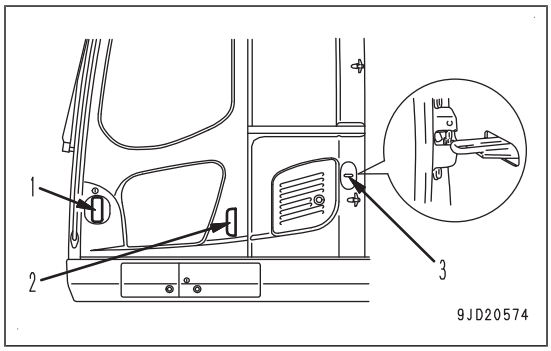
   When stowing the glass, lock it securely and check that there is no play. If there is play or the lock is not properly applied, there is danger that the glass may fall.

   4) When removing the lower window from the stowing position, perform the stowing procedure in the reverse order.

Slide Door

⚠ CAUTION

- **Be sure to check that the sliding door is locked in position both when it is open and when it is closed.**
- **Always place the machine on a level ground when opening or closing the door.**
  Avoid opening or closing the door on a slope, since there is a danger that the operating effort may suddenly change.
- **When opening or closing the door, always use door handle (1) and knob (2).**
- **Be careful not to get your hands caught between the front pillar or center pillar.**
- **When there is anyone inside the cab, always call out a warning before opening or closing the door.**



Door lock

When closing the door, pull door handle (1) back to unlatch lock (3), then pull the door to the front.

REMARK

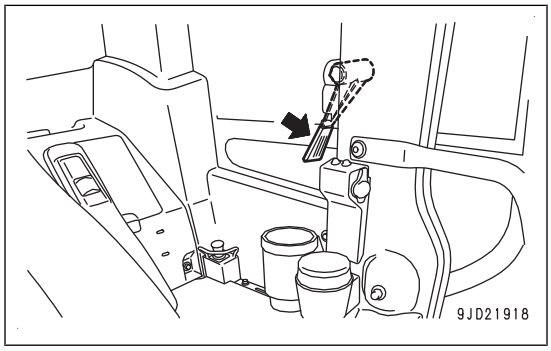
Rubber parts are used for the parts that compose the door. When the ambient temperature is low, the rubber becomes hard, and it is not easy to be locked. In such case, open or close the door with stronger force than usual. At this time, be careful of the area around the machine.

Emergency Escape Hammer

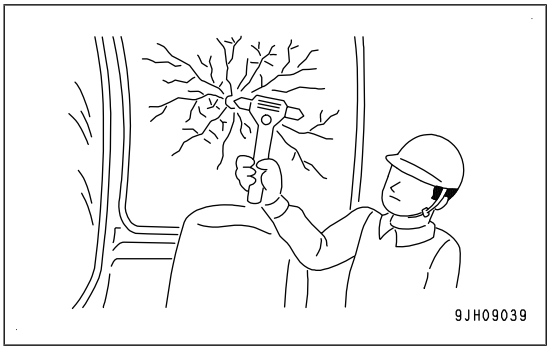
⚠ CAUTION

- **If it is necessary to break the window glass with the hammer, be extremely careful not to get injured with scattered pieces of broken glass.**
- **To prevent injury, remove the broken pieces of glass remaining in the frame before escaping through the window. Be careful also not to slip on the broken pieces of glass.**

If it should become impossible to open the cab door for any reason, and it is necessary to make an emergency escape from the operator's compartment, use hammer to escape.



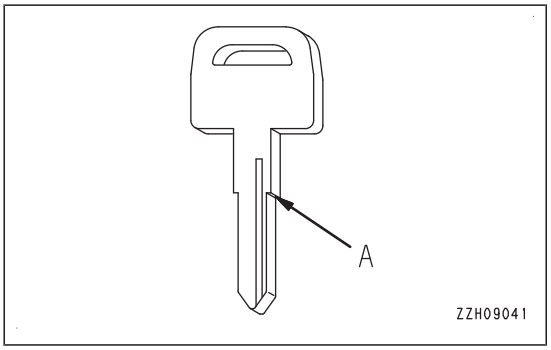
To escape from the operator's cab, use hammer to break the glass and escape through the window.



Cap and Cover with Lock

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

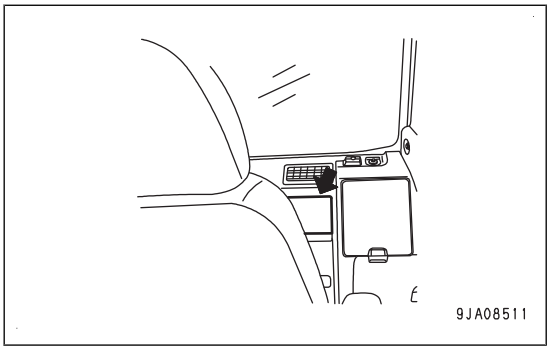
Insert the key as far as it will go to the shoulder (A) and turn it. If the key is turned when it is not inserted all the way to the end, it may break.



Magazine Box

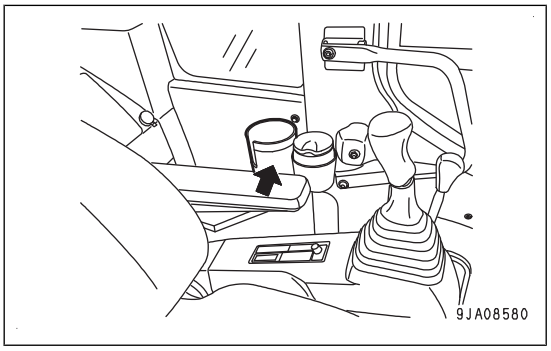
A pocket is provided the rear inside the cab for keeping Operation and Maintenance Manual and oil chart.

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



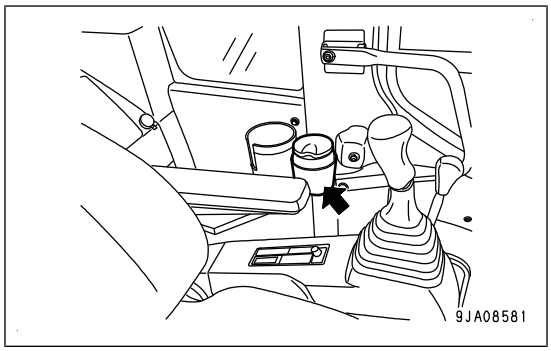
Cup Holder

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



Ashtray

Ashtray is on the left side of the operator's cab.



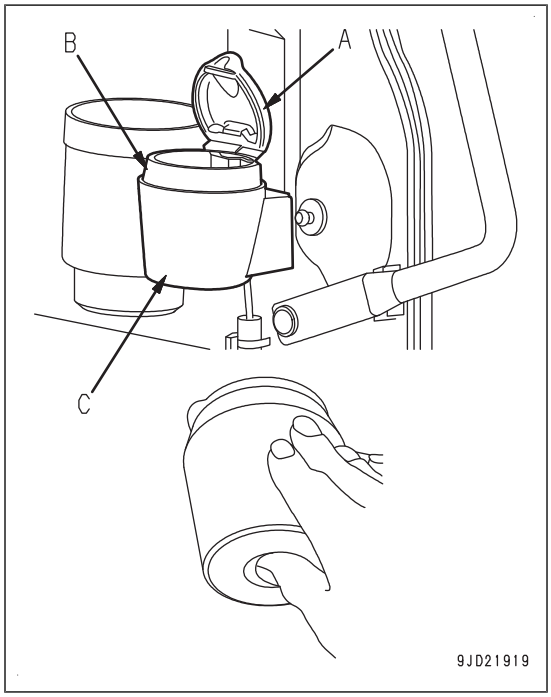
Always extinguish your cigarette before putting it in the ashtray, then be sure to close the lid (A).

When removing ashtray, open the lid (A), hold ashtray body (B), and twist it.

Or, push up ashtray body (B) with a finger through the hole at the bottom of ashtray holder (C).

NOTICE

If you hold and twist lid (A) of ashtray, there is a danger that the ashtray may break.



Power Supply Outlet

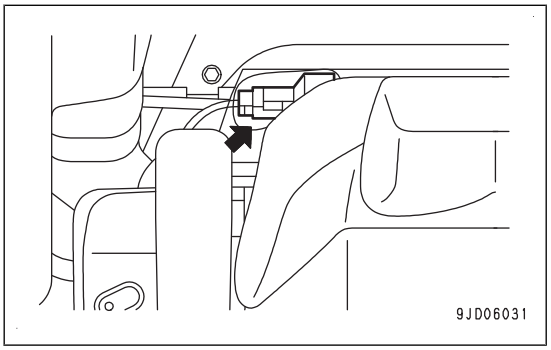
NOTICE

When installing an electrical component which is not a product of Komatsu, limit its capacity to maximum 240 W in the 24 V specification (equivalent to 10 A). When installing an electrical component of capacity larger than above value, consult your Komatsu distributor.

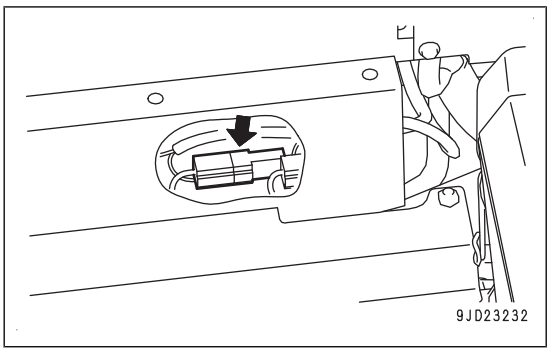
The connectors to take out electric power for optional parts are fixed to the right and left under the floor console. Remove them when using.

Take out power from these connectors for electric parts which are not products of Komatsu.

Right connector No.: M09



Left connector No.: M10



For the connection type connector, see the following table.

Right connector No.: M09

	M type housing (2 poles)		Terminal		
	Body	Rear holder	AVS 0.5	AVS 0.85 to 2	AVS 3
Komatsu part No.	08056-00211	08056-00230	08056-00050	08056-00051	08056-00052

Left connector No.: M10

	X type housing (2 poles)		Terminal		Grommet	
	Body	Rear holder	AVS 0.5 to 1.25	AVS 2 to 3	AVS 0.5 to 1.25	AVS 2 to 3
Komatsu part No.	08055-00212	08055-00230	08055-00040	08055-00041	08055-00060	08055-00061

24V Power Supply

NOTICE

Do not use as a power supply for a 12 V device.

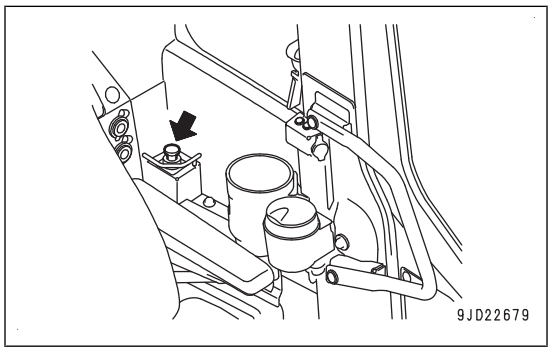
This will cause failure of the equipment.

When cigarette lighter is removed, the lighter socket can be used as a power source.

The capacity of the cigarette lighter is 85 W (24 V x 3.5 A)

REMARK

Use this power source while engine is running.



12V Power Supply

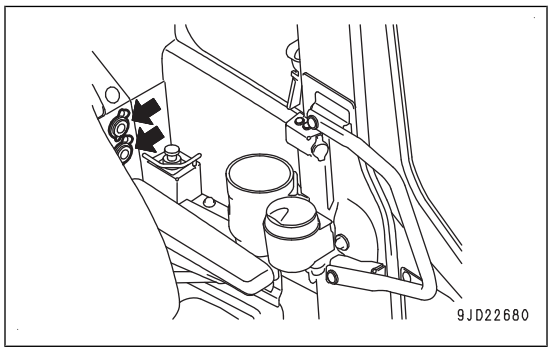
Capacity of this power supply is 144W (12 V x 12 A).

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

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

REMARK

Use this power source while engine is running.

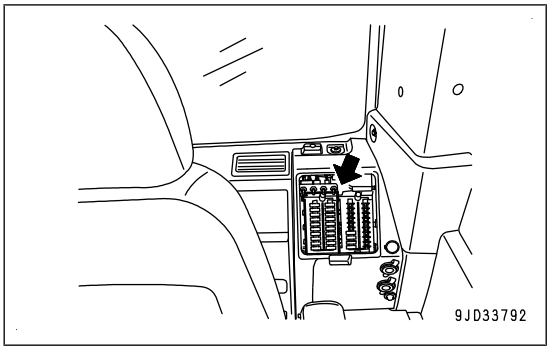


Fuse

NOTICE

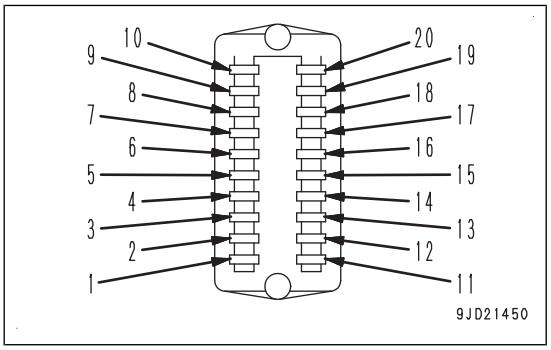
Turn the starting switch to OFF position, then turn the battery disconnect switch to OFF position always before replacing the fuse.

- The fuse holder is installed inside the cover at the rear left of the operator's seat.
- The fuses protect the electrical component and wiring from burning out.
- If the fuse becomes corroded, or looks white powdery, or the fuse is loose in the fuse holder, replace the fuse.
- Replace the fuse with the one of the same capacity.

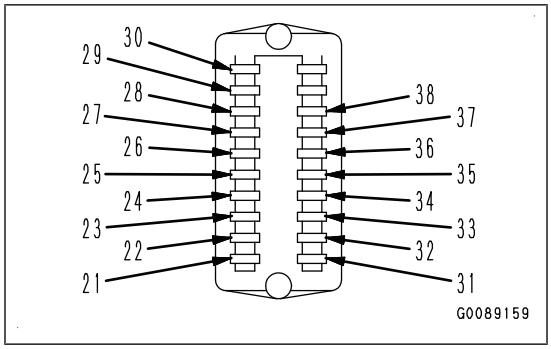


Fuse Capacity and Name of Circuit

No.	Fuse	Name of circuit
(1)	10 A	Secondary switch, working lamp relay
(2)	30 A	Solenoid valve
(3)	5 A	PPC oil pressure lock solenoid
(4)	10 A	Window washer, cigarette lighter
(5)	10 A	Horn
(6)	5 A	Auto-preheater
(7)	10 A	Revolving lamp
(8)	10 A	Radio, speaker, L.H. knob switch
(9)	10 A	Deck light
(10)	20 A	Air conditioner unit
(11)	20 A	Working light
(12)	10 A	Optional power supply (1)
(13)	30 A	Optional power supply (2), 12V power supply, air suspension seat heater
(14)	5 A	Air conditioner ECU power supply
(15)	5 A	Key ACC signal
(16)	10 A	Radio backup, room lamp, system operating lamp
(17)	30 A	Monitor, pump controller
(18)	30 A	Engine controller
(19)	5 A	Air conditioner ECU backup
(20)	10 A	Optional power supply (continuous power supply)

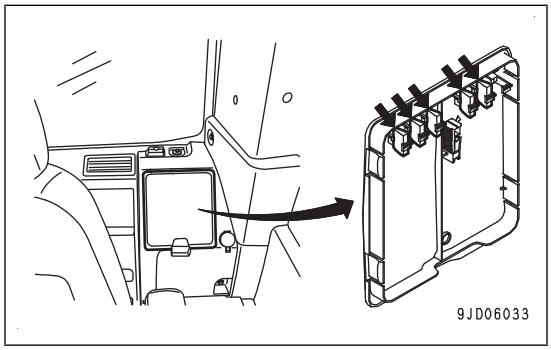


No.	Fuse	Name of circuit
(21)	10 A	CAB head light (1)
(22)	10 A	CAB rear light
(23)	10 A	Lower wiper
(24)	10 A	Quick coupler
(25)	10 A	Refueling pump
(26)	10 A	CAB head light (2)
(27)	10 A	Optional light
(28)	20 A	Auto greasing system
(29)	30 A	Spare
(30)	10 A	Spare
(31)	20 A	Sensor power supply relay (1)
(32)	10 A	Sensor power supply relay (2)
(33)	10 A	DEF line heater relay (1)
(34)	20 A	DEF line heater relay (2)
(35)	10 A	KomVision controller
(36)	20A	KOMTRAX OPT1 (Continuous)
(37)	15A	KOMTRAX OPT2
(38)	15A	Spare



REMARK

- Spare fuses are installed in the back of the fuse holder lid at the rear left of the operator's seat.
- After using the spare fuses, replenish them immediately.
- One spare fuse is installed for each 5A, 10A, 15A, 20A, 25A, 30A.



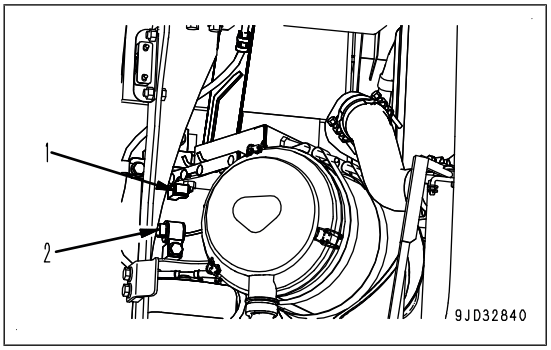
Fusible Link

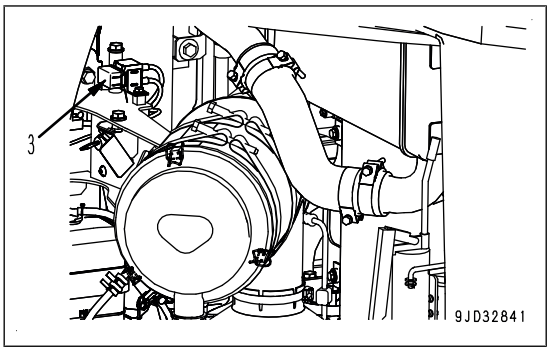
NOTICE

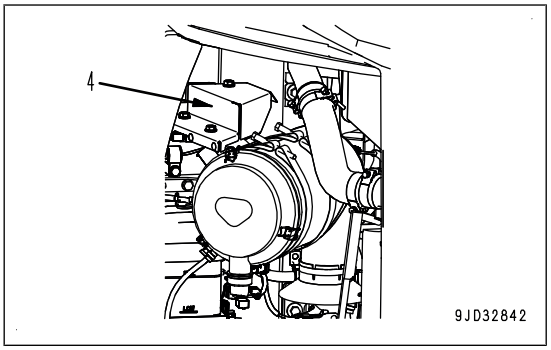
Before replacing a fusible link, be sure to turn the starting switch to OFF position, then turn the battery disconnect switch to OFF position.

If the following phenomena occur, fusible links are suspected of disconnection.

- If the engine starting motor does not work when the engine starting switch is turned to the START position, fusible links (1) and (2) are suspected of disconnection. In that case, open up the door at the machine's left rear to check and replace.
- If the engine starting motor does not work in cold weather when the engine starting switch is turned to the HEAT position (preheating), fusible links (3) are suspected of disconnection. In that case, open the door at the rear left of the machine, and remove the inside cover (4) to check and replace.







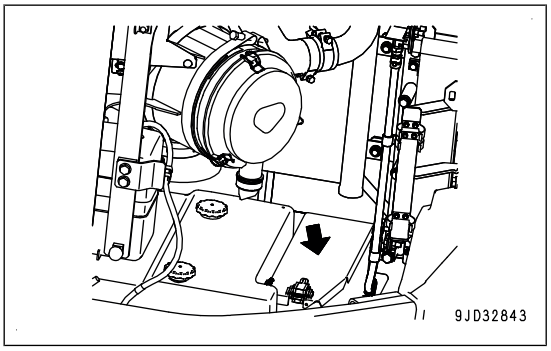
REMARK

A fusible link refers to the large-sized fuse wiring installed in the high current flow part of the circuit. It protects electrical components and wiring from burning, in the same way as an ordinary fuse.

No.	Capacity	Name of circuit	Connector No.	Part No.
(1)	65 A	Continuous power supply	F04	22U-06-11270
(2)	65 A	Continuous power supply	F05	22U-06-11270
(3)	80 A	Preheat	F12	421-06-22820

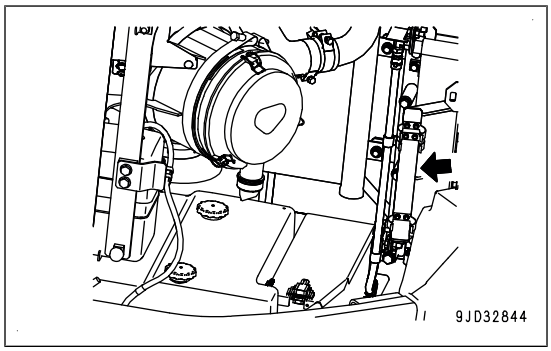
Tool Box

It is in the tool case at the inside of rear door on the left side of the machine. Store the tools in this box while they are not in use.



Grease Pump Holder

It is located inside the door at rear left of the machine. Keep the grease pump hooked on this holder when it is not used.

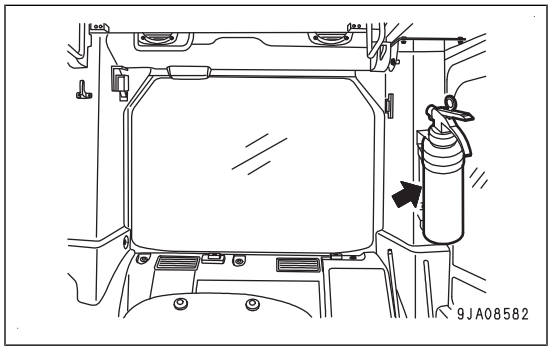


Fire Extinguisher

(if equipped)

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

The directions are described on the nameplate affixed to the fire extinguisher. Just in case, carefully read and understand them beforehand.



Battery Disconnect Switch

⚠ CAUTION

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

NOTICE

- **Keep the 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 the electric welding**
  - **When handling the battery**
  - **When replacing the fuse, etc.**
- **Do not turn the battery disconnect switch to OFF position while the system operating lamp is lit. If the battery disconnect switch is turned to OFF position while the lamp is lit, the data in the controller may be lost and system abnormality may occur.**
- **If this switch is turned to OFF position, all the electrical system is cut out and the functions of KOMTRAX stop. In addition, the time information of the clock and the radio tuning information may be lost. In this case, set them again by referring to “Clock Adjustment” and “HANDLE RADIO”.**

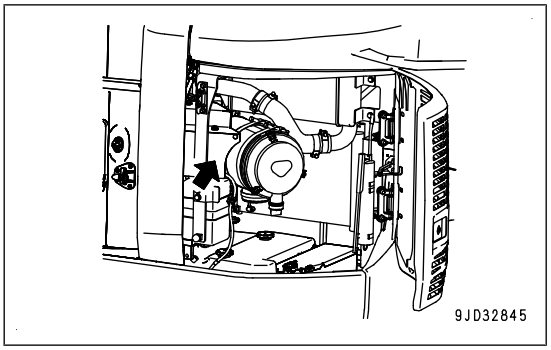
The battery disconnect switch (1) is used to cut out the electricity from the battery.

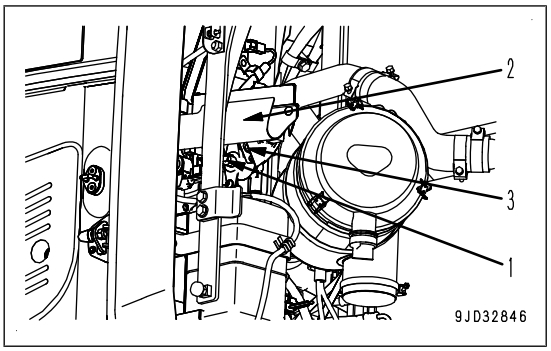
It is installed on the inside of the door at rear left of the machine.

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

REMARK

Operate this switch while the system operating lamp (3) is not lit.





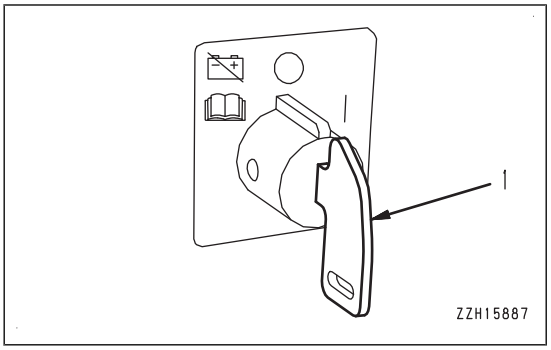
(O): OFF position

The 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

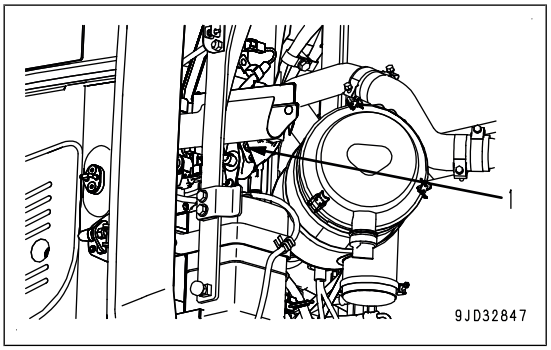
System operating lamp (1) indicates that the controller mounted on the machine is turned on.

System operating lamp (1) lights up when the controller is turned on and goes out in 1 to 7minutes after the starting switch is turned to OFF position.

Before operating the battery disconnect switch, check that system operating lamp (1) is not lit.

NOTICE

If the battery disconnect switch is turned to OFF position while the lamp is lit, the data in the controller may be lost and system abnormality may occur.



REMARK

- Even if the starting switch is in OFF position, the controller may operate. The lamp lights up in this case, but it is not a problem.
- 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.
- The system operating lamp may look slightly luminous in the dark after it is turned off. It is due to the minute leakage of current and not an abnormal phenomenon.

Handle Komatsu Diesel Particulate Filter (KDPF)

⚠ CAUTION

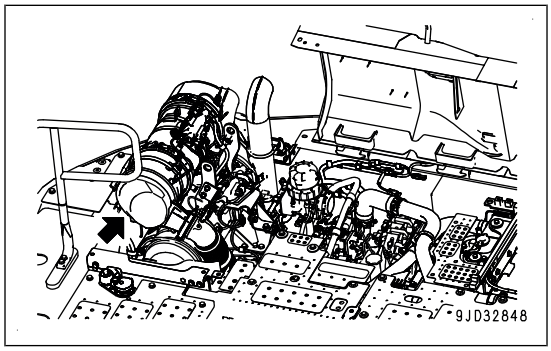
- **Exhaust gas temperature may increase during the aftertreatment devices regeneration and the high temperature may last after the completion of regeneration.**
  Avoid getting near the exhaust pipe outlet and around the aftertreatment devices to prevent being burnt.
  Also, keep combustible materials 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.**

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 “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.

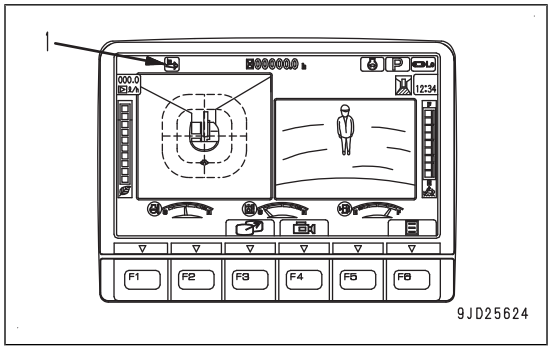


During the KDPF regeneration, the aftertreatment devices regeneration pilot lamp (1) stays lit.

REMARK

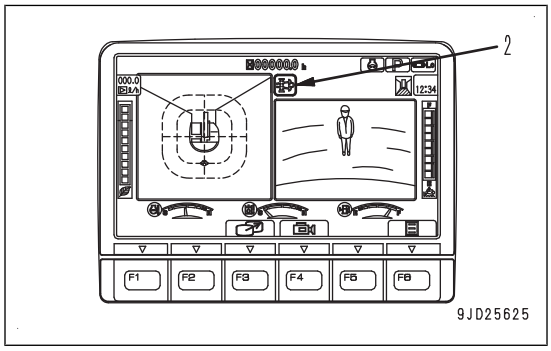
Even if the aftertreatment devices regeneration pilot lamp (1) lights up, the machine does not need to be stopped and the work can be continued, unless the caution lamp is displayed at the center of the monitor.

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, the 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.

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

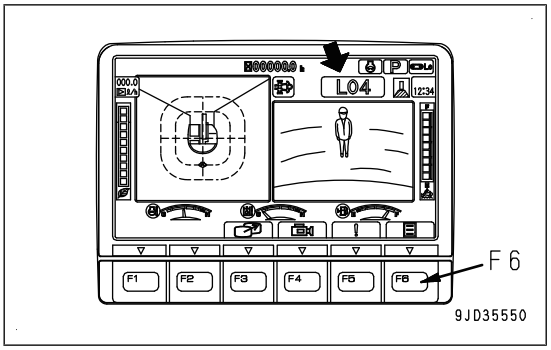


NOTICE

Do not stop engine when the aftertreatment devices regeneration is activated.
When stopping the engine, stop the aftertreatment devices regeneration first, run the engine at low idle for approximately 5 minutes, and then stop the engine.

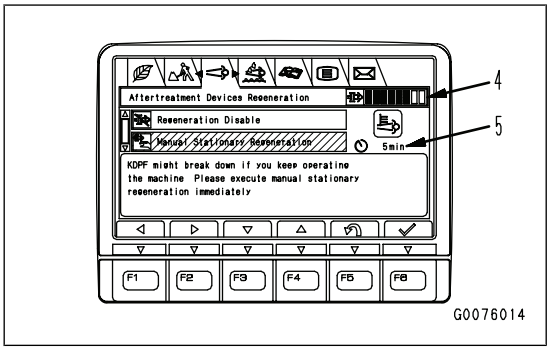
When the Action level “L03” lights up in red, and the KDPF soot accumulation caution lamp (2) lights up in red, engine power deration is activated. To restore engine power, it is necessary to perform “PROCEDURE FOR MANUAL STATIONARY REGENERATION”.

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

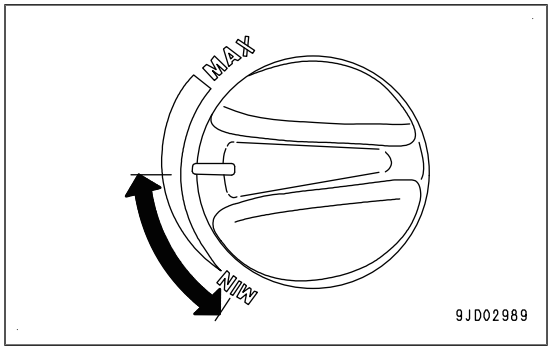
- The soot accumulation level (4) can be checked on “Aftertreatment Devices Regeneration” screen. Press the switch F6 on the standard screen, and the “Aftertreatment Devices Regeneration” screen of the user menu is displayed.
- You can check the remaining regeneration time (5) on “Aftertreatment Devices Regeneration”screen. The shown remaining regeneration time is an approximate value and it can be different from the actual regeneration time.
- Since the soot in the filter of KDPF can be burnt by the high-performance catalyst and high-temperature exhaust heat, the soot accumulation quantity may decrease even if the regeneration is not performed, depending on the operating condition.

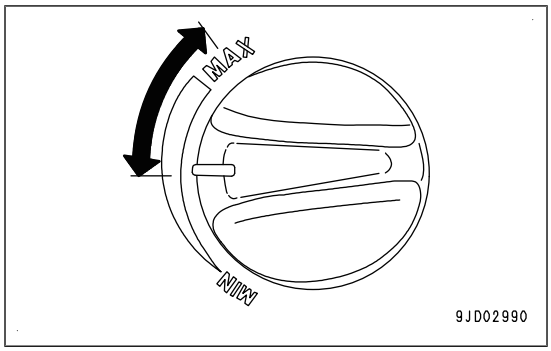


- Even when the soot accumulation level is low, the automatic regeneration may be performed and the manual stationary regeneration may be requested to protect the system. In particular, if engine is kept running with no load, the regeneration frequency may increase, but this is not a failure.
- Even just after the regeneration is completed, the soot accumulation level may not be “0”. This is caused by the accumulated noncombustible material in the exhaust gas and is not a failure.
- Since noncombustible matter which cannot be burnt by the regeneration is accumulated in the filter of KDPF, the filter needs to be cleaned or replaced at regular intervals.
- 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.
- If the mixing ratio of the bio-fuel in the diesel fuel is high, the regeneration of KDPF may become more frequent.
- Ash is easy to be accumulated in KDPF when the biofuel is used. Thus, the regeneration of KDPF can possibly become more frequent if the mixing ratio of the biofuel is high.

REMARK

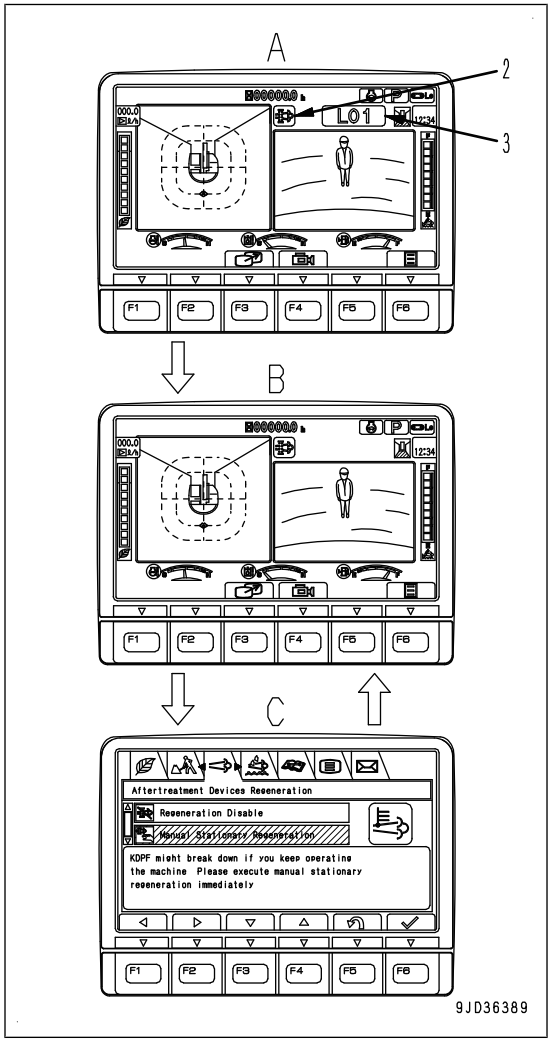
If heavy-duty operation is performed for more than 30 minutes with the fuel control dial between Low idle (MIN) position and High idle (MAX) position, soot is accumulated much and action level “L03” may be displayed. However, this does not indicate abnormality.
After performing manual stationary regeneration,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





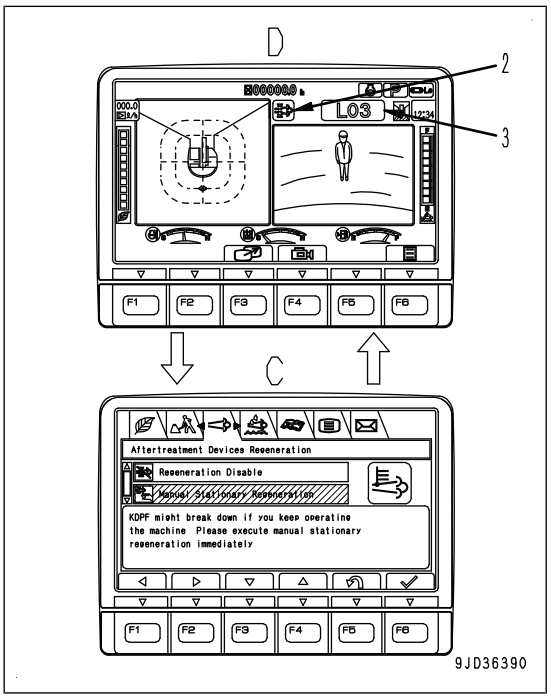
When the Degree of Urgency is Low

- 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 later, and the screen changes back 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, “Aftertreatment Devices Regeneration” (C) is displayed for 30 seconds every 2 hours.
- If the KDPF soot accumulation caution lamp (2) lights up in yellow, stop the machine in a safe place after finishing the work and perform the manual stationary regeneration.



When the Degree of Urgency is High

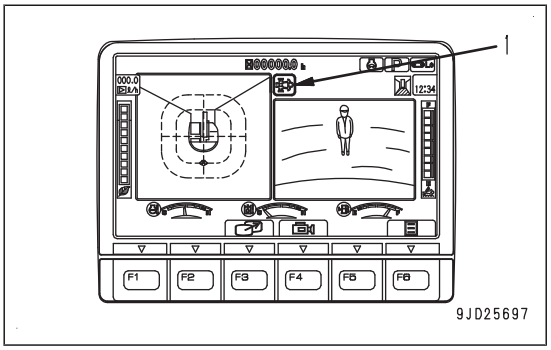
- KDPF soot accumulation caution lamp (2) lights up in red, and “L03” is displayed in red on the action level display (3).
- If the lock lever is set to LOCK position or all the work equipment control levers are set in NEUTRAL, the screen changes to “Aftertreatment Devices Regeneration” screen (C) after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



Manual Stationary Regeneration

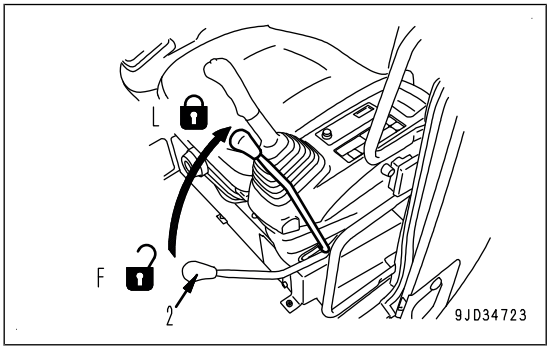
⚠ CAUTION

Exhaust gas temperature may become 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, do not bring any combustible material close to the outlet of the exhaust pipe or the aftertreatment devices to prevent a fire.

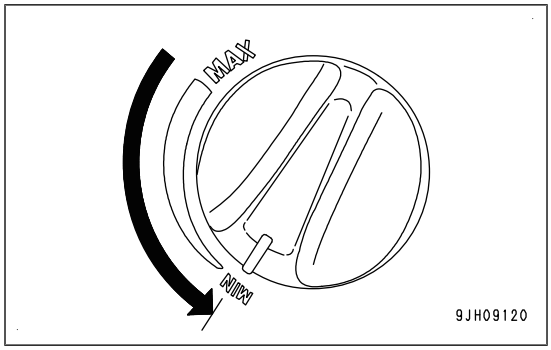


The manual stationary regeneration can be performed while the KDPF soot accumulation caution lamp (1) is lit.

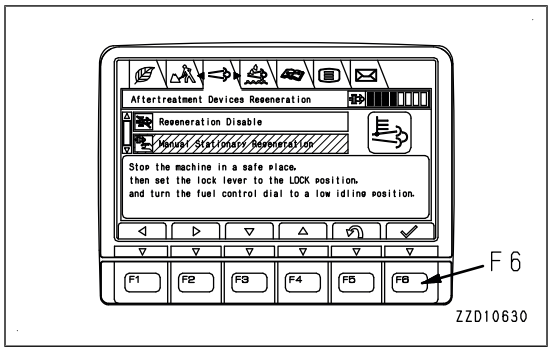
1. Move the machine to a safe place and stop it while the engine is running.
2. Check that there is no person or combustible matter around the machine (particularly in the direction of the exhaust gas flow).
3. Operate the lock lever (2) by red portion on the top, then securely set it to LOCK position (L).



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



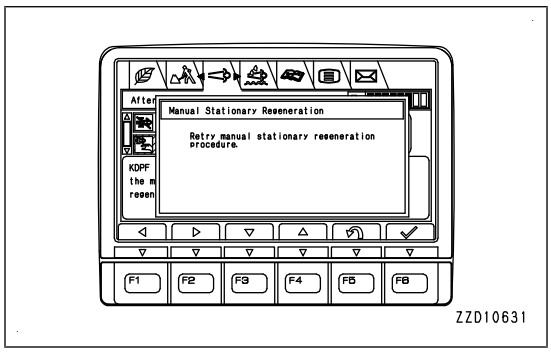
5. Press the switch F6 to display “Aftertreatment Devices Regeneration” screen.

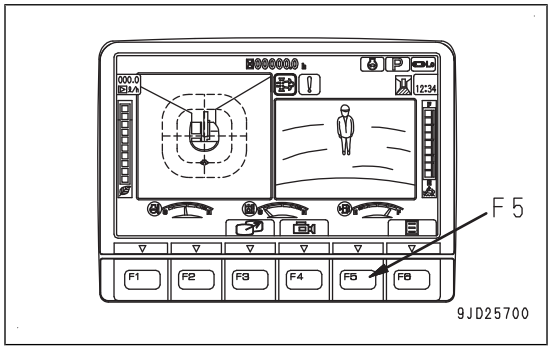


6. Select the manual stationary regeneration, check again safety of the surrounding area and make sure the area is free from irrelevant people or combustible material, then press the switch F6.
If the machine needs to be moved again to secure the safety, move it to a safe place and repeat the procedure from step 1.

REMARK

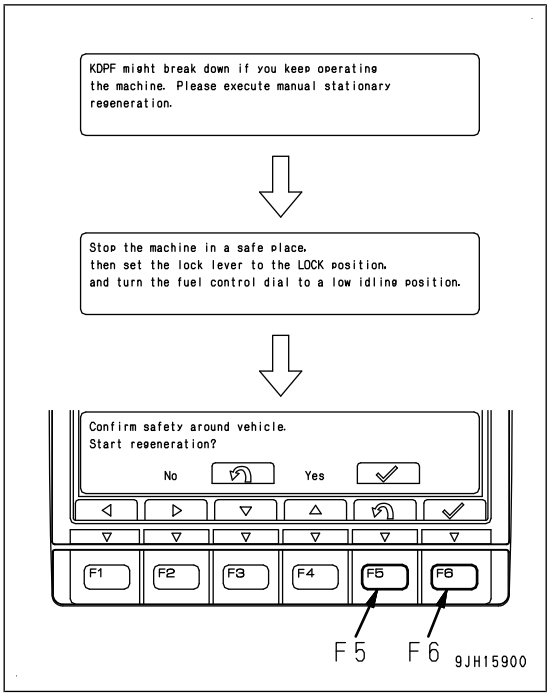
After switch F6 is pressed in step 6., the screen shown in the figure may be displayed. This indicates that the operations in steps 1 to 4 were not performed correctly or there is trouble other than the KDPF soot accumulation abnormality. Check that the engine is running normal, the lock lever is in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

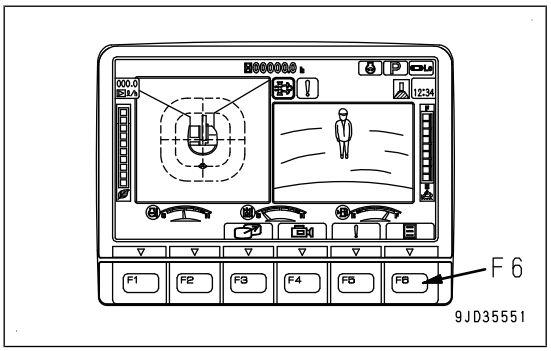




REMARK

- The explanation of the manual stationary regeneration is displayed in 3 parts on the monitor. When the 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 the monitor switch is not operated for 30 seconds, the explanation of the manual stationary regeneration is displayed for 30 seconds, and then the screen returns to the standard screen. At this time, to display the explanation of the manual stationary regeneration again, press the switch F6 on the standard screen to display the “Aftertreatment Devices Regeneration” screen.

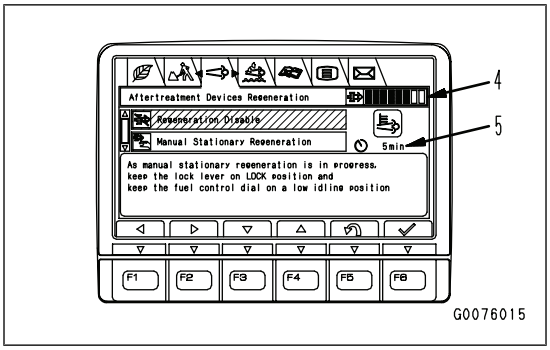


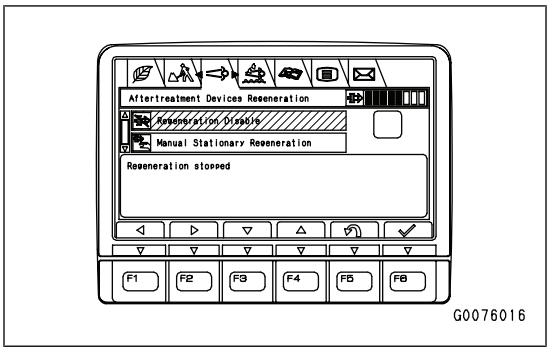


7. This screen is displayed during the manual stationary regeneration. It may take more than 40 minutes to complete the manual stationary regeneration. Do not touch any switch on the screen or operate fuel control dial until the regeneration is completed and the standard screen appears again.

REMARK

- The progress of the manual stationary regeneration performed when soot is accumulated can be checked by the number of lighting lamps of the soot accumulation level (4). The manual stationary regeneration starts at the 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.
- You can check the remaining regeneration time (5) on“Aftertreatment Devices Regeneration”screen. The shown remaining regeneration time is an approximate value and it can be different from the actual regeneration time.
- The manual stationary regeneration for protection of the system may start even when the soot accumulation level is “0” to “3”. In this case, the soot accumulation level may not decrease, but this is not a failure. The progress is not displayed on the monitor during this regeneration. It is completed in approximately 10 minutes.
- If the lock lever or the 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 by referring to the aftertreatment 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.





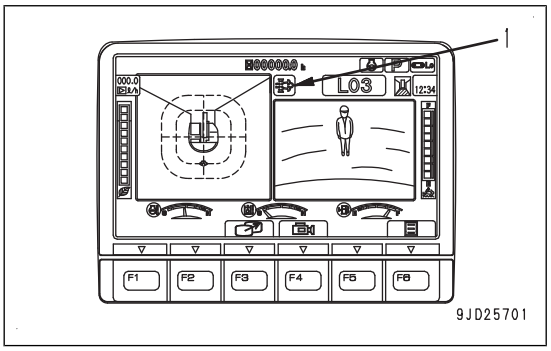
8. After the manual stationary regeneration is completed, the screen automatically returns to the standard screen.

Procedure to Set Aftertreatment Device Regeneration Disable

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

NOTICE

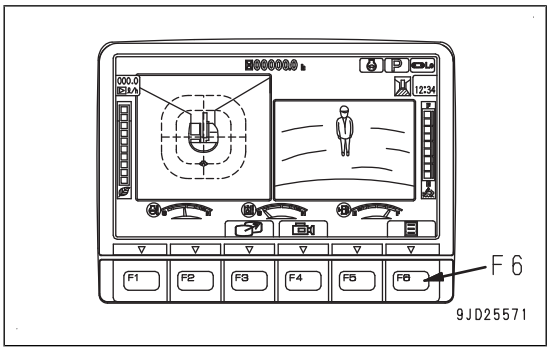
Even if the regeneration is disabled, the KDPF soot accumulation caution lamp (1) lights up if soot is accumulated and the manual stationary regeneration is required. If the KDPF soot accumulation caution lamp lights up, move the machine to a safe place and perform the manual stationary regeneration.
If the operation is continued without performing the manual stationary regeneration, it may cause the failure of KDPF or the engine.



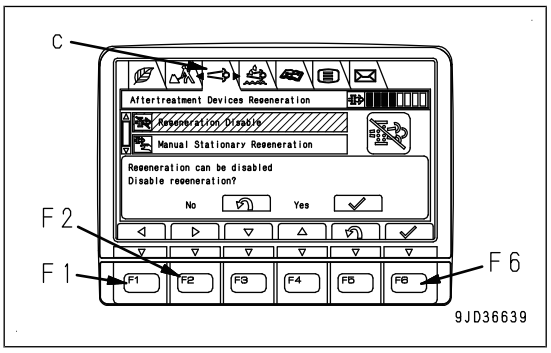
While the Regeneration is Not Done: Setting for the Regeneration Disable

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

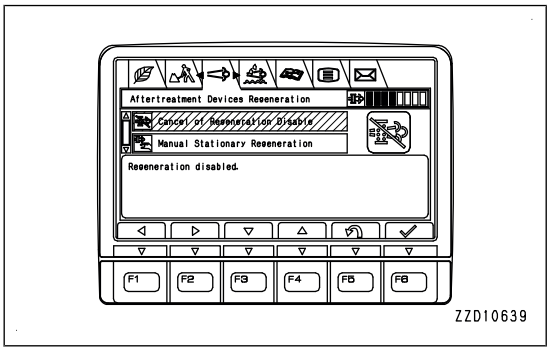
   Press the switch F6 on the standard screen.



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

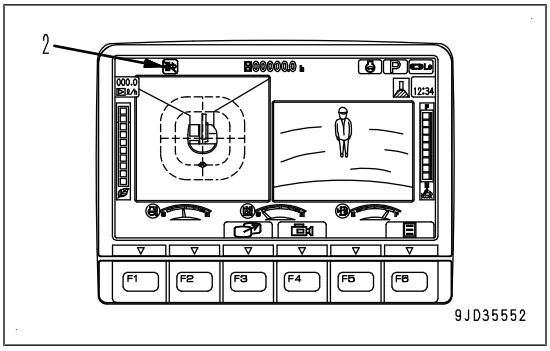


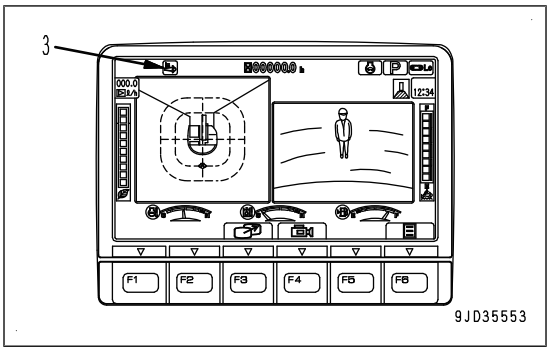
3. Select the Regeneration Disable and press the switch F6, then the regeneration function is disabled and the regeneration cannot be performed.

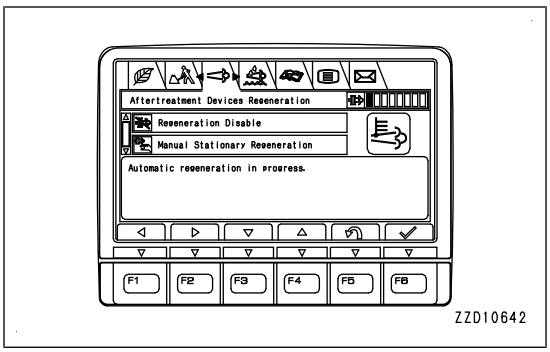


REMARK

- 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 the 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.



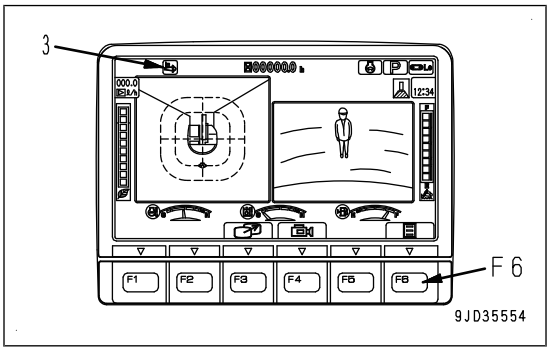




While the Regeneration is Done: Regeneration is Disabled

1. (When the aftertreatment devices regeneration pilot lamp (3) is lit on the standard screen)

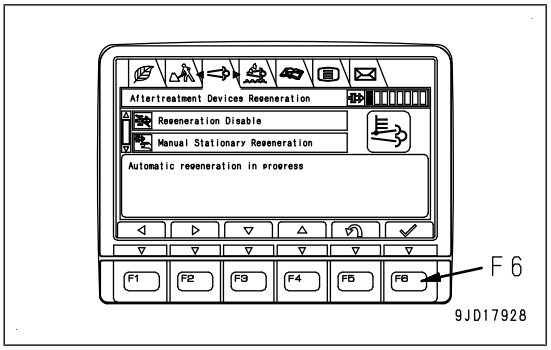
   Press the switch F6 on the standard screen, and “Aftertreatment Devices Regeneration” screen is displayed.

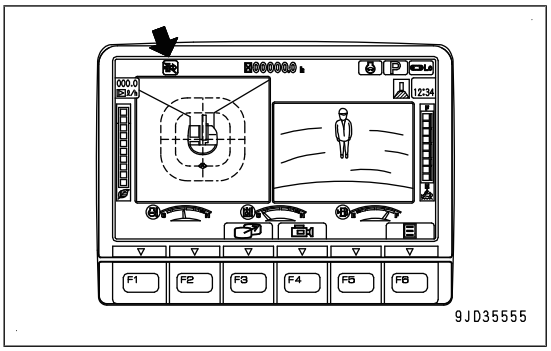


2. Select the Regeneration Disable and then press the switch F6, and the regeneration stops.

   REMARK

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





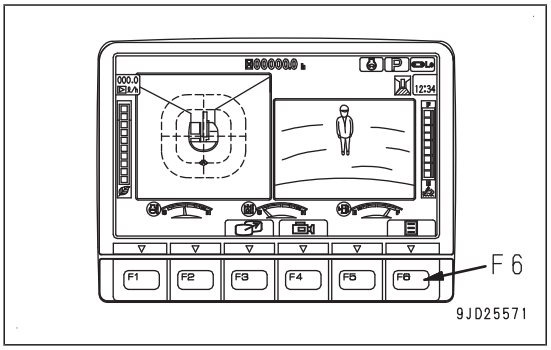
Procedure to Cancel Aftertreatment Devices Regeneration Disable

⚠ CAUTION

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

1. 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.

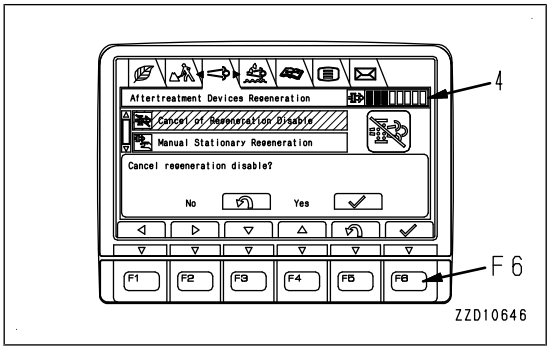


2. Select Cancel of the regeneration disable and press switch F6, and the regeneration disable is canceled.

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

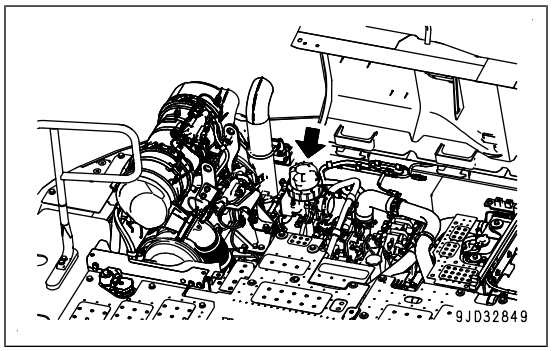
   REMARK

   - 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.**
- **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. Komatsu recommends using 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

Urea SCR system is a device which converts toxic nitrogen oxides (NOx) in the exhaust gas into harmless nitrogen and water. Spraying the DEF into the exhaust gas produces a reaction between the nitrogen oxides and ammonia generated from the DEF, and decomposes the nitrogen oxides into nitrogen and water.

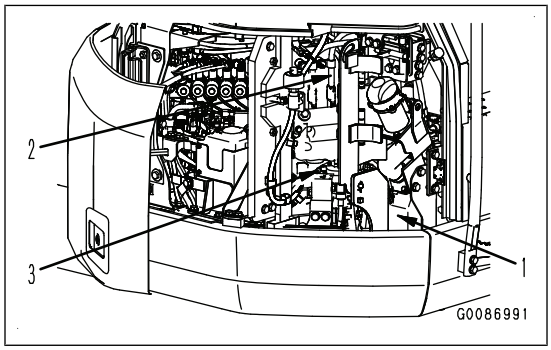
Urea SCR system has functions to monitor the system operation and to save the information of the abnormal state. The information is necessary in order for the urea SCR system to diagnose the inducement level of the engine. The inducement level is informed to the operator in a visual manner and in a auditory way such as buzzer. The inducement of the engine modifies the inappropriate behavior of the urea SCR system. 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.

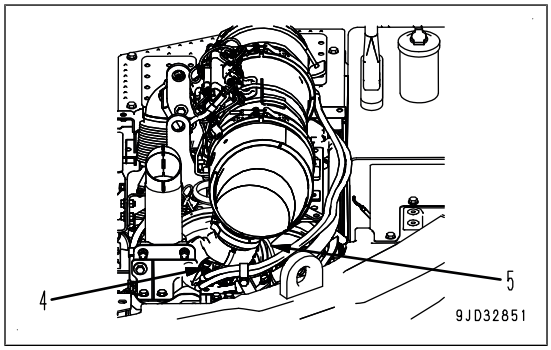
The Komatsu Urea System also monitors recurrences of abnormalities of the system. Inducement in the recurrences is activated when another abnormality occurs within 40 hours after the first abnormality is fixed.

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.





NOTICE

- **Fill ONLY DEF into DEF tank. Foreign material in the DEF system or urea deposits caused by evaporation 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.**

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.

In Cold Weather

DEF freezes at –11 °C.

Urea SCR system is equipped with a heating system to thaw frozen DEF once it is frozen, for example, during parking and to prevent DEF from freezing during operation.

In case DEF freezes during parking, once the engine starts running the heating system automatically starts providing heat to thaw frozen DEF. The pump and the injector start working only after a proper amount of DEF is thawed. This may be noticed as a delay in the start of functioning of the pump and the injector.

The heating system is also activated automatically during operation to prevent DEF from freezing whenever the ambient temperature drops below a certain threshold where DEF in the system may freeze. In the event that the ambient temperature drops further than a temperature where the heating system is capable of maintaining fluidity of DEF, the DEF system automatically starts purging the remaining DEF back to the tank and stops pumping and injection while heating continues. Once the ambient temperature rises above a temperature where DEF system becomes functional, it resumes operation automatically.

Short duration of white plume given off from the tail pipe may be visible at and shortly after engine start-up in cold weather, but this is not malfunction.

Inducement Strategy When the DEF Tank Level Becomes Low

When the amount of DEF in the tank goes low, the Inducement strategy will be activated.

If Inducement starts, add DEF to the DEF tank immediately.

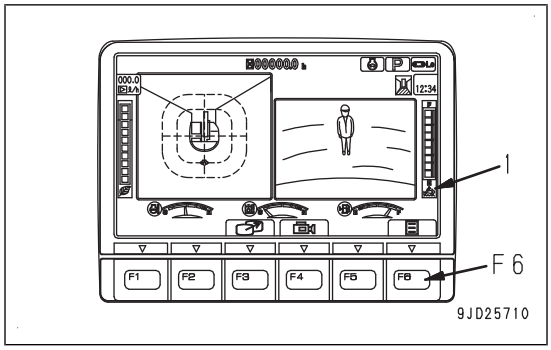
The DEF level caution lamp (1) on the monitor lights up, the audible alert starts, and the Action level is displayed, and Inducement strategy is activated. Inducement strategy includes engine output deration, speed limitation, or other warning actions intend to prompt the operator to maintain or repair SCR system.

The Inducement strategy 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 “L03” or “L04” is displayed, move the machine to a safe place and add DEF.

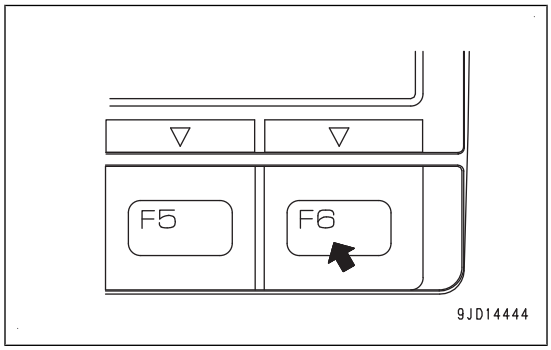
The content of the warning can be checked on the “SCR Information” screen of the user menu.



Perform the following procedure.

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

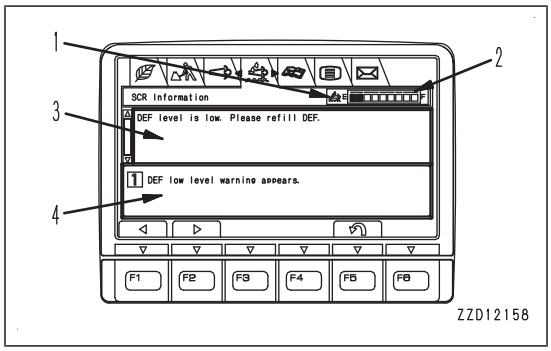
If either lock lever is set to LOCK position or the travel lever and control levers are in NEUTRAL position for over 3 seconds, “SCR Information” screen of the user menu will pop up automatically while the Urea SCR system is in Inducement.



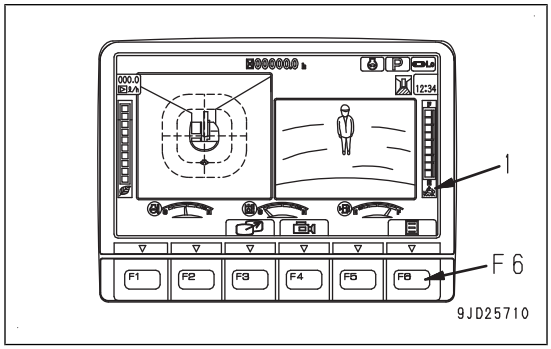
“SCR Information” screen displays the DEF level caution lamp (1), the DEF level gauge (2), information on the Urea SCR System condition (3), and the current status of Inducement (4).

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.

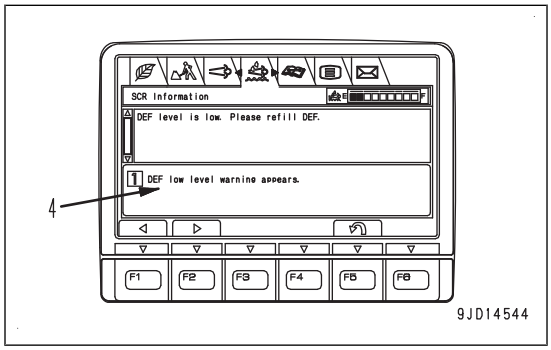


- Warning:
  2 gradations of the DEF level gauge light up in the red range.
  The DEF level caution lamp (1) lights up in red.
  No audible alert.
  No Action level is displayed.
  Press F6 to display the “SCR Information” screen.

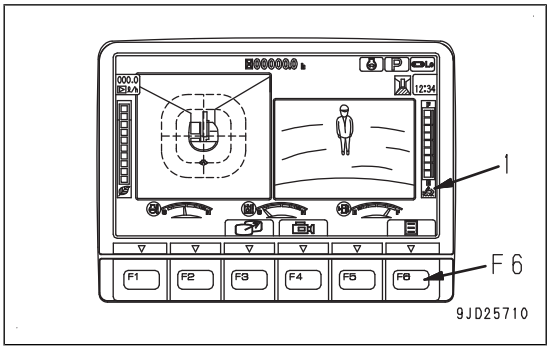


Inducement status (4): “1 DEF low level warning appears.”

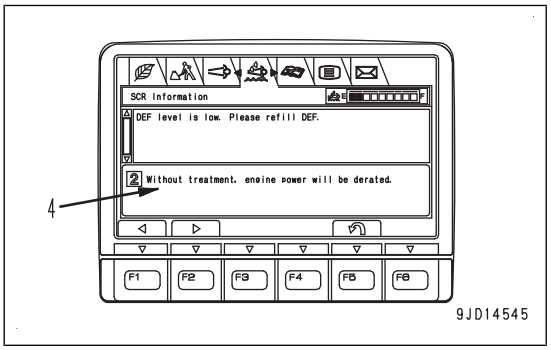
Add DEF to the DEF tank immediately.



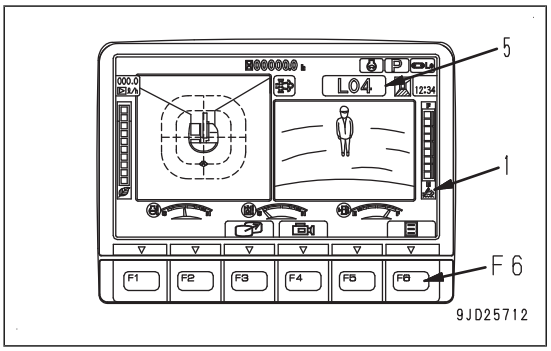
- Continuous Warning:
  The audible alert sounds in repetition of “three beeps and a pause”.
  2 gradations of the DEF level gauge light up in the red range.
  DEF level caution lamp (1) lights up in red.
  No Action level is displayed.
  Press F6 to display the “SCR Information” screen.



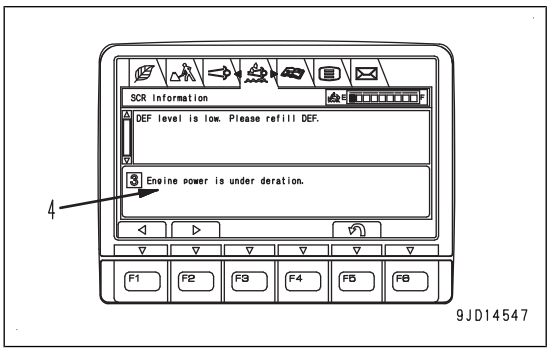
  Inducement status (4): “2 Without treatment, engine power will be derated.”
  Add DEF to the DEF tank immediately.



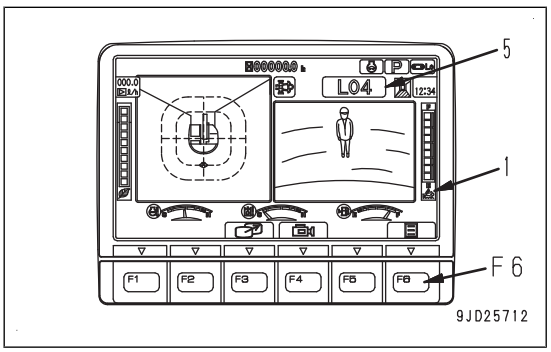
- Low level Inducement:
  The audible alert sounds in short and sharp beeps.
  1 gradation of the DEF level gauge light up in red.
  The DEF level caution lamp (1) lights up in red.
  Action Level “L03” is displayed in red (5).
  Press F6 to display the “SCR Information” screen.



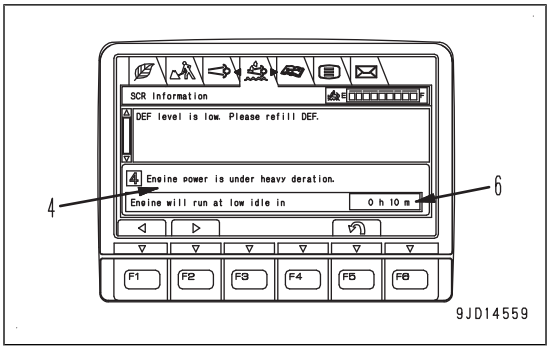
  Inducement status (4): “3 Engine power is under deration.”
  Add DEF to the DEF tank immediately.



- 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.
  When all gradations of the DEF level gauge go off, DEF refilling amount is approximately 12.6 ℓ {3.3 U.S.Gal} to fill up the DEF tank.



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

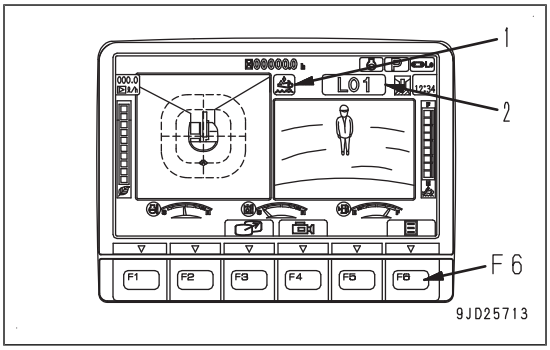


Engine power can be restored temporarily from power derate. This engine power restoration works only when the Inducement status is “Severe Inducement”and relieves back temporarily to the power deration of the “Low level Inducement”. The operator can restore engine power through the machine monitor. For 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 Failures are Found in Urea SCR System Devices (Excluding Failures in KDPF System)

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

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

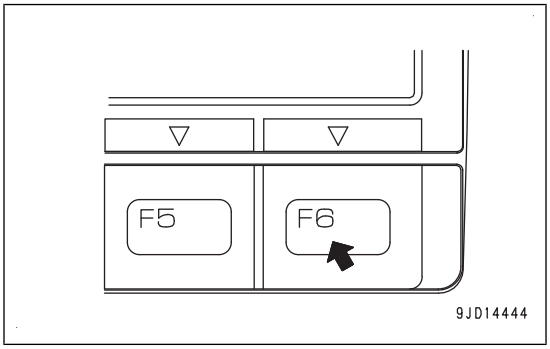


The content of the warning can be checked on the “SCR Information” screen of the user menu.

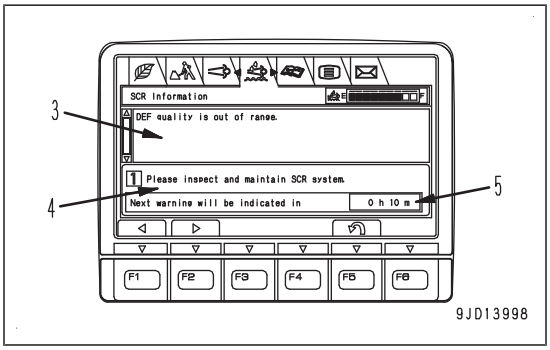
Perform the following procedure.

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

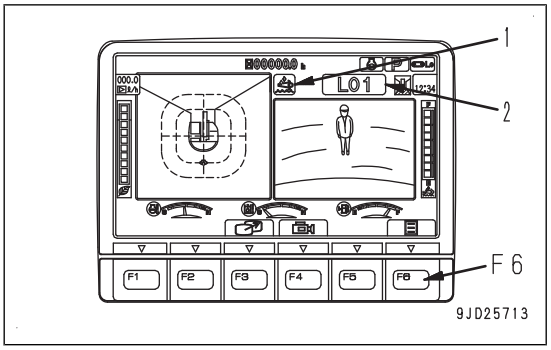
If either lock lever is set to LOCK position or the travel lever and control levers are in NEUTRAL position for over 3 seconds, “SCR Information” screen of the user menu will pop up automatically while the Urea SCR system is in Inducement.



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

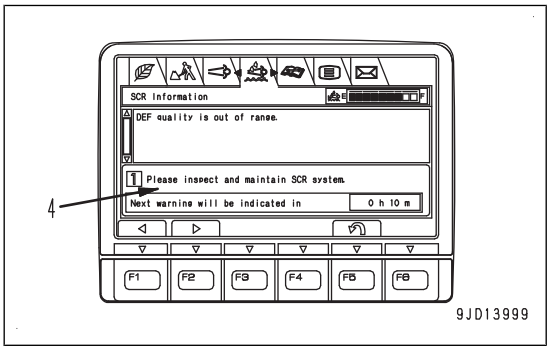


- Warning:
  No audible alert.
  The DEF system caution lamp (1) lights up in yellow.
  Note: Action Level “L01” once shows up in yellow on the machine monitor (2) for two seconds and goes out.
  Press F6 to display the “SCR Information” screen.

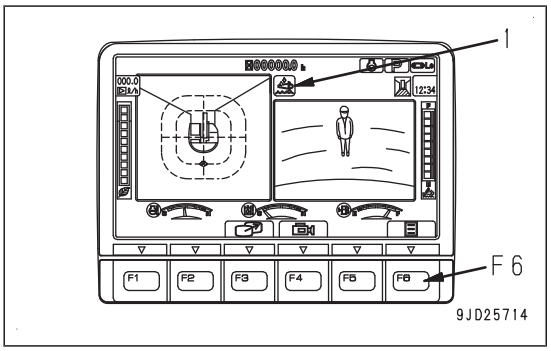


  “SCR Information” screen message (4): “1 Please inspect and maintain SCR system.”

  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”.

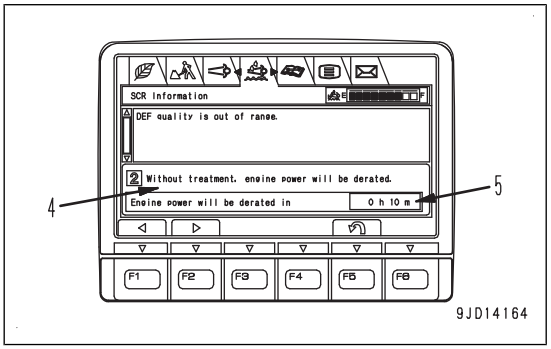


- Continuous Warning:
  The audible alert sounds in repetition of “three beeps and a pause”.
  The DEF system caution lamp (1) lights up in yellow.
  If operation continues for 5 hours after “Warning” started without taking any actions instructed by the Action Level table, Inducement advances to “Continuous Warning”.
  Press F6 to display the “SCR Information” screen.

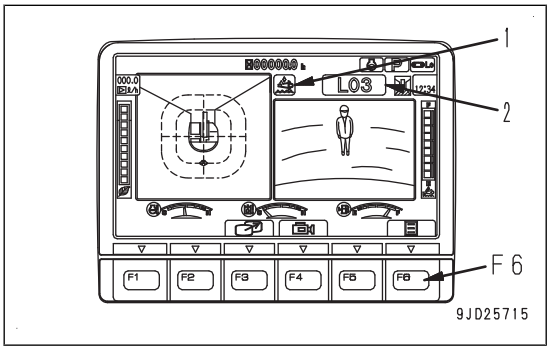


  “SCR Information” screen message (4): “2 Without treatment, engine power will be derated.”

  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.

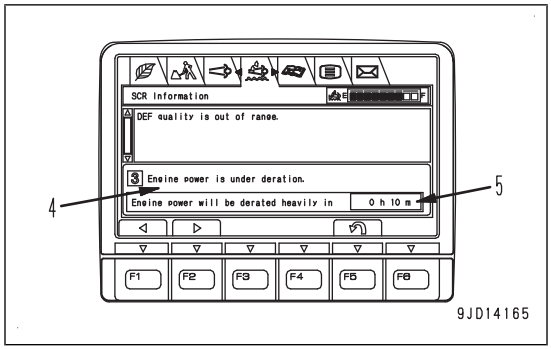


- Low level Inducement:
  The audible alert sounds in short and sharp beeps.
  The DEF system caution lamp (1) lights up in red.
  Action level “L03” lights up in red at action level display (2) and stays on.
  Press F6 to display the “SCR Information” screen.

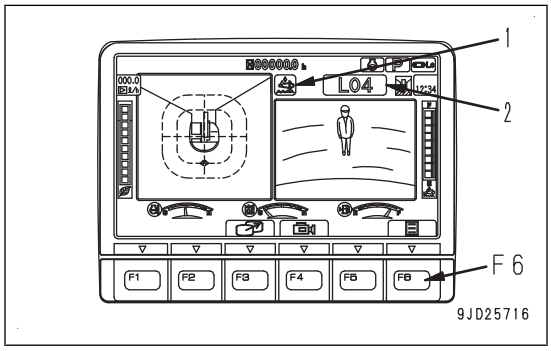


“SCR Information” screen message (4): “3 Engine power is under deration.”

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.

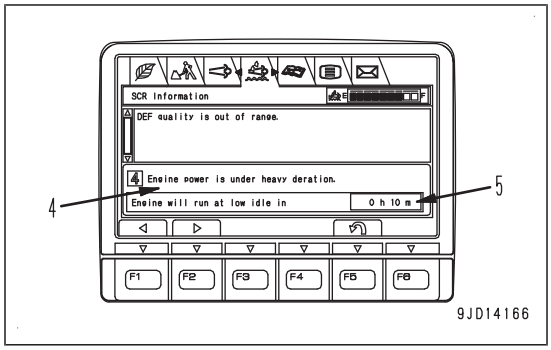


- Severe Inducement:
  The audible alert sounds in continuous beep.
  The DEF system caution lamp (1) lights up in red.
  Action level “L04” lights up in red (2).
  Press F6 to display the “SCR Information” screen.



“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.

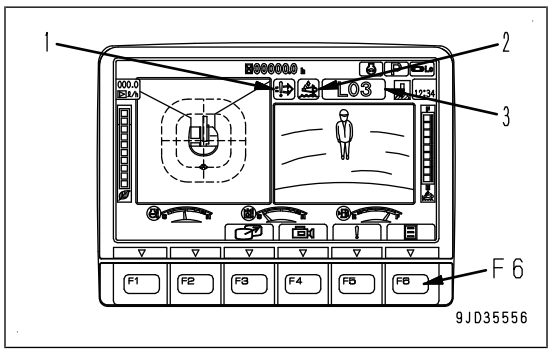


Engine power can be restored temporarily from power derate. If Inducement advances to “Severe Inducement” and it becomes necessary to restore engine power, use the engine power restoration function to move the machine to a safe place and contact your Komatsu distributor. This engine power restoration 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 Failure by KDPF System is Found in 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. 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”,

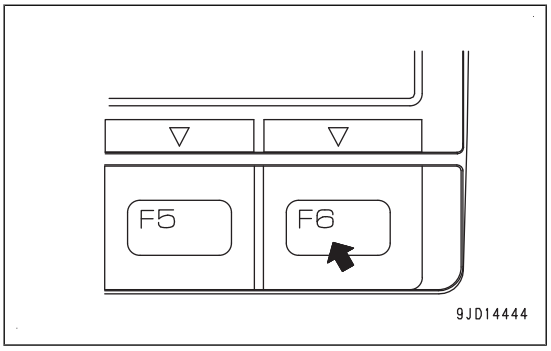


the engine power will be further derated. If “L03” is displayed, move the machine to a safe place and contact your Komatsu distributor.

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

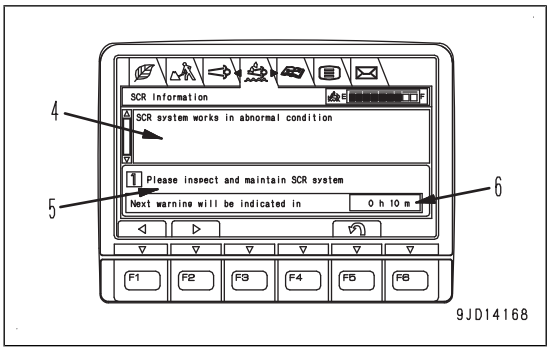
Perform the following procedure.

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

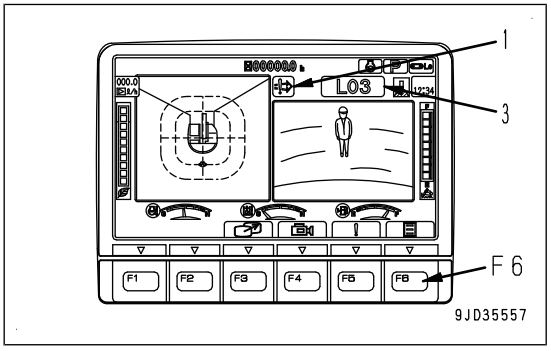


If either lock lever is set to LOCK position or the travel lever and control levers are in NEUTRAL position for over 3 seconds, “SCR Information” screen of the user menu will pop up automatically while the Urea SCR system is in Inducement.

“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).

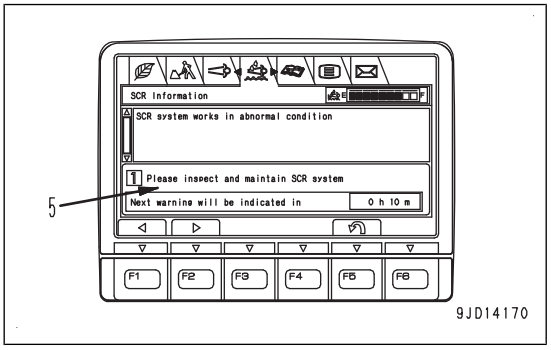


- Warning:
  The audible alert sounds in short and sharp beeps.
  The KDPF system caution lamp (1) lights up in red.
  The action level “L03” lights up in red at action level display (3).
  Press F6 to display the “SCR Information” screen.

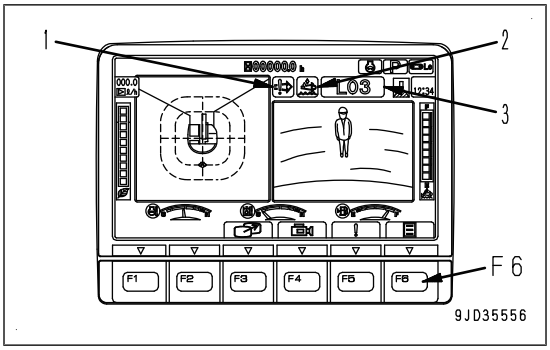


“SCR Information” screen message (5): “1 Please inspect and maintain SCR system.”

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

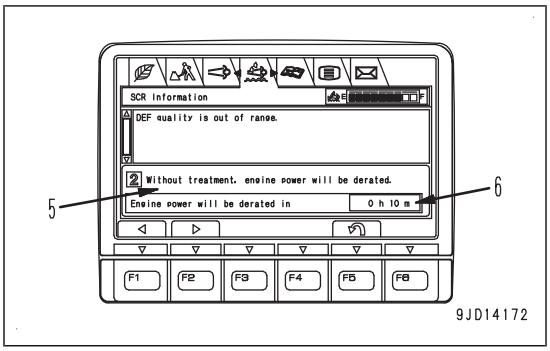


- Continuous Warning:
  The audible alert sounds in repetition of “three beeps and a pause”.
  The KDPF system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in yellow.
  The action level “L03” lights up in red at action level display (3).
  Press F6 to display the “SCR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

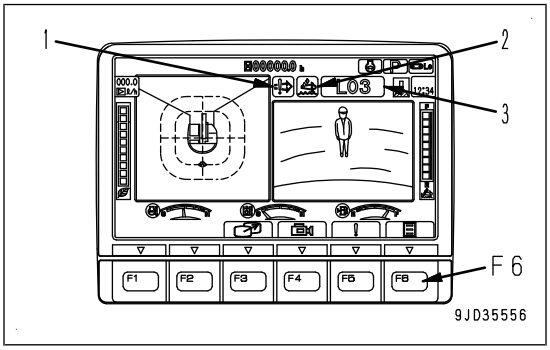


“SCR Information” screen message (5): “2 Without treatment, engine power will be derated.”

Move the machine to the safe place and contact your Komatsu Distributor.
The duration time of “Continuous Warning” is 5 hours. The remaining time (Hours and 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.

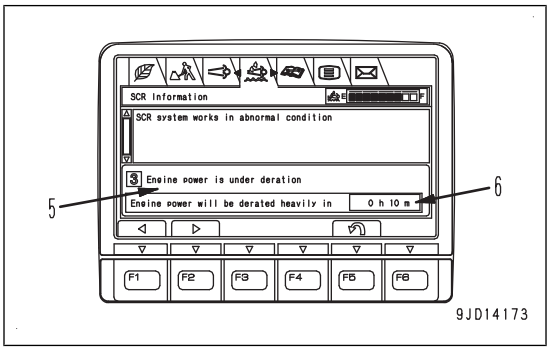


- Low level Inducement:
  The audible alert sounds in short and sharp beeps.
  The KDPF system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in red.
  The action level “L03” lights up in red at action level display (3).
  Press F6 to display the “SCR Information” screen.

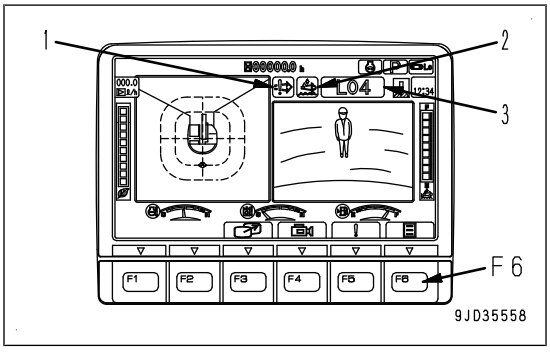


“SCR Information” screen message (5): “3 Engine power is under deration.”

Due to the reduction of engine power, the machine normal operation will be limited.
The duration time of “Low level Inducement” is 10 hours. The remaining time (Hours and 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.

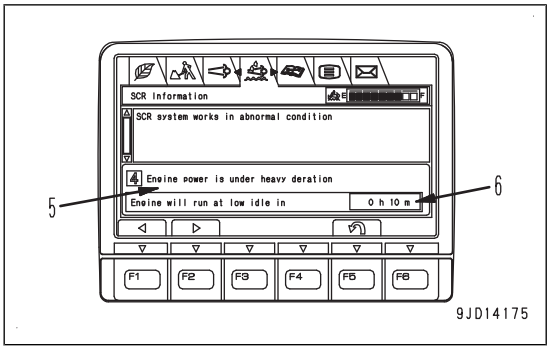


- Severe Inducement:
  The audible alert sounds in continuous beep.
  The KDPF system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in red.
  Action level “L04” lights up in red at action level display (3).
  Press F6 to display the “SCR Information” screen.



“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.

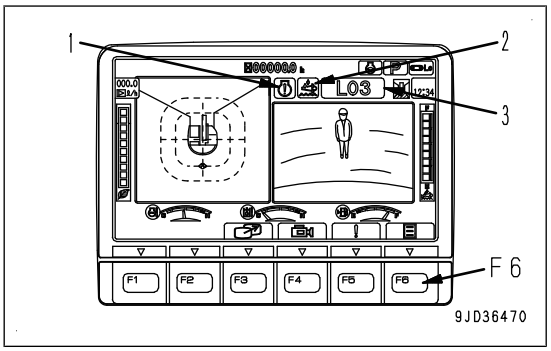


Engine power can be restored temporarily from power derate. This engine power restoration works only when the Inducement status is “Severe Inducement” and Engine power can be restored temporarily from power derate. This engine power restoration works only when the Inducement status is “Severe Inducement” 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 Urea SCR System by the EGR Valve 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. 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.

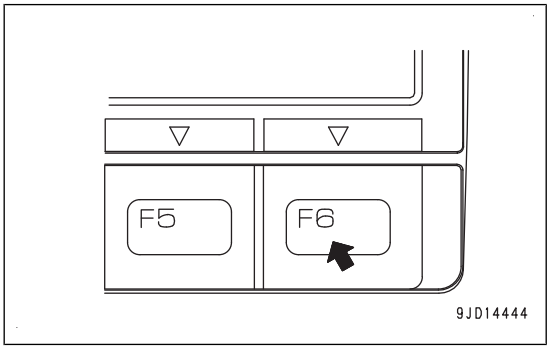


The content of the warning can be checked on the “SCR Information” screen of the user menu.

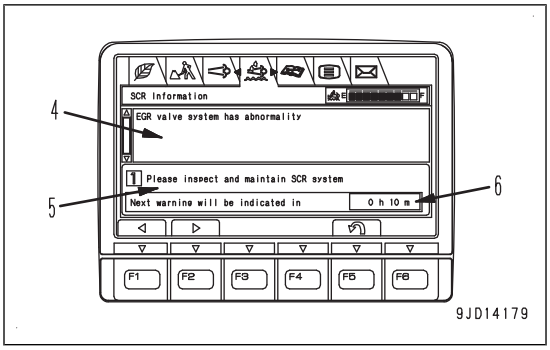
Perform the following procedure.

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

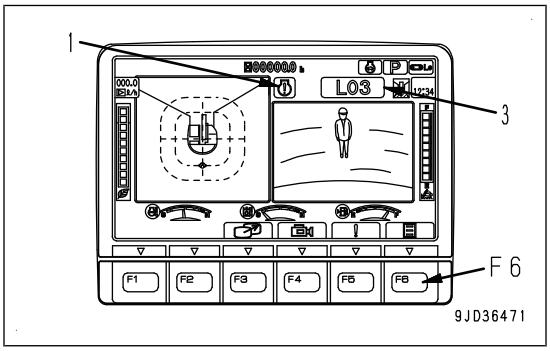
If either lock lever is set to LOCK position or the travel lever and control levers are in NEUTRAL position for over 3 seconds, “SCR Information” screen of the user menu will pop up automatically while the Urea SCR system is in Inducement.



“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).

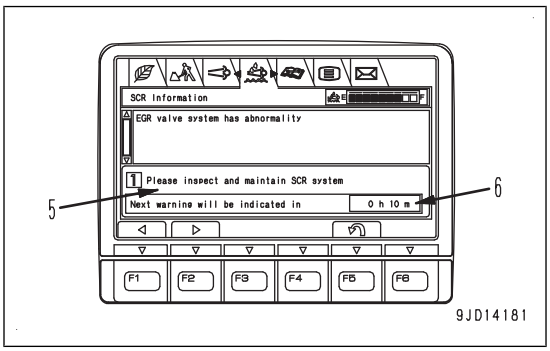


- Warning:
  The audible alert sounds in short and sharp beeps.
  The Engine system caution lamp (1) lights up in red.
  The action level “L03” lights up in red at action level display (3).
  Press F6 to display the “SCR Information” screen.

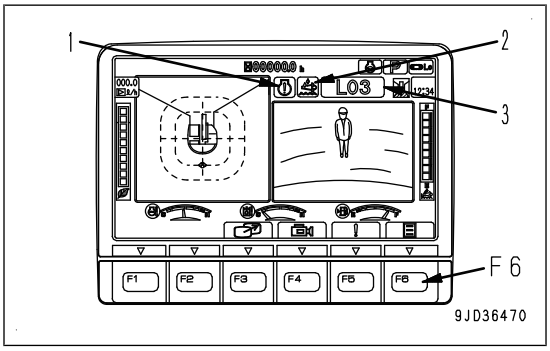


“SCR Information” screen message (5): “1 Please inspect and maintain SCR system.”

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

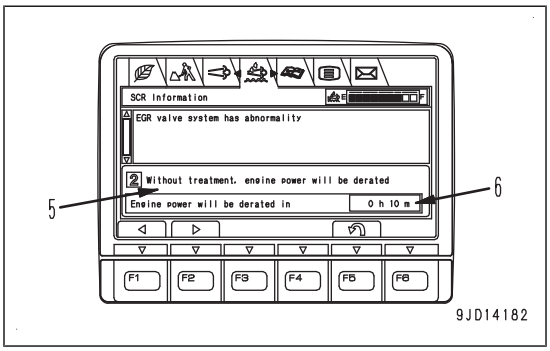


- Continuous Warning:
  The audible alert sounds in repetition of “three beeps and a pause”.
  The Engine system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in yellow.
  The action level “L03” lights up in red at action level display (3).
  Press F6 to display the “SCR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

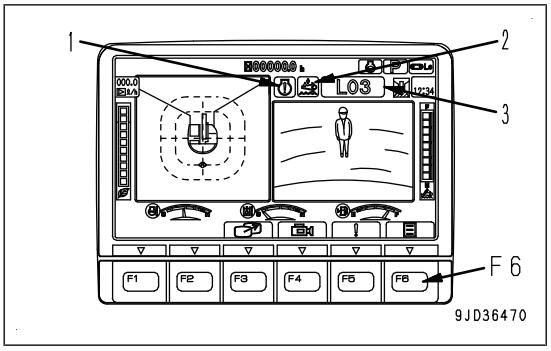


“SCR Information” screen message (5): “2 Without treatment, engine power will be derated.”

Move the machine to the safe place and contact your Komatsu Distributor.
The duration time of “Continuous Warning” is 5 hours. The remaining time (Hours and 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.

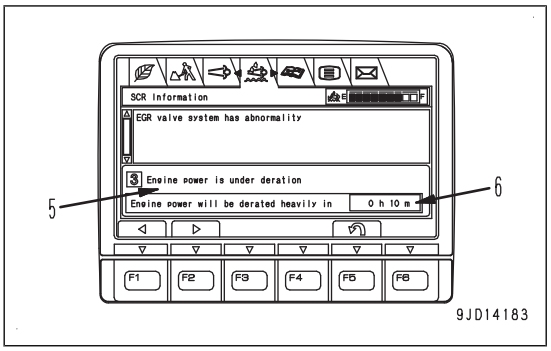


- Low level Inducement:
  The audible alert sounds in short and sharp beeps.
  The Engine system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in red.
  The action level “L03” lights up in red at action level display (3).
  Press F6 to display the “SCR Information” screen.

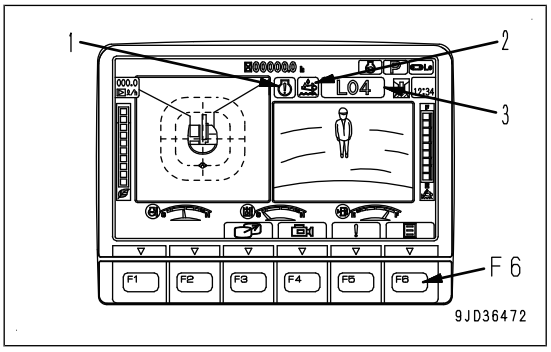


“SCR Information” screen message (5): “3 Engine power is under deration.”

Due to the reduction of engine power, the machine normal operation will be limited.
The duration time of “Low level Inducement” is 10 hours. The remaining time (Hours and 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.

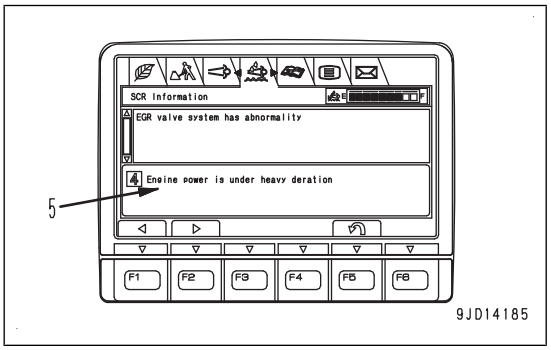


- Severe Inducement:
  The audible alert sounds in continuous beep.
  The Engine system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in red.
  Action level “L04” lights up in red at action level display (3).
  Press F6 to display the “SCR Information” screen.



“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 EGR Valve 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.

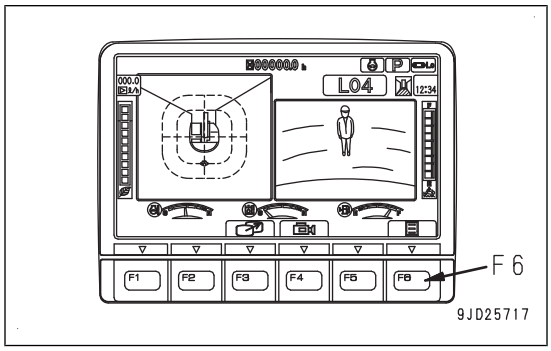
In case the Urea SCR system advances to “Severe Inducement”, engine power is derated heavily. This may cause difficulties of moving the machine to a safe place for adding DEF or troubleshooting and correcting abnormalities of the Urea SCR system. For temporary remedies from these difficulties the operator 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.

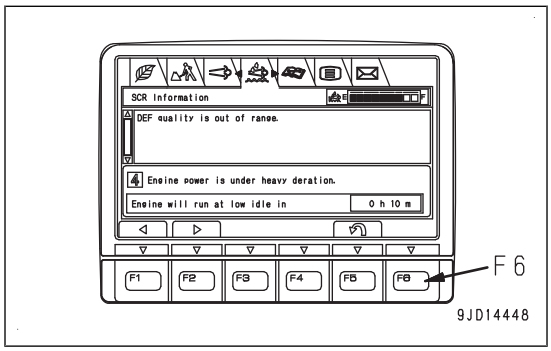
Procedure to activate “Temporary Restoration from Inducement”.

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”.



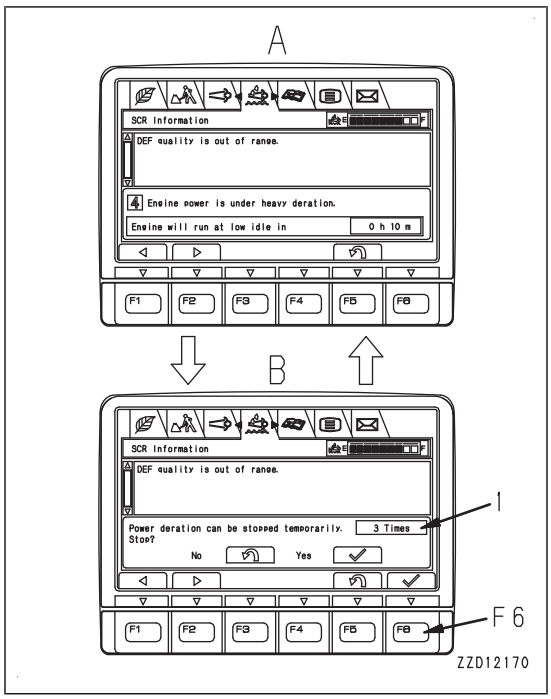
2. Press F6 to display the menu windows popping up in the bottom half of the “SCR Information”.

   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.



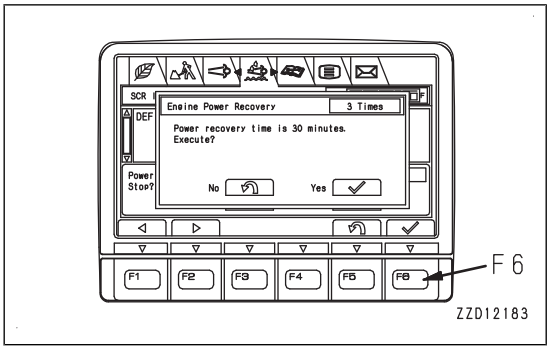
3. Press F6 while the pop-up menu screen B is displayed.

   The “Engine Power Recovery” window will be displayed.
   If F6 is not pressed for 30 seconds, “ Standard Screen” will be displayed, and start again by pressing F6.
   The remaining number of operations of Temporary Restoration from inducement is displayed in the column (1) of the pop-up menu window B.

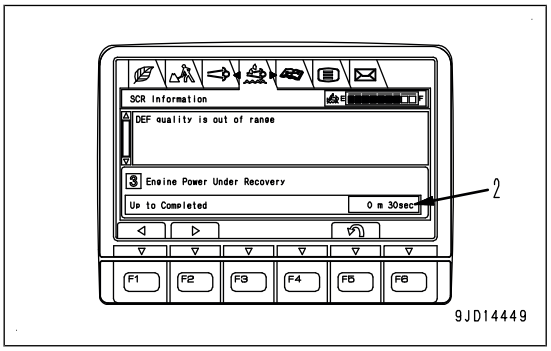


4. Press F6 while the “Engine Power Recovery” window is displayed.

   Temporary Restoration from Inducement is activated and engine power deration is relieved to the deration of “Low level Inducement” for the maximum of 30 minutes.



   The remaining time (Minutes and Seconds) of “Temporary Restoration from Inducement” is displayed in the column (2) on the “SCR Information” screen.

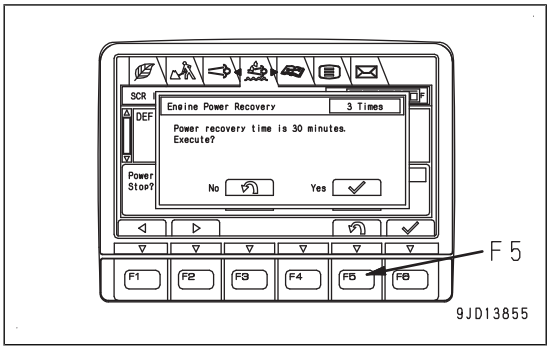


If it is decided NOT to activate “Temporary Restoration from Inducement” after having progressed to the “Engine Power Recovery” window, follow the steps explained in this section.

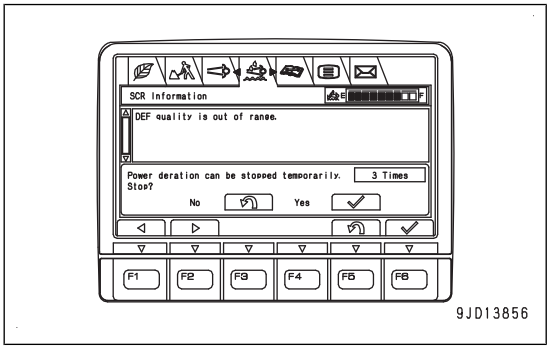
To deactivate “Temporary Restoration from Inducement” function.

1. Press F5 while the “Engine Power Recovery” window is displayed.

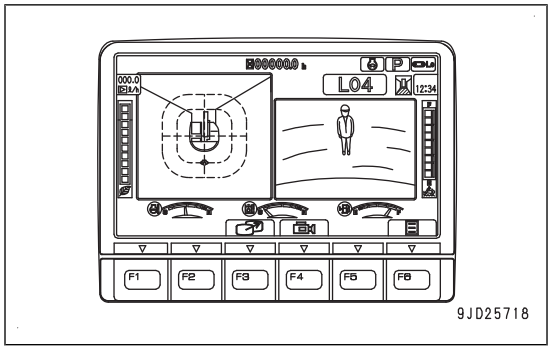
   This procedure is split from procedure 4 in “Temporary Restoration from Inducement”.



   “SCR Information” screen is displayed.



2. Move any operating lever to display “Standard Screen”.
   “Temporary Restoration from Inducement” is deactivated.



Function to Monitor Failures to be Occurred Again in 40 Hours or Below

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.

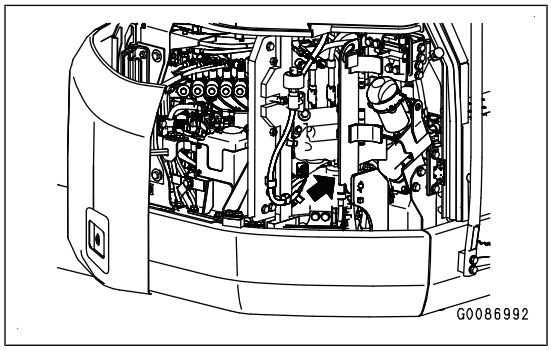
If this occurs, utilize “Temporary Restoration from Inducement” and move to the machine to a safe place, and contact your Komatsu distributor.

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

The DEF filter is a filter element to clean the DEF sucked from the DEF tank by DEF pump, and to supply it to the DEF injector.



NOTICE

- **The DEF filter element needs to be replaced every 2000 hours.**
- **If the machine is operated without the DEF filter attached, or with the filter other than Komatsu genuine parts, foreign materials may enter the DEF pump and DEF injector which will cause failure of the machine. Never operate the machine without the DEF filter attached, nor use the filter other than Komatsu genuine parts.**
- **The DEF filter cannot be cleaned. Flushing or regenerating of it will degrade the performance of the DEF filter, and will contaminate the DEF pump and the 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 remotely manages the 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 {at least 8.7 in} 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 {within 39 ft 4 in} 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 When You Use 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.
- 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.
- 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.

NOTICE

For more information on KOMTRAX and the Radio Equipment Directive (2014/53/EU), please refer to the Komatsu Europe website.
https://www.komatsu.eu/Komtrax-Radio-Equipment-Directive

Machine Operations and Controls

Checks and Adjustment Before You Start Engine

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.

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 all mirrors

    Check for damage to all mirrors. If there is damage, repair it. Clean the surfaces of the mirrors and adjust the angle according to “METHOD FOR ADJUSTING MIRRORS”.

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

    When cleaning the camera, wipe off any dirt with soft cloth.

    When cleaning camera, if you stand on an unstable place, or take an unstable posture, you may fall and be injured. Put proper stepladder or step on the level and firm ground, and clean the camera in secure posture.

    Check that the camera is in correct position or has no 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.

How to Examine Before You Start Operation

Always check the items in this section before starting the engine each day.

Handle Refuel Pump

⚠ WARNING

- **Do not spill the fuel or overflow the fuel when refueling (it may cause a fire).**
- **If the fuel is spilled, wipe it off completely. If the fuel is spilled on the soil or sand, remove the soil or sand.**
- **Fuel is highly flammable, and it is dangerous. Never bring any open flame close to the fuel.**

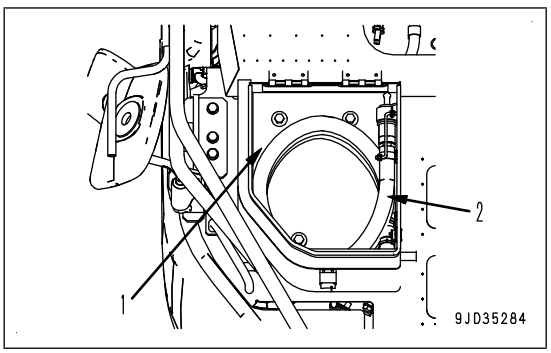
⚠ CAUTION

- **Park the machine on a level place always when refilling the fuel.**
- **Do not leave the machine during refilling the fuel. Keep a close watch on the refueling work.**
- **If the fuel is spilled or overflowed, check that there is no fuel left around the electric devices and components which become high in temperature.**
- **Do not operate the pump while the strainer valve cap is closed because the parts in the refuel pump can be damaged.**
- **To prevent the air suction of pump that causes failure, do not operate the pump while the strainer valve does not soak in the fuel.**
- **The refueling pump is protected by the in-line blade fuse (10 A). If the pump does not operate, check the fuse.**
- **Check that the strainer at the hose end is clean.**
- **Close the hose strainer valve cap (H) in order to prevent the fuel from leaking or overflowing if refueling pump is not used.**
- **Contact your Komatsu distributor if there is any malfunction in the auto shut-off refuel system. Do not use the system unless the problem is solved.**
- **There is a danger that high pressurized water damages the pump. Be careful that high pressurized water does not get on it directly.**

The fuel can be refueled by using the refueling pump from the fuel barrel if the machine is operated in a site where there is neither a fuel container nor a pump.

The refueling pump is located inside the door on the rear right side of the machine.

1. Take out the refuel hose (2) from the inside of the cover (1) on the right side of the machine.

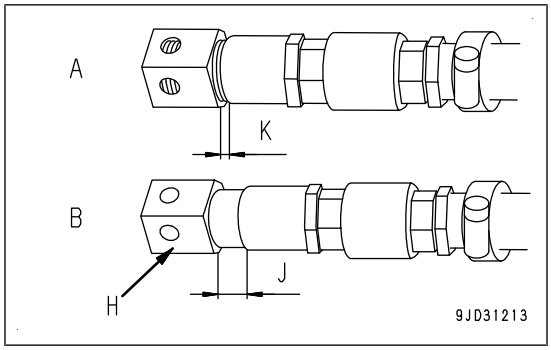


2. Loosen the strainer valve cap (H) until it comes to OPEN position (J).

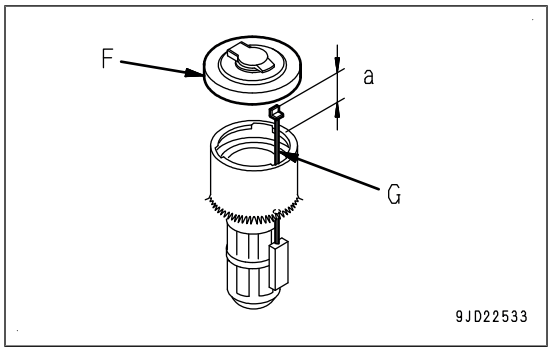
   (A) Closed position

   (B) Open position

3. Put the refuel hose (2) in the fuel barrel next to the machine.

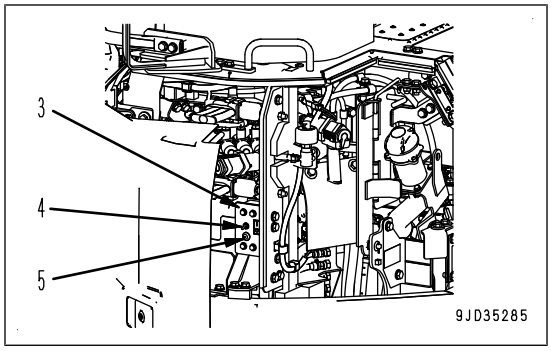


4. Remove the oil filler cap (F).



5. Turn on the master switch (4) for the refuel auto stop system on the refuel switch box (3).

   The refuel switch box (3) is located inside the door (1) on the right side of the machine.



6. When the refueling pump with auto shut-off refuel system is used

   1) Press the switch (5) once to start the refueling.

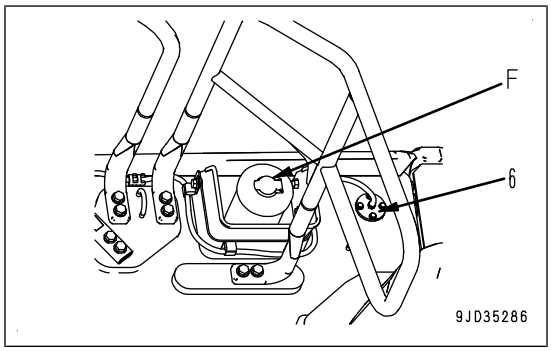
      The refueling automatically continues until the fuel tank becomes full (the refueling pump stops when the float switch (6) reaches the upper limit).

      Stop the machine on a level ground, and keep a close watch on the refueling to avoid the fuel spillage and overflow.

      The refueling can be stopped anytime by turning off the master switch (4).

      Keep pressing the switch (5) to further refuel the fuel tank with fuel after the float switch stopped the refueling pump.

      Keep pressing the switch (5), then the refueling pump makes the fuel tank full.



      Releasing the switch (5) stops the refueling pump in this state that the refuel auto stop system is canceled.

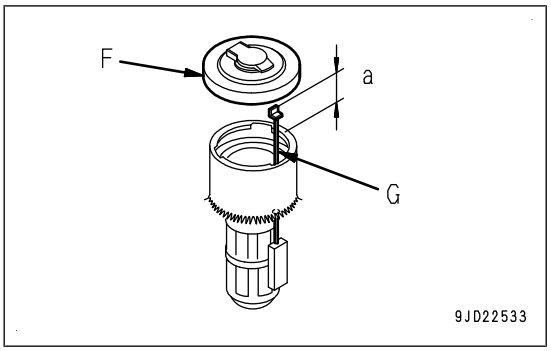
      When using this canceling of the refuel auto stop system, keep a close watch on the fuel level in the fuel tank to prevent the fuel from spilling and overflowing.

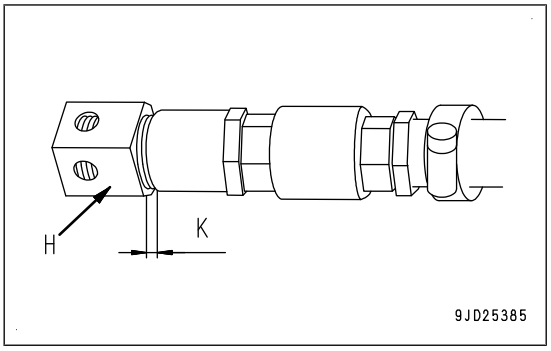
      If the fuel is spilled out, turn off the master switch (4) and stop the refueling immediately.

   2) Check that the master switch (4) is returned to OFF position after the refueling is completed.

7. Perform the following to clear up after the refueling is completed.
   1) Push the float gauge (G) straight down with the fuel filler cap (F). Be careful not to get the float gauge (G) caught in the tab of the fuel filler cap, and tighten the fuel filler cap (F).
   2) Tighten the strainer valve cap (H) until it comes to CLOSE position (K).

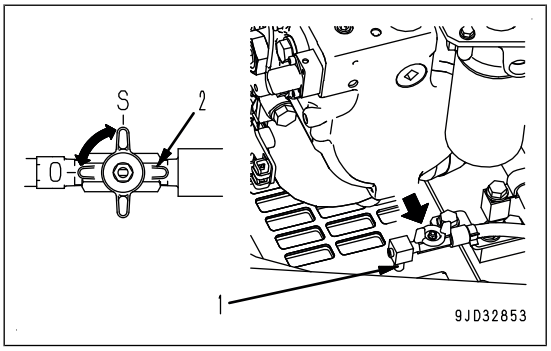
      It prevents the fuel which remains in the hose from leaking.
   3) Return the fuel hose to the inside of the door (1) on the right side of the machine.





How to Drain Water and Sediment from Fuel Tank

1. Open the door on the rear right side of the machine.
2. Prepare a container to catch fuel under the drain port (1).
3. Turn the 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 the drain valve (2) to CLOSE position (S).
5. Close the door.



How to Examine Water Separator, Drain Water and Sediment

1. Open the door on the rear right side of the machine.

   It is possible to judge the water level and amount of sediment by looking through transparent cup (2).

2. If there is any water or sediment collected at the bottom, place a container to catch the drained water under the drain hose (4).
3. Loosen the drain valve (3) and drain the water.
4. When fuel starts draining from the drain hose (4), tighten the drain valve (3) immediately.

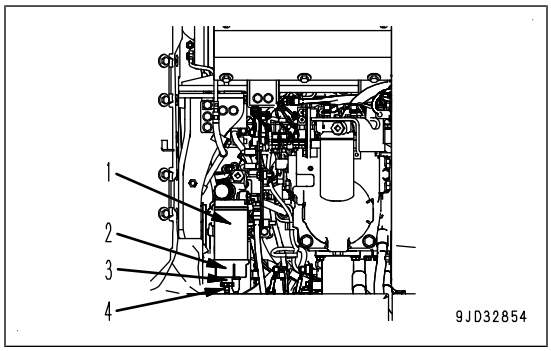
   On this machine, a sensor is installed to detect if water accumulates in transparent cup (2).

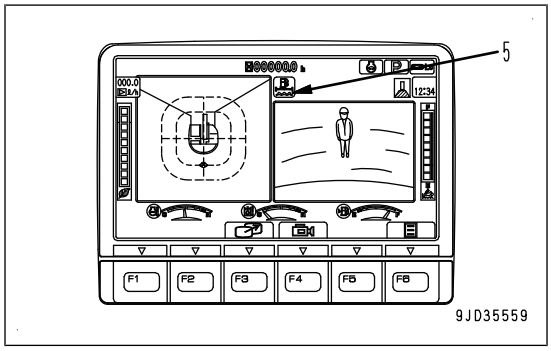
   When the water separator caution lamp (5) lights up in red on the machine monitor, it indicates that water is accumulated in transparent cup (2).

   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 right figure. If other caution lamps also light up at the same time, the water separator caution lamp lights up at a different position.





NOTICE

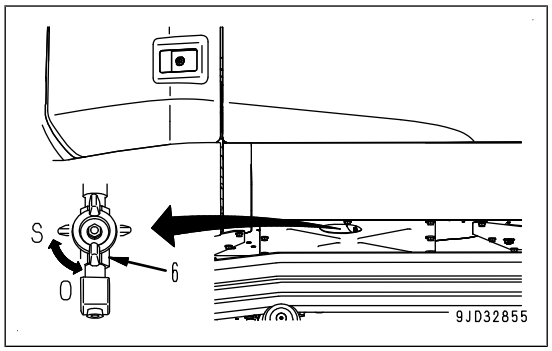
- **If the water accumulated in transparent cup (2) has been frozen, the water separator caution lamp may not light up. After the engine is started, as the temperature around fuel prefilter (1) increases, the frozen water melts and the water separator caution lamp may suddenly light up. In cold season, even if the water separator caution lamp is not lit, drain the water frequently.**
- **If the water inside transparent cup (2) freezes, wait until the frozen water has melted completely, then follow the preceding procedures to drain the water.**

REMARK

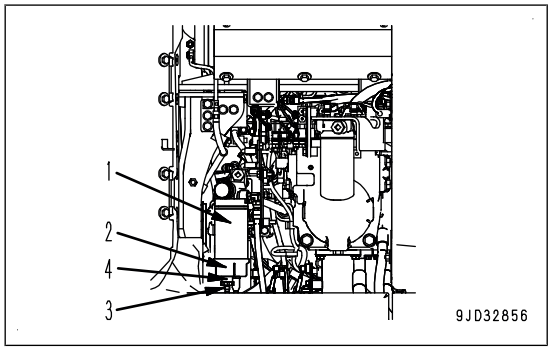
- If transparent cup (2) is dirty and it is difficult to see the inside, clean the transparent cup (2) when replacing the fuel prefilter cartridge (1).
- If the drain valve (3) has been removed during the cleaning operation, coat the O-ring with grease and tighten until it contacts the bottom.

How to Adjust the Drain Valve

1. Turn the valve (6) at the bottom of the fuel tank to CLOSE position (S).
2. Place a container under the fuel pre-filter cartridge to catch the fuel.



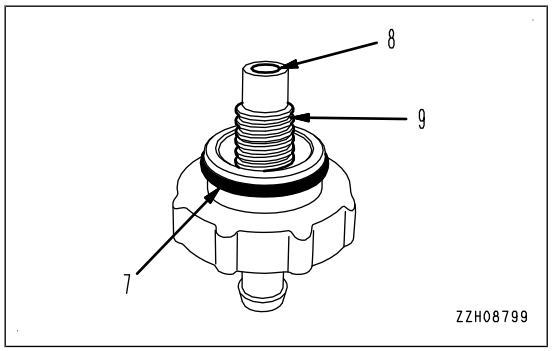
3. Loosen the drain valve (4) and drain water and sediment from transparent cup (2), and also drain all the fuel accumulated in the fuel pre-filter cartridge (1).
4. Check that nothing more comes out from the drain hose (3), then remove the drain valve (4).



5. Apply a suitable amount of grease to the O-ring (7).

   REMARK

   When applying the grease, be careful not to allow the grease to adhere to the water drain port (8) and threaded part (9) of the drain valve.
6. Tighten the drain valve (4) by hand until it contacts the bottom of the transparent cup (2).
7. Remove the fuel container.
8. Turn the valve (6) at the lower part of the fuel tank to OPEN position (O).
9. Bleed air from the fuel circuit.



How to Examine Oil Level in Hydraulic Tank, Add Oil

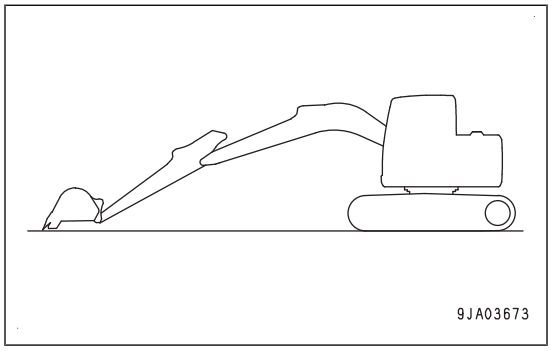
⚠ WARNING

- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When removing the oil filler cap, the oil may spurt out. Turn it slowly to release the internal pressure, then remove it carefully.**

1. Set the machine in the posture shown in the figure.

   If the machine is not set as shown in the figure, set it according to the following procedure.

   1) Start the engine, and run it at low speed.
   2) Retract the arm and bucket cylinder rods to the end.
   3) Lower the boom and lower the bucket tooth to the ground.
   4) Stop the engine.



2. Turn the starting switch to ON position within 15 seconds after stopping the engine, and move each control lever (for work equipment and travel) to the full stroke in all directions.

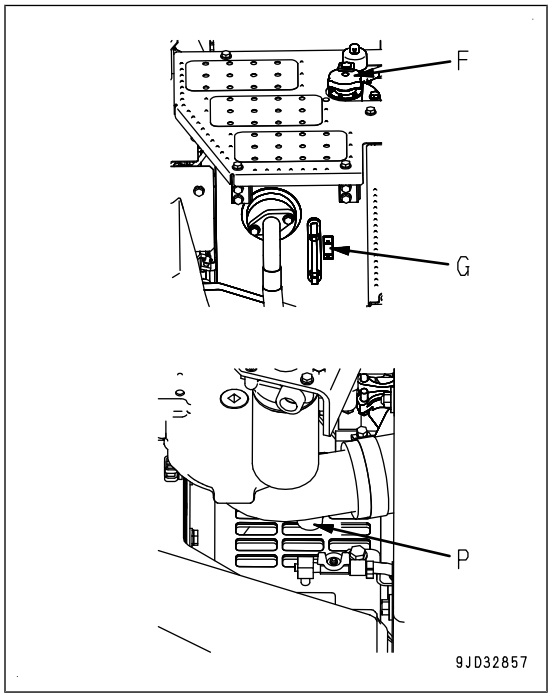
   The internal pressure is released by this operation.

3. Stop the engine.

4. Open the door on the right side of the machine and check the sight gauge (G).

   When the oil level is between the lines H and L, it is appropriate.

   If the oil level is below the level L, the hydraulic oil is insufficient. Perform the following procedure.



5. Add oil through the oil filler port (F) until the oil level comes between the levels H and L of sight gauge (G).

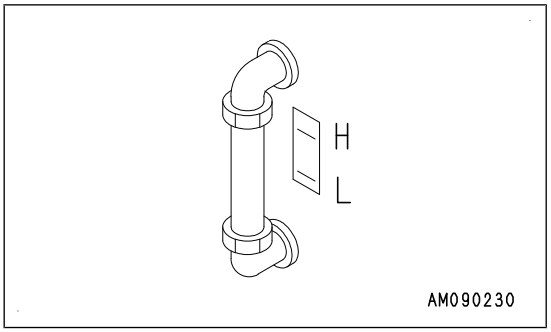
   NOTICE

   Do not add oil above H line. It may damage the oil circuit and cause the oil to spurt out.
   If oil is added above H level, stop the engine, wait for the oil temperature to cool down, discharge excessive oil from drain plug (P) under the suction tube in a container for waste oil.

REMARK

The oil level vary with the oil temperature. Accordingly, use the following as a guide:

- Before starting operation: Between H and L levels (Oil temperature 10 to 30 °C {50 to 86 °F})
- Normal operation: Around H Level (Oil temperature 50 to 80 °C {122 to 176 °F})



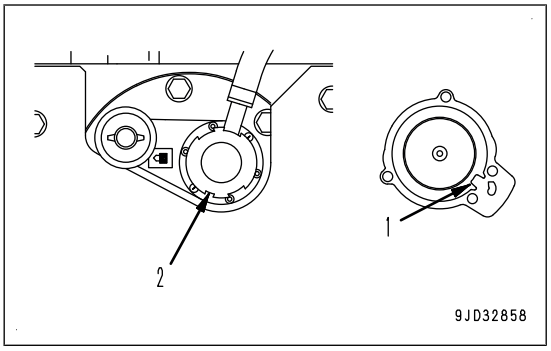
How to Install Hydraulic Oil Filler Port Cap

⚠ CAUTION

If the oil filler cap is inserted in reverse, it only rotates by approximately 1/4 turn and cannot be locked.

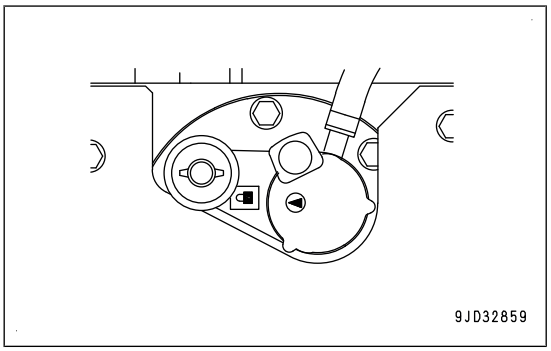
Install the oil filler cap according to the following procedure.

1. Align the small protrusion (1) of oil filler cap and small cut out part (2) of filler, and then insert the cap.



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.



How to Examine Coolant Level, Add Coolant

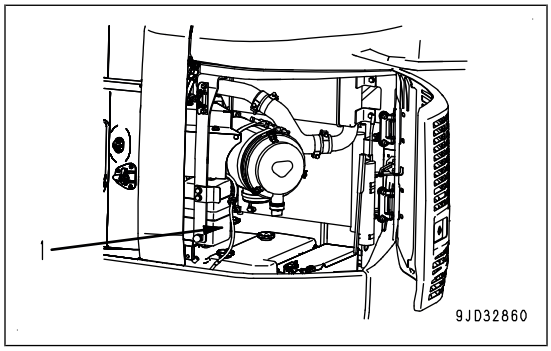
⚠ WARNING

- **Do not open the radiator cap unless it is necessary. When checking the coolant level, check it with the reservoir tank when the engine is cold.**
- **Immediately after the engine is stopped, the coolant is still hot and the pressure is accumulated in the radiator. You may get burn injury if you remove the cap in this state. 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.

   If the coolant level is within the range between FULL and LOW of the reservoir tank (1), 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 reservoir tank (1).



2. Tighten the cap securely after adding.

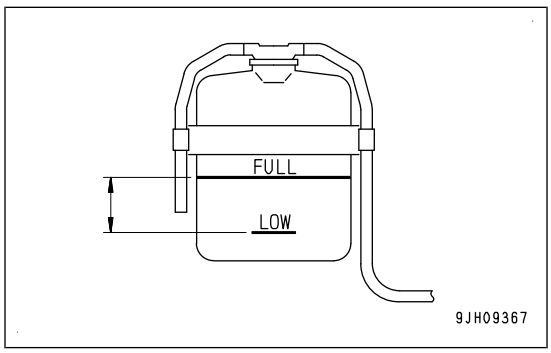
   NOTICE

   If the reservoir tank is empty, leakage of coolant is suspected. After checking, repair any abnormality immediately.

3. Check the coolant level in the radiator if there is no abnormality.

   If it is insufficient, add coolant according to the coolant density table in “METHOD FOR CLEANING INSIDE OF COOLING SYSTEM”, and then add coolant to the reservoir tank.

   After replenishment, check that there is no abnormality.



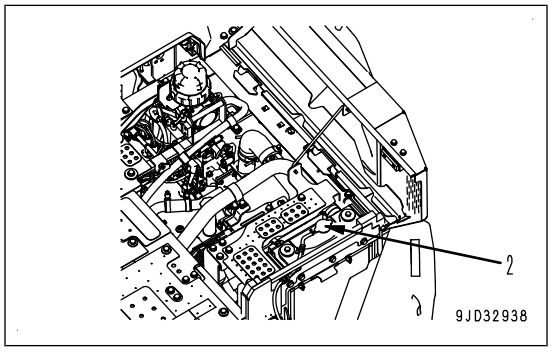
4. If the inside of reservoir tank (1) is so dirty that you cannot check the coolant level, see “How to Clean Inside of Cooling System”.
5. If the coolant level has been continuously low, check the coolant level in the radiator.

   If the coolant level is low, add Non-Amine Engine Coolant (AF-NAC) of the same density as the one in the radiator.
6. To bleed air, start the engine, raise the coolant temperature to approximately 90 °C, and then stop the engine.
7. After the coolant temperature drops, check the coolant level in the radiator and reservoir tank.

   If the coolant level is low, add Non-Amine Engine Coolant (AF-NAC) of the same density as the one in the radiator.

   NOTICE

   Refilling and draining function of the radiator cap (2) may be faulty if coolant level in the reservoir tank is obviously above FULL level all the time before the engine is started (coolant temperature is low). Replace the radiator cap (2) by referring to “How to Replace Radiator Cap”.



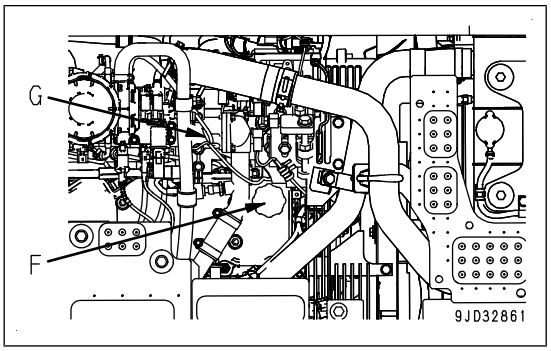
How to Examine Oil Level in Engine Oil Pan, Add Oil

⚠ WARNING

Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.

- When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine. If the machine is inclining, make it level before checking.
- When the ambient temperature is low, water or emulsified matter may stick to the dipstick and oil filler cap, etc. or the drained oil may be milky white. However, if the coolant level is normal, it is not a problem.

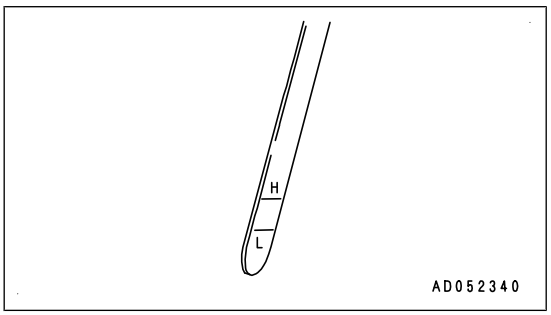
1. Open the engine hood.
2. Pull out the dipstick (G) and wipe off the oil with a cloth.
3. Insert the dipstick (G) fully into the dipstick pipe and pull it out.



4. Check if the oil is sticking up to between marks H and L on dipstick (G).

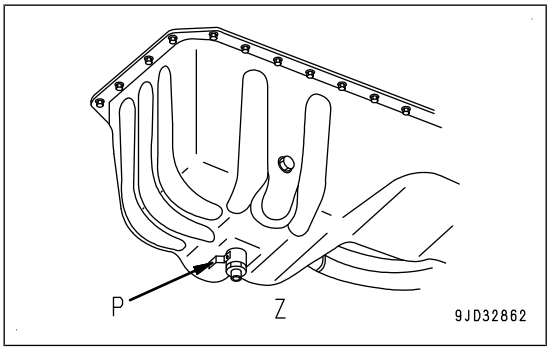
   If the oil level is between marks H and L, it is correct.

   If the oil level is below L mark, add oil through the oil filler port (F).



5. If the oil level is above the mark H, decrease it to a proper level according to the following procedure.
   1) Remove the cover (1).
   2) Drain the excessive engine oil through the drain valve (P) at the bottom of the engine oil pan.

      When draining the oil, prepare a container to catch 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.



How to Examine 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.

How to Examine Fuel Level, Add Fuel

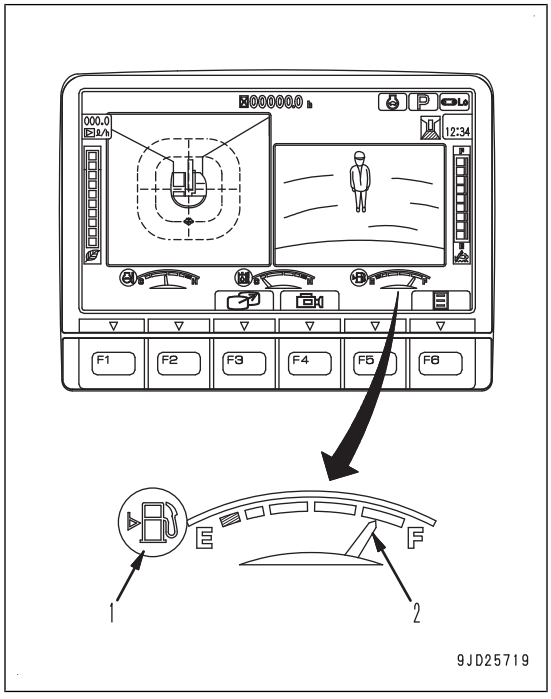
⚠ WARNING

When adding fuel, never spill the fuel nor let it overflow. This may cause fire.
If any fuel has spilled, wipe it up completely. If fuel has spilled over soil or sand, remove that soil or sand.
Fuel is highly flammable and dangerous. Do not bring any open flame near fuel.

1. Turn the starting switch to ON position. When the fuel level caution lamp (1) lights up in red, check the fuel level with fuel gauge (2) on the machine monitor.

   When the fuel gauge pointer indicates the red range, the fuel quantity is 41 ℓ or less.

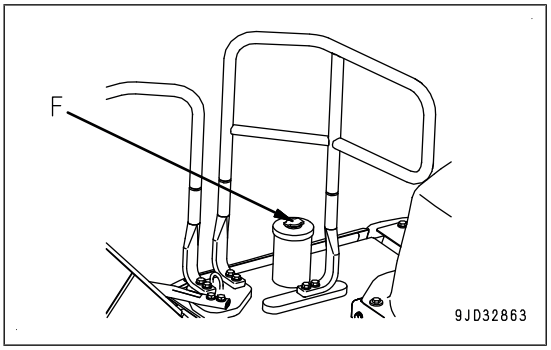
   Since the fuel level is low, add fuel.
2. After checking, return the starting switch to OFF position.

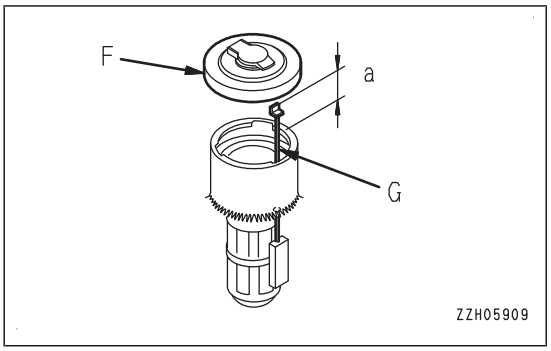


3. Open the fuel filler cap (F) on the fuel tank and add fuel through the filler port until the float gauge (G) comes up to the highest point.

   Fuel tank capacity: 290 ℓ

   Position of tip (a) of float gauge (G) when fuel tank is full: approximately 50 mm

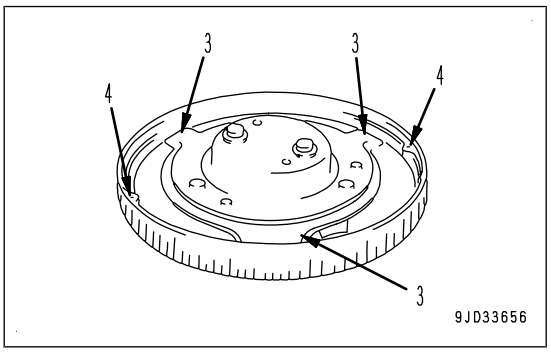




REMARK

If breather hole (4) in the cap is clogged, the pressure inside the tank will go down and this may cause the fuel to stop flowing. To prevent this, clean the breather hole from time to time.

4. After adding fuel, push the float gauge (G) straight down with the fuel filler cap (F). Be careful not to get the float gauge (G) caught in the tab (3) of fuel filler cap, and tighten the fuel filler cap (F) securely.



How to Examine DEF Level and Add DEF

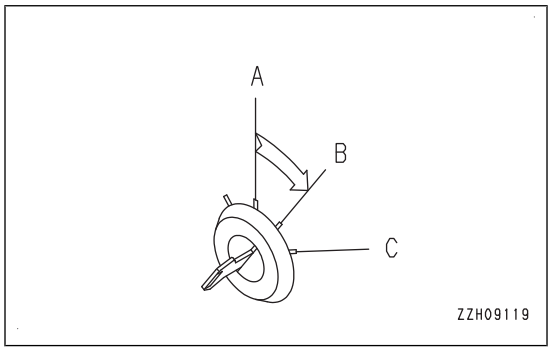
⚠ WARNING

- **Do not put any fluid other than DEF into DEF tank.**
- **When opening the cap of DEF tank of the machine, the ammonia vapor may escape. Keep your face away from the filler port during opening or refilling.**
- **Foreign materials entered in DEF system or urea deposit by urea separation may disturb the operation of the system. Before removing the filler port 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 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.**

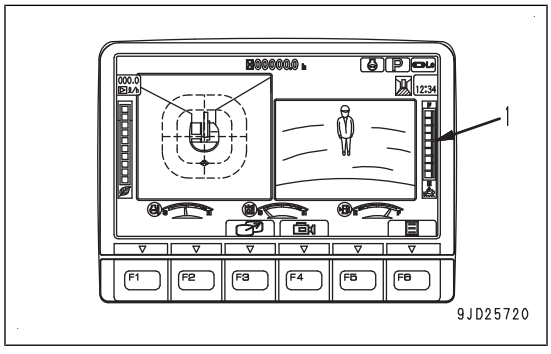
NOTICE

- **Do not add DEF more than the line F of sight gauge (3). DEF may leak through the breather. When DEF may freeze in cold weather, do not add it more than the line (8) of sight gauge (3).**
  Be careful of the DEF level when performing operations on a slope or traveling on a rough ground. When the remaining DEF level is low, it may become the warning level if DEF pump sucks air or if DEF level suddenly drops.
- **If DEF is stored in another container, foreign material may be mixed in it and toxic gas or corrosive substance may be produced by chemical reactions. When adding DEF, do not transfer it to another container.**
- **If you use a funnel to add DEF, the strainer will be broken. Do not use a funnel.**
- **When using a portable refill container, use it up each time. If any of it is left, completely seal it up. Remove the foreign material, if there is any.**
- **Do not wash the supply 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 alarm buzzer sounds to warn the abnormality. In this case, ask your Komatsu distributor for draining of the wrong fluid and inspection. DEF injector and/or DEF pump may need to be replaced.**

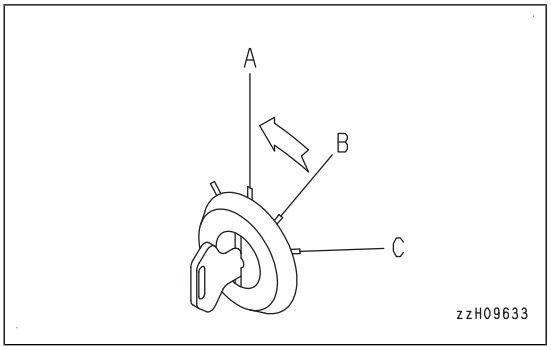
1. Turn the starting switch to ON position (B).



2. Check the DEF level gauge (1) on the machine monitor.



3. After checking, turn the starting switch back to OFF position (A).

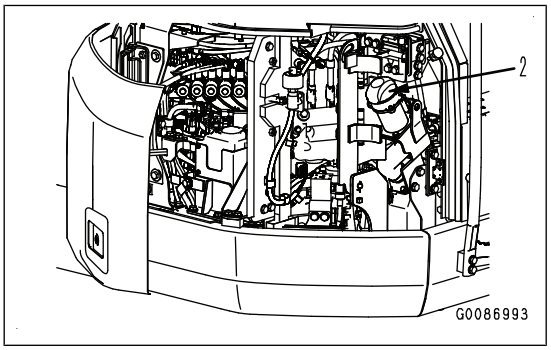


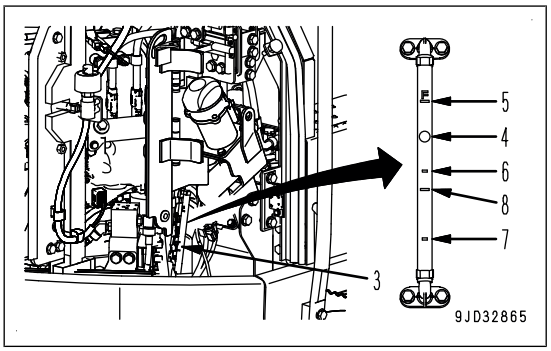
4. If DEF is insufficient, add it.

   When adding DEF with BIB container, see “How to Add DEF from BIB Container”

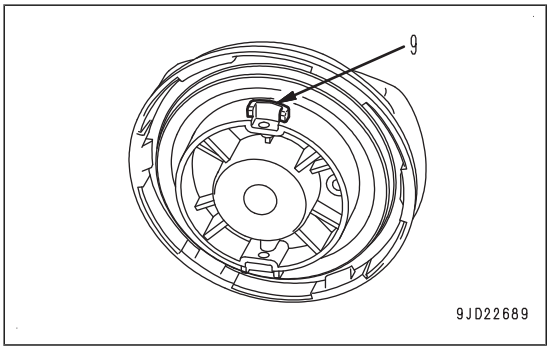
   1) Open the cover at the right front side of the machine and clean the DEF tank cap and the area around.
   2) Turn the cap of oil filler port (2) counterclockwise.
      The oil filler cap is opened.
   3) By sight gauge (3), add DEF through the filler port until float (4) reaches line F (5).
      Line (6) in the sight gauge indicates approximately 5 ℓ below the line F, and the line (7) indicates approximately 10 ℓ below the line F.

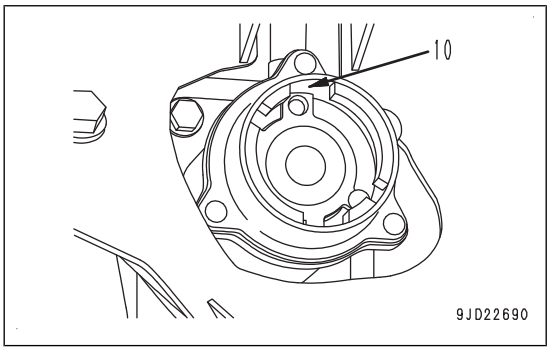
      The line (8) is the adding line when DEF may freeze in cold weather.



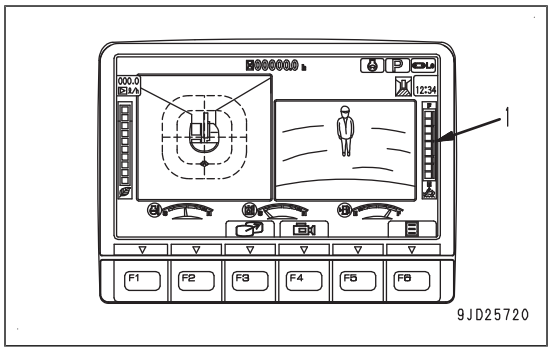


5. After adding, align claw (9) of the cap with groove (10) of the filler port and close the cap securely by turning it clockwise by 90 °.





REMARK



- It is recommended to use a nozzle having a diameter and a length specified by ISO 22241-4 and an auto stop function to add DEF. When the specified nozzle is used, the magnet installed inside the filler port of the tank cancels the wrong fluid addition prevention device, and you can add DEF. This mechanism prevents addition of DEF into the fuel tank, addition of fuel into DEF tank, and spill of DEF from the filler port.
- When using a nozzle which is not conformed to ISO 22241-4, hold it in your hand and add DEF carefully while checking the sight gauge.
- Add only DEF in clearly marked DEF tanks that have the blue cap.
- If the starting switch is turned to ON position immediately after adding DEF, DEF level gauge (1) on machine monitor will be delayed.

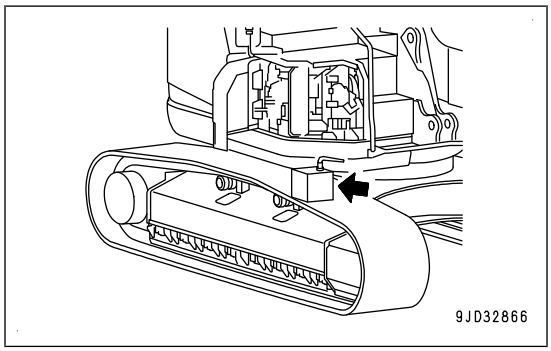
How to Add DEF from BIB Container

⚠ CAUTION

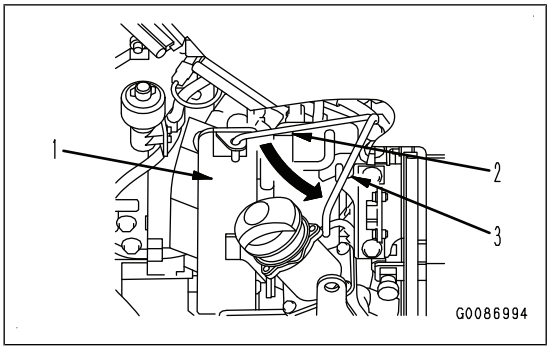
- **When opening or closing the cover on the front right of the machine, stop the machine on a level ground, lower the work equipment to the ground, stop the engine, and then perform the work.**
- **When opening the bracket, do not release your hand from the step until it is opened horizontally.**
- **Open the bracket and put the BIB container on it.**
- **Do not put the BIB container whose capacity exceeds 10ℓ onto the opened bracket.**
- **Do not put your foot and hand on or lean on the opened bracket.**
- **Weight of the BIB container 10ℓ is 11kg.**
  Before putting it on the bracket, put the BIB container on the track first.
  Then put the BIB container onto the opened bracket.

Prepare a BIB container of 10ℓ.

1. Place the machine on a level ground and lower the work equipment to the ground.
   If the machine is inclining, make it level.
2. Stop the engine.
3. Open the cover on the front right of the machine, and clean the blue DEF tank cap and around.
4. Put the BIB container onto the track first.

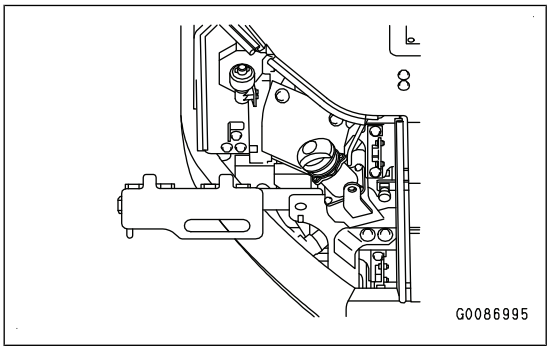


5. Climb on the top of the track from the front of the machine.
6. Put the lock bar (2) of bracket (1) onto the holder (3).



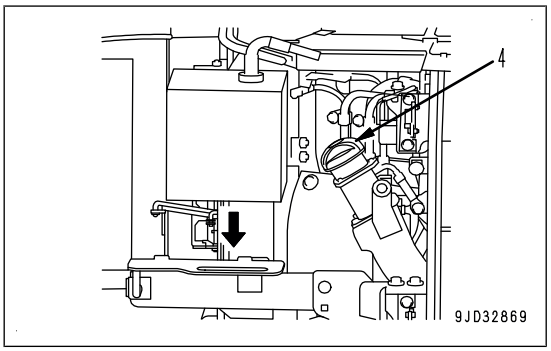
7. Open the bracket (1).

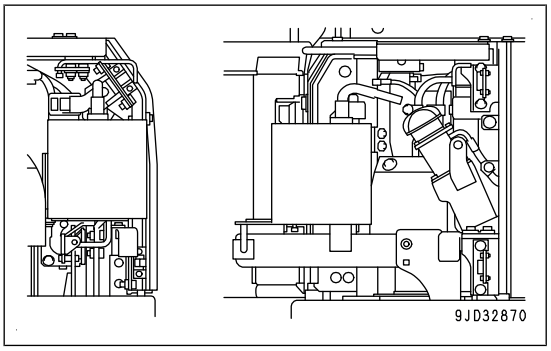
   It can be used as a place where the BIB container is put on.



8. Put the BIB container gently onto it.
9. Turn the cap of filler port (4) counterclockwise.

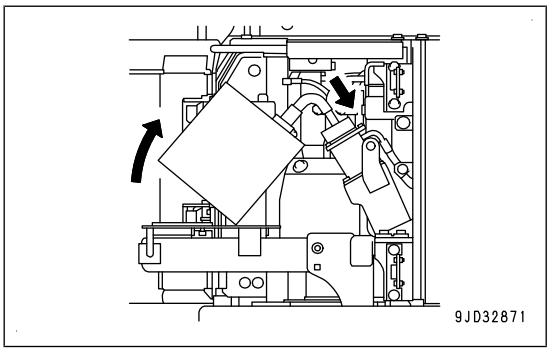
   The cap of filler port is opened.





10. Insert the bellows hose of the BIB container into the filler port (4).

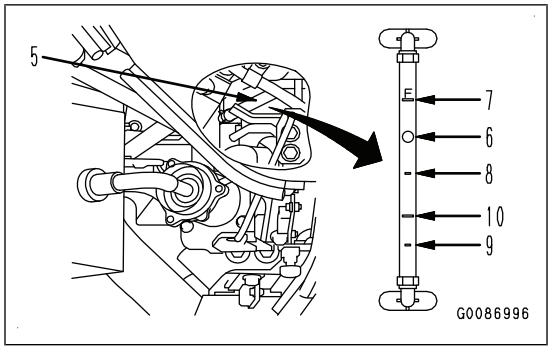
    If it is difficult to insert the bellows hose into the filler port (4), make the mating point of the end of the BIB container and the bracket as a fulcrum, and lift up the other end of BIB container to perform the work.



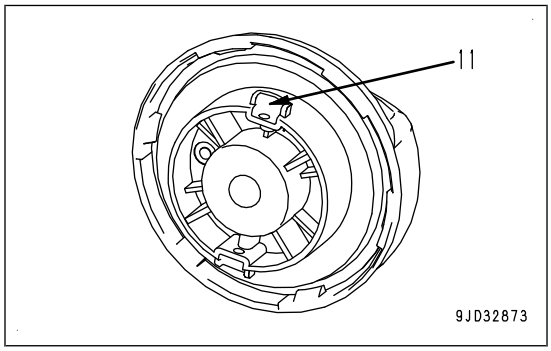
11. By sight gauge (5), add DEF through the filler port until float (6) reaches the line F (7).

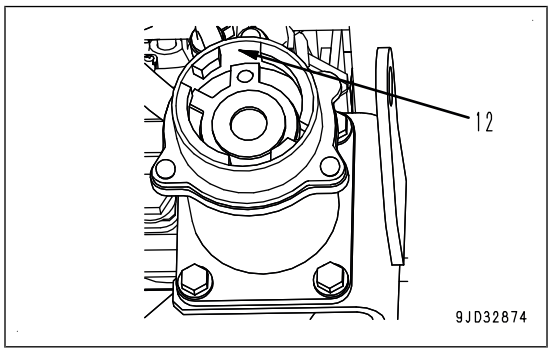
    Line (8) in the sight gauge indicates approximately 5ℓ below the line F, and the line (9) indicates approximately 10ℓ below the line F.

    The line (10) is the adding line when DEF may freeze in cold weather.



12. After adding, align claw (11) of the cap with groove (12) of the filler port and close the cap securely by turning it clockwise by 90°.

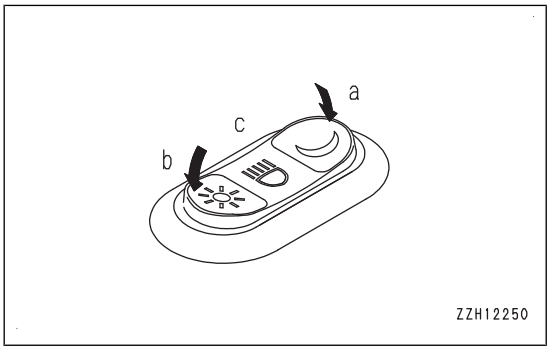




How to Examine Working Lamp

Check that the working lamps and lamps inside the instruments light up properly. Check also that there is no dirt or damage.

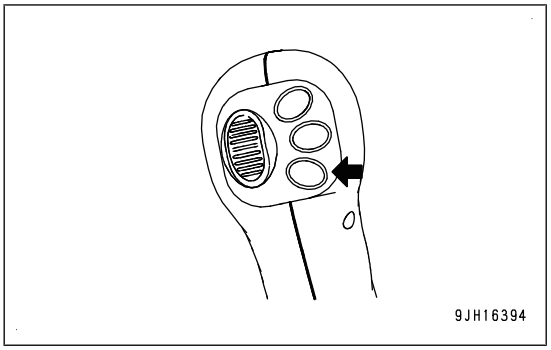
1. Turn the starting switch to ON position.
2. Check that the working lamp lights up properly when the lamp switch is at night mode (a) and at day mode (b).
3. After inspection, turn the lamp switch to OFF position (c), and the working lamp goes out.
4. After checking, turn the starting switch back to 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.

How to Examine 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.

Adjustment

Adjust 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.

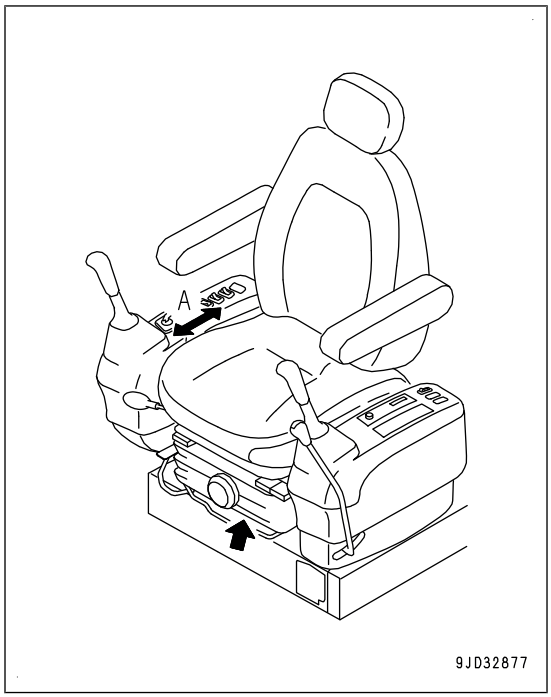
NOTICE

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.

How to Adjust Seat Fore-and-Aft Direction

Pull up the lever, set the seat to the desired position, then release the lever.
Fore-and-aft adjustment: 100 mm (10 stages)

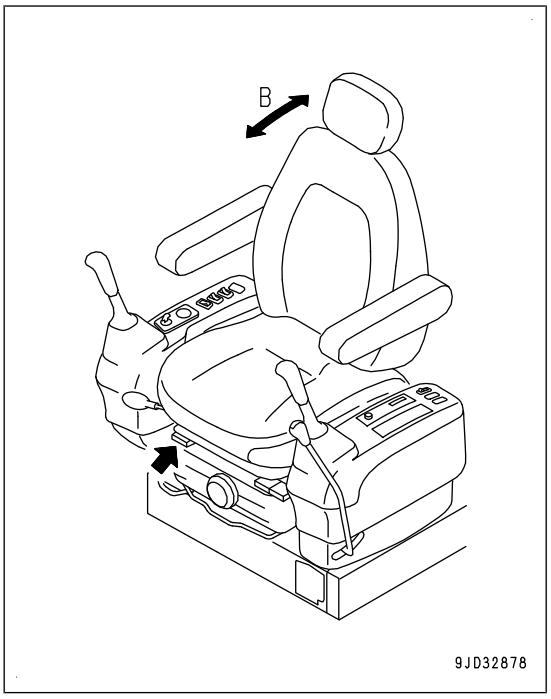


How to Recline Seat

Pull up the lever and set the seat back to a position which is comfortable for operation, then release the lever.

REMARK

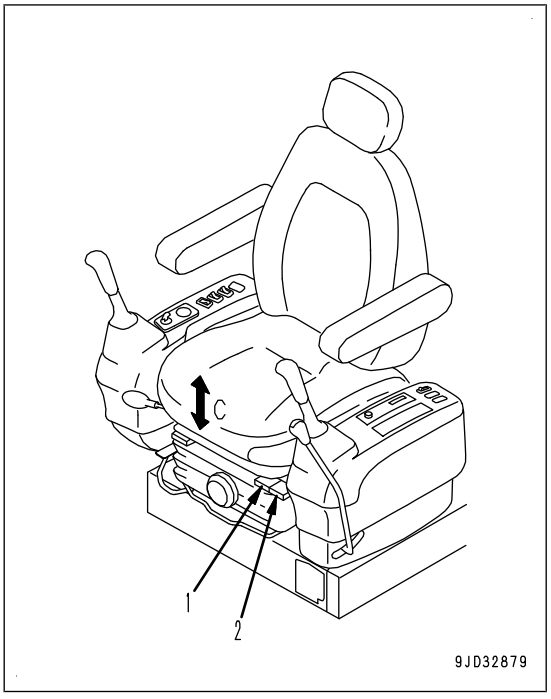
- The seat can be reclined more when the seat is pushed to the front. The amount of reclining decreases as the seat is pushed back, so when moving the seat back, return the backrest to the original position.
- Sit with your back against the backrest when adjusting. If your back is not touching the backrest, it may suddenly move forward.



How to Tilt Seat

- Forward tilt
  Push down lever (1) to adjust the forward tilt angle of the seat. (3 stages)
  - To raise the forward tilt angle of the seat, keep the lever (1) pushed down and apply your weight to the rear of the seat.
  - To lower the forward tilt angle of the seat, keep the lever (1) pushed down and apply your weight to the front of the seat.
- Backward tilt
  Pull up lever (2) to adjust the backward tilt angle of the seat. (4 stages)
  - To raise the backward tilt angle of the seat, keep lever (2) pulled up and stand up slightly to remove your weight from the seat.
  - To lower the backward tilt angle of the seat, keep lever (2) pulled up and apply your weight to the rear of the seat.

  Tilt adjustment: Up 13 °, down 8.5 °



How to Adjust Seat Height

It is possible to move the seat up or down by combining adjustments forward tilt and backward tilt.

After setting the forward tilt or backward tilt to the desired height, operate the opposite tilt to set the seat horizontal, and secure it in position.
Adjustment amount of height: 56 mm

REMARK

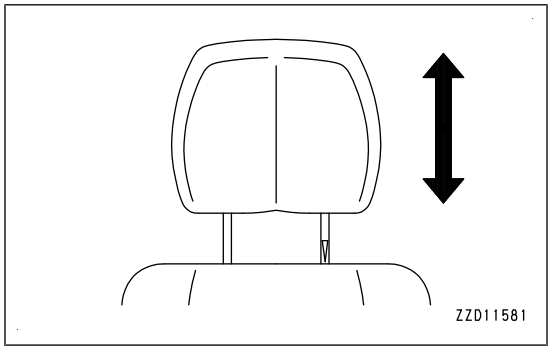
If the suspension is not filled enough with air, it may be difficult to operate the reclining and tilt adjustment lever. In such case, fill the suspension with air and operate the adjustment lever.

How to Adjust Headrest in Vertical Direction

Move the headrest up or down to the desired height.

NOTICE

When adjusting the headrest height, operate it so that the shaft of the headrest becomes straight. If it is twisted forcibly, the mounting part may break.



How to Adjust Armrest Angle

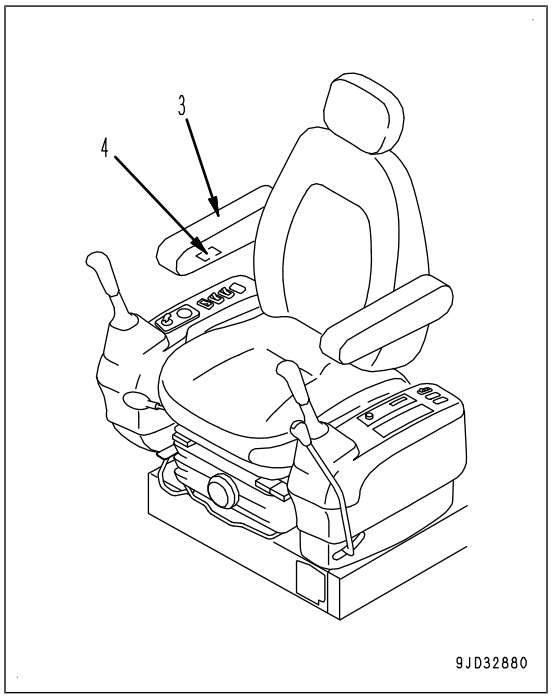
Armrest (3) can be moved up to approximately 90 ° by hand.

By turning the dial (4) at the bottom of the armrest (3) by hand, it is possible to make vertical angle adjustment finely.
If the dial is turned clockwise (counterclockwise), the armrest is raised (lowered).

Armrest adjustment angle: 25 °

REMARK

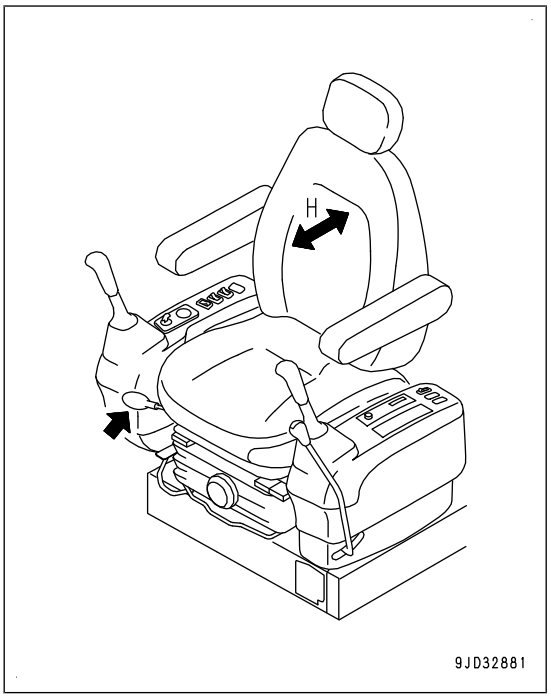
If the seat back is tipped toward the front without raising the armrest (3), armrest (3) rises automatically.



How to Adjust Lumbar Support

Adjust the seat back face in an optimum swelling.
When the pump is pressed, seat back face centre swells up.

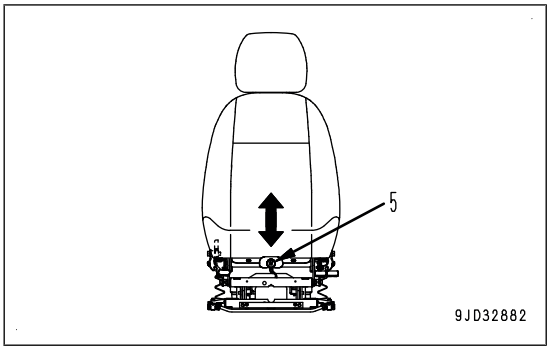
When the button at pump root is pressed, seat back face centre deflates.



How to Adjust Air Suspension Seat Hardness

If you press the suspension switch (5), the suspension becomes hard.
If you pull the suspension switch (5), the suspension becomes soft. (Air hissing sound will be heard.)

Adjustment range by the weight: 60 to 150 kg

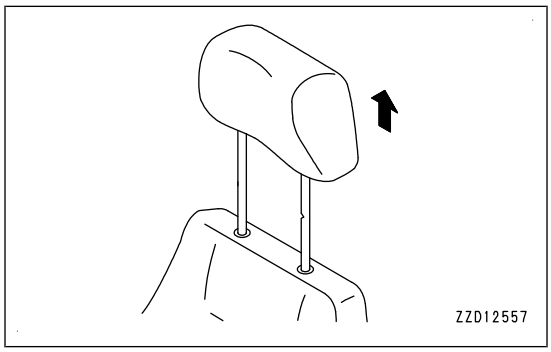


Remove and Install Headrest

Remove Headrest

When the headrest is not necessary, remove it according to the following procedure.

Pull up the headrest 80 mm or more.
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.

Install Headrest

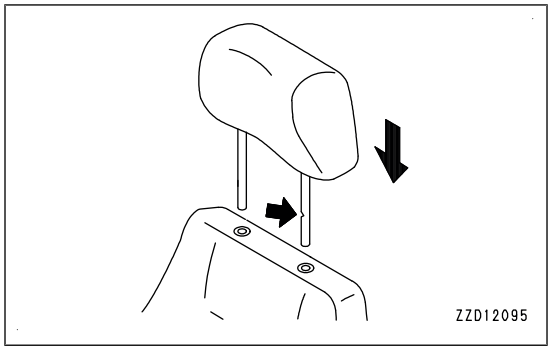
1. Insert the headrest into the hole at the seat back.

   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.



How to Adjust Mirrors

⚠ WARNING

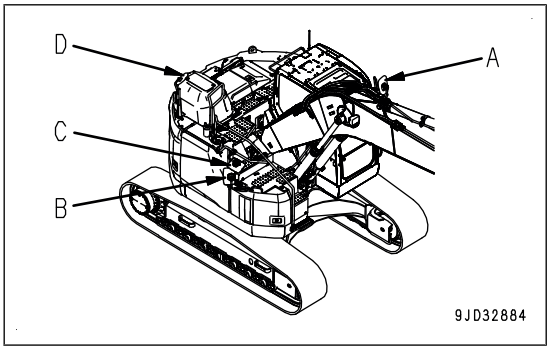
Be sure to adjust the mirrors before starting the work. If they are not adjusted properly, you cannot secure the visibility and will be injured or may lead to a serious personal injury or death.

⚠ CAUTION

Check that the following conditions are satisfied before starting the work to prevent the machine from moving during the work.

- **The machine is placed on a 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. front mirror
Mirror (D): Machine rear mirror



Procedure to Adjust Machine Left Front Mirror (A)

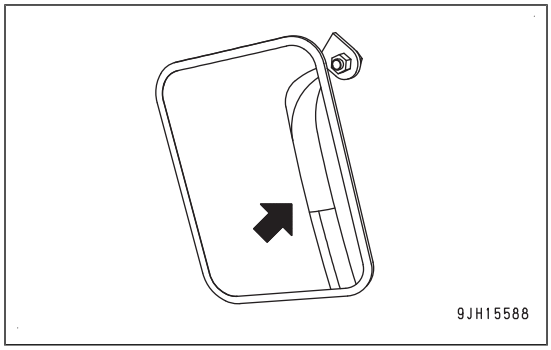
⚠ CAUTION

The following conditions must be met before starting the work to prevent the machine from moving during the work.

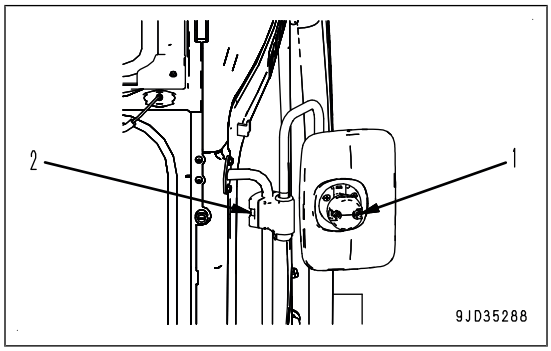
- **The machine is placed on a level ground.**
- **The work equipment is lowered to the ground in secure posture.**
- **The lock lever is in LOCK position.**
- **The engine is stopped.**

Adjust the mirror so that you can see a person at the rear left end 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 to Adjust Regular Position of Machine Left Front Mirror (A)”.

Procedure to Adjust Regular Position of Machine Left Front Mirror (A)

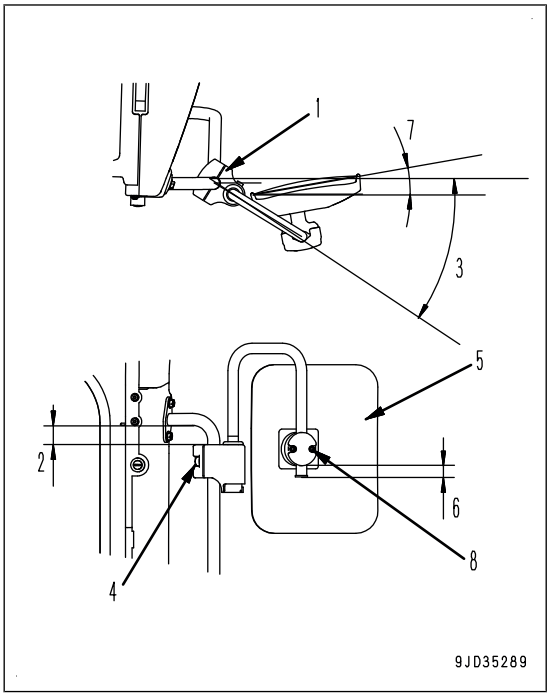
⚠ CAUTION

The following conditions must be met before starting the work to prevent the machine from moving during the work.

- **The machine is placed on a level ground.**
- **The work equipment is lowered to the ground in secure posture.**
- **The lock lever is in LOCK position.**
- **The engine is stopped.**

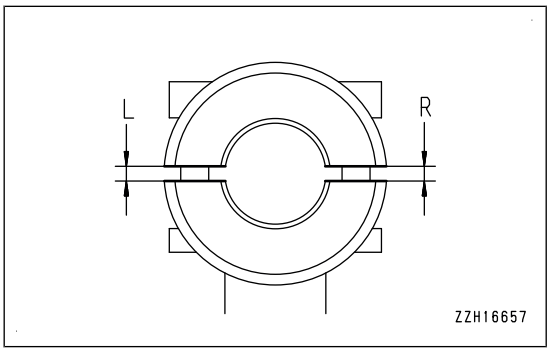
When returning the mirror to its regular position, perform the following adjustment.

1. Adjust the stay (1).
   Mounting position (2): 35 mm
   Mounting angle (3): 30 °
   Tightening torque of mounting bolt (4): 15 to 19.6 Nm {1.52 to 2.0 kgfm}
2. Adjust the mirror (5).
   Mounting position (6): 15 mm
   Mounting angle (7): 10 °
   Tightening torque of mounting bolt (8): 6.0 to 7.0 Nm {0.61 to 0.71 kgfm}

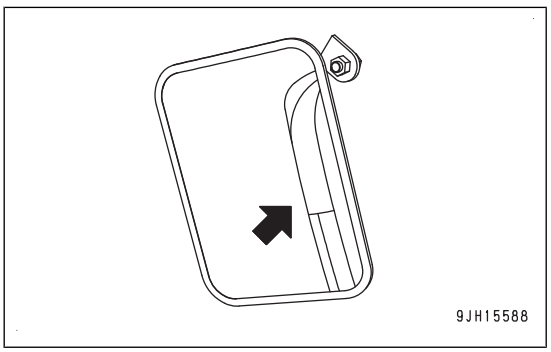


NOTICE

- **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 will be damaged. Be sure to tighten the bolts to the specified torque.**



Adjust the mirror so that the side of the machine is reflected in it as shown in the figure.



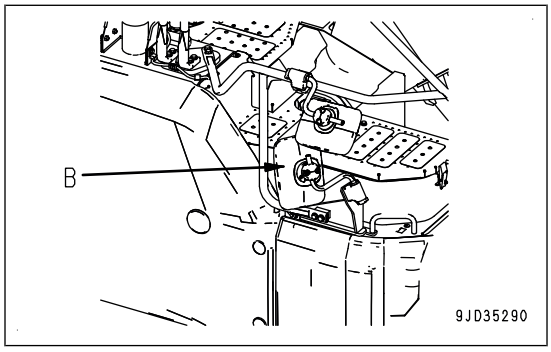
Procedure to Adjust Machine Right Front Mirror (B)

⚠ CAUTION

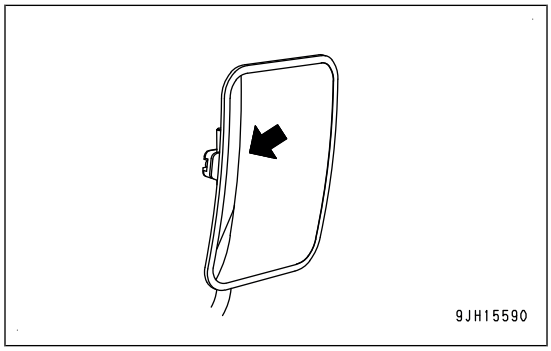
The following conditions must be met before starting the work to prevent the machine from moving during the work.

- **The machine is placed on a level ground.**
- **The work equipment is lowered to the ground in secure posture.**
- **The lock lever is in LOCK position.**
- **The engine is stopped.**

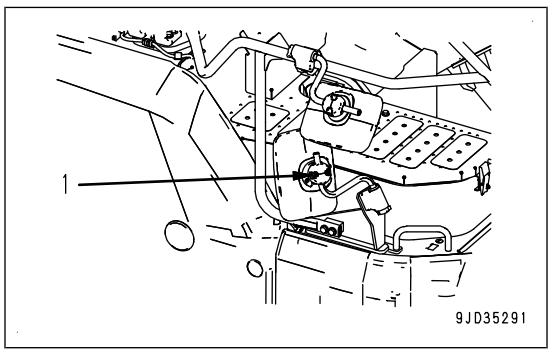
Adjust the mirror so that you can see a person at the rear right end of the machine.



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 end of the machine.



3. If you cannot adjust, loosen mounting bolts (1) 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 to Adjust Regular Position of Machine Right Front Mirror (B)”.

Procedure to Adjust Regular Position of Machine Right Front Mirror (B)

⚠ CAUTION

The following conditions must be met before starting the work to prevent the machine from moving during the work.

- **The machine is placed on a level ground.**
- **The work equipment is lowered to the ground in secure posture.**
- **The lock lever is in LOCK position.**
- **The engine is stopped.**

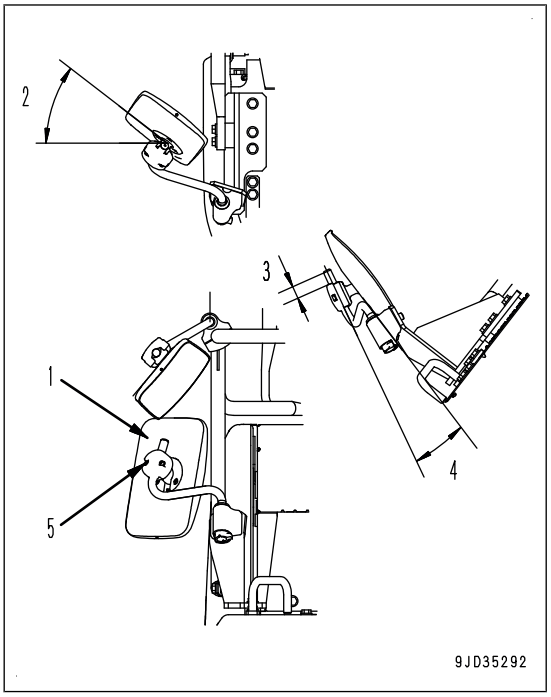
When returning the mirror to its regular position, perform the following adjustment.

Adjust the mirror (1).
Mounting angle (2): 45 °

Mounting position (3): 33 mm

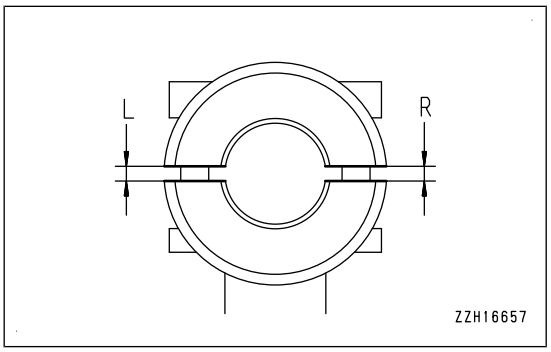
Mounting angle (4): 12 °

Tightening torque of mounting bolt (5): 6.0 to 7.0 Nm {0.61 to 0.71 kgfm}

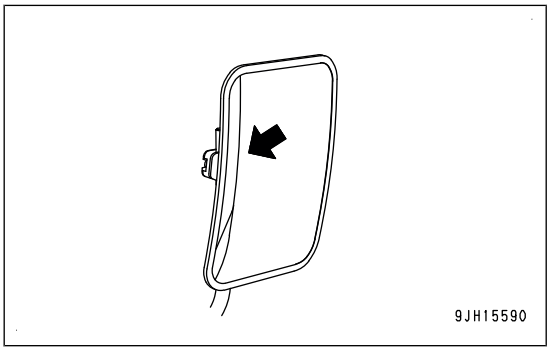


NOTICE

- **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 will be damaged. Be sure to tighten the 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.



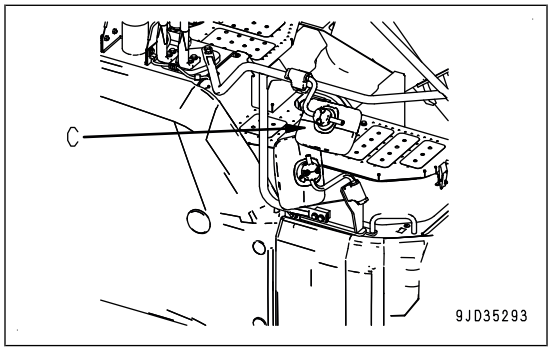
Procedure to Adjust Machine Right Front Mirror (C)

⚠ CAUTION

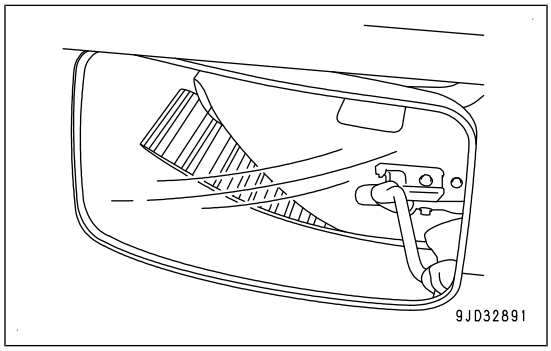
The following conditions must be met before starting the work to prevent the machine from moving during the work.

- **The machine is placed on a level ground.**
- **The work equipment is lowered to the ground in secure posture.**
- **The lock lever is in LOCK position.**
- **The engine is stopped.**

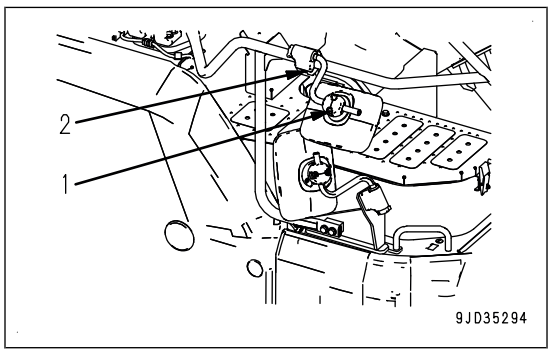
Adjust the mirror so that you can see a person on the right side of the machine.



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 on the right side of the machine.



3. If you cannot adjust, loosen the mounting bolt (1) of mirror and the mounting bolt (2) of 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 to Adjust Regular Position of Machine Right Front Mirror (C)”.

Procedure to Adjust Regular Position of Machine Right Front Mirror (C)

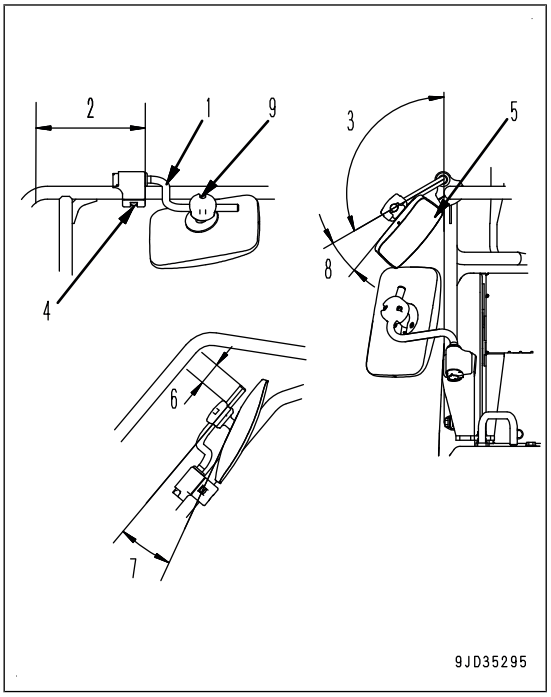
⚠ CAUTION

The following conditions must be met before starting the work to prevent the machine from moving during the work.

- **The machine is placed on a level ground.**
- **The work equipment is lowered to the ground in secure posture.**
- **The lock lever is in LOCK position.**
- **The engine is stopped.**

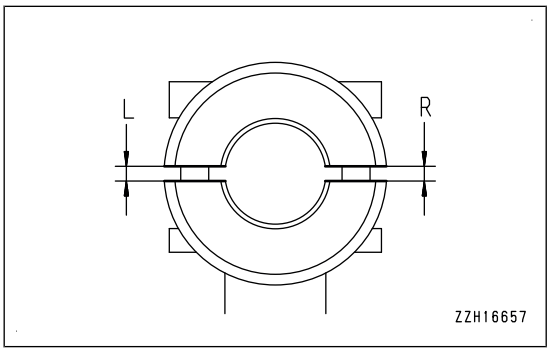
When returning the mirror to its regular position, perform the following adjustment.

1. Adjust stay (1).
   Mounting position (2): 295 mm
   Mounting angle (3): 120 °
   Tightening torque of mounting bolt (4): 15 to 19.6 Nm {1.52 to 2.0 kgfm}
2. Adjust the mirror (5).
   Mounting position (6): 60 mm
   Mounting angle (7): 15 °
   Mounting angle (8): 20 °
   Tightening torque of mounting bolt (9): 6.0 to 7.0 Nm {0.61 to 0.71 kgfm}

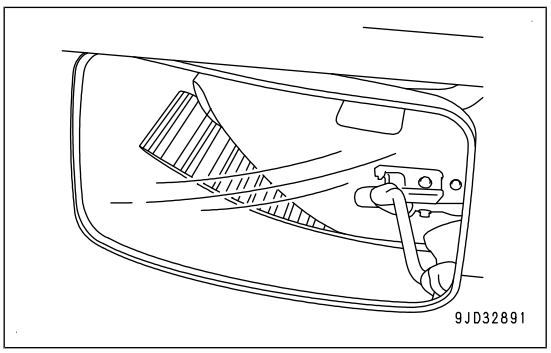


NOTICE

- **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 will be damaged. Be sure to tighten the bolts to the specified torque.**



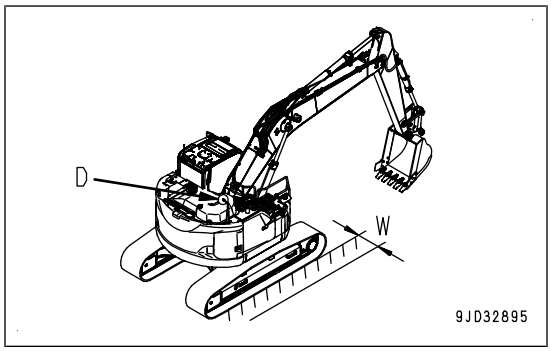
Adjust the mirror so that the side of the machine is reflected in it as shown in the figure.



Procedure to Adjust Machine Rear Mirror (D)

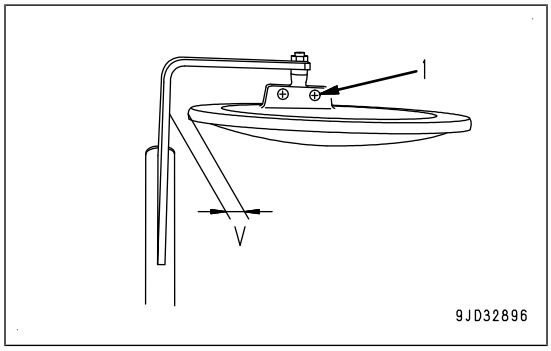
Adjust this mirror so that people within 1 m away from around the machine can be seen from the operator's seat.

(W): 1 m



The regular position of the mirror is as follows.

- If mirror (C) does not move smoothly when adjusting its angle, loosen mirror securing screw (10).
  Tightening torque of screw: 6.0 to 6.5 Nm {0.61 to 0.66 kgfm}
- When installing mirrors (C), make sure to leave clearance (V) to prevent contact between the mirror and mirror stay.
  (V): 10 mm or more



How to Fasten and Unfasten Seat Belt

⚠ WARNING

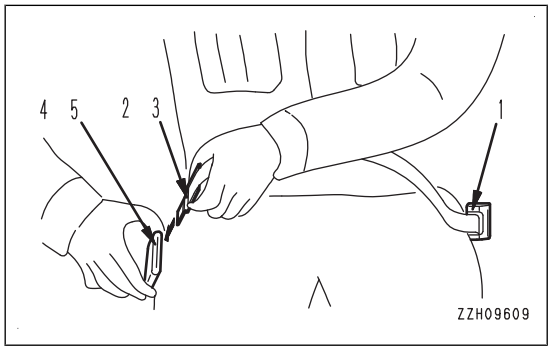
- **Before fastening the seat belt, check that there is no problem in the belt mounting bracket or belt. If it is worn or damaged, replace it.**
- **Even if no problem can be seen in the belt, replace the seat belt every 3 years from starting usage or 5 years after manufacture whichever comes sooner.**
- **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.

How to Fasten 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.

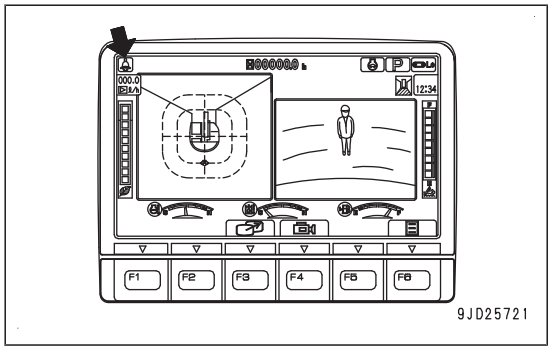


How to Unfasten Seat Belt

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.

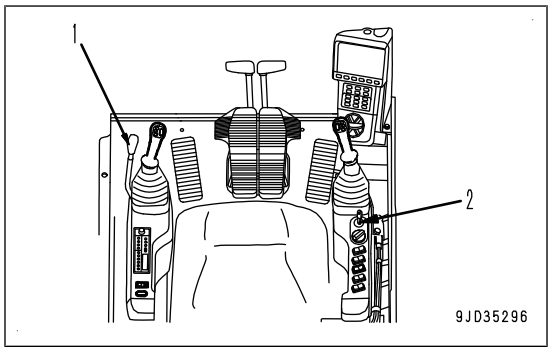


Operations and Checks Before You Start Engine

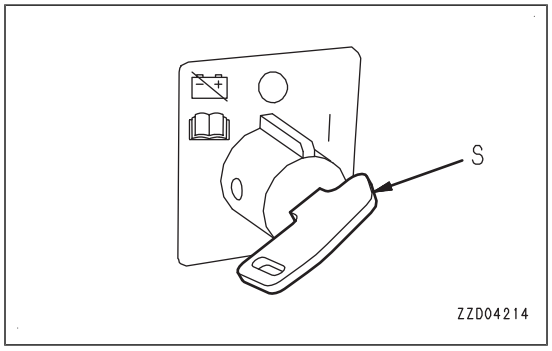
⚠ WARNING

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.

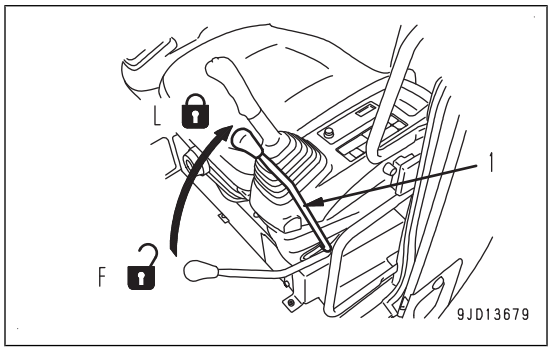


1. Check that the battery disconnect switch (S) is in ON position (I).



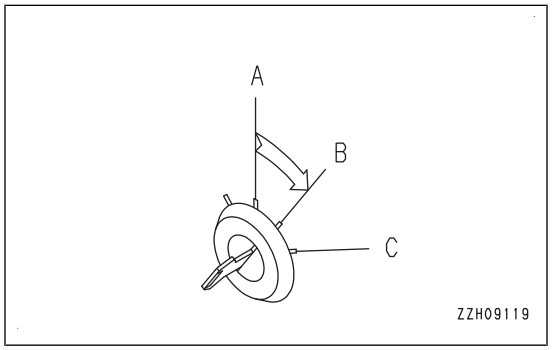
2. Check that the lock lever (1) is at LOCK position (L).
3. Check that all the control levers and control pedals are at NEUTRAL position.

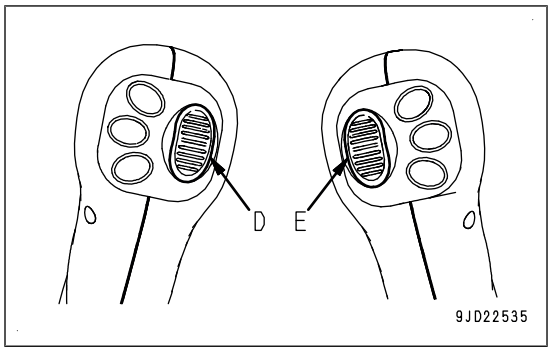
   If all the control levers and control pedals are released, they return to NEUTRAL position.



4. Insert the key into starting switch (2) and turn it to ON position (B).

   At this time, do not touch the proportional control slide switch on the left side (D) or right side (E). If it is touched, “neutral detection system” recognizes the “NEUTRAL” at wrong position, and it will result in the unexpected movement of the attachment.



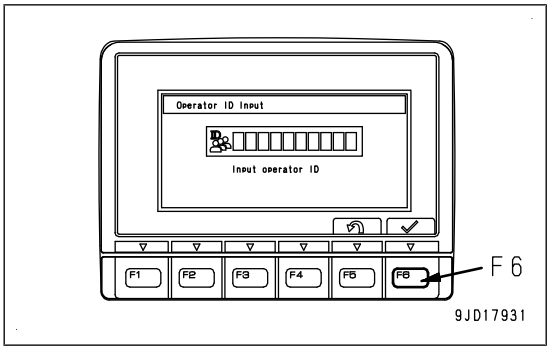


5. On the input display screen displayed on the monitor, input the password and push input confirmation switch F6.

   If a password is set, the input display screen will be indicated on the monitor screen.

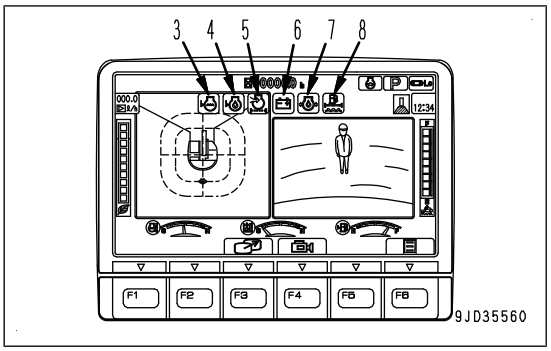
   REMARK

   For the setting, changing, or canceling the password, ask your Komatsu distributor.



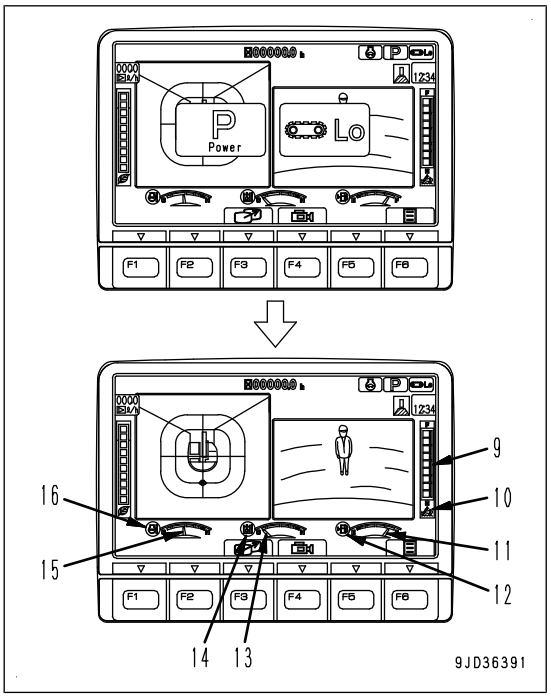
6. Perform the following inspection on the machine monitor.

   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 (3)
      - Engine oil level caution lamp (4)
      - Air cleaner clogging caution lamp (5)
      - Charge level caution lamp (6)
      - Engine oil pressure caution lamp (7)
      - Water separator caution lamp (8)



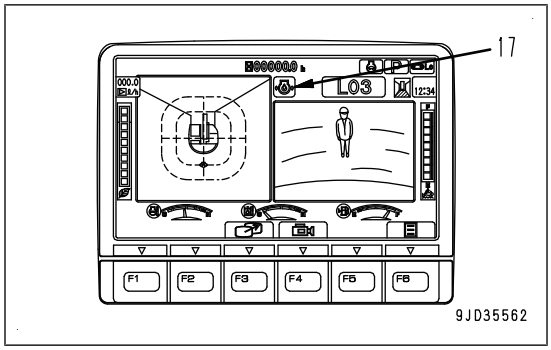
   If any caution lamp does not light up or the buzzer does not sound, there is probably a failure in the caution lamp, so ask your Komatsu distributor for repair.

   2) The screen changes to the working mode and travel speed display screen after approximately 2 seconds, and then it changes to the standard screen.
      - DEF level gauge (9)
      - DEF level caution lamp (10)
      - Fuel gauge (11)
      - Fuel level caution lamp (12)
      - Hydraulic oil temperature gauge (13)
      - Hydraulic oil temperature caution lamp (14)
      - Engine coolant temperature gauge (15)
      - Engine coolant temperature caution lamp (16)



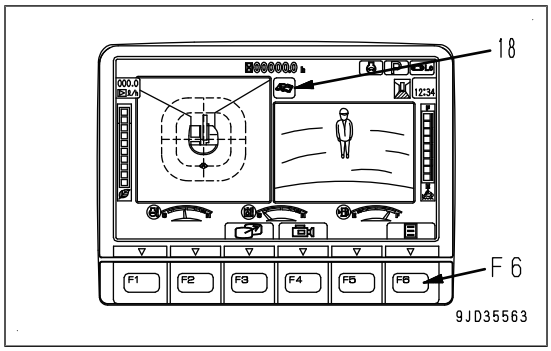
3) If the caution lamp (17) stays lit in red, immediately check the item lit in red.

For the contents and check methods for caution lamps, see “Caution Lamp List”.



7. If the maintenance time of that item has been passed, maintenance time caution lamp (18) lights up in red for 30 seconds. Press the switch F6, check that item, and then perform maintenance immediately.

For the method of checking the maintenance time, see “Explanation of Components”, “MAINTENANCE SCREEN SETTING”.



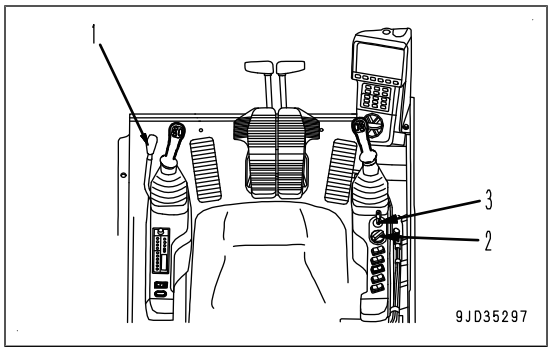
How to Start Engine

⚠ WARNING

- **Start the engine only while sitting on the operator's seat.**
- **Do not attempt to start the engine by short-circuiting the engine starting circuit. Doing so may cause a serious personal injury or death or fire.**
- **Check that there is no person or obstacle in the area around the machine, then sound the horn and start the engine.**
- **Never use the starting aid fluids to start the engine as they may cause explosions.**
- **Exhaust gas is toxic. When starting the engine in confined spaces, be particularly careful to ensure good ventilation.**

NOTICE

- **Check that the fuel control dial (2) is at Low idle (MIN) position before starting the engine. The engine will accelerate suddenly and cause damage to the engine parts if the fuel control dial is at High idle (MAX) position.**
- **Do not keep the starting switch key (3) at 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 caution lamp is lit.**



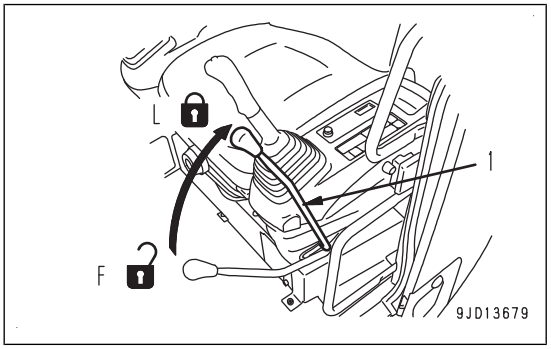
This machine is equipped with an engine automatic preheating function (engine automatic preheating system) that starts the engine preheating automatically.

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.

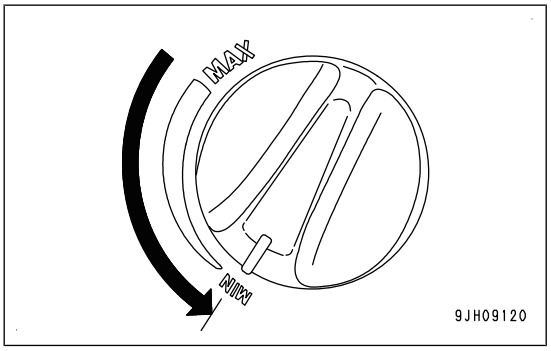
Start the engine according to the following procedure.

1. Check that the lock lever (1) is at LOCK position (L).

   If the lock lever (1) is in FREE position (F), the engine does not start.



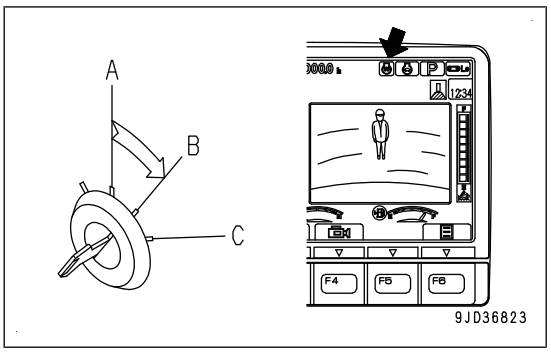
2. Turn the fuel control dial (2) to Low idle (MIN) position.



3. Turn starting switch key (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 starting switch key (3) at ON position (B) until the preheating pilot lamp goes out. The lighting 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 -15 °C {5 °F}	5 seconds to 30 seconds
-15 °C {5 °F} and below	30 seconds

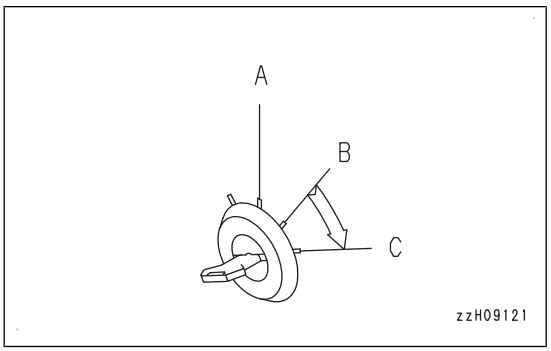
   If a password has been set, the input display screen will be indicated on the monitor screen, but the preheating pilot lamp also operates as in the standard screen.

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 starting switch key (3) to START position (C).

   The engine will start.

   REMARK

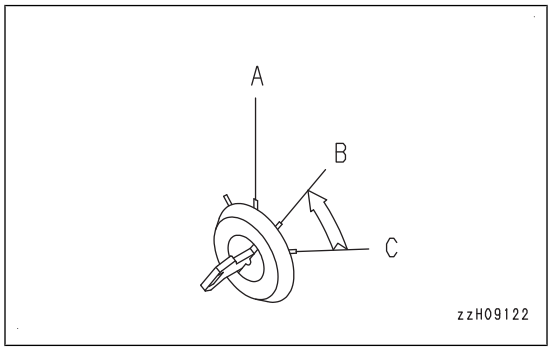
   If the ambient temperature is low, the engine may not start even when the key in starting switch (3) is kept at START position (C) for 20 seconds.
   If this happens, wait for at least 2 minutes, then start again from the beginning.
   To preheat the engine forcibly when the automatic preheating does not start, see “How to Do Manual Preheating When You Start Engine”.



5. When releasing your hand from the key in starting switch (3) after starting the engine, it automatically returns 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.



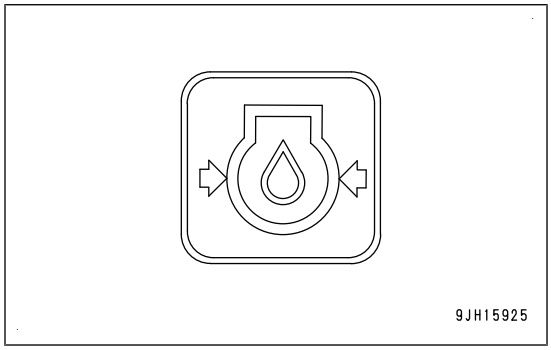
6. After the engine starts, wait for the engine oil pressure caution lamp to go out. Do not touch the control levers or control pedal while the engine oil pressure caution lamp is lit.

NOTICE

If the engine oil pressure caution lamp does not go out even after 4 to 5 seconds have passed, stop the engine immediately. Check the oil level, check for leakage of oil, and take the necessary action.

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

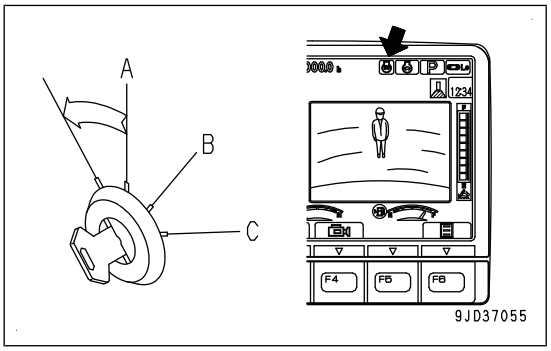
Urea SCR system has the function of heating system and keeping it warm to prevent freezing of DEF.
If DEF is frozen, the DEF system is automatically heated to thaw DEF after the engine is started. The devices do not operate until DEF is thawed and supplied, but this does not indicate any abnormality.
When the ambient temperature decreases to a level where DEF may freeze while the machine is in operation, the DEF system is warmed automatically to prevent freezing. When the ambient temperature decreases to a level where freezing of DEF is not preventable, the devices stop automatically, but this does not indicate any abnormality.
If DEF freezes, thawing operation is performed automatically. Never heat DEF. Harmful ammonia gas will be generated.

Manual Preheating When You Start Engine

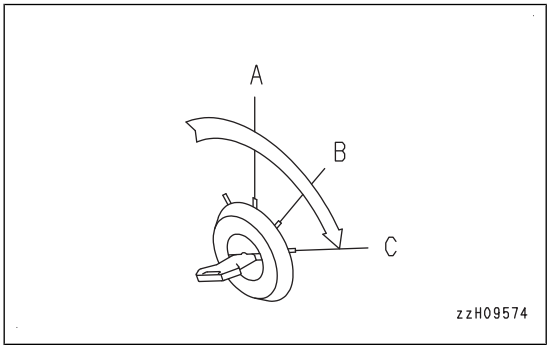
Regardless of the ambient temperature, it is possible to start the engine preheating manually.

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). 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 cancelled, 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.

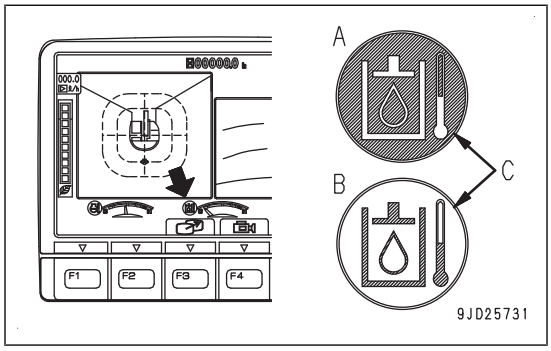
REMARK

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.

Operations and Checks After You Start 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.

How to Examine 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.

How to Examine 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.

Operate Engine in Break-in Period

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.

Engine Warm-up Operation

NOTICE

- **Do not accelerate the engine abruptly until it is warmed up.**
- **Do not run the engine at low idle or high idle under no load for more than 20 minutes. This will have an adverse effect on the environment and also on the internal structure of the engine. If it is necessary to run the engine at idle for 20 minutes or more, apply a load from time to time or run at a medium speed.**

This machine is equipped with an automatic engine warm-up system, so if the engine coolant temperature is 30 °C or less after the engine is started, the engine warm-up operation starts automatically. When the engine automatic warm-up operation starts, the engine speed is maintained higher than the normal speed at low idle.

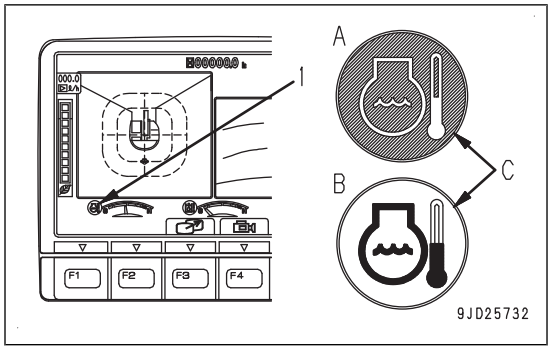
If the engine coolant temperature goes 30 °C or more or if the warm-up operation is continued for more than 10 minutes, the automatic warm-up operation is canceled and the engine speed drops to the normal speed at low idle.

Do not start operating the machine immediately. First, perform the following operations and checks.

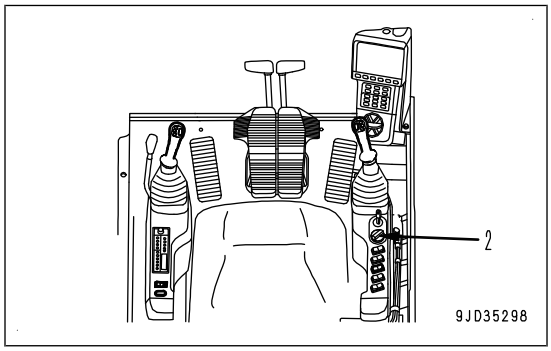
1. Check that engine coolant temperature caution lamp (1) displays the correct temperature.

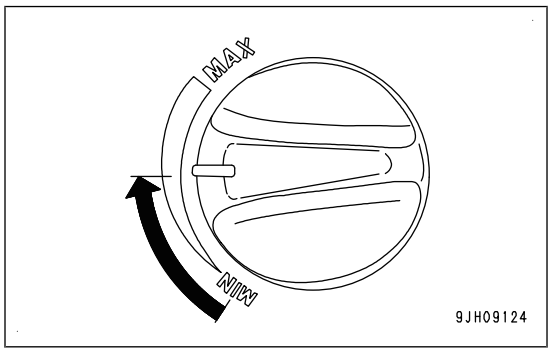
   If the display indicates low temperature, perform additional warm-up operation of the engine according to step 2 until it indicates the correct temperature.

   - Display (A) when temperature is correct: Caution lamp background (C) is blue.
   - Display (B) when temperature is low: Caution lamp background (C) is white.



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 correct temperature.

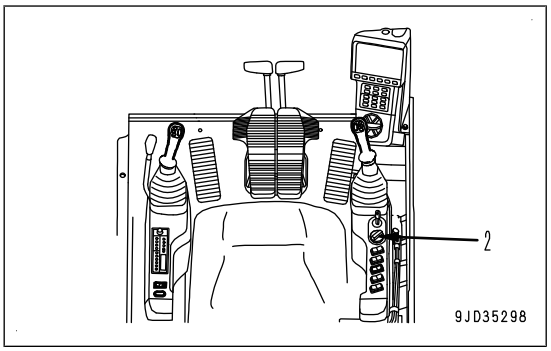
- Display (A) when temperature is correct: Caution lamp background (C) is blue.
- Display (B) when temperature is low: Caution lamp background (C) is white.

If the engine coolant temperature caution lamp displays the correct temperature, the engine warm-up operation is completed.

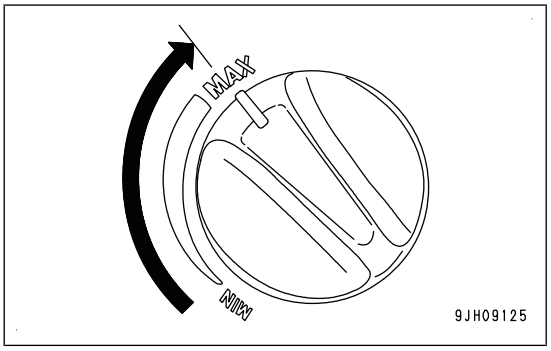
Then, perform the warm-up operation for the hydraulic components.

How to Cancel Automatic Warm-up Operation

When you are forced to urgently cancel the automatic warm-up operation or to lower the engine speed to Low idle, do as follows.

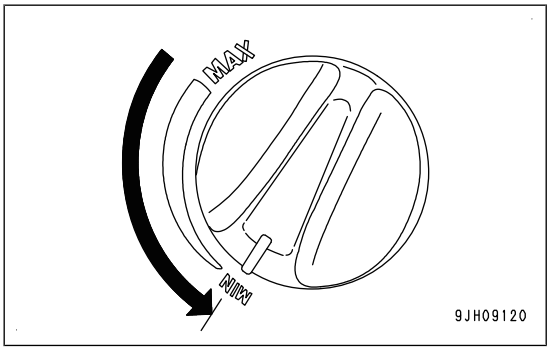


1. Turn the fuel control dial (2) to High idle (MAX) position and hold it for 3 seconds or more.



2. Turn the fuel control dial (2) to Low idle (MIN) position.

   The engine automatic warm-up is cancelled, and the engine speed is lowered.



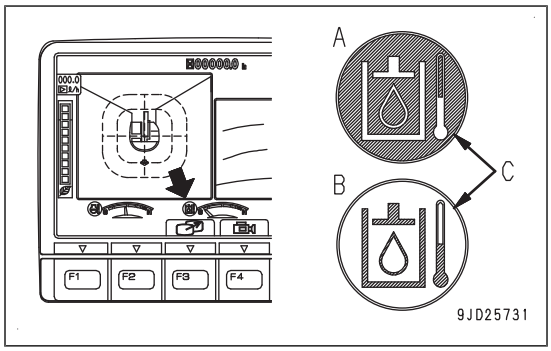
REMARK

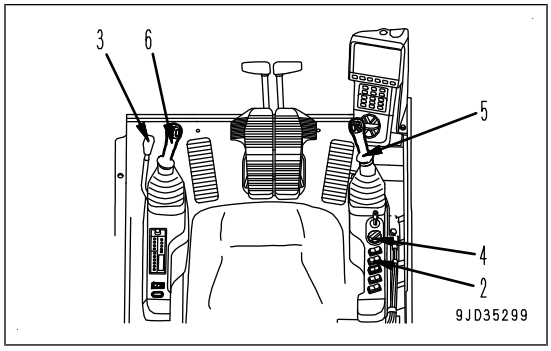
Turbo protect function takes priority over the engine automatic warm-up operation.
When the turbo protect function activates, run the engine at low idle even the engine coolant temperature is 30 °C or lower. Then the engine automatic warm-up starts automatically to increase the engine speed.

Hydraulic System Warm-up Operation

⚠ WARNING

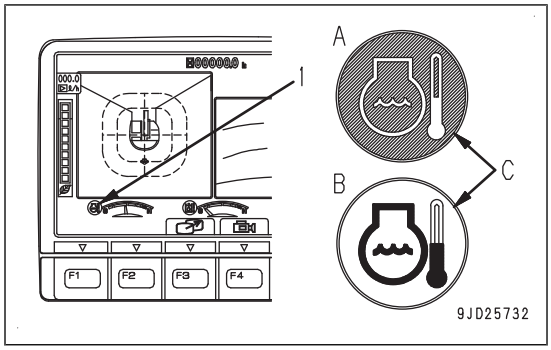
- **Before performing the warm-up operation for the hydraulic component, set the swing lock switch on, check on the monitor that the swing lock is actuated, then start the warm-up operation.**
- **Before warming up the hydraulic component, check that there is no person or obstacle in the area around the machine, then sound the horn and start the operation.**
- **Perform the warm-up operation for the hydraulic component until the hydraulic oil temperature caution lamp displays the correct temperature. (When the hydraulic oil temperature is low, the low temperature display shown in the figure is given.)**
  - **Display (A) when temperature is correct: Caution lamp background (C) is blue.**
  - **Display (B) when temperature is low: Caution lamp background (C) is white.**
- **The warm-up operation for the hydraulic component 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).**
- **Check the direction of the track frame before operating the travel lever.**



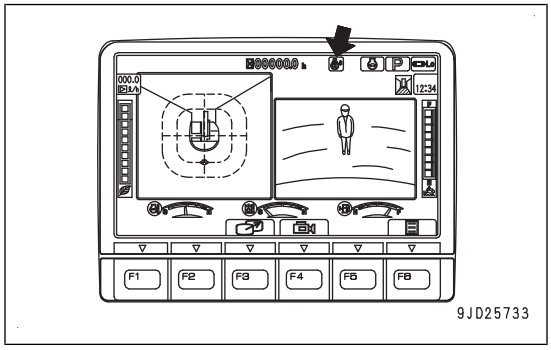


1. Check that the engine coolant temperature caution lamp (1) displays the correct temperature.
   - Display (A) when temperature is correct: Caution lamp background (C) is blue.
   - Display (B) when temperature is low: Caution lamp background (C) is white.

   If it displays the low temperature, perform additional warm-up operation until the engine coolant temperature caution lamp (1) displays the correct temperature.



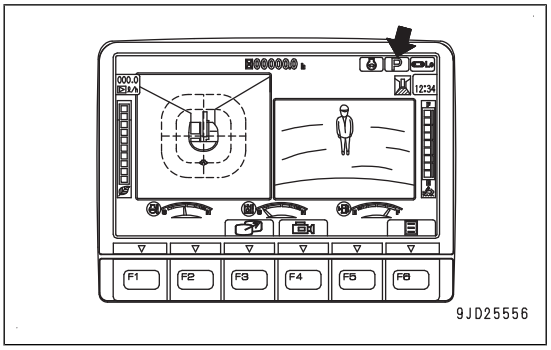
2. Set the swing lock switch (2) to ON position and check that the swing lock pilot lamp is lit.



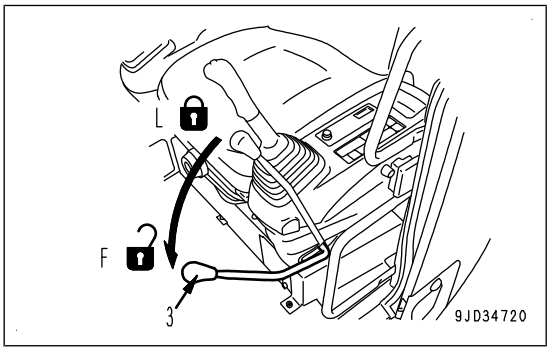
3. Set the working mode to P mode (heavy-duty operation mode).

   The hydraulic component is warmed up quickly.

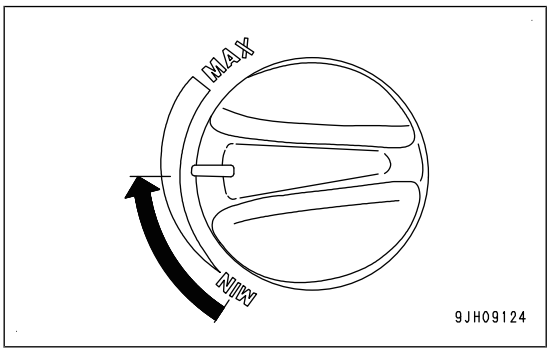
   For setting the working mode, see “Working Mode Selector Switch”.



4. Operate the lock lever (3) by the red portion on the top, slowly and securely set it to FREE position (F), then raise the bucket from the ground.



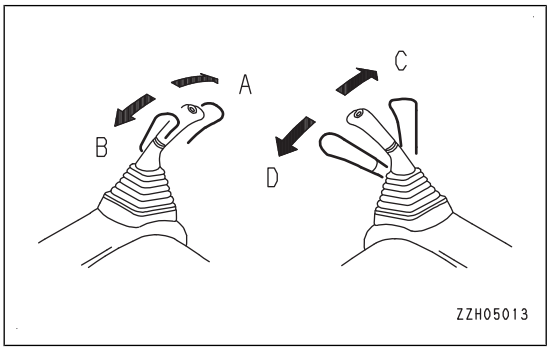
5. Turn fuel control dial (4) to a point midway between low speed (MIN) and full speed (MAX).



6. Operate the work equipment to warm up the hydraulic components.

   NOTICE

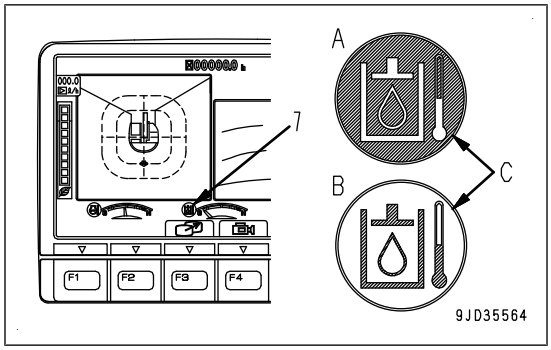
   When the work equipment is operated, take care that it does not interfere with the machine or ground.



   1) Move the 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.
   2) Move the R.H. work equipment control lever (5) slowly in the direction of bucket DUMP position (C). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.
   3) Next, move the L.H. work equipment control lever (6) slowly in the direction of arm IN position (B). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.
   4) Move the L.H. work equipment control lever (6) slowly in the direction of arm OUT position (A). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.
7. Repeat the operation of step 6 for 5 minutes.
8. Check that the hydraulic oil temperature caution lamp (7) displays the correct temperature.

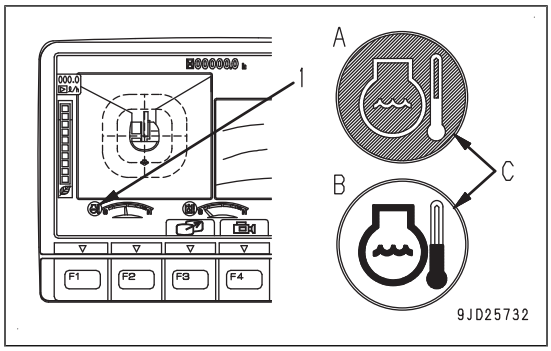
   If the hydraulic oil temperature caution lamp does not display the correct temperature (it displays the low temperature), repeat the steps 6. to 7. until it displays the correct temperature.

- Display (A) when temperature is correct: Caution lamp background (C) is blue.
- Display (B) when temperature is low: Caution lamp background (C) is white.

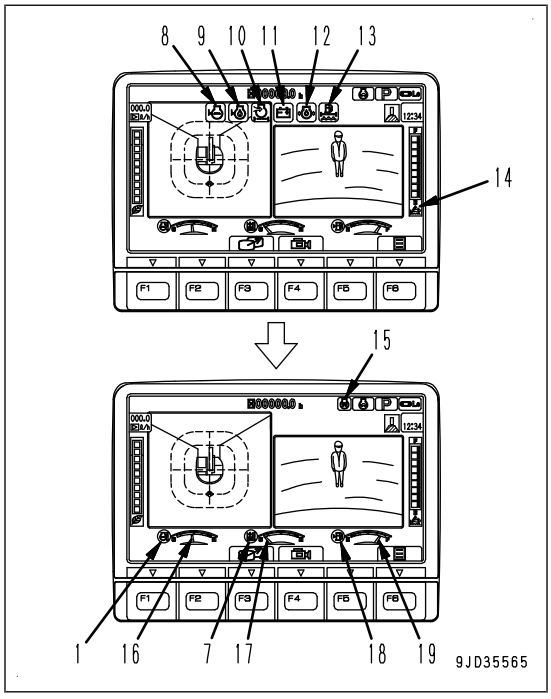


9. Check that the engine coolant temperature caution lamp (1) displays the correct temperature.
   - Display (A) when temperature is correct: Caution lamp background (C) is blue.
   - Display (B) when temperature is low: Caution lamp background (C) is white.

   If it displays the low temperature, perform additional warm-up operation of the engine until the engine coolant temperature caution lamp (1) displays the correct temperature.



10. Check that the hydraulic oil temperature caution lamp and engine coolant temperature caution lamp display the correct 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
    - Engine oil level caution lamp (9): OFF
    - Air cleaner clogging caution lamp (10): OFF
    - Charge level caution lamp (11): OFF
    - Engine oil pressure caution lamp (12): OFF
    - Water separator caution lamp (13): OFF
    - DEF level caution lamp (14): OFF
    - Engine preheating pilot lamp (15): OFF
    - Engine coolant temperature gauge (16): Indicator is in green range
    - Engine coolant temperature caution lamp (1): Displays correct temperature
    - Hydraulic oil temperature gauge (17): Indicator is in green range
    - Hydraulic oil temperature caution lamp (7): Displays correct temperature
    - Fuel level caution lamp (18): Displays appropriate level
    - Fuel gauge (19): Indicator is in green range



11. Check for abnormal exhaust gas color, noise, or vibration.

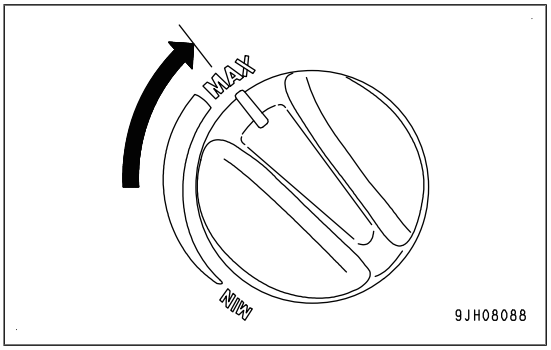
    If any problem is found, contact your Komatsu distributor.

NOTICE

Warm-up all the hydraulic component by performing the warm-up operation for hydraulic system in cold weather (ambient temperature less than 0 °C) even when the hydraulic oil temperature caution lamp displays the correct temperature.

12. Hydraulic system warm-up operation in cold weather

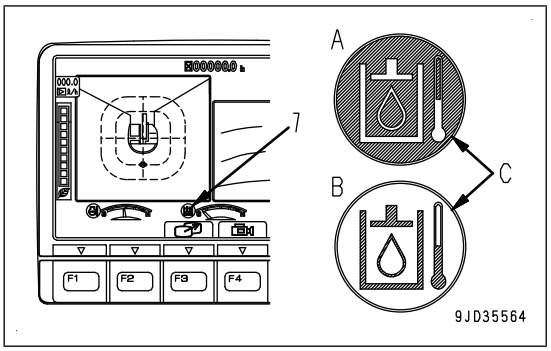
1) Turn the fuel control dial (4) to High idle (MAX) position.



2) Repeat the work equipment operation in step 6 for 3 to 5 minutes.
   - Display (A) when temperature is correct: Caution lamp background (C) is blue.
   - Display (B) when temperature is low: Caution lamp background (C) is white.

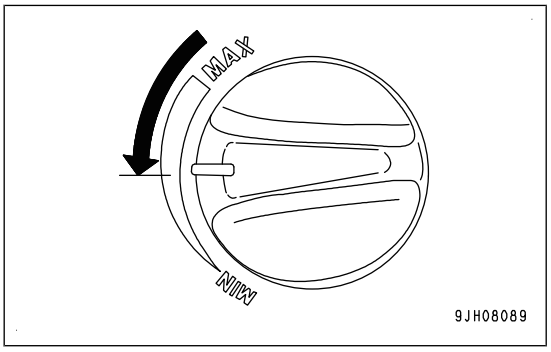
3) Check that hydraulic oil temperature caution lamp (7) displays correct temperature.

   If it does not display the correct temperature, repeat the step 2) until the hydraulic oil temperature caution lamp (7) displays the correct temperature.



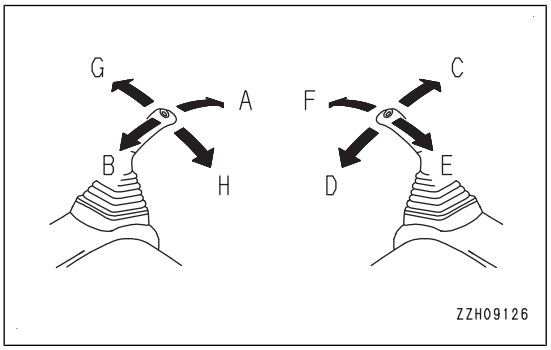
13. Before starting the work, check that the fuel control dial (4) is at a position midway between Low idle (MIN) and High idle (MAX).

    If it is not at the midway position, set it to the midway position and run the engine at a mid-range speed before operating.



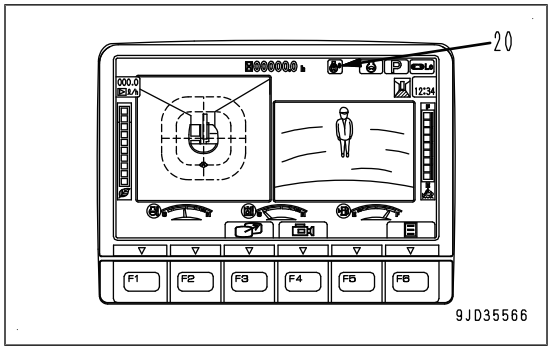
14. Repeat the following operation slowly 3 to 5 times before starting actual work.

    Circulate the warm hydraulic oil through all control circuits.

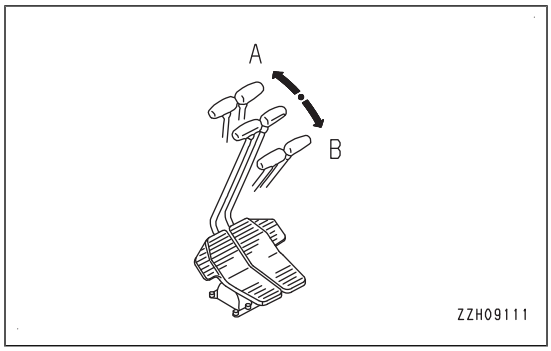


- Boom operation: RAISE (E) ←→ LOWER (F)
- Arm operation: IN (B) ←→ OUT (A)
- Bucket operation: CURL (D) ←→ DUMP (C)
- Swing operation: LEFT (G) ←→ RIGHT (H)

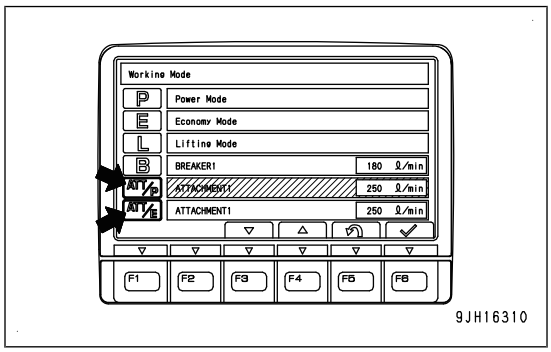
When performing the swing operation, release the swing lock switch (2), check that the swing lock pilot lamp (20) is not lit, then perform the swing operation.



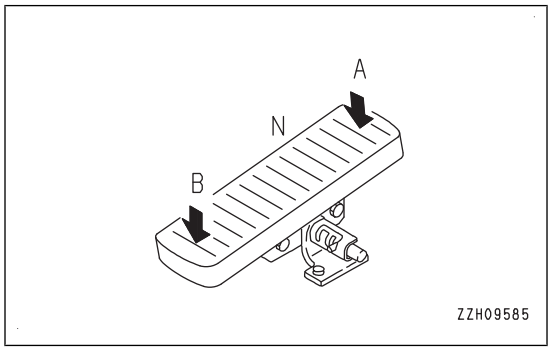
- Travel (Lo) operation: FORWARD (A) ←→ REVERSE (B)



- For the attachment operations (if equipped), change the working mode to the attachment mode.



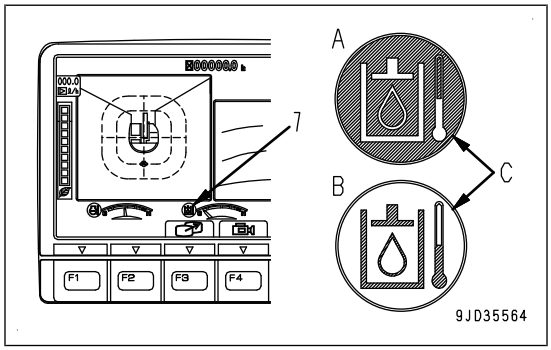
Attachment operation: One way (A) ←→ Other way (B)



15. Check that the hydraulic oil temperature caution lamp (7) displays the correct temperature.

    If the hydraulic oil temperature caution lamp does not display the correct temperature (it displays the low temperature), repeat the steps 6. to 7. until it displays the correct temperature.

    - Display (A) when temperature is correct: Caution lamp background (C) is blue.
    - Display (B) when temperature is low: Caution lamp background (C) is white.



If the hydraulic oil temperature caution lamp displays the correct temperature, the hydraulic component warm-up operation is completed.

After checking that the hydraulic oil temperature caution lamp displays the correct temperature, perform the operation after completion of the warm-up operation.

Air Conditioner Warm-up Operation

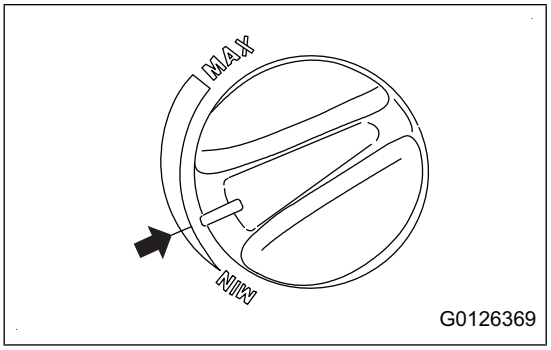
NOTICE

To prevent the failure of the air conditioner compressor, do the warm-up operation of the air conditioner one time a day when you use the air conditioner for the first time. If you turn on the air conditioner while the engine runs at high speed, the excessive load is applied to the air conditioner compressor, and it can cause the seizure in the air conditioner compressor.

When you operate the machine while the auto switch or the air conditioner switch is turned on, use the air conditioner in the conditions that follow for 3 minutes after the air conditioner is started.

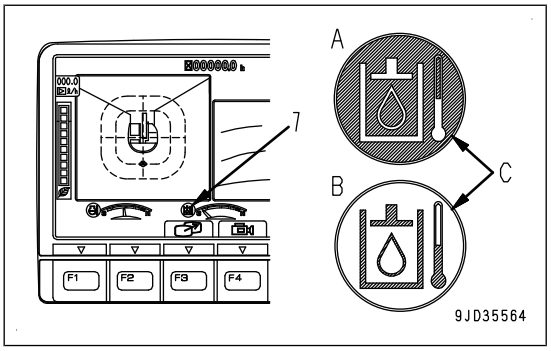
1. Set the fuel control dial as shown in the figure (at the 1/4 position between the low idle (MIN) and high idle (MAX) position).
2. Set the temperature to 18.0℃, set the air flow to the maximum, and continue for 3 minutes.

   The air conditioner compressor starts up securely, and the warm-up operation of the air conditioner is done.



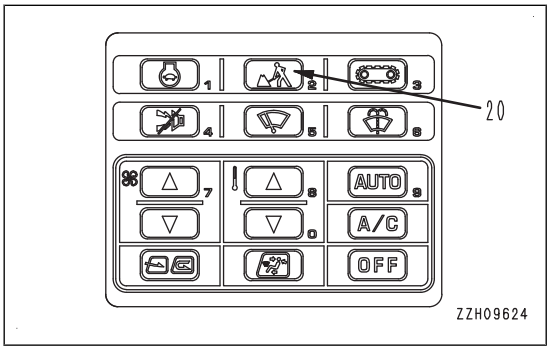
How to Operate Machine After Warm-up Operation is Ended

1. Check that hydraulic oil temperature caution lamp (7) displays proper temperature.
   - Display (A) when temperature is proper: Caution lamp background (C) is blue.
   - Display (B) when temperature is low: Caution lamp background (C) is white.



2. Press working mode selector switch (20) of the machine monitor to select the working mode to be used.

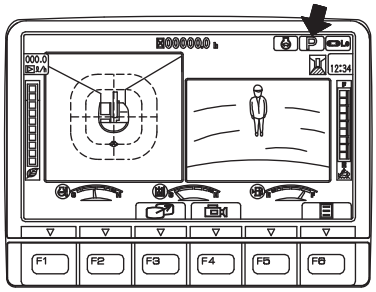
   For change of the working mode, see “Working Mode Selector Switch”.



Working Mode Display

P mode

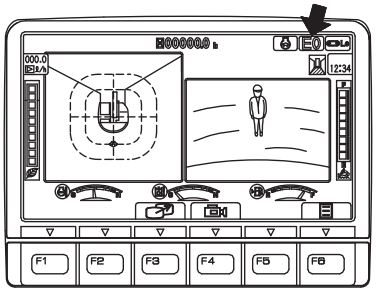
For heavy-duty operations



9JD25556

E mode

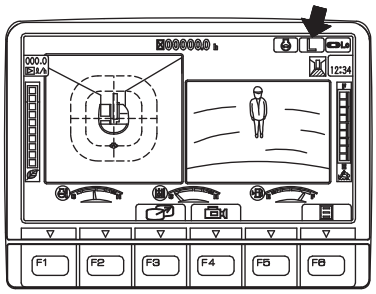
For fuel economy conscious operations



9JD25738

L mode

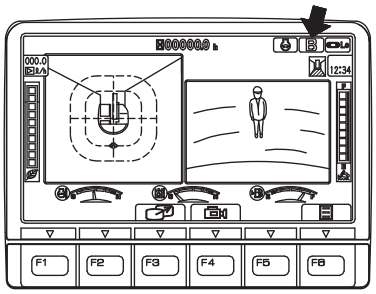
For operations requiring fine control



9JD25739

B mode

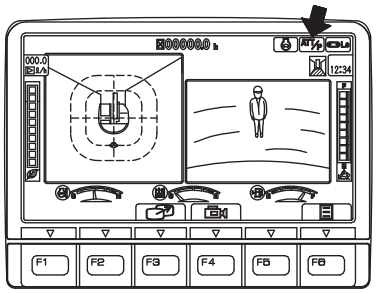
For breaker operations



9JD25740

ATT/P mode

For operations of 2-way attachments like crusher

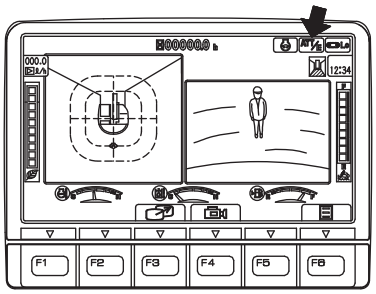


9JD25741

ATT/E mode

For operations of 2-way attachments like crusher

(fuel economy conscious operations)



9JD25742

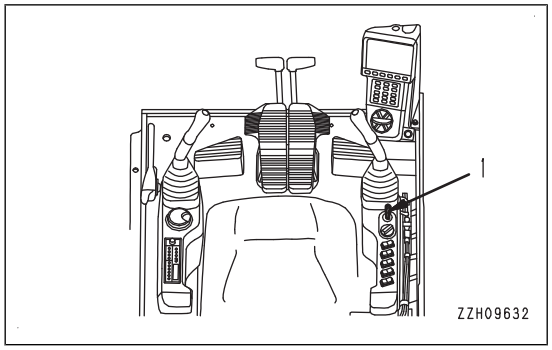
How to Stop Engine

⚠ WARNING

Keep away from the exhaust pipe immediately after stopping the engine.

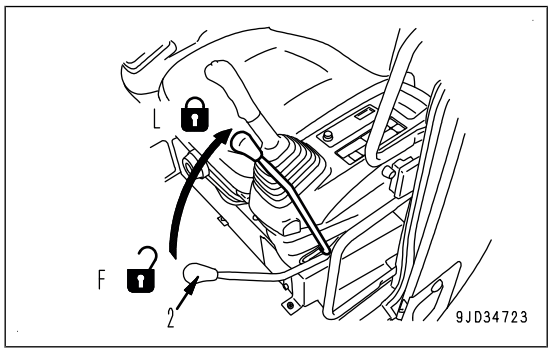
NOTICE

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, and run the engine at low idle for approximately 5 minutes. Then stop the engine.

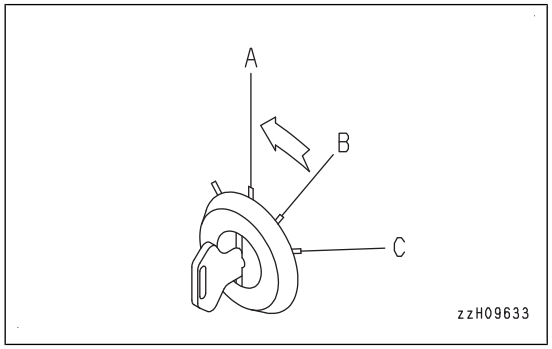


Stop the engine according to the following procedure.

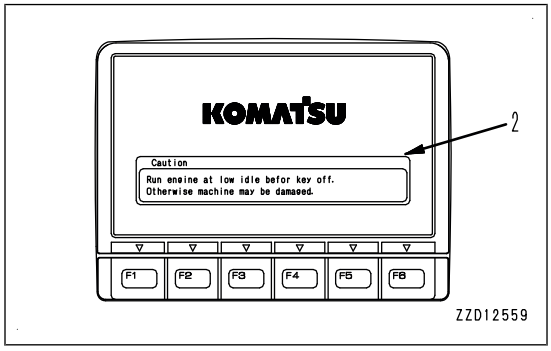
1. Operate the operating portion (2) of the lock lever to set it securely to LOCK position (L).
2. Run the engine at low idle for approximately 5 minutes to cool down gradually.



3. Turn the starting switch to OFF position (A), and stop the engine.



4. Remove the key from starting switch (1).



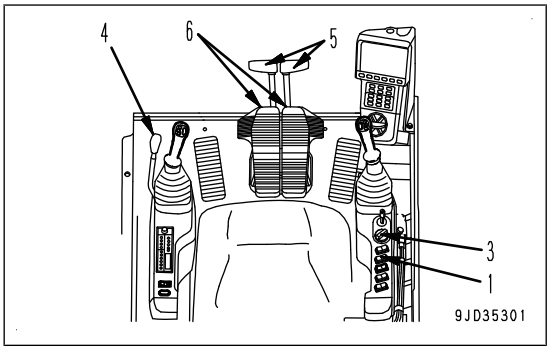
REMARK

- 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 purpose, the devices keep operating up to 7 minutes after the key in the starting switch is turned to OFF position, and this does not indicate abnormality.
  Do not turn OFF the battery isolator switch while the devices are operating to purge. After the purge is completed, the devices stop automatically.

How to Start Machine (Travel FORWARD and REVERSE) and Stop Machine

⚠ WARNING

- **Check the direction of the track frame before operating the travel lever and travel pedal.**
  If the track frame is facing the rear (if the sprocket is at the front), the machine moves in the opposite direction to the direction of the operation of the travel levers or travel pedals (front and rear travel are reversed, right and left steering are reversed).
- **Check that the area around the machine is safe, sound the horn before starting the machine.**
- **Prohibit anyone other than the operator from coming close to the machine during checks.**
- **Clear any obstacles from the travel path.**
- **There is a blind spot at the rear of the machine, so be particularly careful when traveling in reverse.**
- **Operate the levers carefully. The engine speed may suddenly increase during the autodeceleration.**
- **When traveling, check that the travel alarm sounds normally.**

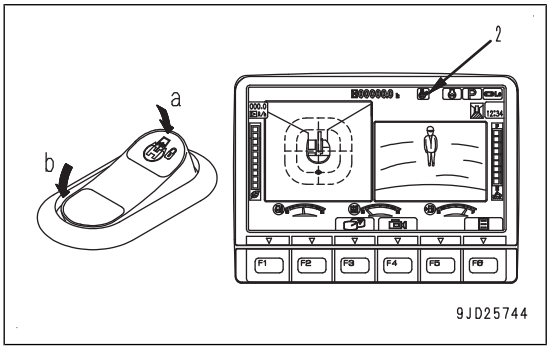


Screen on the machine monitor is automatically switched to the bird's eye view display of KomVision when traveling.

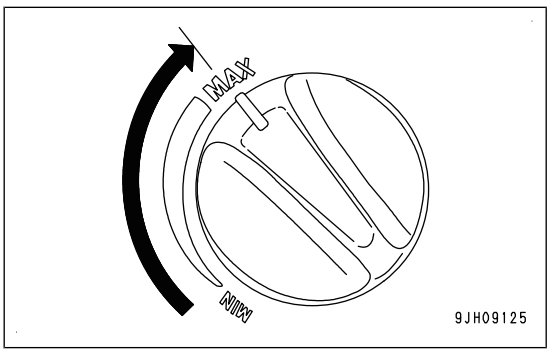
Prepare to Move Machine

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.

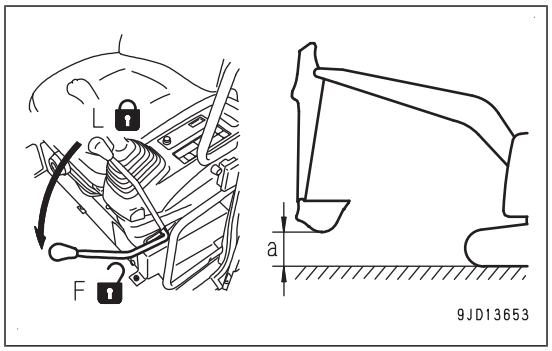


How to Travel FORWARD

1. Be sure to operate the lock lever (4) by the red portion on the top, then set it to FREE position (F).
2. Set the work equipment in the travel posture and raise it to height (a).

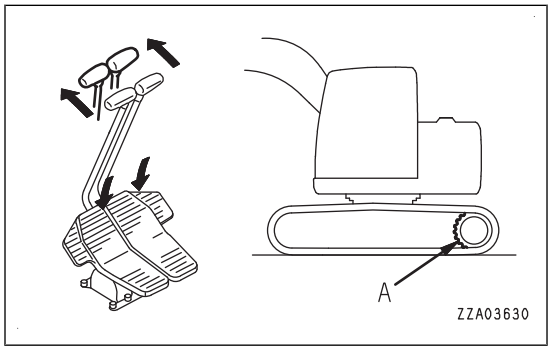
   (a): 40 to 50 cm {15.7 to 19.7 in}

   If the work equipment blocks the view and it is difficult to travel safely, raise the work equipment further.



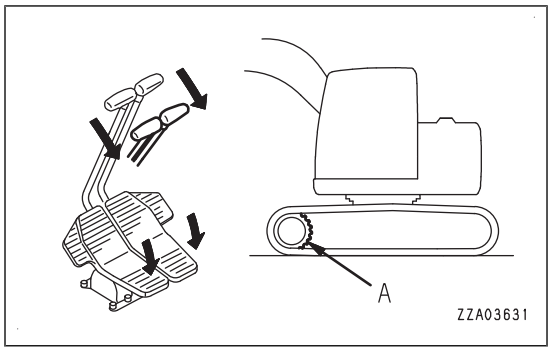
3. Operate the R.H. and L.H. travel levers (5) or R.H. and L.H. travel pedals (6) as follows.
   - When the sprocket (A) is at the rear of the machine

     Start the machine either by pushing right and left travel levers (5) forward slowly or by depressing the front parts of right and left travel pedals (6) slowly.



   - When sprocket (A) is at the front of the machine

     Start the machine either by pulling right and left travel levers (5) backwards slowly or by depressing the rear parts of right and left travel pedals (6) slowly.



4. When traveling, check that the travel alarm sounds normally.

   If the travel alarm does not sound, ask your Komatsu distributor for repair.

   REMARK

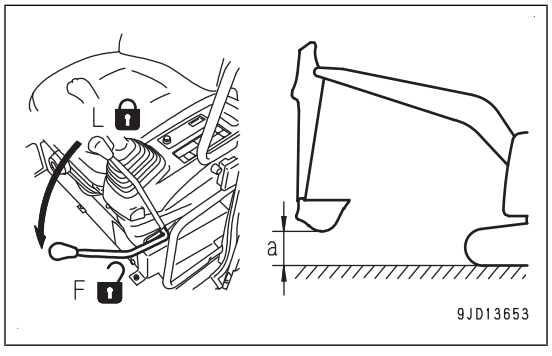
   In low temperatures, if the machine travel speed is not normal, thoroughly perform the warm-up operation. In addition, if the undercarriage is packed with mud and the machine travel speed is not normal, remove the soil and mud from the undercarriage.

How to Travel REVERSE

1. Be sure to operate the lock lever (4) by the red portion on the top, then set it to FREE position (F).
2. Set the work equipment in the travel posture and raise it to height (a).

   (a): 40 to 50 cm {15.7 to 19.7 in}

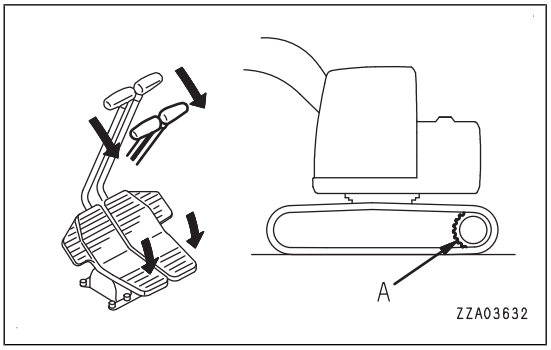
   If the work equipment blocks the view and it is difficult to travel safely, raise the work equipment further.



3. Operate the R.H. and L.H. travel levers (5) or R.H. and L.H. travel pedals (6) as follows.

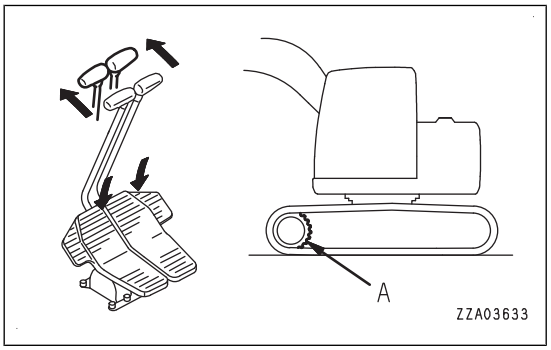
- When the sprocket (A) is at the rear of the machine

  Start the machine either by pulling levers (5) backwards slowly or by depressing the rear parts of pedals (6) slowly.



- When sprocket (A) is at the front of the machine

  Start the machine either by pushing levers (5) forward slowly or by depressing the front parts of pedals (6) slowly.



4. When traveling, check that the travel alarm sounds normally.

   If the travel alarm does not sound, ask your Komatsu distributor for repair.

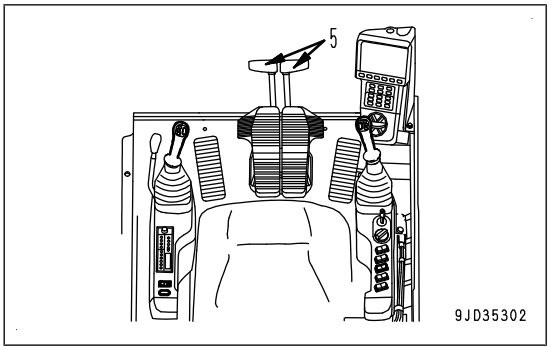
   REMARK

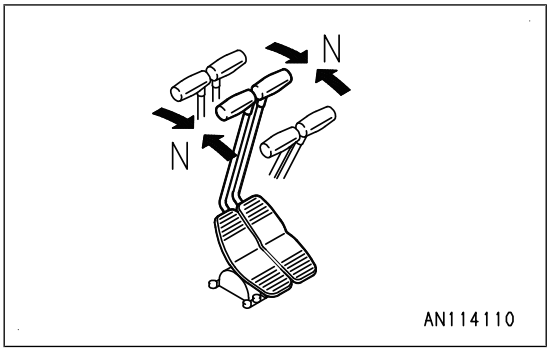
   In low temperatures, if the machine travel speed is not normal, thoroughly perform the warm-up operation. In addition, if the undercarriage is packed with mud and the machine travel speed is not normal, remove the soil and mud from the undercarriage.

How to Stop Machine

Avoid a sudden stop. Stop the machine gradually.

Set right and left travel levers (5) in NEUTRAL position (N).
The machine stops.





Steer Machine

How to Steer Machine (Change Direction)

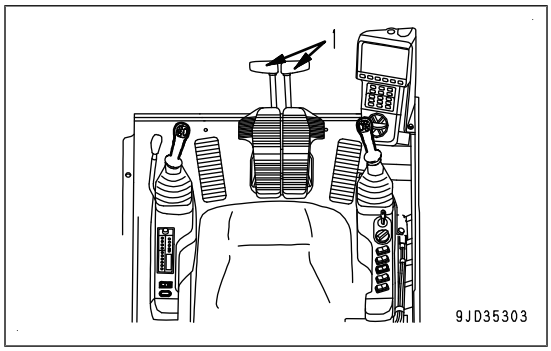
⚠ WARNING

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.



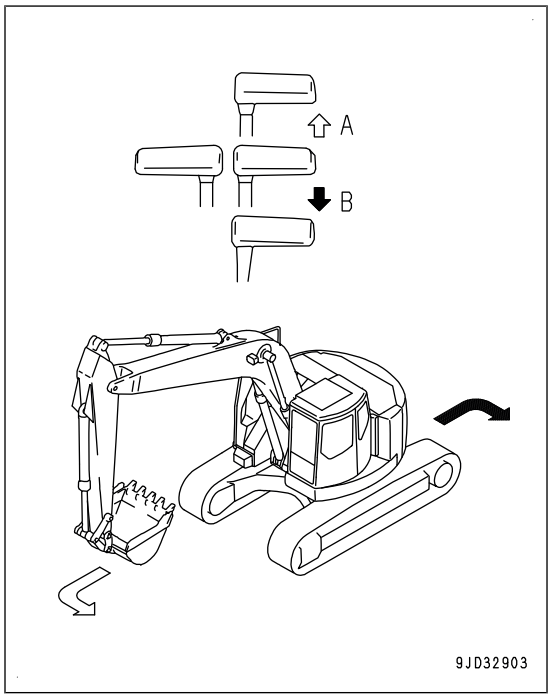
Operation to Change Direction of Stopped Machine

When turning left

- (A): Left turn in forward
  Push the right travel lever forward.
  The machine turns left in forward.
- (B): Left turn in reverse
  Pull the right travel lever backward.
  The machine turns left in reverse.

REMARK

When turning right, read the preceding procedure by replacing the word “left” with “right”, then operate the left travel lever.



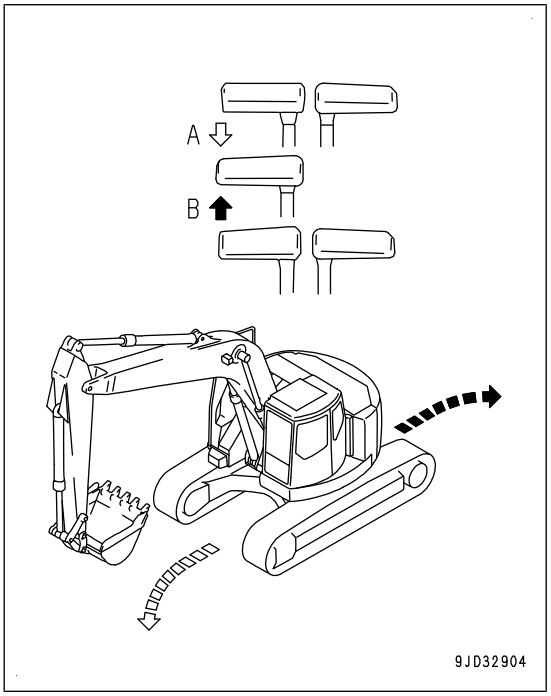
Change Direction of Machine

When turning left

- (A): Forward left turn
  Return the left travel lever from FORWARD to NEUTRAL position.
  The machine turns left in forward.
- (B): Reverse left turn
  Return the left travel lever from REVERSE to NEUTRAL position.
  The machine turns left in reverse.

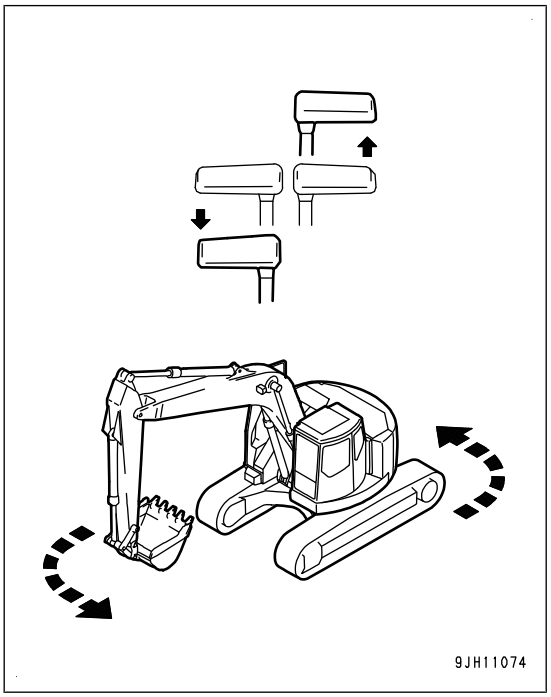
REMARK

When turning right, read the preceding procedure by replacing the word “left” with “right”, then operate the right travel lever.



Operate Counter-Rotation Turn

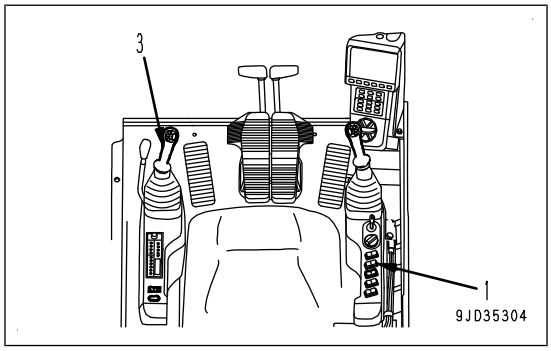
- Counter-rotation turn to left
  1. Pull the left travel lever toward you.
  2. Push the right travel lever forward.
     The machine make a counter-rotation turn to the left.
- Counter-rotation turn to right
  1. Pull the right travel lever toward you.
  2. Push the left travel lever forward.
     The machine make a counter-rotation turn to the right.



How to Swing Machine

⚠ WARNING

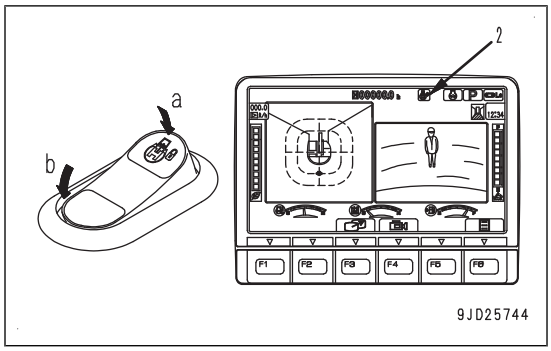
- **The tail of the machine goes over the track width. Check the safety around the machine before swinging the upper structure.**
- **If the travel levers are operated when the engine speed is decreased by the auto-deceleration function, the engine speed will suddenly increase. Operate the levers carefully.**



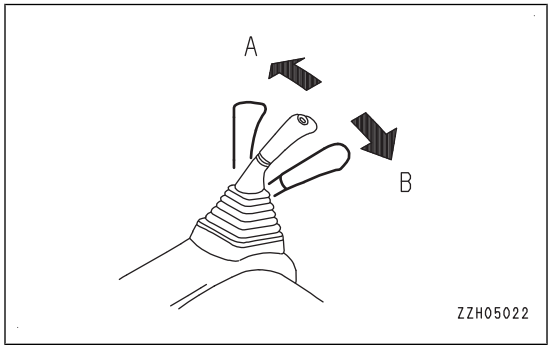
Screen on the machine monitor is automatically switched to the bird's eye view display of KomVision when swinging.

When swinging the upper structure, do as follows.

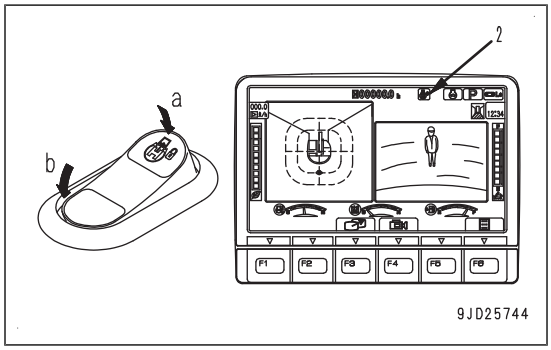
1. Before swinging, turn the swing lock switch (1) to OFF position (cancel).
   (a): ON position
   (b): OFF position
2. Check that the swing lock pilot lamp (2) is not lit.



3. Operate the 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 the swing lock switch (1) to ON position (actuate).
   (a): ON position
   (b): OFF position
5. Check that the swing lock pilot lamp (2) is lit.



How to Operate Work Equipment

⚠ WARNING

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.

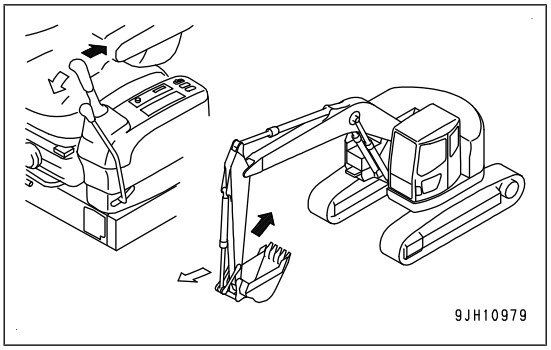
When the work equipment operation or swing operation is performed, the screen on the machine monitor is automatically switched to the bird's eye view display of KomVision.

Use the R.H. and L.H. work equipment control levers to operate the work equipment.

When the work equipment control levers are released, they return to NEUTRAL position and the work equipment is held in that position.

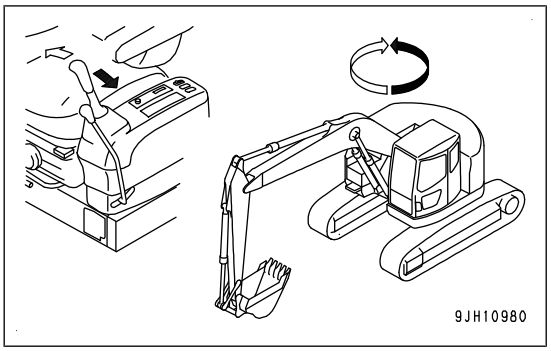
- Arm operation

  Move the L.H. work equipment control lever back and forth.
  You can operate the arm.



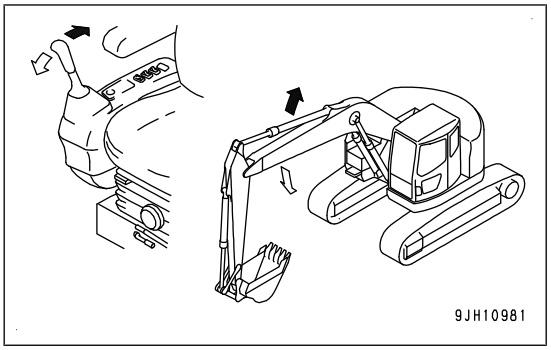
- Swing operation

  Move the L.H. work equipment control lever to the right and left.
  The upper structure swings.



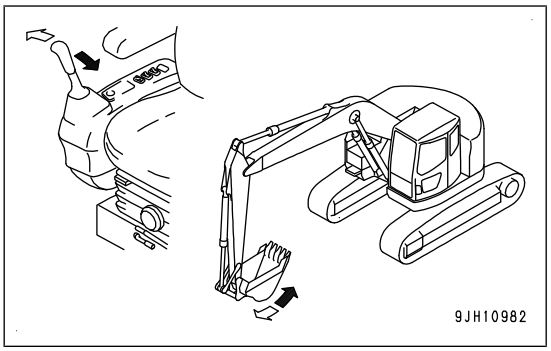
- Boom operation

  Move the R.H. work equipment control lever back and forth.
  You can operate the boom.



- Bucket operation

  Move the R.H. work equipment control lever to the right and left.



You can operate the bucket.

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

The control circuit on this machine is equipped with an accumulator. 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

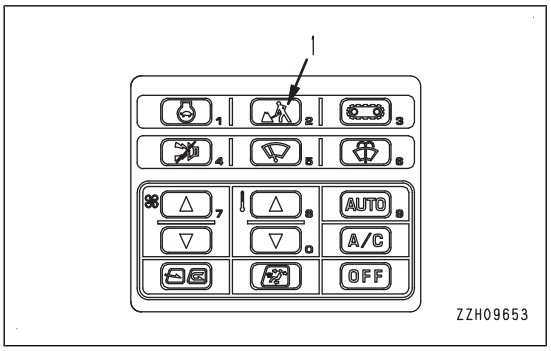
How to Select Working Mode

Use working mode selector switch (1) to select the working mode that matches the operating conditions or purpose. This will make it possible to perform operations efficiently.

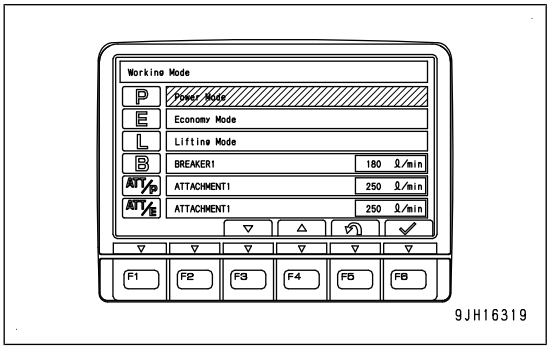
Use the following procedure to select the most efficient working mode.

When the starting switch is turned ON, the working mode is set to the mode that was in operation when the starting switch was last turned OFF.

Use the working mode selector switch to set the mode to the most efficient mode to match the type of work.



Working mode	Applicable operations
P mode	Normal digging or loading operations (production conscious operation)
E mode	Normal digging or loading operations (fuel consumption conscious operation)
L mode	Positioning operations (fine control operations)
B mode	Breaker 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)



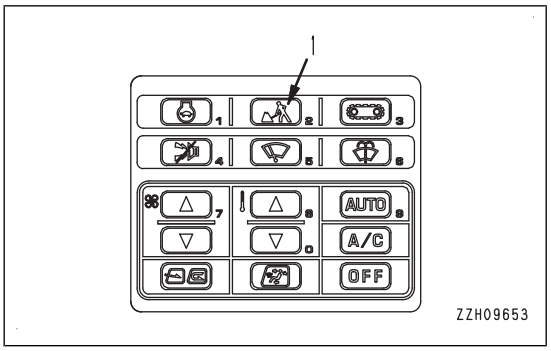
NOTICE

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.

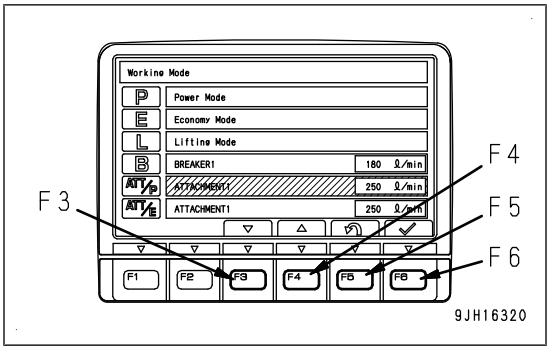
Set the working mode according to the following procedure.

1. Press working mode selector switch (1).

   The screen changes to the working mode selection screen.

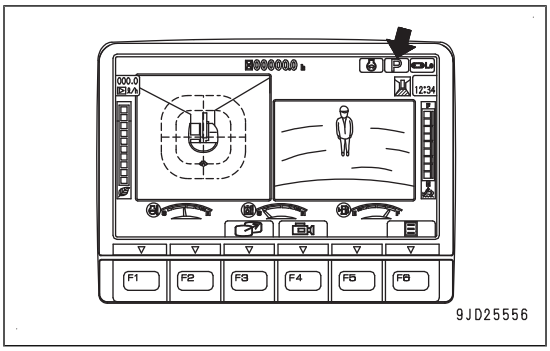


2. Press working mode selector switch (1) or switch F3 or F4 to select the appropriate mode.



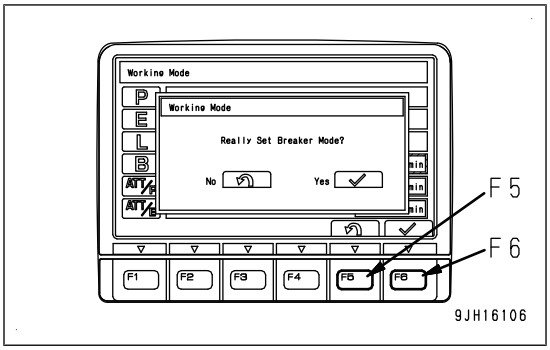
3. Select a desired working mode and press switch F6. The change is entered and the screen returns to the standard screen.

   If 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 switch F6.
  If switch F5 is pressed, the screen returns to the working mode selection screen.



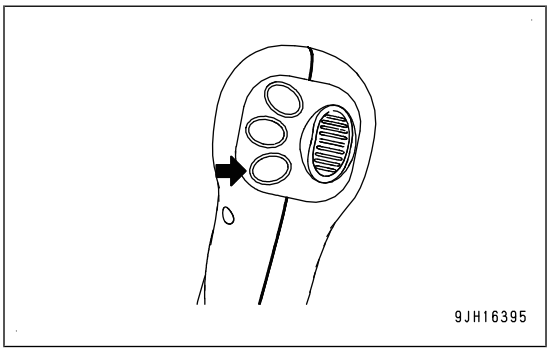
How to Use One-Touch Power Maximizing Function

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

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.



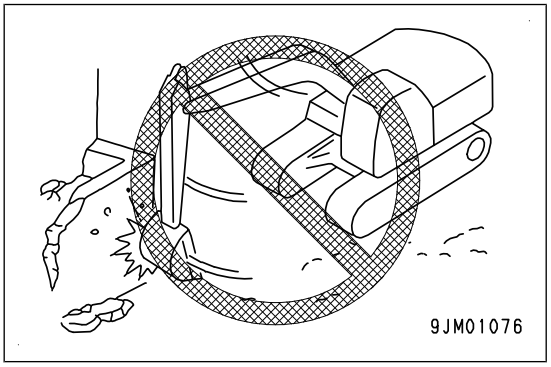
Prohibited Operations

⚠ WARNING

- **Do not operate the work equipment control lever when the machine is travelling.**
- **If any lever is operated when the auto-deceleration is being actuated, the engine speed will suddenly increase, so be careful when operating.**

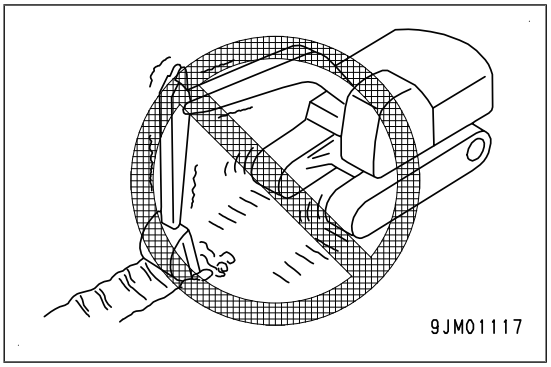
Do Not Use the Swing Force to Hit and Give Shocks to the Object

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.



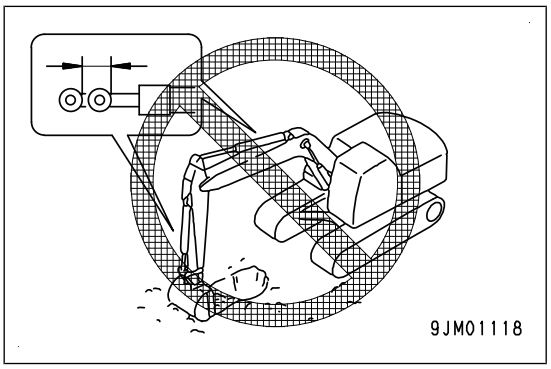
Prohibition of Operations by Travel Force

Do not use the travel force to perform excavation by digging the bucket into the ground. This damages the machine or work equipment.



Prohibition of Operations at Stroke End of Hydraulic Cylinder

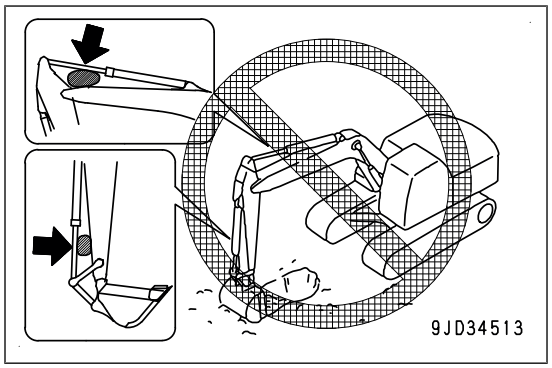
If the work equipment is used with the cylinder rod operated to its stroke end, and given impact by some external force, the hydraulic cylinders may be damaged, causing personal injury. Do not perform operations with the hydraulic cylinder fully retracted or fully extended.



Do Not Work If Foreign Material is Accumulated Around Hydraulic Cylinder

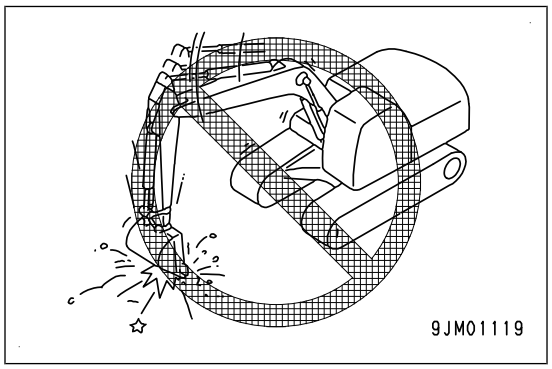
If operation is continued while something sticks between the hydraulic cylinder and work equipment, the cylinder rod may bend and break.

Do not perform the work while something sticks between the hydraulic cylinder and work equipment.



Prohibition of Operations with Bucket Dropping Force

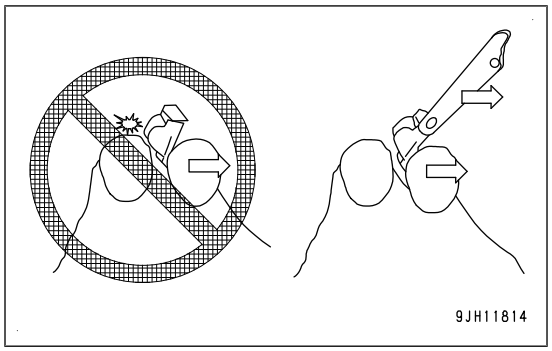
Do not use the dropping force of the machine for digging, nor use the dropping force of the bucket as a mattock, breaker, or pile driver. This will drastically reduce the life of the machine.



Prohibition of Operations Which You Use Bucket as Lever

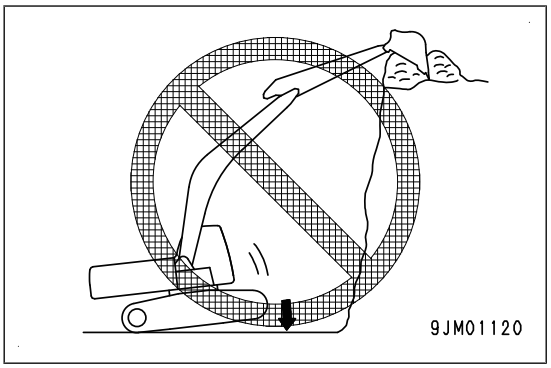
Do not put the bucket back to a rock and use it as a lever to dig. This can apply an excessive force to the chassis and bucket, and the machine may break.

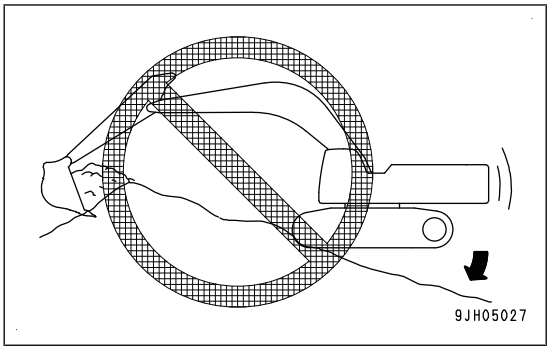
In this case, dig by using only the force of the arm or bucket. If an excessive force is applied, the safety valve of the hydraulic system controls it into a proper range to prevent breakage of the machine.



Prohibition of Operations to Use Machine Dropping Force

Do not use the dropping force of the machine for digging.

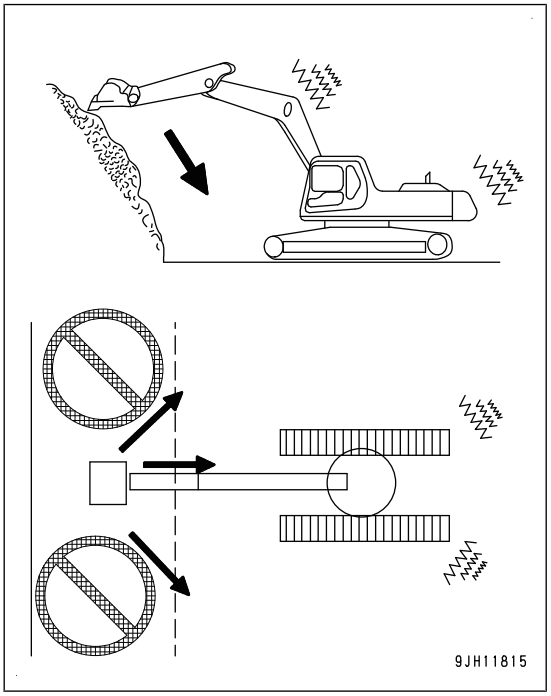




Prohibition of Digging Operation at an Angle When Teeth Do Not Engage

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.

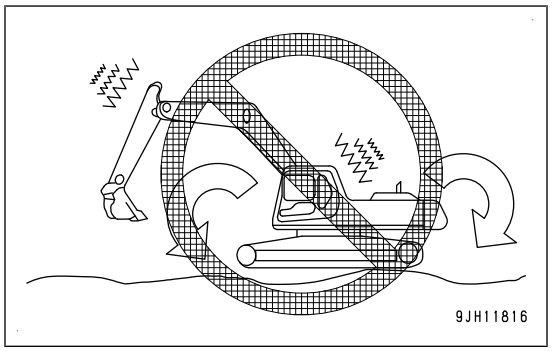


Prohibition of Dig Operation on Hard Rocky Ground

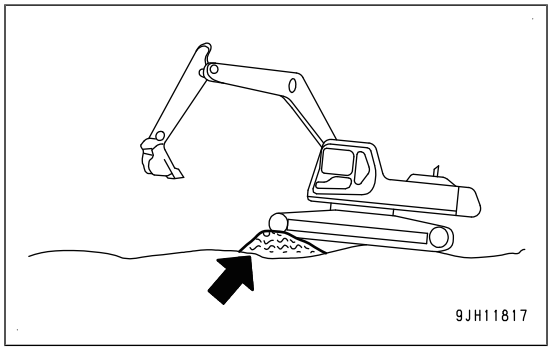
Do not attempt to directly excavate hard rocky ground with the work equipment. It is better to excavate it after breaking up by some other means. This will not only save the machine from damage but will make for better economy.

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.



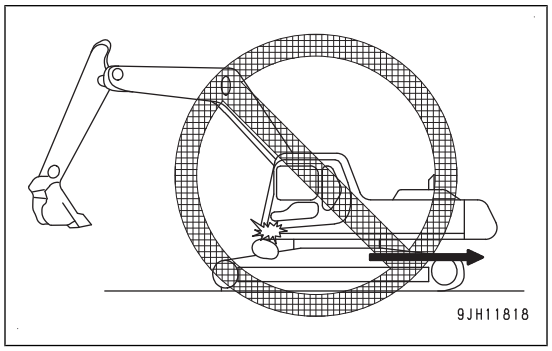
In this case, prepare an embankment, etc. in front of the track to stabilize the machine.



Prohibition to Swing or Move When Rock is on Top of Track Assembly

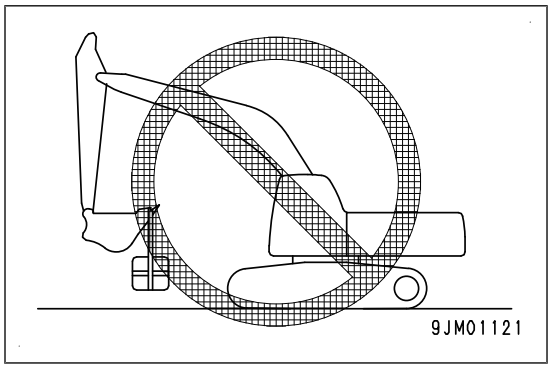
If the machine travels or swings with crushed stones, soil, or sand on the track, they hit and damage the undercover and frame. In the worst case, the hydraulic components are damaged and a serious accident can result.

During operation, keep checking the track top for crushed stones, soil, and sand.



Do Not Do Lifting Operations

Although lifting operation with this machine is prohibited, it is permitted only when the special lifting hook is installed.

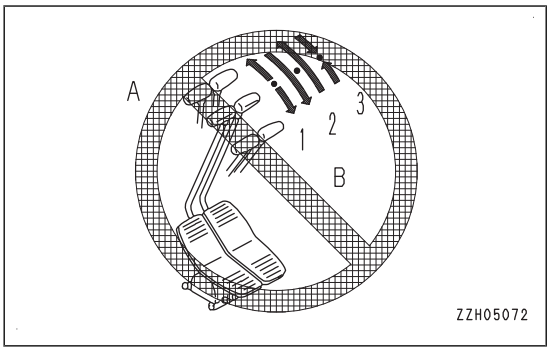


Prohibition of Sudden Lever or Pedal Shift During High Speed Travel

(1) Do not operate the levers and pedals suddenly nor take any other action to move the machine quickly.

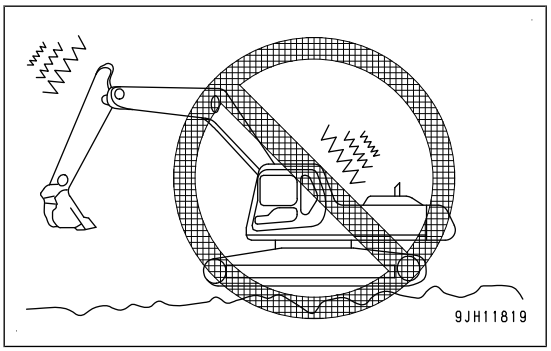
(2) Do not operate the levers or pedals suddenly from FORWARD (A) to REVERSE (B) (or from REVERSE (B) to FORWARD (A)).

(3) Do not operate the levers or pedals suddenly (do not release them suddenly) to stop the machine when driving it at high speed.

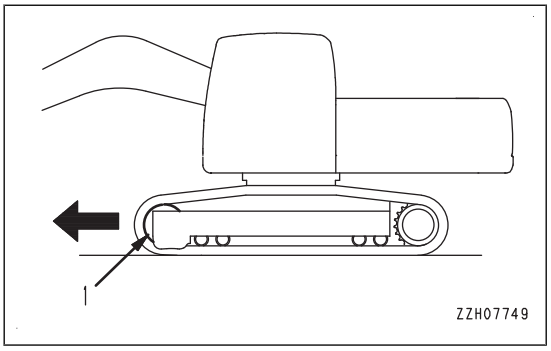


Prohibition of High-Speed Travel Operations on Rough Ground

If the machine travels on rough ground (rock-bed, etc.) at high speed, large push-up loads are applied to the chassis, thus the service life of the chassis is shortened.



When driving on rough ground (rock-bed, etc.), direct the idler (1) having the cushion mechanism in the travel direction and drive the machine at low speed.



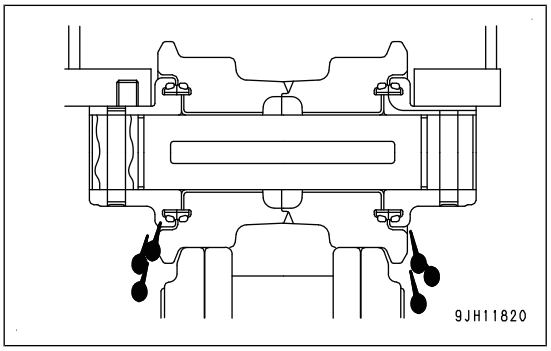
Prohibition of Long-Time Travel

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.



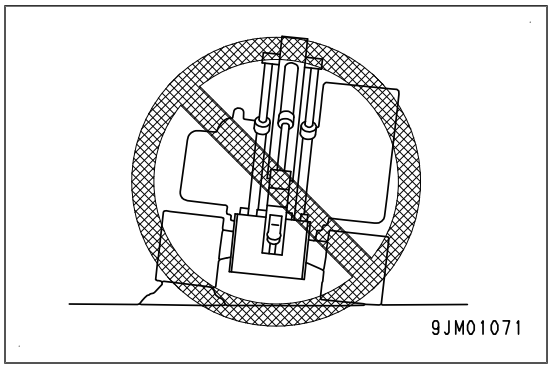
For the adjustment, see MAINTENANCE, “METHOD FOR CHECKING AND ADJUSTING TRACK TENSION”.

Precautions for Operation

Precautions When You Travel

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.

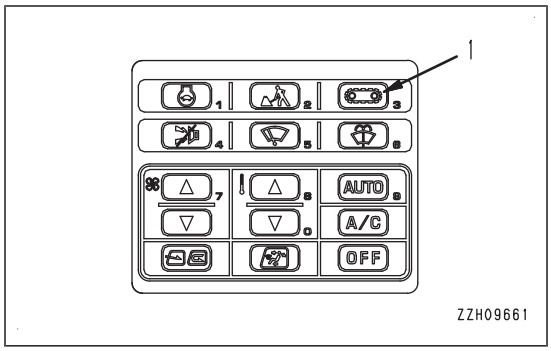
If there is no way to avoid travelling over an obstacle, reduce the travel speed, keep the work equipment close to the ground, and try to drive the machine so that the centre of the track passes over the obstacle.

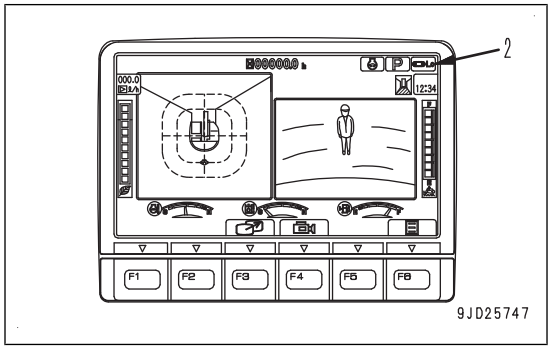


Precautions for High Speed Travel

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).

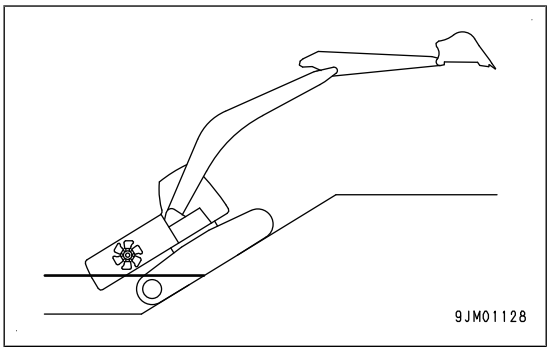




Allowable Depth of Water, Soil and Dirt

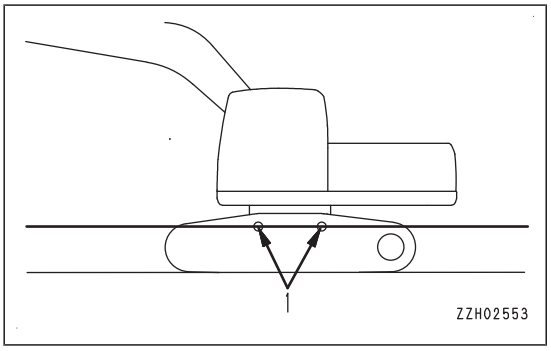
NOTICE

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.



Do not drive the machine in water or soil or sand deeper than the centre 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)

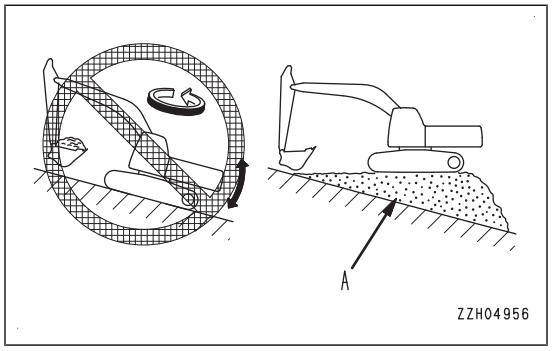


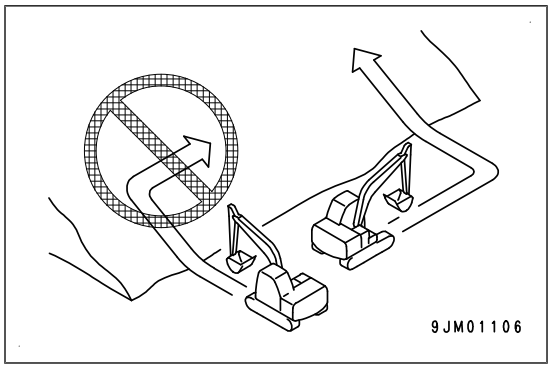
Precautions When You Operate Machine on Slopes

⚠ WARNING

- **When performing the swing operation or operating the work equipment on slopes, machine may lose its balance and tip over. Avoid such operations as much as possible.**
  It is particularly dangerous to swing downhill when the bucket is loaded.
  If it is unavoidable to perform such operations, prepare an embankment to make a platform (A) on the slope so that the machine is horizontal.
- **Do not operate or drive the machine on a slope covered with the steel plates. Even with slight slopes there is a hazard that the machine may slip.**
- **Do not drive the machine up or down on steep slopes. There is a danger that the machine may turn over.**
- **When traveling, raise the bucket approximately 20 to 30 cm {7.9 to 11.8 in} above the ground.**

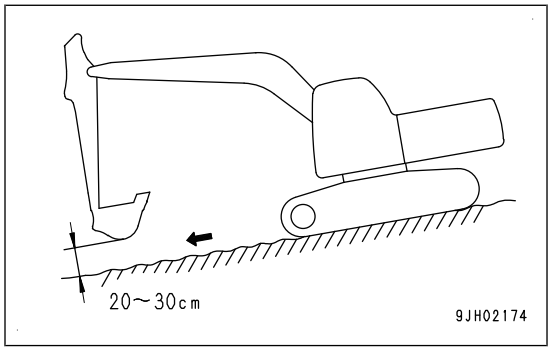
  Do not drive the machine downhill in reverse.
- **Never turn on slopes or drive across slopes.**
  Go down to a flat place once, and take a safer way such as a detour.
- **Stay alert while driving and operating the machine in order to stop it safely when the machine slips or becomes unstable.**
- **When the machine is traveling uphill, if the shoes slip or it is impossible to travel uphill with using only the force of the tracks, do not use the pulling force of the arm to help the machine travel uphill. There is a danger that the machine may tip over. Accordingly, don't drive the machine uphill with this method.**
- **Never perform the swing operation on a slope by using the left work equipment control lever even if the engine is stopped. Otherwise, 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.**



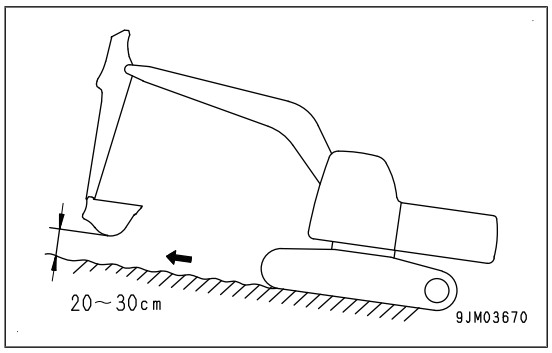


1. When traveling down steep hills, use the travel lever and fuel control dial to keep the travel speed low.

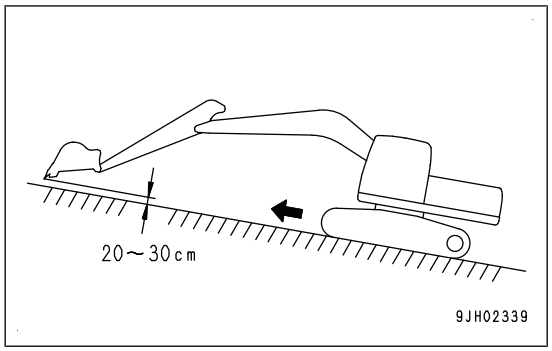
   When traveling down a steep hill of more than 15°, set the work equipment to the posture shown in the figure, and travel at low engine speed.



2. When traveling up a steep hill of more than 15°, set the work equipment to the posture shown in the figure.



When traveling up a steep slope, extend the work equipment to the front to improve the balance, keep the work equipment approximately 20 to 30 cm {7.9 to 11.8 in} above the ground, and travel at low speed.



Brake On Downhill Slope

Put the travel lever in NEUTRAL position. This will cause the brake to be automatically applied.

If Engine Stops

If the engine stops when traveling uphill, move the travel levers to NEUTRAL position, lower the bucket to the ground, stop the machine, then start the engine again.

Be Careful of DEF Level

Before working on a slope or traveling on a rough ground, check DEF tank and add sufficient amount of DEF as necessary. If the remaining DEF level becomes low, sudden drop of its level or abnormality in urea SCR system may be detected. If DEF level caution lamp or DEF system caution lamp lights up in red, move the machine to a level place immediately and add DEF.

How to Escape 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.

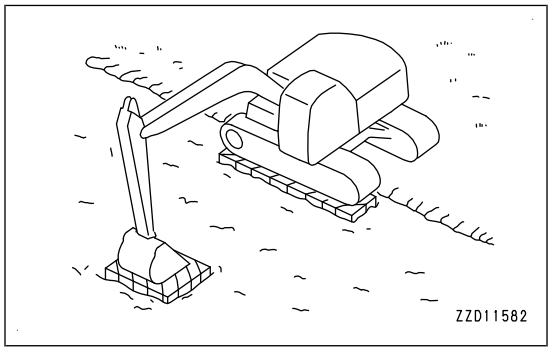
Track on One Side Stuck

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 °.

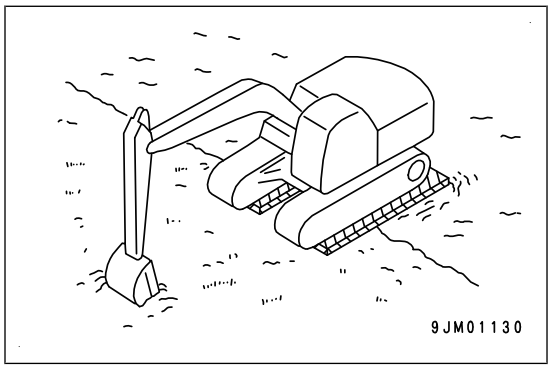
The same applies when using the bucket installed in the reverse direction.

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.



When Tracks on Both Sides Get 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.

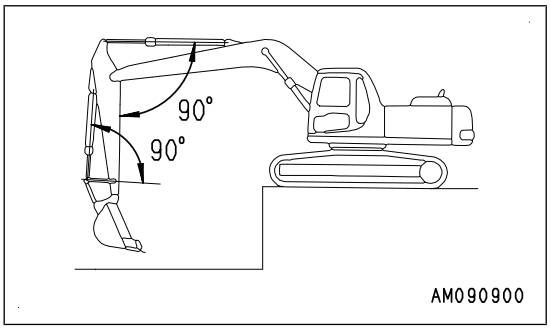
Digging Work

Backhoe Work

It is suitable for excavating areas that are lower than the machine.

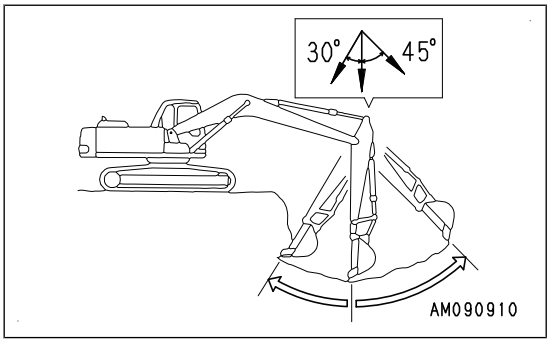
When the condition of the machine is as shown in the figure (angle between bucket cylinder and link, and between arm cylinder and arm is 90 °), the maximum excavation force is obtained from the pushing force of each cylinder.

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.

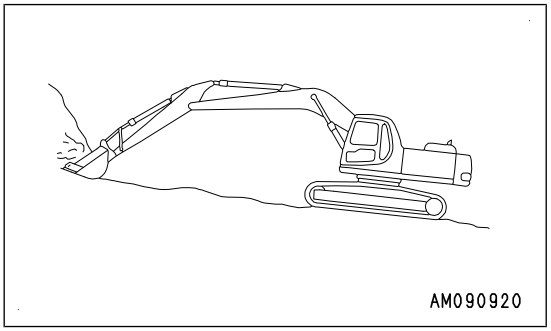
There may be some differences depending on the excavation depth, but try to stay within the above range rather than operating the cylinder to the end of its stroke.



Shovel Work

This is suitable for excavating at a position higher than the machine.

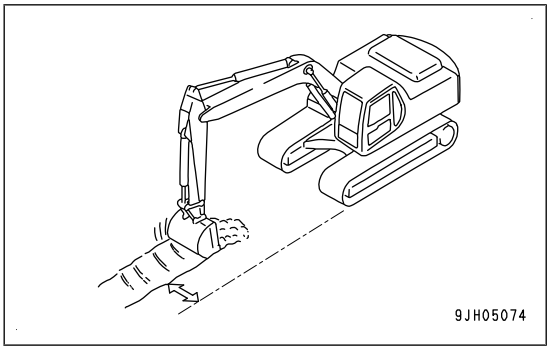
Shovel work is performed by attaching the bucket in the reverse direction.



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.

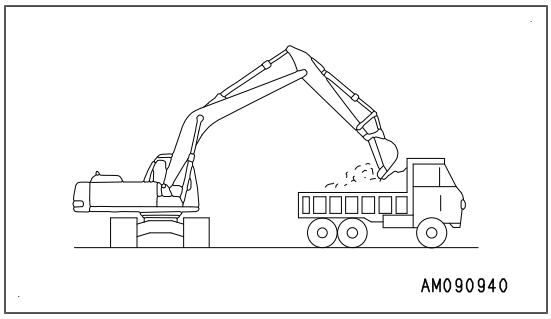
To excavate a wide ditch, first dig both sides and then finally remove the centre portion.



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 to Reduce 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
- Travelling 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.

Replace and Invert 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.

Replace Bucket

Replace the bucket according to the following procedure.

1. Lower the bucket to the flat surface of the ground.

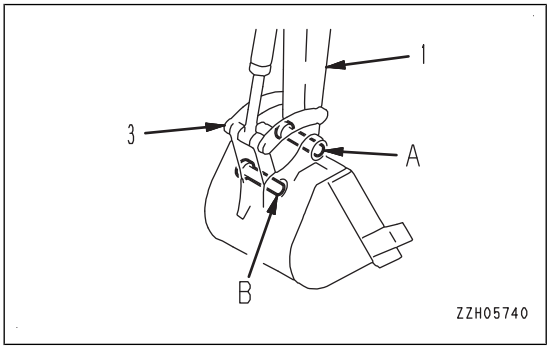
   NOTICE

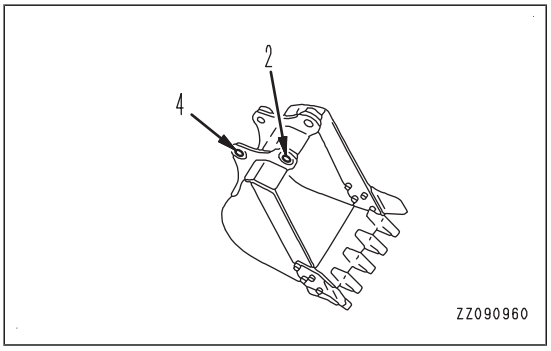
   After removing the pins, make sure that mud or sand does not get on them. Dust seals are fitted at both ends of the bushings, be careful not to damage them.

   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.

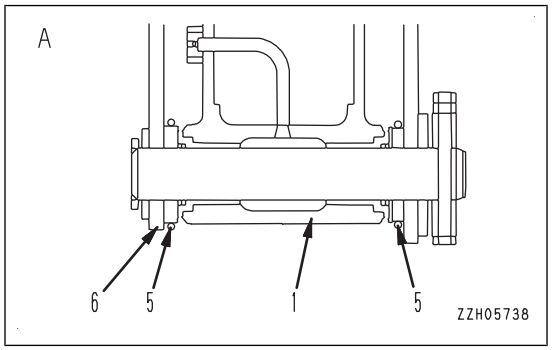




3. Align the pin hole of arm (1) with replacement bucket hole (2), then align the pin hole of link (3) with hole (4), and install pins (A) and (B) which are coated with grease.

REMARK

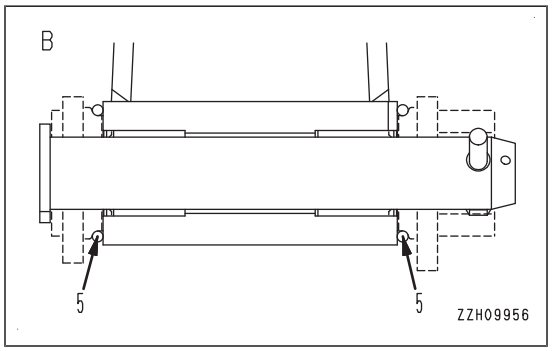
When installing the bucket, for arm pin part (A), fit O-ring (5) to bucket (6) in the position shown in the figure. After inserting the pin, fit it in the regular groove. For link pin part (B), install the bucket with O-ring (5) fitted in the regular groove.



4. Install the stopper bolts and nuts for each pin, then grease the pins.

REMARK

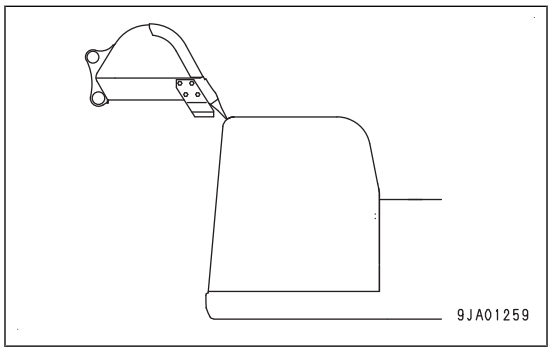
- Lubricate with grease thoroughly until the grease comes out from the end faces.
- When replacing the bucket, replace the dust seal with a new one if it is damaged. If a damaged one is used without being replaced, sand and dirt may enter the part of pin and cause abnormal wear of the pin.



How to Invert Bucket

⚠ WARNING

When reversing a bucket, there is the danger that the bucket tooth tip overruns the normal trajectory and interferes with the cab, thus causing a serious trouble.
Pay good attention to the work when reversing a bucket so that the bucket and the cab may not interfere with each other.



Invert the bucket according to the following procedure.

1. Lower the bucket to the flat surface of the ground.

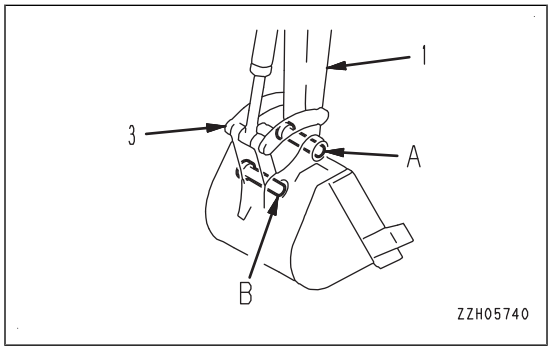
REMARK

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.

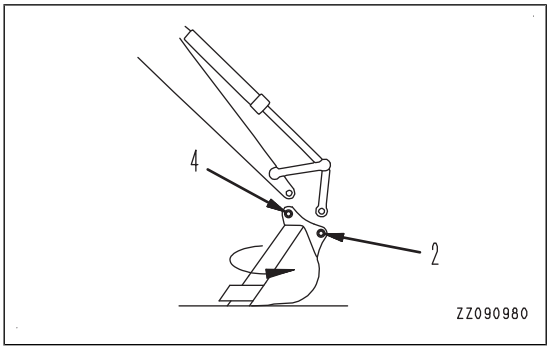
NOTICE

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.

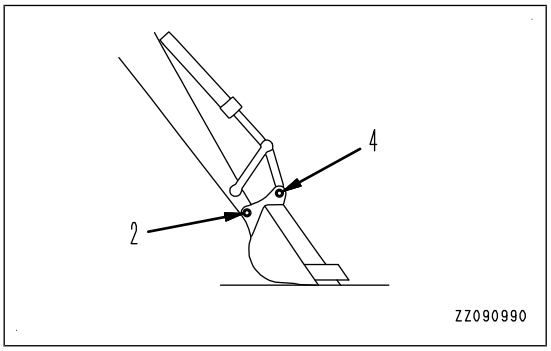
2. Remove the double nut of stopper bolt at arm pin (A) and link pin (B), then pull out the bolts.
3. Pull out arm pin (A) and link pin (B), then remove the bucket.

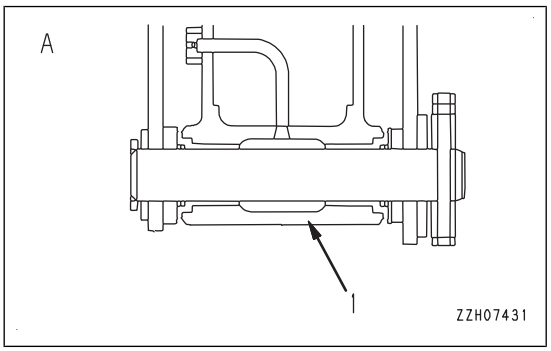


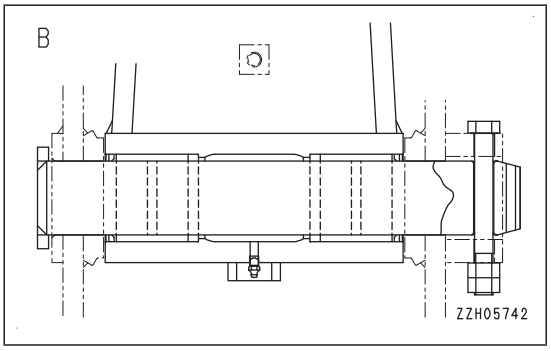
4. Invert the removed bucket.



5. Align the pin hole of arm (1) with hole (2) of the bucket to be replaced, then align the pin hole of link (3) with hole (4), and install the 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.

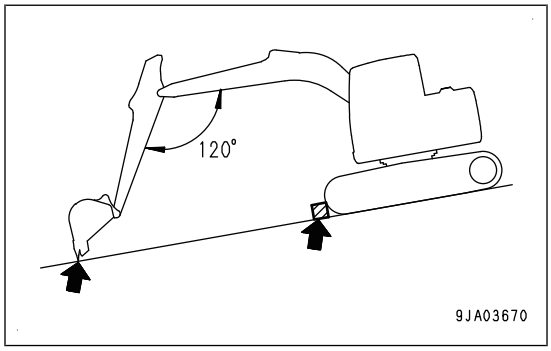
REMARK

- 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 seal is used without being replaced, sand and dirt may enter the pin portion and cause abnormal wear of the pin.

How to Park Machine

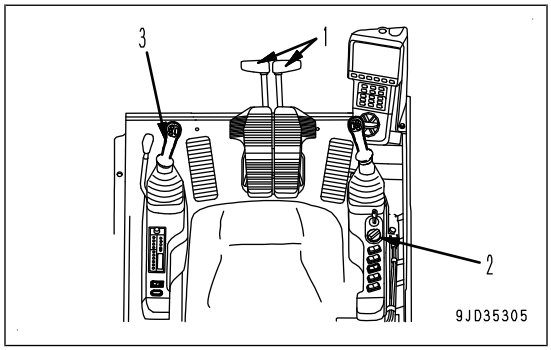
⚠ WARNING

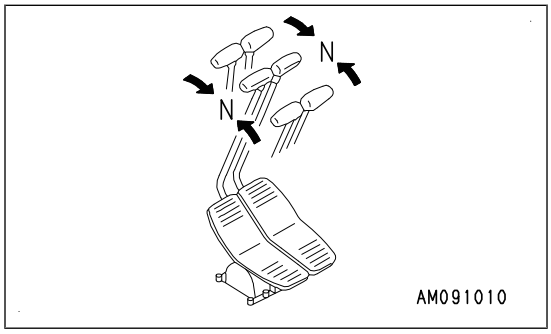
- **Avoid a sudden stop. Stop the machine gradually.**
- **Place the machine on a firm, level ground.**
  Do not park the machine on a slope.
  Block the tracks from movement if it is unavoidably necessary to park the machine on a slope. As an additional safety measure, thrust the work equipment into the ground.
- **The machine may move suddenly if the control lever is touched by accident. This may lead to a serious personal injury or death. Set the lock lever securely to LOCK position always before leaving the operator's seat.**



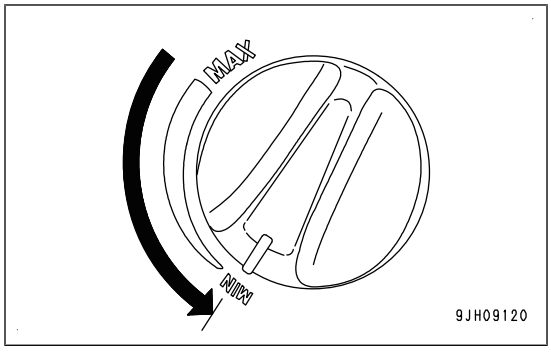
1. Set the right and left travel levers (1) in NEUTRAL position.

   The machine stops.

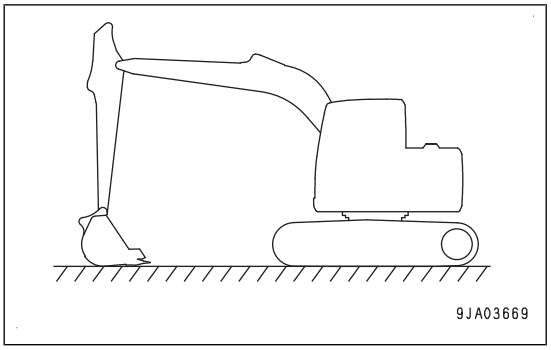




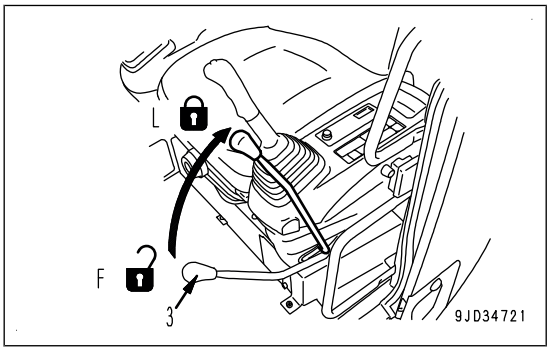
2. Turn the fuel control dial (2) to low idle (MIN) position in order to lower the engine speed.



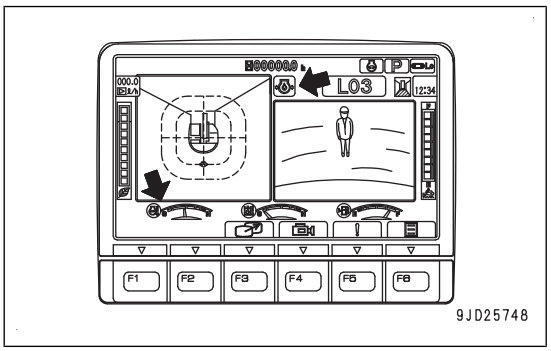
3. Make the undercarriage and upper structure point to the same direction, and lower the bucket to the ground with its bottom face horizontal.



4. Be sure to operate the lock lever (3) by the red portion on the top, then set it to LOCK position (L).



5. Check the engine coolant temperature and the 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”.
   - If the engine oil pressure caution lamp is lit, stop the engine immediately. Then, inspect and take necessary remedy according to “TROUBLES AND ACTIONS”.



6. Stop the engine.

To secure a sufficient space to get off the machine, move the operator's seat and console backward if they are positioned forward.

How to Examine After You Complete 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 positions.

(1) Operator's cab door

Always close the window.

(2) Air conditioner FRESH air filter intake port

(3) Engine hood

(4) Left side door of the machine

(5) Front door on the right side of the machine

(6) Rear door on the right side of the machine

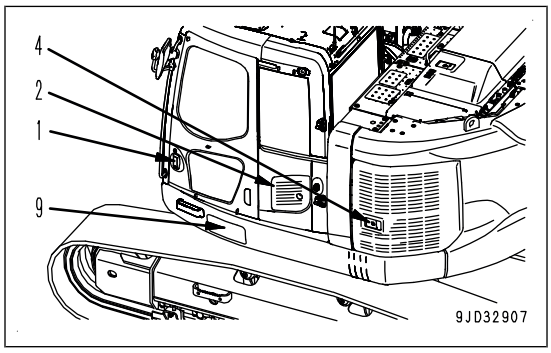
(7) Hydraulic tank oil filler cap

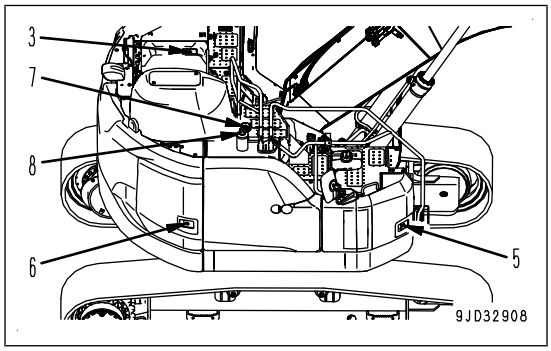
(8) Fuel tank filler port cap

(9) Maintenance door on the bottom of cab

REMARK

Use the starting switch key to lock and unlock all these places.





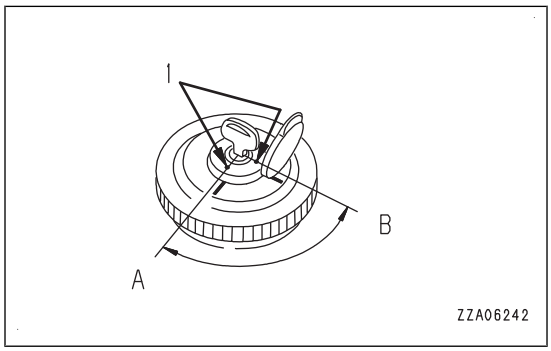
Open and Close Cap with Lock

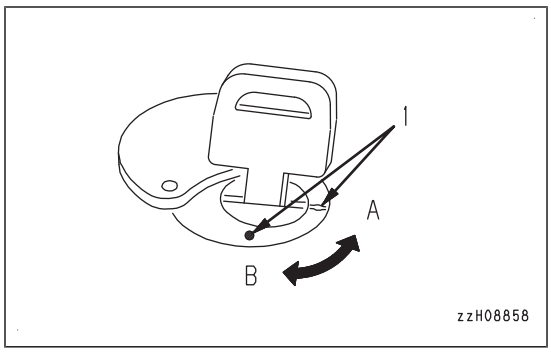
Procedure to Open Cap with Lock

1. Insert the key into the key slot.
2. Turn the key clockwise, align the matching marks (1) of the key groove and the cap, then open the cap.

   Position (A): OPEN

   Position (B): CLOSE (LOCK)





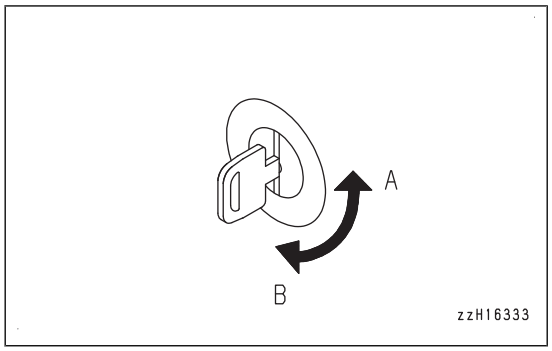
Procedure to Lock Cap with Lock

1. Screw in the cap until it becomes tight, then insert the key into the key slot.
2. Turn the starting switch key to CLOSE position (B), then remove the key.

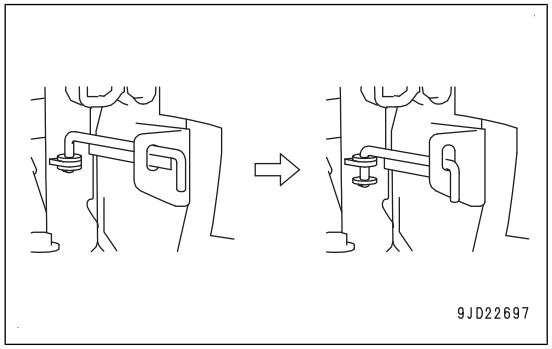
How to Open and Close Cover with Lock

Procedure to Open Cover with Lock

1. Insert the key into the key slot.
2. Turn the key counterclockwise, and pull the cover handle.
   Position (A): OPEN
   Position (B): CLOSE (LOCK)

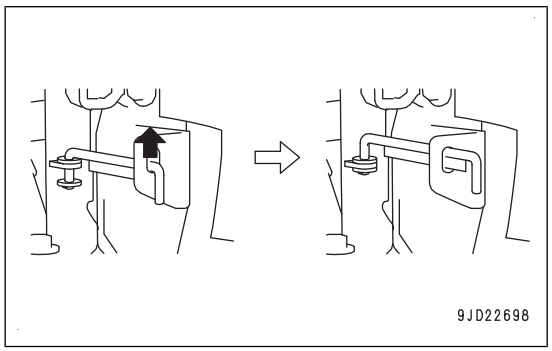


3. If it is equipped with stay for supporting the cover, open the cover wide until the stay is set in LOCK position.



Procedure to Lock Cover with Lock

1. If it is equipped with a stay for supporting the cover, hold up the stay from the LOCK position.
2. Close the cover and insert the key into the key slot.
3. Turn the key clockwise and remove it.



How to Open and Close Engine Hood

⚠ CAUTION

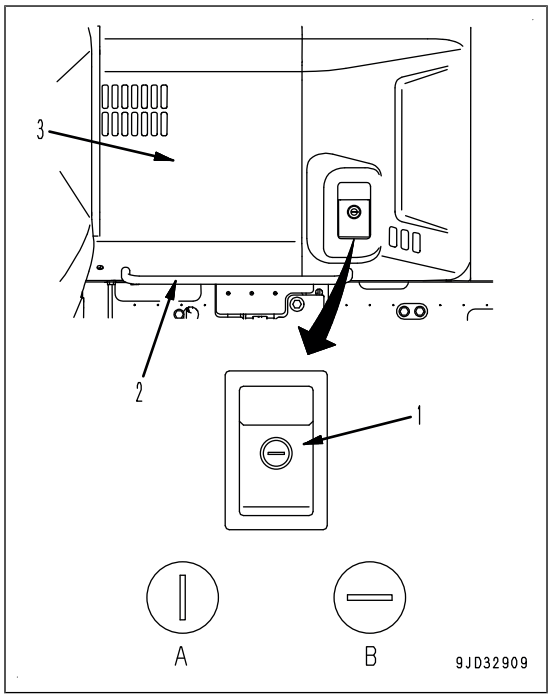
- **When opening or closing the engine hood, place the machine on a level ground, lower the work equipment to the ground, stop the engine, then perform the operation.**
- **When opening the engine hood, do not release the handle until the stay is set in the lock position securely.**
- **When closing the engine hood, hold the handle securely since the engine hood may moves down because of its own weight.**
  If the engine hood is not locked, it may close suddenly because of wind, etc.
- **Immediately after the engine is stopped, the engine hood and aftertreatment devices are still hot. Accordingly wait until they have cooled down before opening or closing the engine hood.**

NOTICE

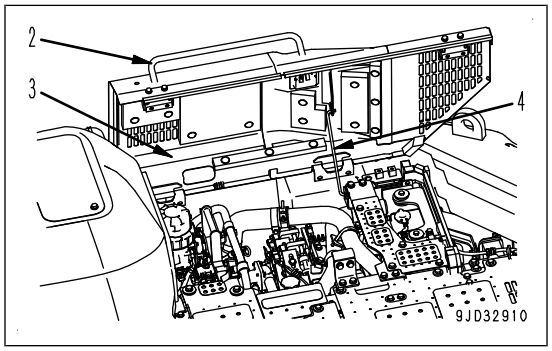
Always keep the engine hood locked unless you need to open it.

Procedure to Open Engine Hood

1. Lower the work equipment to the ground on a level place, then stop the engine.
2. Insert the key into the key slot.
3. Turn the key counterclockwise (A) and remove it.
   Position (A): OPEN (UNLOCK)
   Position (B): CLOSE (LOCK)
4. Unlock the lock by pulling the engine hood open lever (1) to your side.
5. Hold the engine hood open lever (1) and the engine hood grip (2), and open the engine hood (3).

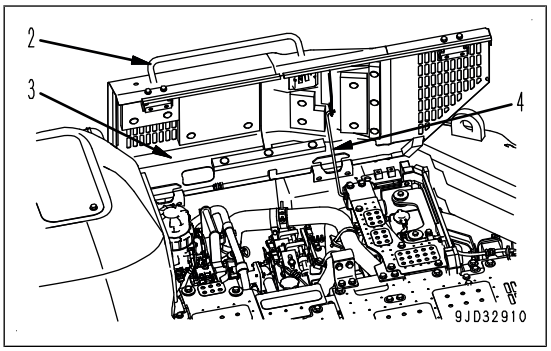


6. Pull up the engine hood (3) and fix the hood support stay (4) to the fixing position.



Procedure to Lock Engine Hood

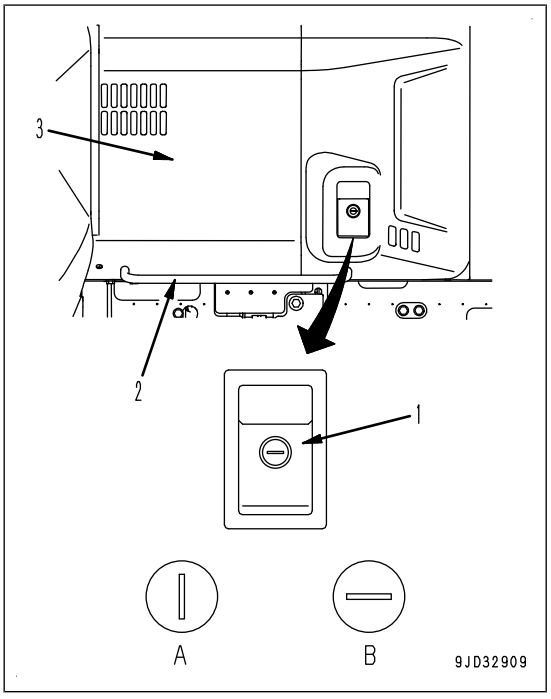
1. Hold the grip of engine hood (4), and remove the hood support stay (2) from the hood fixing position.
2. Check that stay (4) is set in sliding position, and then close the engine hood (3).
3. Close the engine hood (3) slowly and push it to lock it securely.



4. Insert the key into the key slot.
5. Turn the key clockwise (B) and remove it.

   (A): OPEN

   (B): CLOSE



How to Open and Close Pump Room Door

⚠ CAUTION

- **When inspecting or servicing the inside of the door, be sure to fix the door open by using the stopper.**
- **Before opening or closing the pump room door, place the machine on a level ground, lower the work equipment to the ground, stop the engine.**

NOTICE

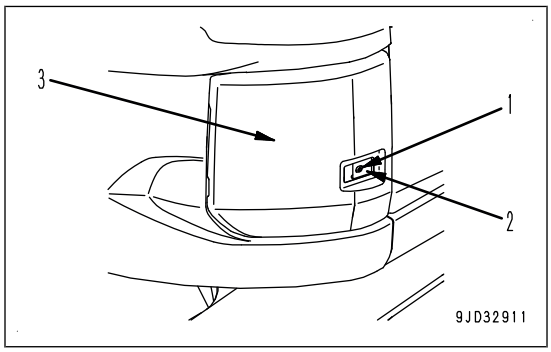
Always keep the door locked unless you need to open it.

REMARK

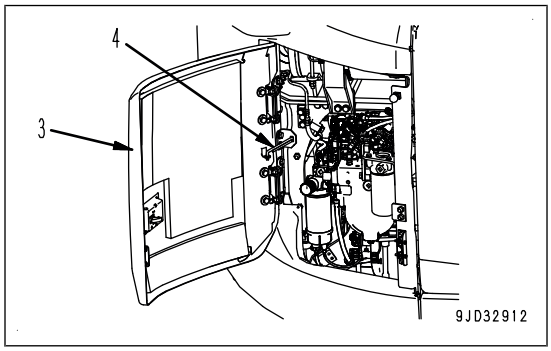
The pump room door is on the rear right of the machine.

Procedure to Open Pump Room Door

1. Insert the key into the key hole (1) of the door, and unlock the door.
2. Insert your fingers into lever (2) and open door (3).



3. Insert the rod (4) into the groove, and fix the door.



Procedure to Lock Pump Room Door

1. Pull up the rod (4), and remove it from the groove.
2. Close the door (3).
3. Insert the key into the key hole (1) of the door, and lock the door.

How to Open and Close Battery Room Door

⚠ CAUTION

- **When inspecting or servicing the inside of the door, be sure to fix the door open by using the stopper.**
- **Before opening or closing the battery room door, place the machine on a level ground, lower the work equipment to the ground, stop the engine.**

NOTICE

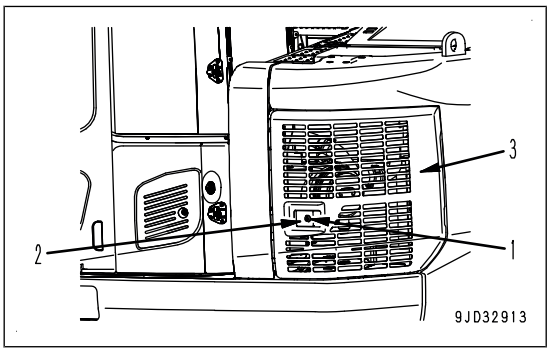
Always keep the door locked unless you need to open it.

REMARK

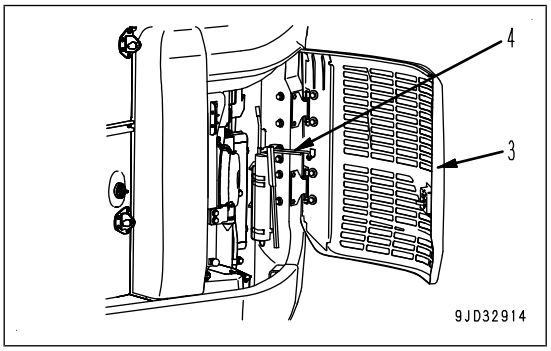
Battery room door is on the rear left of the machine.

Procedure to Open Battery Room Door

1. Insert the key into the key hole (1) of the door, and unlock the door.
2. Insert your fingers into lever (2) and open door (3).



3. Insert the rod (4) into the groove, and fix the door.



Procedure to Lock Battery Room Door

1. Pull up the rod (4), and remove it from the groove.
2. Close the door (3).
3. Insert the key into the key hole (1) of the door, and lock the door.

How to Open and Close Valve Room Door

⚠ CAUTION

- **When inspecting or servicing the inside of the door, be sure to fix the door open by using the stopper.**
- **Before opening or closing the valve room door, place the machine on a level ground, lower the work equipment to the ground, stop the engine.**

NOTICE

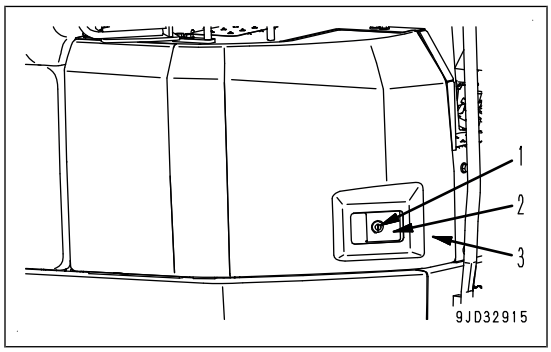
Always keep the door locked unless you need to open it.

REMARK

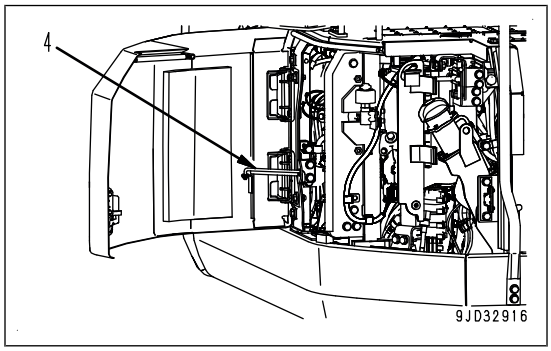
The valve room door is on the front right of the machine.

Procedure to Open Valve Room Door

1. Insert the key into the key hole (1) of the door, and unlock the door.
2. Insert your fingers into lever (2) and open door (3).



3. Pull up the rod (4), insert it into the groove, and fix the door.



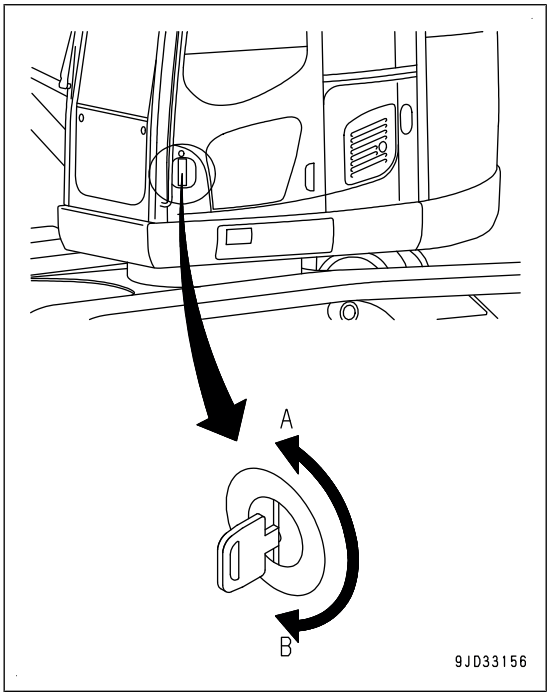
Procedure to Lock Valve Room Door

1. Pull up the rod (4), and remove it from the groove.
2. Close the door (3).
3. Insert the key into the key hole (1) of the door, and lock the door.

How to Open and Close Operator Cab Door Lock

When You Open 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 (UNLOCK)
   Position (B): CLOSE (LOCK)



Lock

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

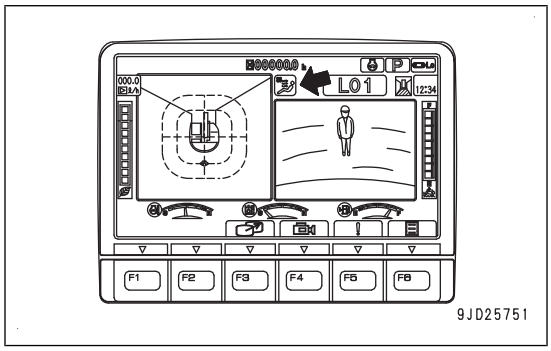
NOTICE

- **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 to the control panel, sunlight sensor, and filter, it can cause failure. Do not let water get on them. Also, do not let open flame be 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.



Refresh Air During Cooling

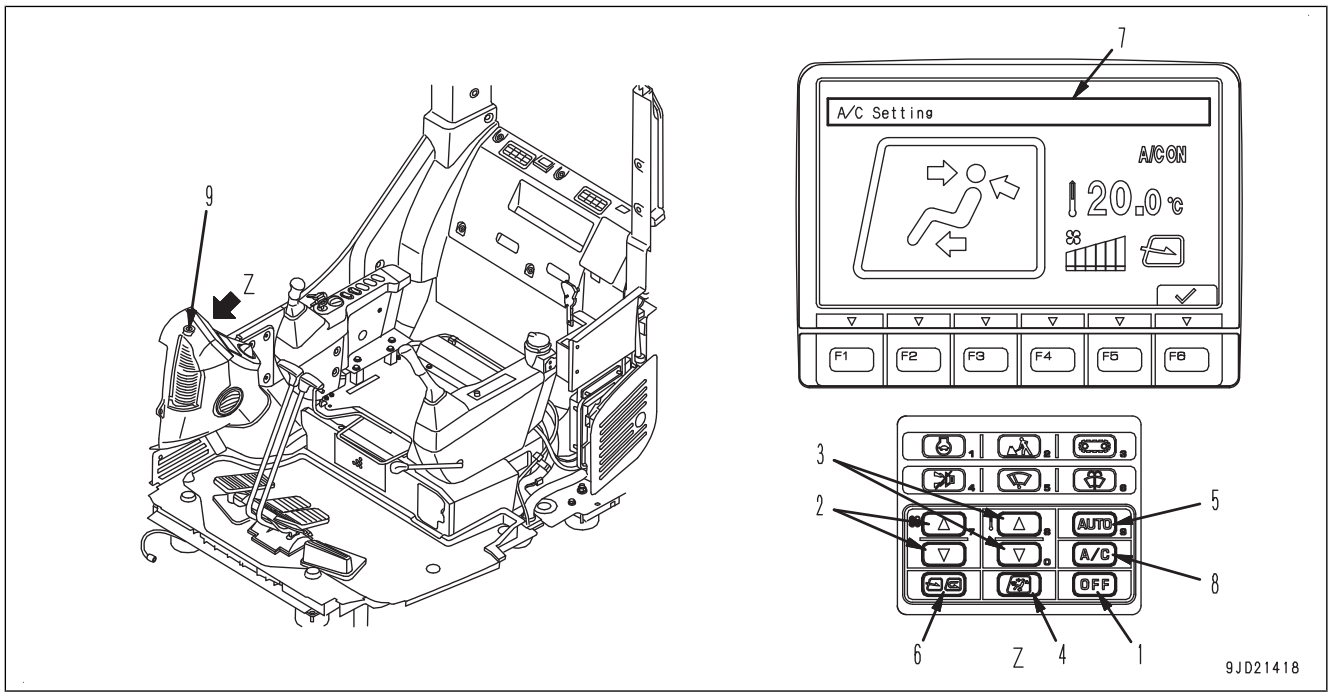
- When running the air conditioner for a long time, turn the lever to FRESH position once an hour to perform ventilation and cooling.
- If you smoke when the air conditioner is on, the smoke may hurt your eyes. In such case, open the window and turn the lever to FRESH for a while for ventilation and driving smoke out.

Be Careful Not to Cool Too Much

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 Components



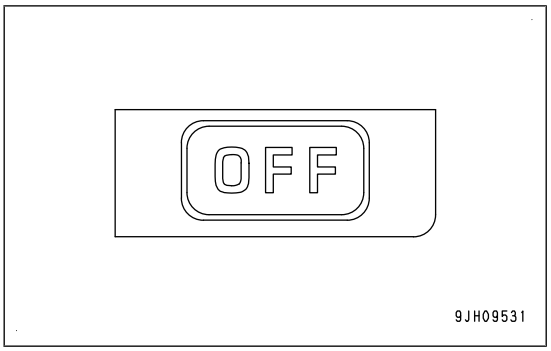
(1) OFF switch
(2) Fan switch
(3) Temperature control switch
(4) Vent selector switch
(5) Auto switch
(6) FRESH/RECIRC air selector switch
(7) Monitor
(8) Air conditioner switch
(9) Sunlight sensor

OFF Switch

This switch is used for stopping the fan and air conditioner.

REMARK

Even if this OFF switch is pressed, the monitor screen does not switch to the air conditioner adjustment screen.

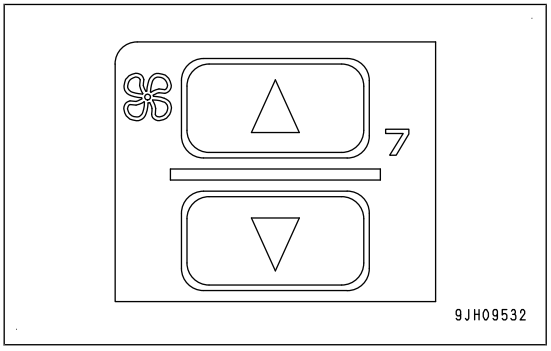


Fan Switch

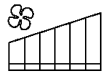
You can adjust the air flow by using the fan switch.

The air flow can be adjusted to 6 levels.

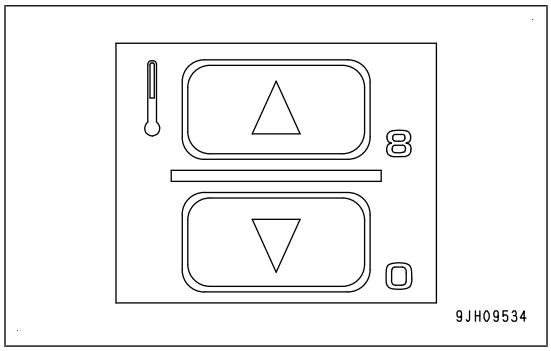
- Press the △ switch to increase the air flow; press the ▽ switch to decrease the air flow.
- During auto operation, the air flow is automatically adjusted.



Monitor Display and Air Flow Rate

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 Control Switch



Use the temperature control switch to adjust the temperature inside the cab. The temperature can be set in the range of 18 to 32℃.

- Push the △ switch to raise the set temperature, and push the ▽ switch to lower the set temperature.
  The set temperature is shown on the display monitor.
- The temperature is usually set at 25℃.
- The temperature can be set in the steps of 0.5℃.

Monitor display and function

When the temperature is set to the minimum (18.0℃), the air flow is fixed to the maximum cooling temperature.

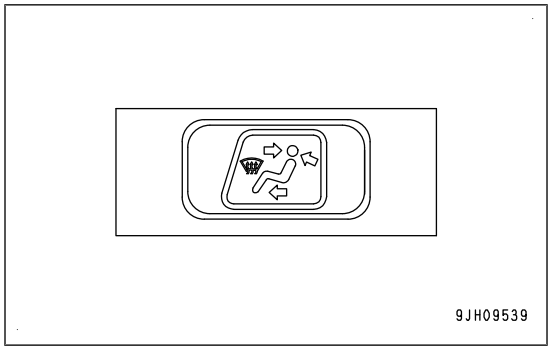
When the temperature is set to 18.5 to 31.5℃, the temperature in the cab is adjusted to the set temperature.

When the temperature is set to the maximum (32.0℃), the air flow is fixed to the maximum heating temperature.

REMARK

If the temperature is set to 18.0°C or 32.0°C during automatic operation, the air flow of the fan is set to “HIGH” all the time, and it does not change even when the temperature in the cab reaches the set value.

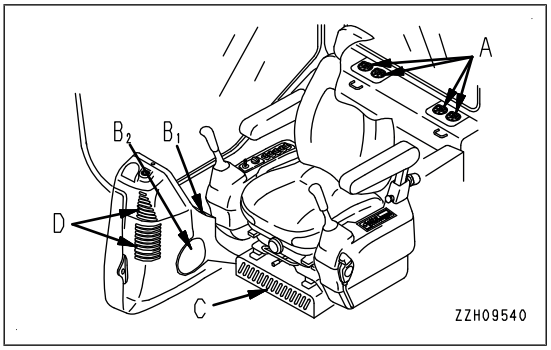
Vent Selector Switch



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 ○.

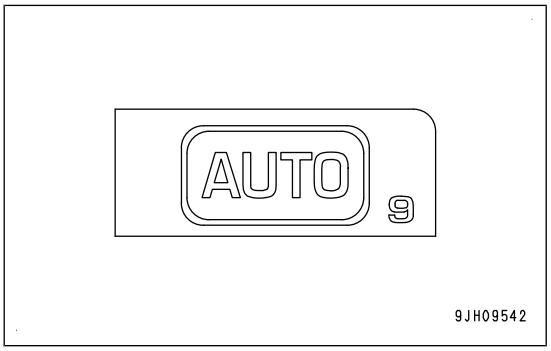


LCD display	Air vent mode	Vent				Remarks
		(A)	(B)	(C)	(D)	
	Front vent		○			Not selected in auto mode
	Front and rear vents	○	○			-
	Front, rear, and foot vents	○	○	○		-
	Foot vent			○		-
	Foot vent Defroster vent			○	○	Not selected in auto mode
	Defroster vent				○	Not selected in auto mode

Auto Switch

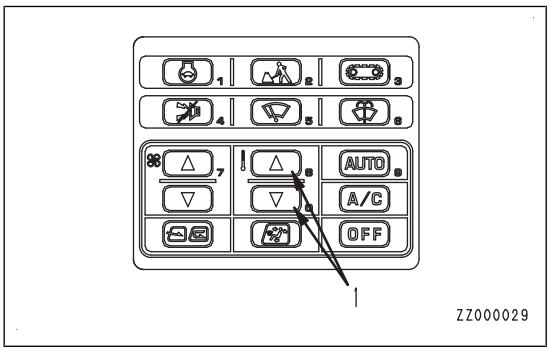
Use the auto switch for automatic selection of the air flow, vents, and air source (FRESH/RECIRC) according to the set temperature.

- 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).

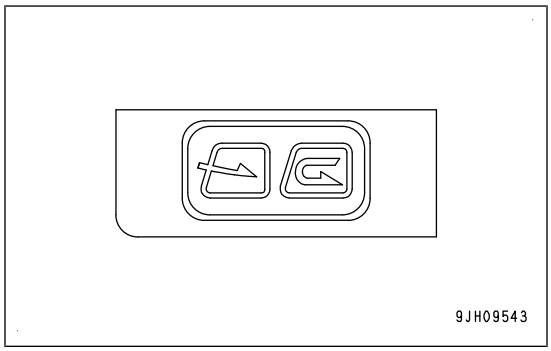


REMARK

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.

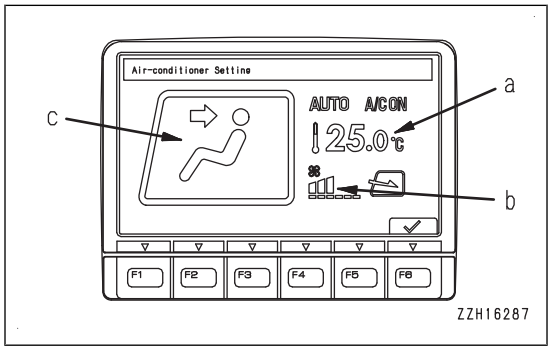
Use this setting to perform rapid cooling of the cab or when outside air is dirty.

FRESH

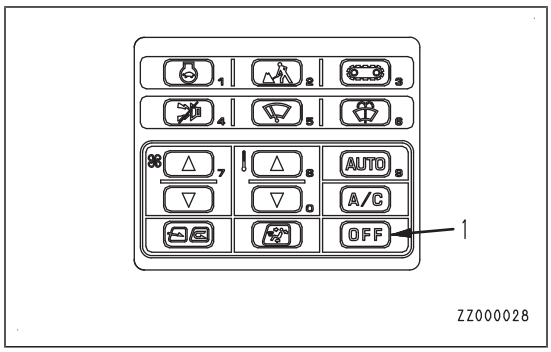
Outside air is taken into the cab.

Use this setting to take in fresh air or to demist the window glass.

Display Monitor

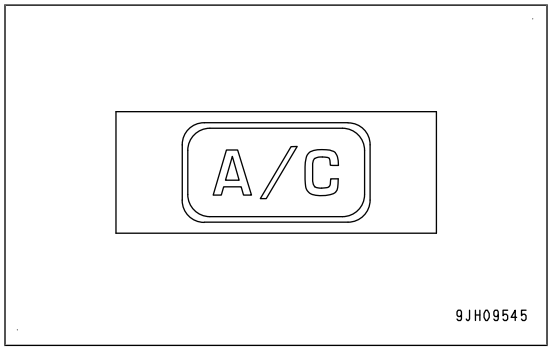


This monitor display indicates the status of temperature setting (a), air flow rate (b), and vents (c).



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

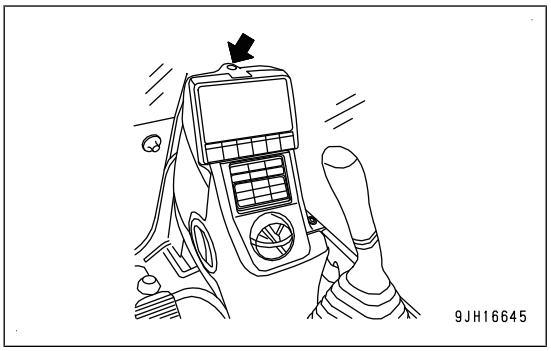


Use air conditioner switch for turning the air conditioner (cooling, dry heating) ON or OFF.

- 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.

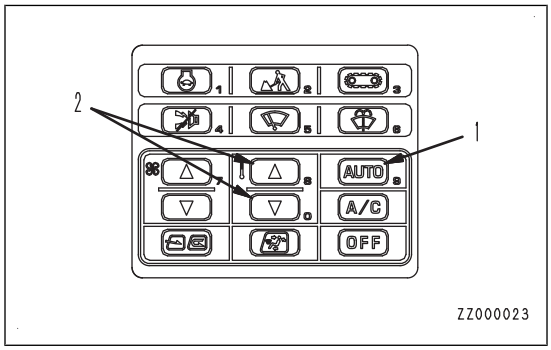


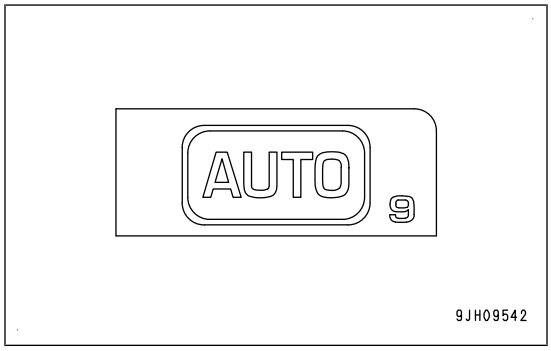
Operate Air Conditioner

The air conditioner can be operated automatically or manually. Select the method of operation as desired.

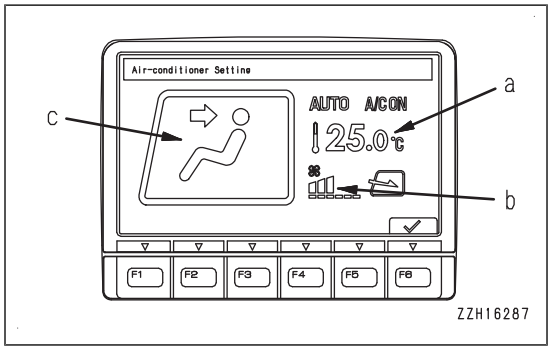
How to Use Automatic Operation

1. Turn auto switch (1) ON.



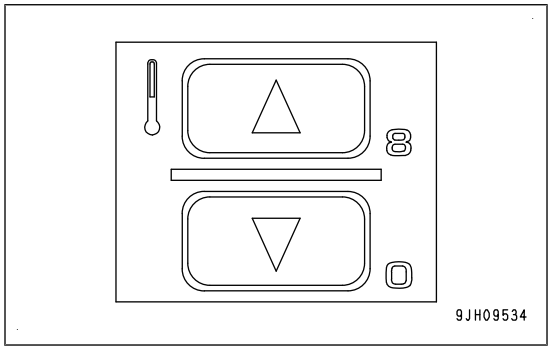


Set temperature (a) and air flow (b) are displayed.



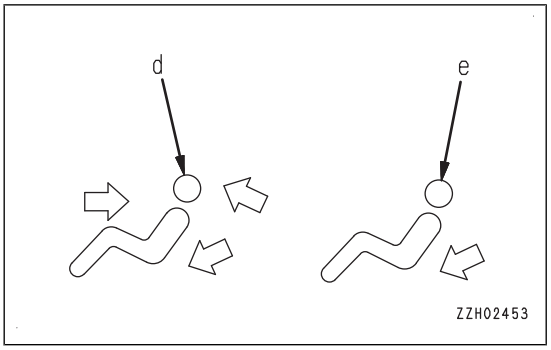
2. Use temperature control switch (2) to set to the desired temperature.

   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.



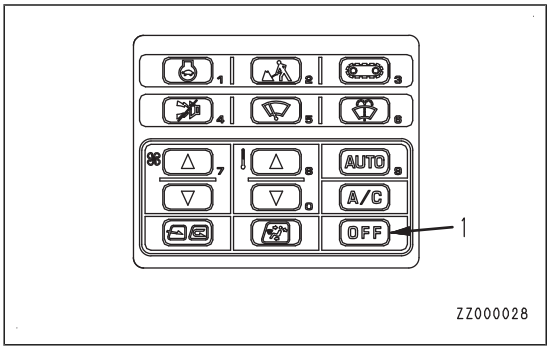
REMARK

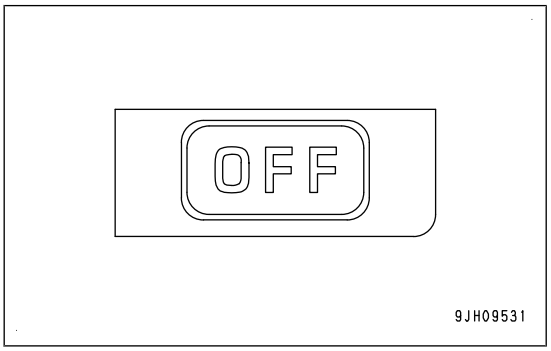
When vent monitor (c) displays (d) or (e), and engine coolant temperature is low, the air flow is automatically limited to prevent cold air from blowing out.



Stop Automatic Operation

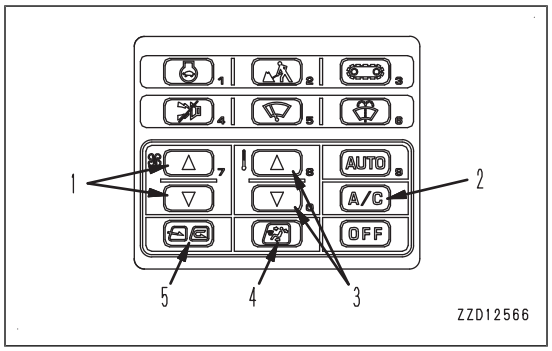
Press OFF switch (1).
The air conditioner stops.

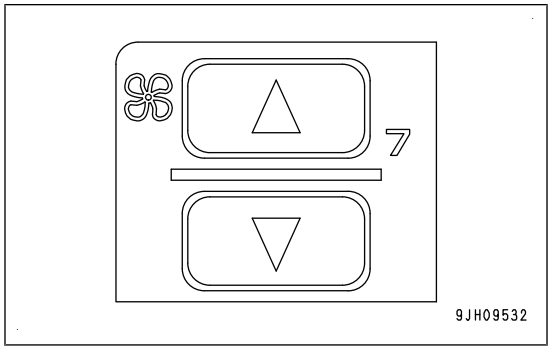




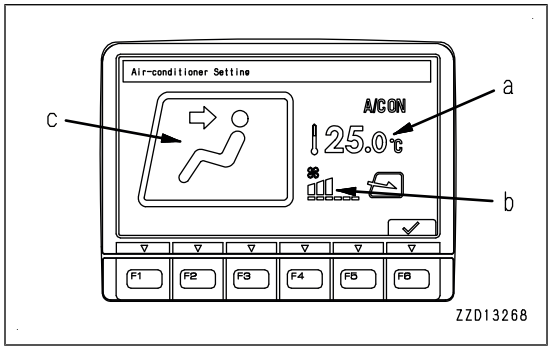
How to Use Manual Operation

1. Press fan switch (1) and adjust the air flow.

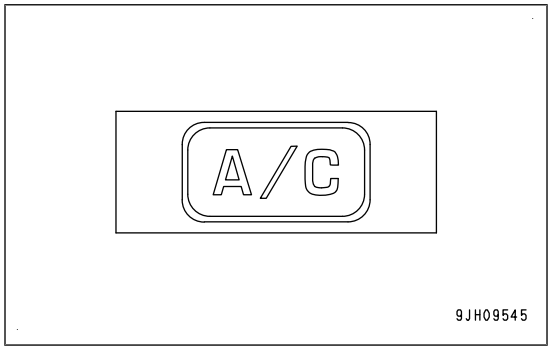




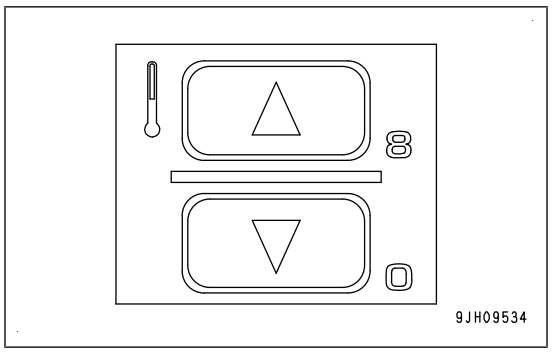
When doing this, check that temperature setting (a) and air flow (b) are displayed on the monitor.



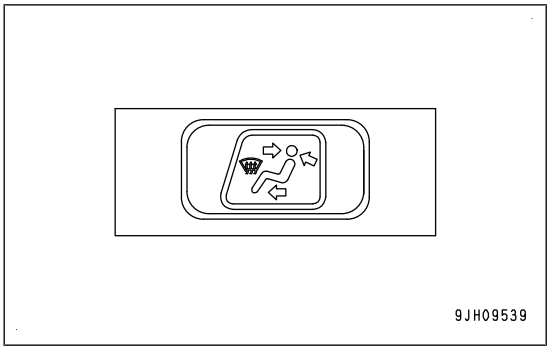
2. Turn air conditioner switch (2) ON.



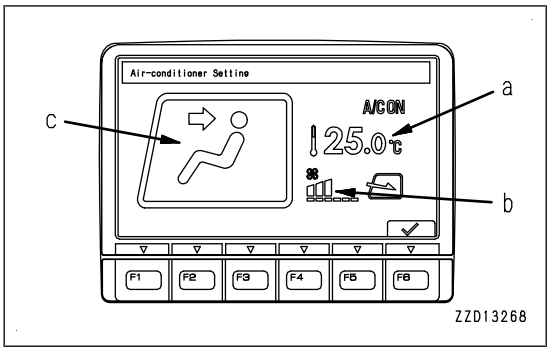
3. Use temperature control switch (3) to set to the desired temperature.



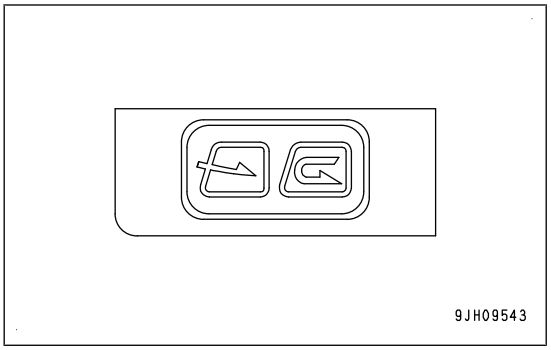
4. Press vent selector switch (4) and select the desired vents.



When this is done, the display for vent (c) of the monitor changes according to the selection.

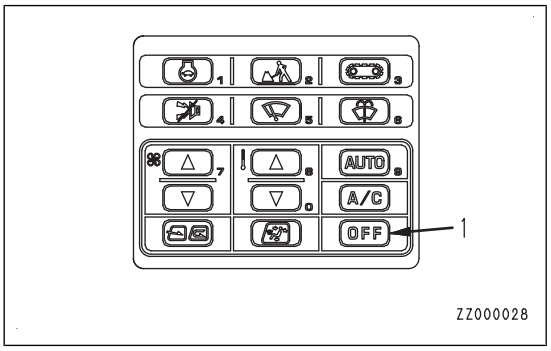


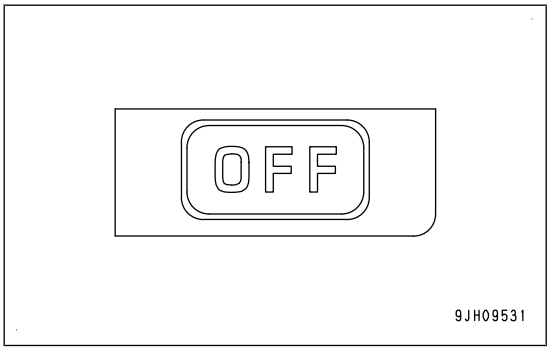
5. Press FRESH/RECIRC air selector switch (5) and select recirculation of the air inside the cab (RECIRC) or intake of fresh air from outside (FRESH).



Stop Manual Operation

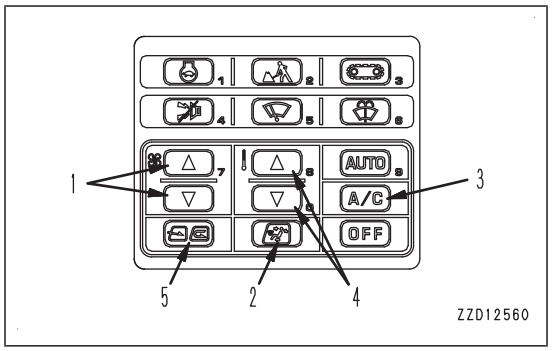
Press OFF switch (1).
The air conditioner stops.



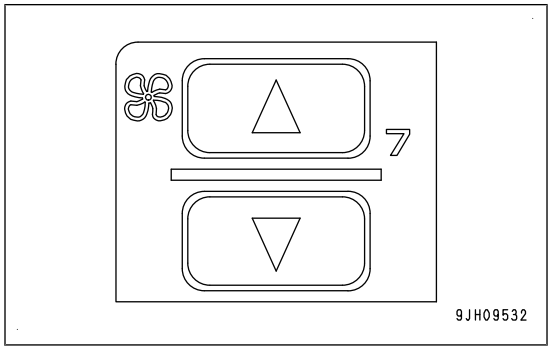


Cold Air to Face Warm Air to Feet

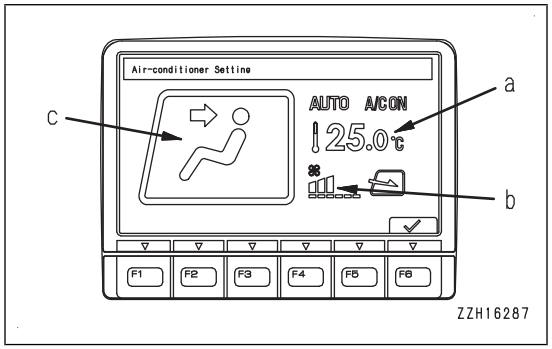
To operate with cold air blowing to the face and warm air blowing to the feet, set as follows.



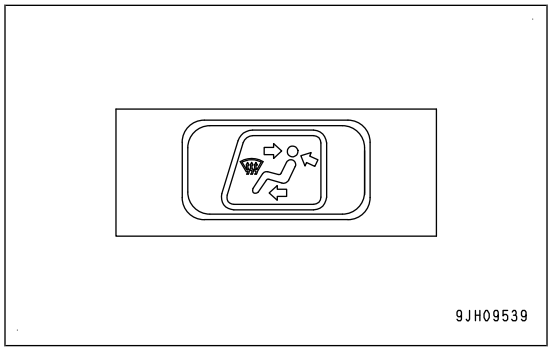
1. Press fan switch (1) and adjust the air flow.

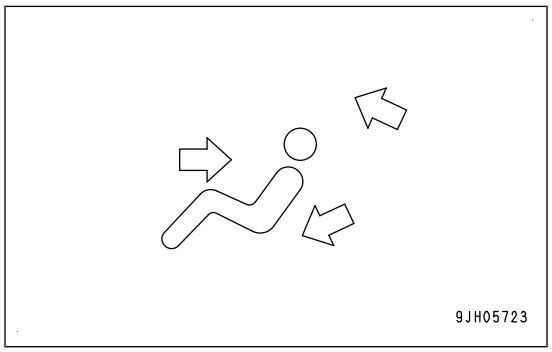


When doing this, check that temperature setting (a) and air flow (b) are displayed on the monitor.

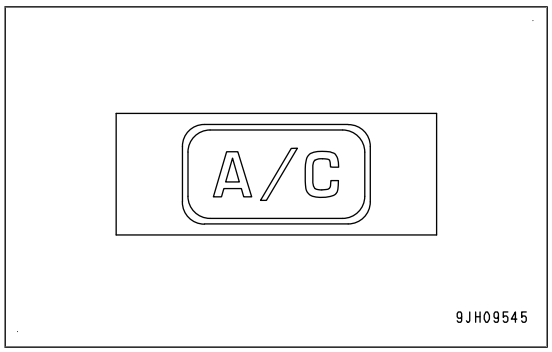


2. Press vent selector switch (2) and set the vent display on the monitor to the display shown in the figure.

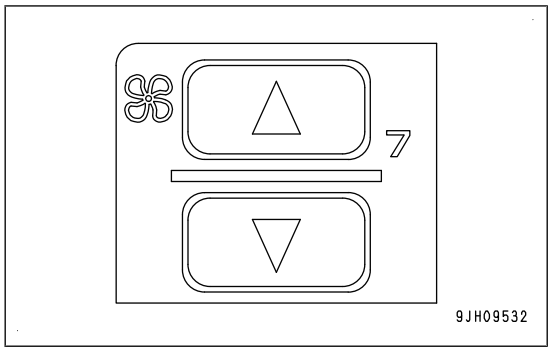


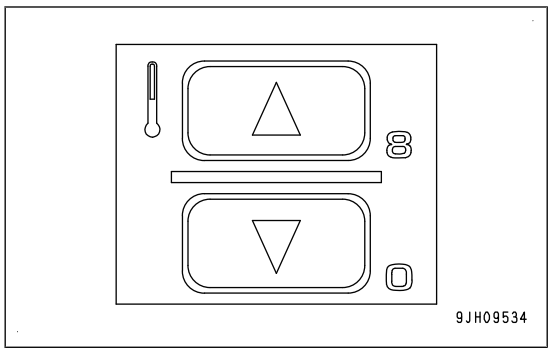


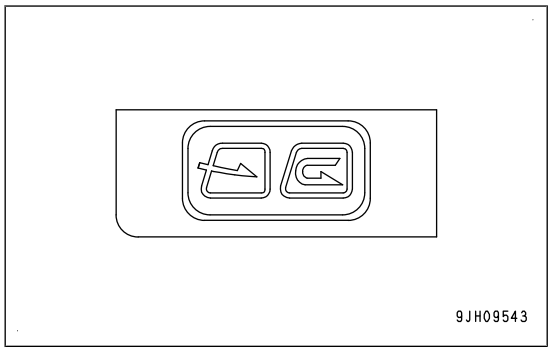
3. Turn on the air conditioner switch (3).



4. Adjust fan switch (1), temperature control switch (4) and FRESH/RECIRC selector switch (5) to the desired positions.

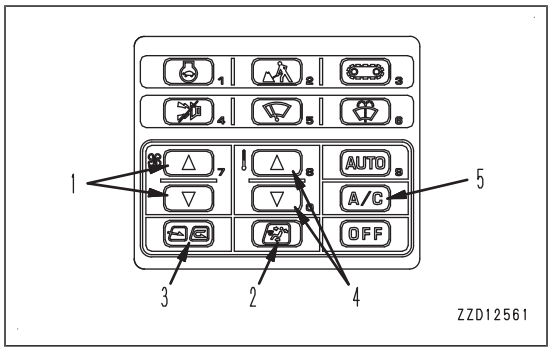


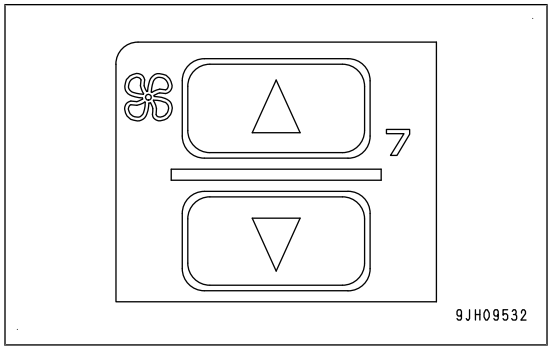




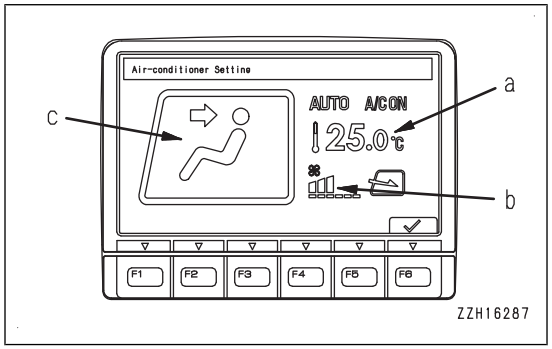
How to Use Defroster

1. Press fan switch (1) and adjust the air flow.

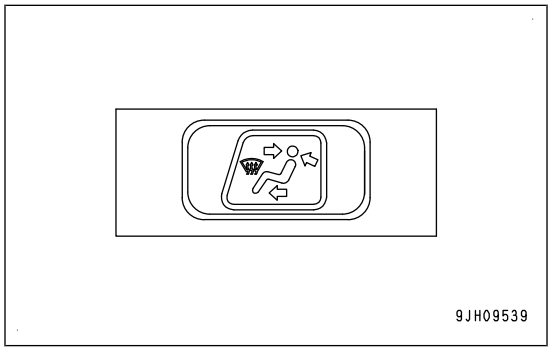


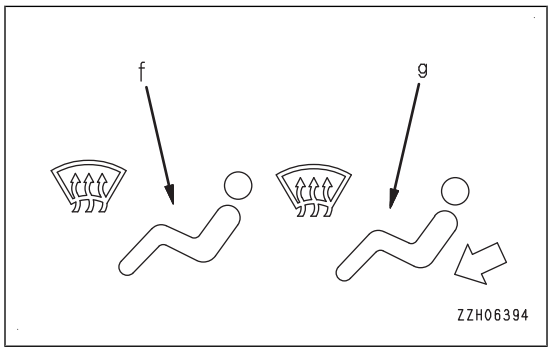


When doing this, check that temperature setting (a) and air flow (b) are displayed on the monitor.

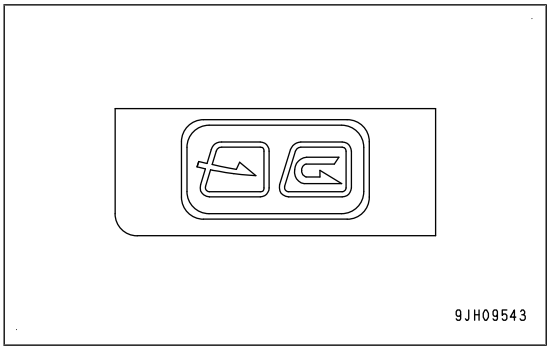


2. Press vent selector switch (2) and set vent display on the monitor to (f) or (g) as shown in drawing.

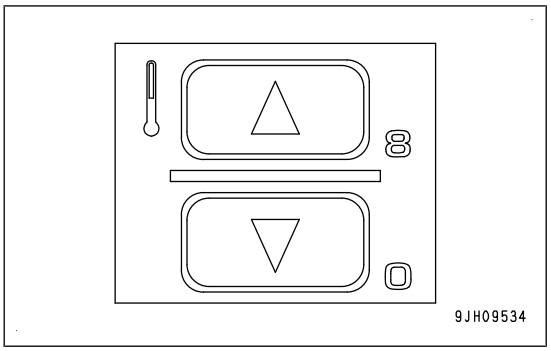




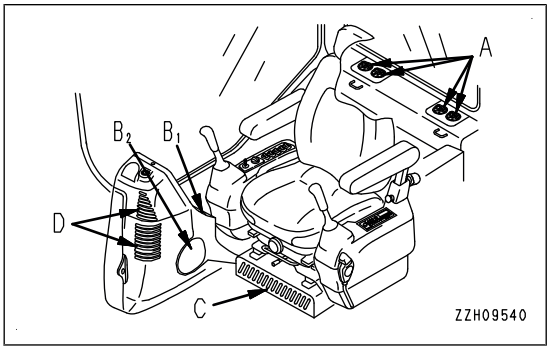
3. Press FRESH/RECIRC selector switch (3) and set it to FRESH mode.



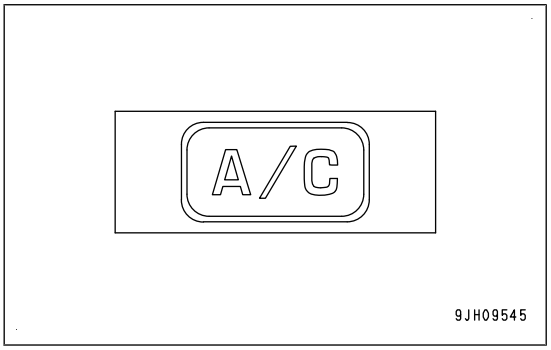
4. Press temperature control switch (4) and set temperature on the monitor to 32.0 of maximum heating.



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.)



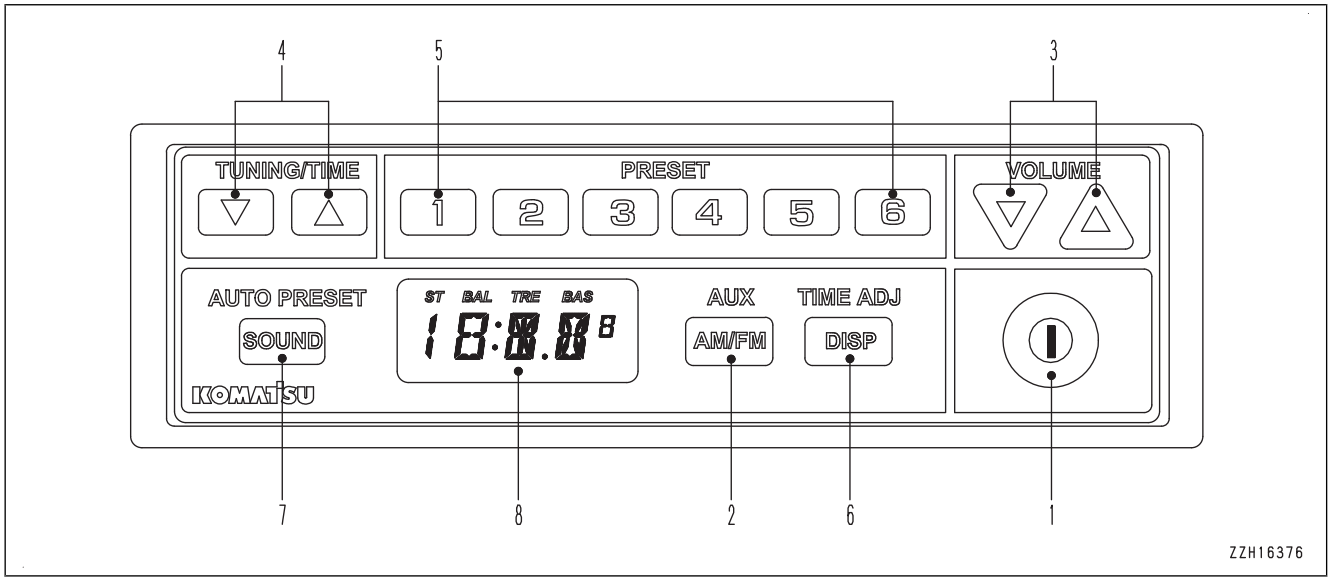
6. When operating in the rainy season or when it is desired to remove the mist from the window glass or to dehumidify the air, turn on the air conditioner switch (5).



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.

Explanation of Radio Equipment



(1) Power button
(2) Band/AUX selector button
(3) Volume control button
(4) Tuning/time adjustment button
(5) Preset button
(6) Display selector button
(7) Sound control 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 △ button, and the volume increases. Press the ▽ button, and the volume decreases. The range for the volume is 0 to 32.

Hold down this button, and you can change the volume continuously.

Tuning/Time Adjustment Button

Use the tuning/time adjustment button to select frequency and step for sound adjustment and to adjust time.

Preset Button

If you register desired stations to the preset button beforehand, you can select each station by touching this button once.

It is possible to preset 6 stations each for both AM and FM.

Display Selector Button

Use the display selector button to change frequency and clock shown on the display.

Each time you press this button, frequency, clock and band are shown on the display in this order.

If 1.5 seconds passes while a band is shown, a frequency will be displayed.

As long as AUX is selected, this button alternately switches the display between AUX and the clock.

Sound Control Button

Press the sound control button, and the sound adjustment is ready.

Each time this button is pressed, BAL (Balance), TRE (Treble) and BAS (Bass) will be selected in this order.

If this button is pressed while BAS is displayed, the sound adjustment will be cancelled.

Display

(A): Band name, “AUX”, frequency, clock and other character/ numeric information are displayed.

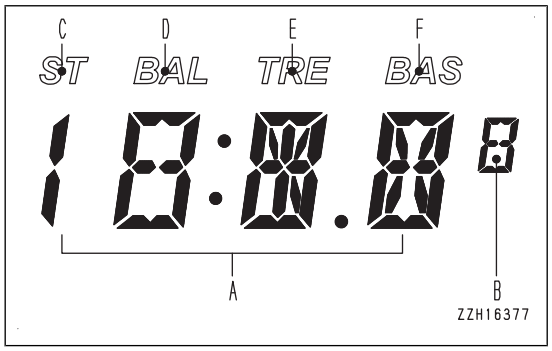
(B): Frequencies are displayed at steps of 50 kHz in certain areas.

(C): Lights up when a stereo broadcasting is heard while a FM station is selected.

(D): Lights up at the time of balance adjustment in the sound adjusting condition.

(E): Lights up at the time of treble adjustment in the sound adjusting condition.

(F): Lights up at the time of bass adjustment in the sound adjusting condition.



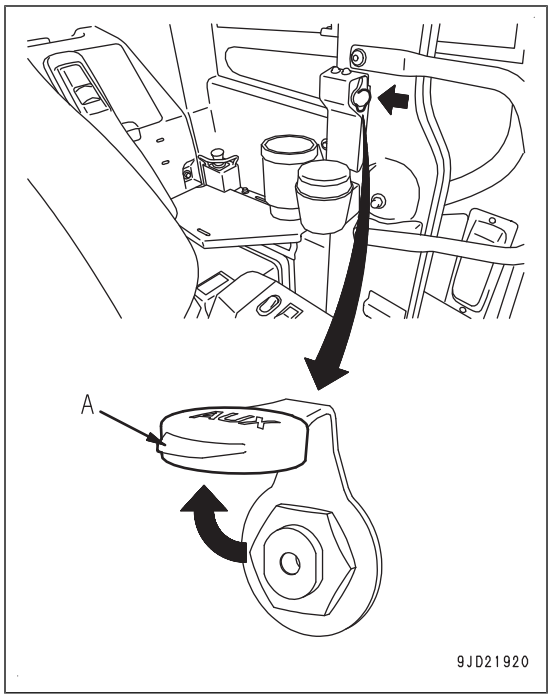
AUX

NOTICE

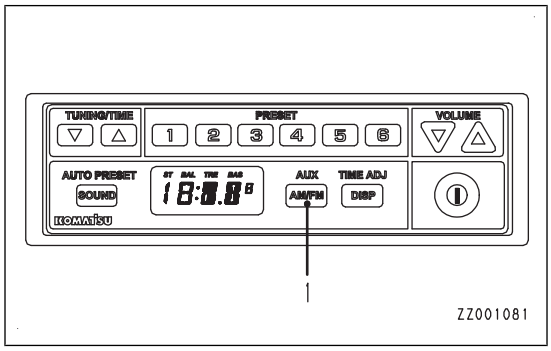
- **A stereo miniature plug can be connected.**
  Read the instruction manual of the equipment to connect carefully.
- **As a power source, use the battery attached to the equipment to connect.**
  If you use an electric power supply installed to the machine, the noise may occur.
- **The noise may occur if you pull out the input plug when AUX is selected, or if you push in or pull out the plugs of the equipment to connect.**

You can hear the sound through the speaker of the machine when you connect a commercially available portable audio equipment to the machine.

1. Open cap (A) at the rear right of the operator's seat.
2. Connect a portable audio equipment by using an commercially available audio cable.



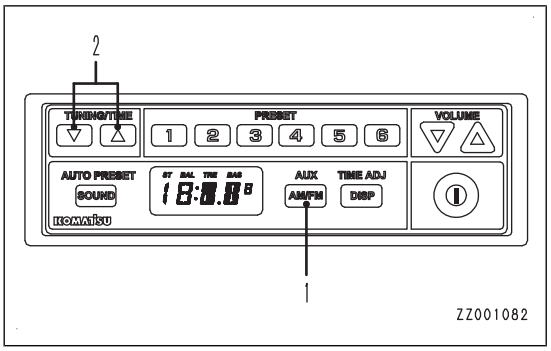
3. Press band/AUX selector button (1) to select “AUX”.



Operate Radio

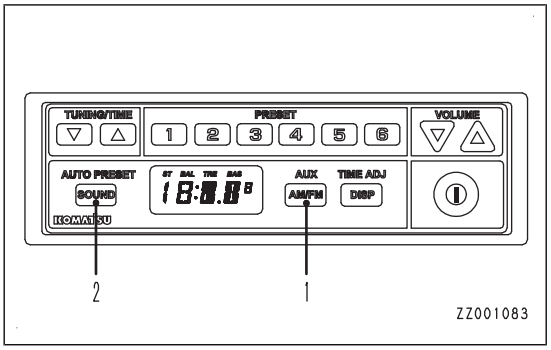
Adjust Frequency

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 △ button, and the frequency increases; press the ▽ button, and the frequency decreases.
   - Hold down the △ button, and the frequency increases continuously; hold down the ▽ button, and the frequency decreases continuously.
   - Hold down the △ button and release it, then the frequency increases continuously. Hold down the ▽ button and release it, them the frequency decreases continuously as an auto seek. When a proper frequency is picked up, the tuning automatically stops.



How to Adjust Frequency (Auto Presetting)

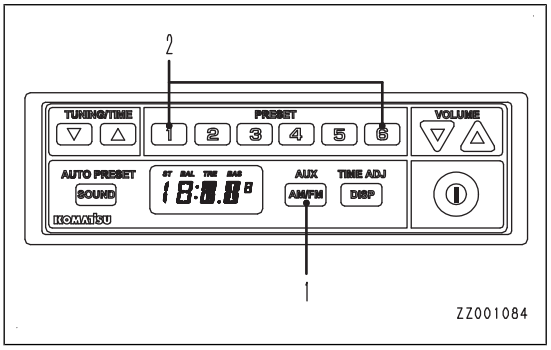
1. Press band/AUX selector button (1) and select FM or AM.
2. Hold down sound control button (2).



When a proper frequency is picked up, it is automatically registered to preset memories 1 to 6.

Load Preset

1. Press band/AUX selector button (1) and select FM or AM.
2. Press one of 1 to 6 of preset button (2).



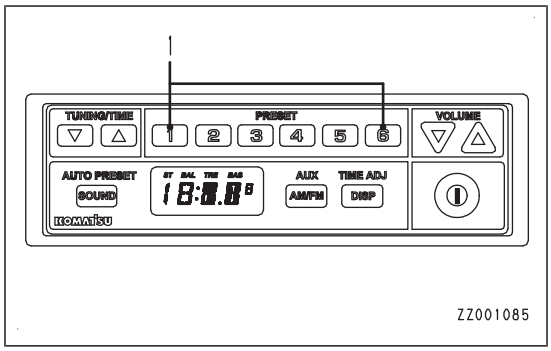
The frequency registered in the preset number of the pressed button is called up and received.

“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.

Preset Station

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.

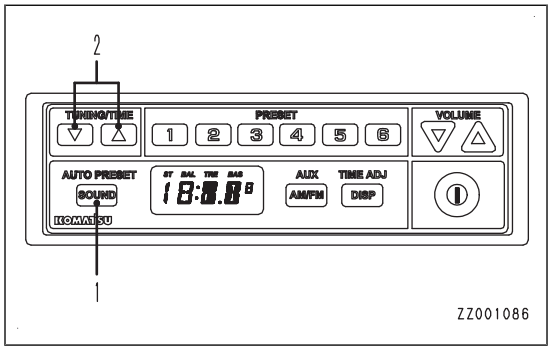
“Example”
While a frequency is displayed, keep pressing button 1 of preset button (1), and the preset number “P-1” is displayed.

After the preset number flashes 3 times, the frequency is displayed and then registered to preset number “P-1”.

How to Adjust Sound Balance

1. Press sound control button (1) to light up “BAL” on the display.

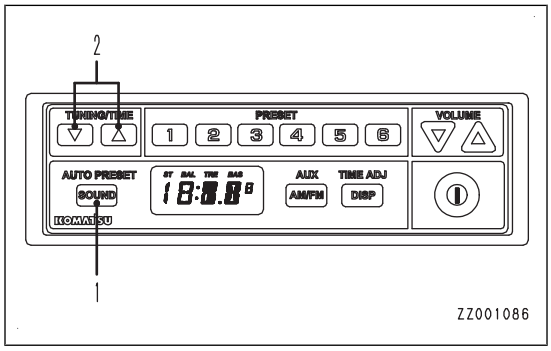
   You can adjust the sound (balance).
2. Press tuning/time adjustment button (2) to adjust the sound (balance).
   - Press the △ button, and the speaker output on the R side increases by 1. (R1 to R7)
   - Press the ▽ button, and the speaker output on the L side increases by 1. (L1 to L7)



High Register Range (Treble) Setting

1. Press sound control button (1) to light up “TRE” on the display.

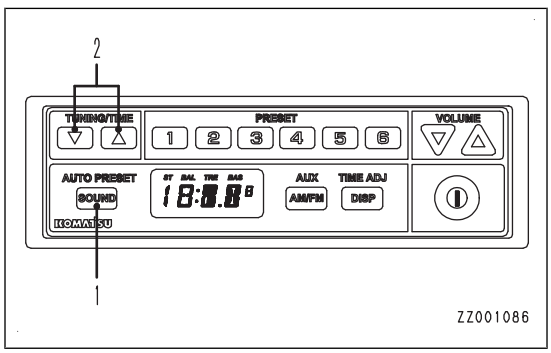
   You can adjust the high register range (treble) of the sound.
2. Press tuning/time adjustment button (2) to adjust the high register range (treble).
   - Press the △ button, and the high register range (treble) level increases by 1. (Maximum + 7)
   - Press the ▽ button, and the high register range (treble) level decreases by 1. (Minimum - 7)



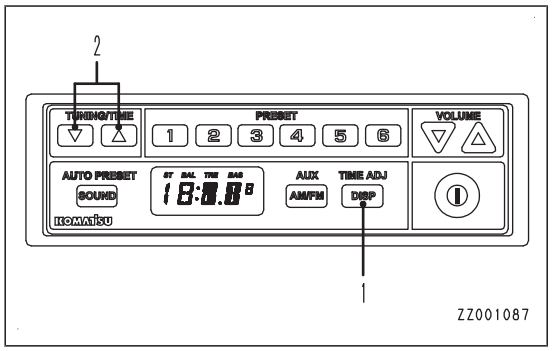
Low Register Range (Bass) Setting

1. Press sound control button (1) to light up “BAS” on the display.

   You can adjust the low register range (bass) of the sound.
2. Press tuning/time adjustment button (2) to adjust the low register range (bass).
   - Press the △ button, and the low register range (bass) level increases by 1. (Maximum + 7)
   - Press the ▽ button, and the low register range (bass) level decreases by 1. (Minimum - 7)



How to Adjust Clock



1. Press display selector button (1) to display the clock.
2. Hold down display selector button (1) to flash the “HOUR” display portion.

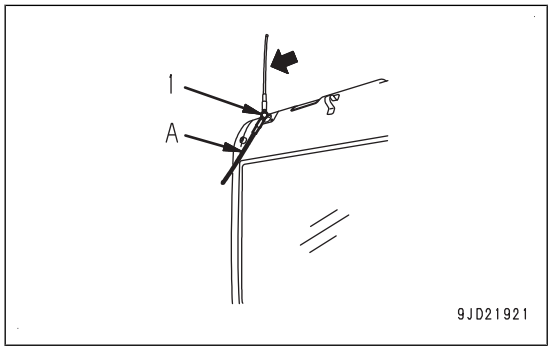
   You can adjust the hour.
3. Press tuning/time adjustment button (2) to adjust the hour.
   - If you press △ button, “HOUR” display increases by 1.
   - If you press ▽ button, “HOUR” display decreases by 1.
4. Press display selector button (1) to flash the “MINUTE” display portion.

   You can adjust the minute.
5. Press tuning/time adjustment button (2) to adjust the minute.
   - If you press △ button, “MINUTE” display increases by 1.
   - If you press ▽ button, “MINUTE” display decreases by 1.
6. Press display selector button (1) to cancel time adjustment.

   The screen returns to clock display.

Stow Antenna

Before transporting the machine putting it inside a building, store the antenna to prevent any interference.



1. Loosen antenna mounting bolt (1) and store the antenna at position (A).
2. After storing the antenna, tighten bolt (1).

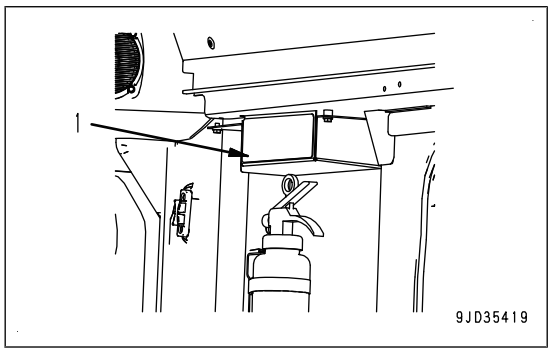
Space for Radio Cassette

The radio cassette player is not installed at factory.

If the installation is needed, remove the front cover (1), and connect the speaker wires and the antenna to the radio cassette player.

For the installation, consult your Komatsu distributor.

Do not operate the radio in the L.H. console if a radio cassette player is installed to this place.



Handle KomVision

⚠ WARNING

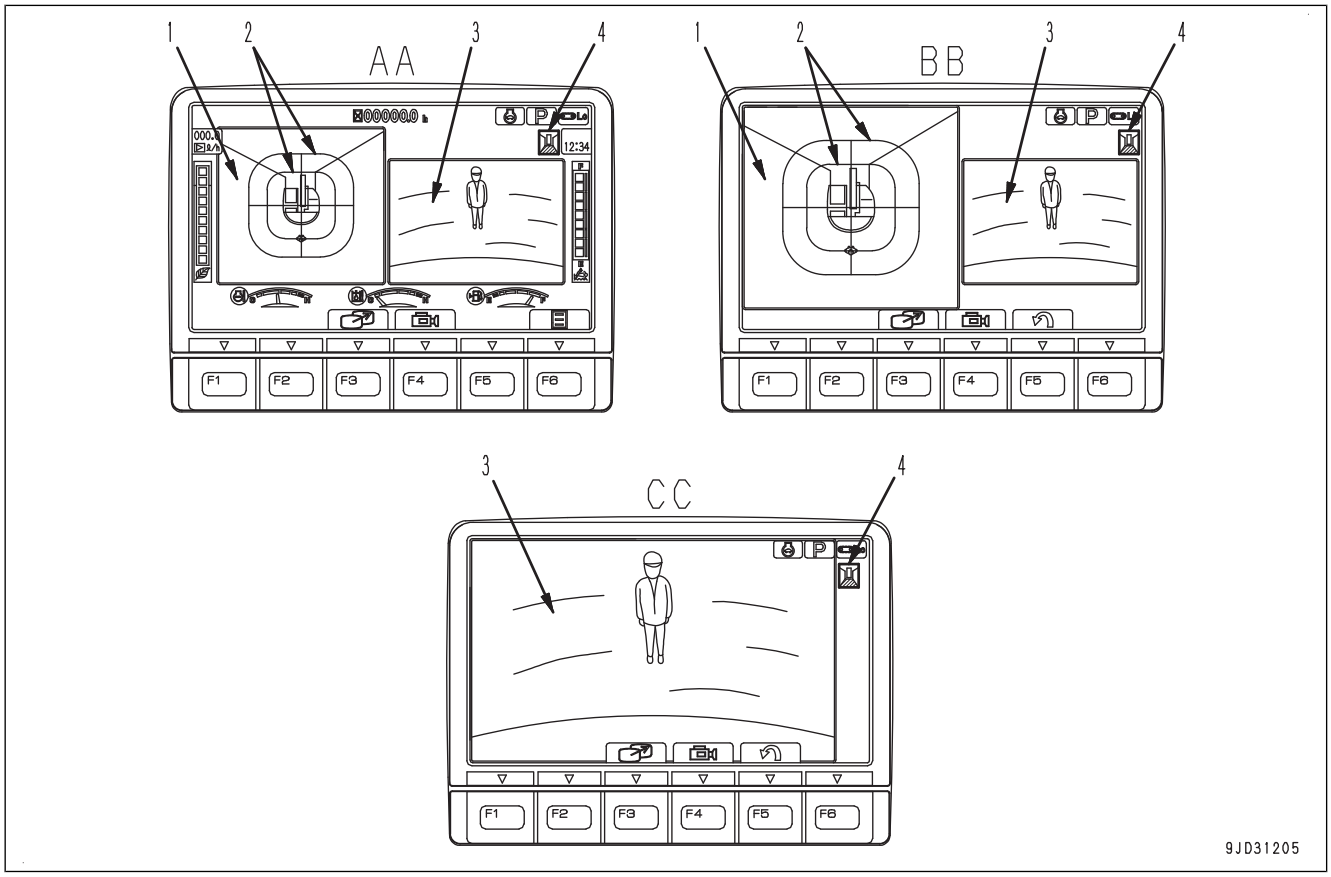
- **Physically make sure the adjacent safety around the machine. Do not make sure with just the monitor images.**
- **The work equipment will always show on the top of the monitor screen, regardless of the direction of the sprocket. Be aware of the direction of the machine.**

KomVision is the CCTV system for Komatsu machines.

Precautions When You Use KomVision

- If the normal range cannot be confirmed in the confirmation of the camera visibility, it is necessary to adjust the monitor screen. Ask your Komatsu distributor to perform this work.
- The machine monitor image may not be displayed due to darkness at night or in a tunnel, fog, snow, rain, cloud of dust, etc.
- Obstacles above the camera of the machine are not displayed. Be careful enough of the work equipment of a large machine, tree branches, etc. in high positions.
- Reference line is displayed with reference to the flat ground, so the distance of the guide line is not correct on slopes and uneven ground.

Monitor Display



AA: Standard screen, BB: Enlarged bird's eye view display, CC: Camera image screen

(1) Bird's eye view display
(2) Reference line
(3) Camera image
(4) Camera switch display

KomVision composes images of three camera installed on the machine. It displays the bird's eye view of 270 degrees of area around the machine.

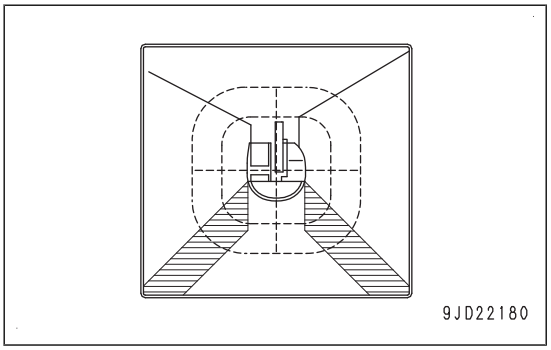
The shaded area in the figure is not displayed on the monitor screen even if the camera images are synthesized.

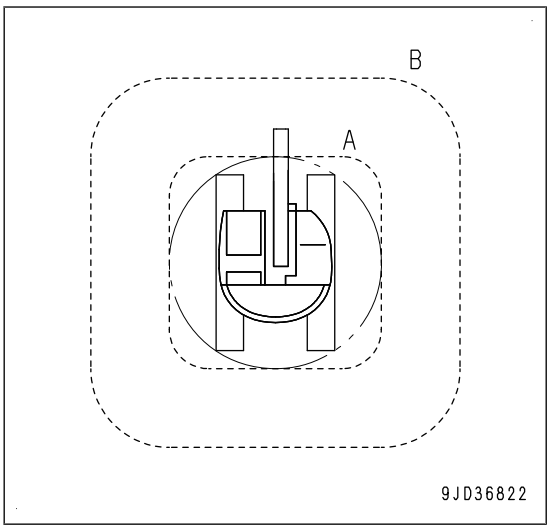
Since this image is electronically synthesized, the objects in the image may be displayed double or distortions or misalignment may occur in the shaded areas of the back of the machine.

For the camera image, the image shot by each of the loaded cameras is displayed.

The reference line is displayed as follows:

Display area	Display color
Quadrangle (A) in which the track edge is inscribed when the machine swings	Red
Quadrangle + 2 m (B) in which the track edge is inscribed when the machine swings	Yellow





Transportation

Precautions When You Transport Machine

Select Transportation Method

- When transporting the machine, choose the transportation method in reference to the weight and dimensions.
  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.

Load onto and Unload from a Trailer

Precautions When You Load onto and Unload from a Trailer

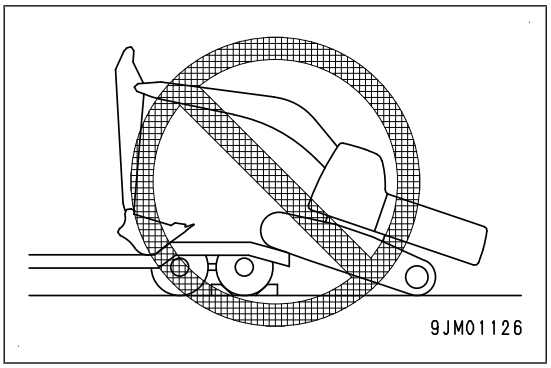
⚠ WARNING

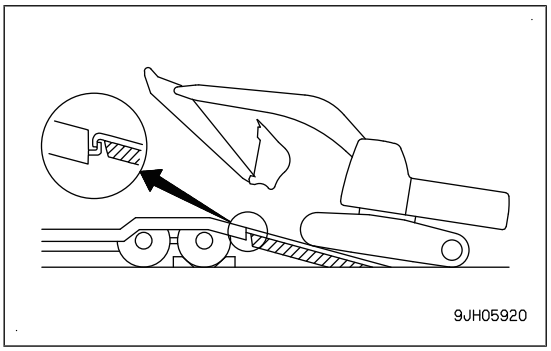
Always observe the following when loading or unloading the machine from a trailer.

- **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.





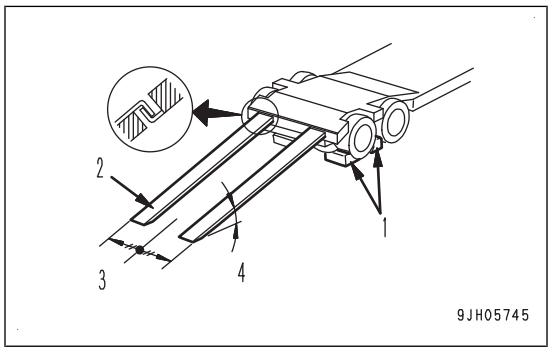
Procedures to Load Machine

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 the chocks (1) to the tires to secure the trailer.
3. Set the right and left ramps (2) parallel to each other and equally spaced to the right and left of center (3) of the trailer. Make the installation angle (4) at 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.

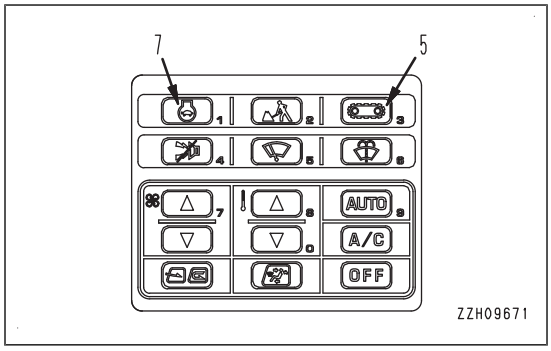


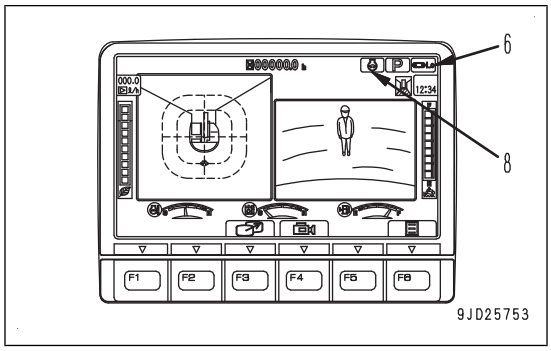
4. Press the travel speed selector switch (5) to set the travel speed to low (Lo lights up).

   The travel speed (Lo, Mi, Hi) is displayed on the travel speed display (6).
5. Turn off the auto-deceleration switch (7) and operate the fuel control dial to set the engine to low speed.

   Each time the auto-deceleration switch (7) is pressed, it switches OFF to ON to OFF in turn.

   When the auto-deceleration switch (7) is turned off, the auto-deceleration pilot lamp (8) goes out.



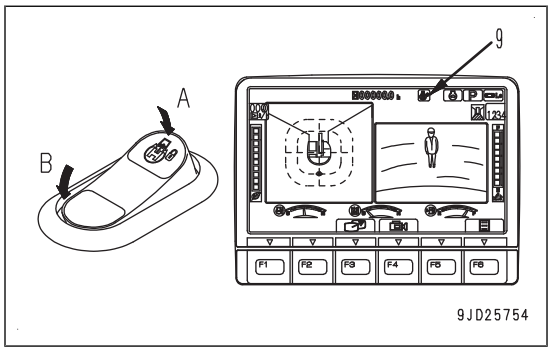


6. Turn on the swing lock switch to apply the swing lock.

   When the swing lock switch is turned to ON position, the swing lock pilot lamp (9) lights up.

   (a): ON position

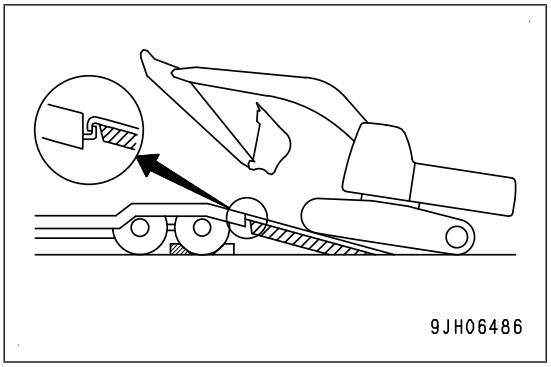
   (b): OFF position



7. If the machine is equipped with work equipment, set the work equipment at the front, and drive the machine forward to load it; if it has no work equipment, drive it in reverse to load it.

   Follow the instructions and signals of a conductor particularly when driving the machine in reverse.

8. Before moving the machine onto the ramps, check that the machine is positioned in a straight line with the ramps and that the centerline of the machine matches that of the trailer.

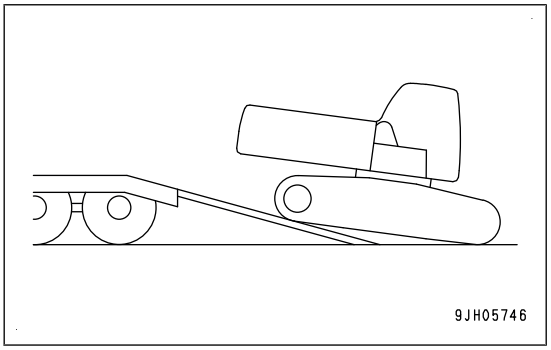


9. Set the travel direction toward the ramps and drive slowly.

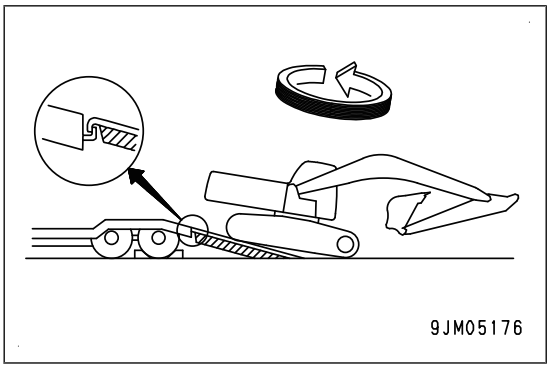
   Lower the work equipment as far as possible without causing interference.

   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 off the swing lock switch.



11. Swing the upper structure slowly 180 °.

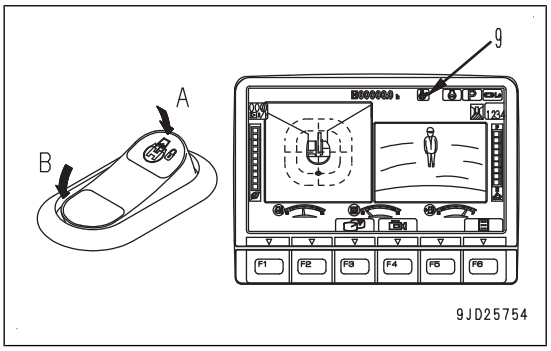


12. Turn on the swing lock switch to apply the swing lock.

    When the swing lock switch is turned to ON position, the swing lock pilot lamp (9) lights up.

    (a): ON position

    (b): OFF position

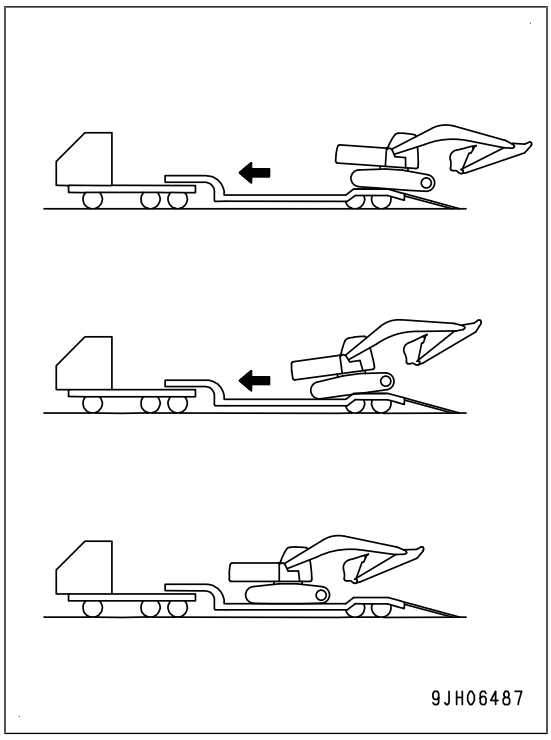


13. Drive the machine slowly in reverse to load it onto the trailer.

    When the machine travels over the rear wheels of the trailer, it becomes unstable. Drive the machine carefully and slowly.

    When the machine passes over the rear wheels, it inclines backward. Carefully drive the machine in reverse to the specified point, and then stop it.

14. Put the work equipment down on a wooden block, or etc.



How to Secure Machine

NOTICE

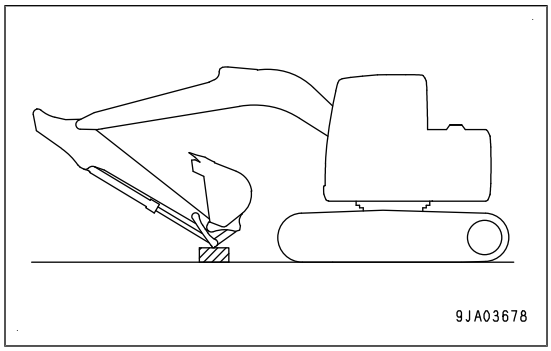
- **Stow the radio antenna. Retract the mirrors so that they are within the width of the machine.**
  For stowing radio antenna, see "Stow Antenna". For stowing mirror, see "Procedure to Adjust Machine Left Front Mirror (A)".
- **Prevent the machine from moving during transportation, by putting wooden blocks on the front and rear sides of the tracks.**
- **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.

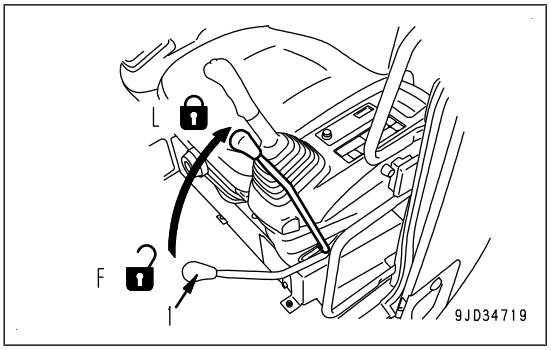
1. Extend the bucket and arm cylinders fully, then lower the boom slowly.

   NOTICE

   Prevent the machine from moving during transportation, by putting wooden blocks on the front and rear sides of the tracks.



2. Operate the lock lever (1) by the red portion on the top, then securely set it 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.

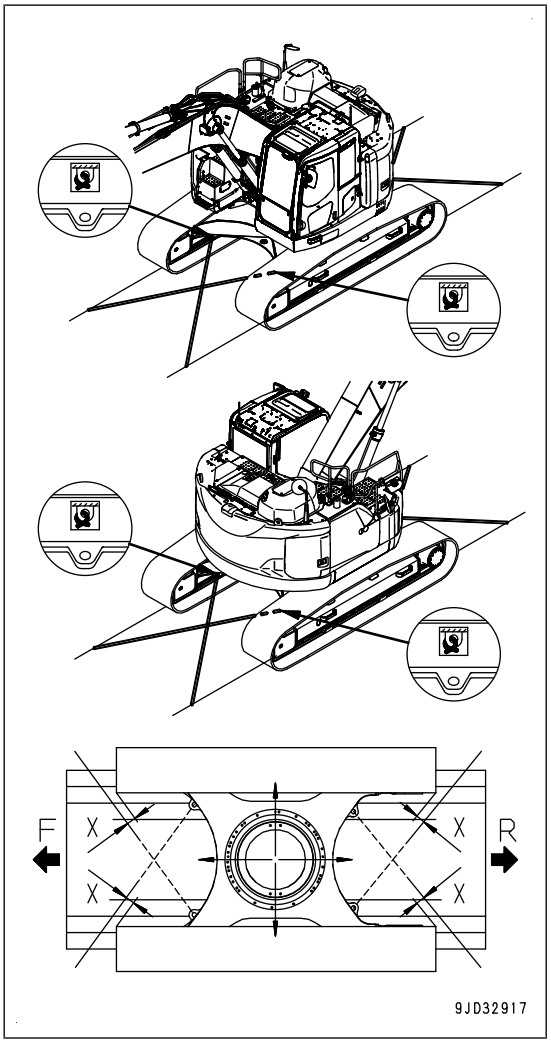
How to Secure Machine with Tie-down Point

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.)

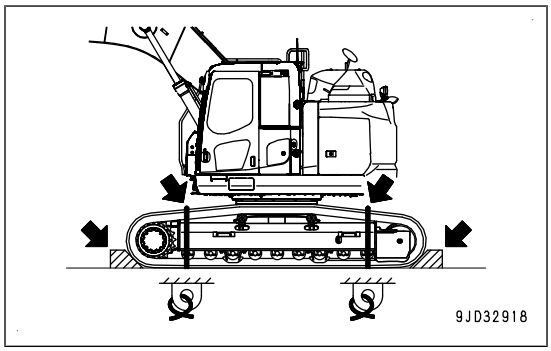
F: Forward travel direction

R: Reverse travel direction



How to Secure Machine Without Tie-down Point

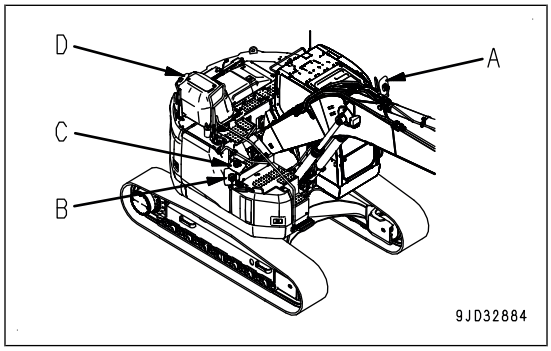
Prevent the machine from moving during transportation, by putting wooden blocks on the front and rear sides of the tracks, and secure the machine with chains or wire ropes of suitable strength.
Fix the machine securely to prevent it from slipping sideways in particular.



How to Remove and Install Mirror

If they are to be removed for shipment, or are to be installed again, perform the following procedure.

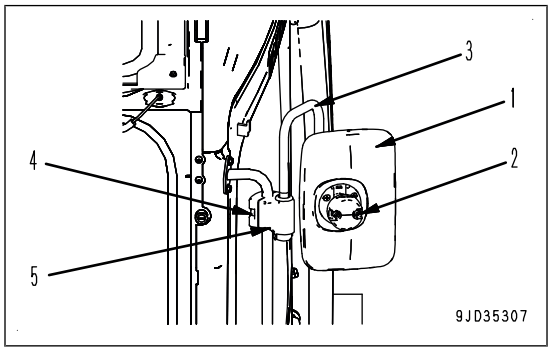
After installation of mirror, always adjust it. For details, see “How to Adjust Mirrors”.



How to Remove Mirror

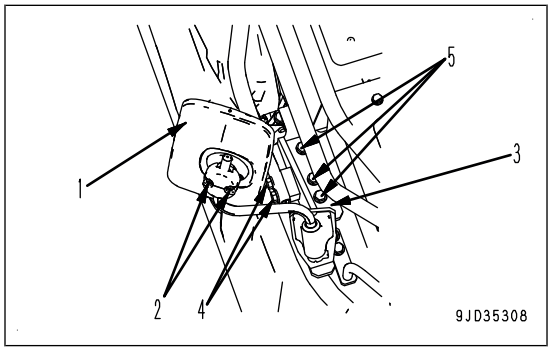
Mirror (A)

1. Loosen the mounting bolt (2), and remove the mirror (1) from the support (3).
2. Loosen the bolts (4), and remove the support (3) and clamp (5) from the handrail.



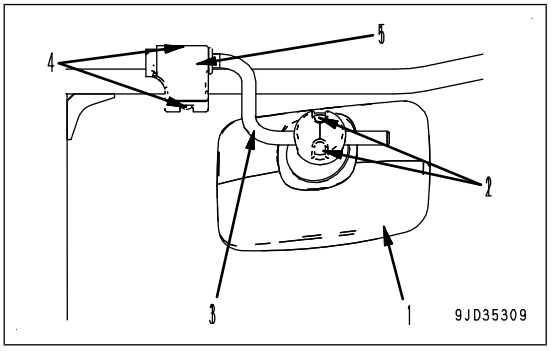
Mirror (B)

3. Loosen the mounting bolts (2), then remove the mirror (1) from the bracket (3).
4. Loosen the bolts (4), and remove the bracket (3) from the handrail.
5. Loosen the bolts (5), and remove the bracket (3) from the machine body.



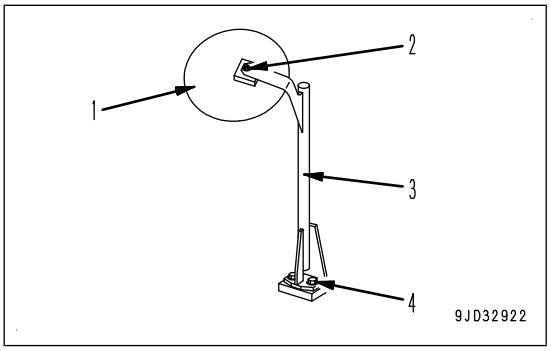
Mirror (C)

6. Loosen the mounting bolts (2), and remove the mirror (1) from the support (3).
7. Loosen the bolts (4), and remove the support (3) and clamp (5) from the handrail.



Mirror (D)

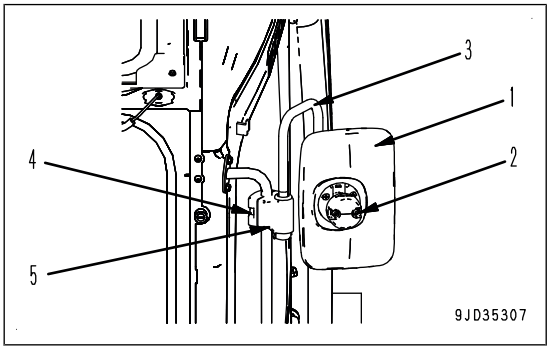
8. Loosen the mounting nut (2), and remove the mirror (1) from the bracket (3).
9. Remove the bolt (4), and remove the bracket (3) from the machine body.



How to Install Mirror

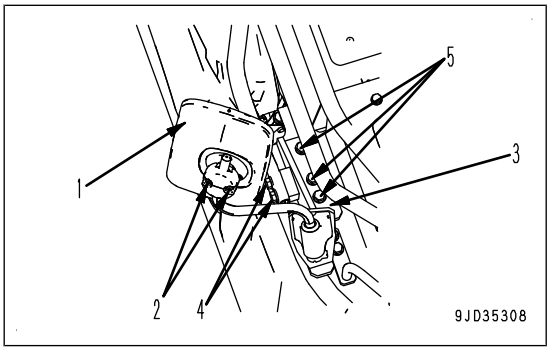
Mirror (A)

1. Install the support (3) and clamp (5) to the handrail with the mounting bolts (4).
2. Install the mirror (1) to the support (3) with the mounting bolts (2).



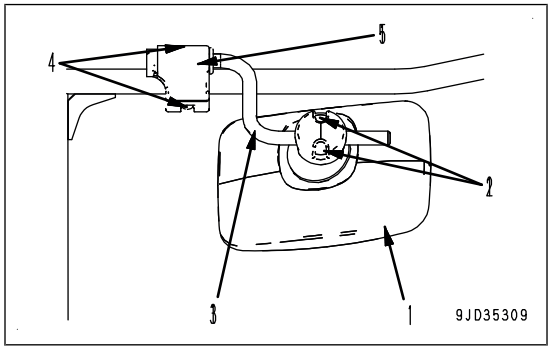
Mirror (B)

3. Install the bracket (3) to the machine body with the mounting bolts (5).
4. Install the bracket (3) to the handrail with the mounting bolts (4).
5. Install the mirror to the bracket (3) with the mounting bolts (2).



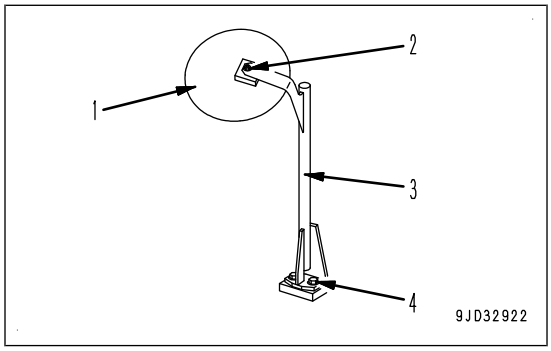
Mirror (C)

6. Install the support (3) and clamp (5) to the handrail with the mounting bolts (4).
7. Install the mirror (1) to the support (3) with the mounting bolts (2).



Mirror (D)

8. Install the bracket (3) to the machine body with the mounting bolts (4).
9. Install the mirror (1) to the bracket (3), and tighten the mounting nut (2).



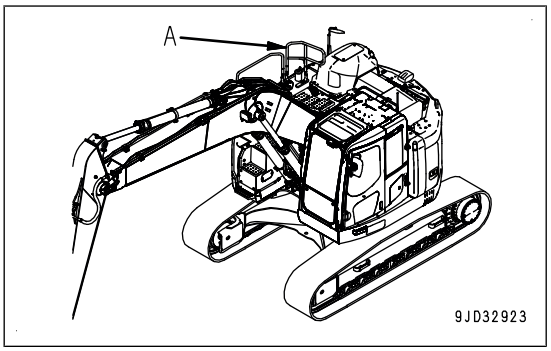
How to Remove and Installing Handrail

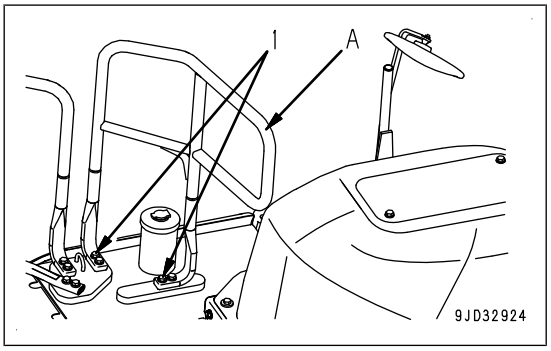
⚠ WARNING

- **After the machine is transported, 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 footing 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.**
  Observe the following procedures for the removal and installation.

How to Remove Handrail

Remove the bolts (1), and remove the handrail (A).





How to Install Handrail

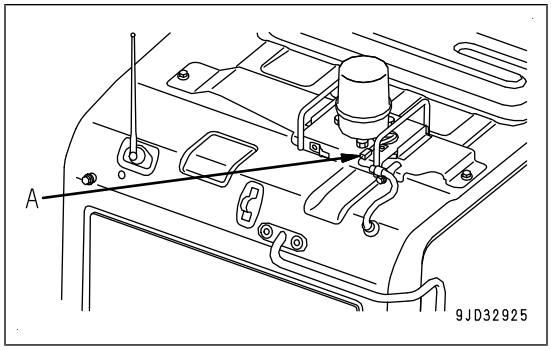
Install the handrail (A), then tighten it with bolts (1).
Tightening torque: 98 to 123 Nm {10.0 to 12.5 kgfm}

How to Remove and Install Revolving Lamp

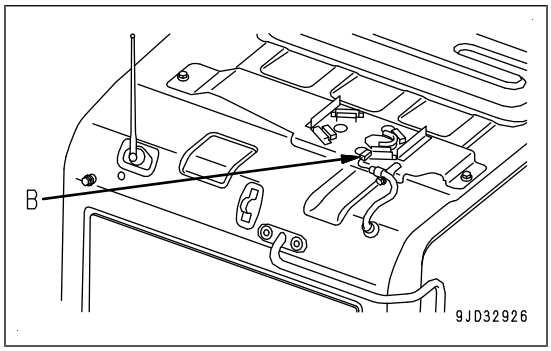
How to Remove Revolving Lamp

1. Remove the connector (A) of the revolving lamp.

   When removing the connector, pull it out while pressing the claw in the center of the connector.



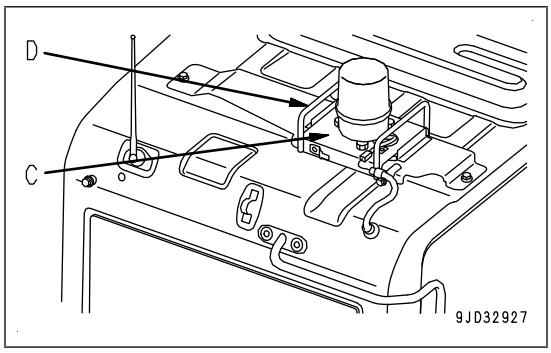
2. Put the connector for wiring (B) in a clean vinyl bag or the like to protect it from water, etc. during transportation, and fix it to the operator's cab with sealing tape or the like.



3. Remove the revolving lamp bracket (C).

   REMARK

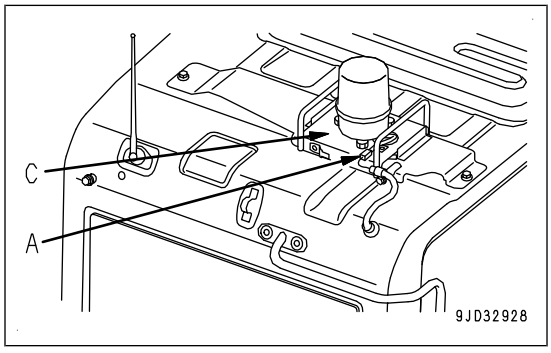
   When removing and installing the revolving lamp, be sure to hold grip (D) instead of lamp itself to prevent damage.



How to Install Revolving Lamp

1. Install the revolving lamp bracket (C) to the mounting stand.
2. Insert the connector (A).

   Securely insert the connector until it clicks.



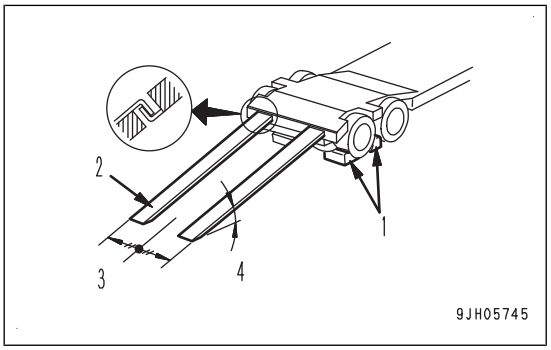
Procedures to Unload Machine

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 the chocks (1) to the tires to secure the trailer.
3. Set the right and left ramps (2) parallel to each other and equally spaced to the right and left of center (3) of the trailer. Make the installation angle (4) at maximum of 15 °.

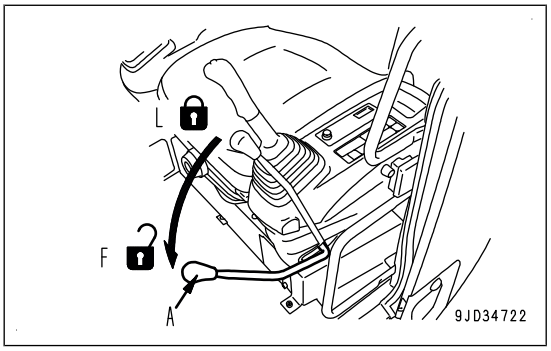
   If the ramps bend a large amount under the weight of the machine, put blocks under the ramps to prevent them from bending.



4. Remove the chains or wire ropes which are fastening the machine.
5. Start the engine.

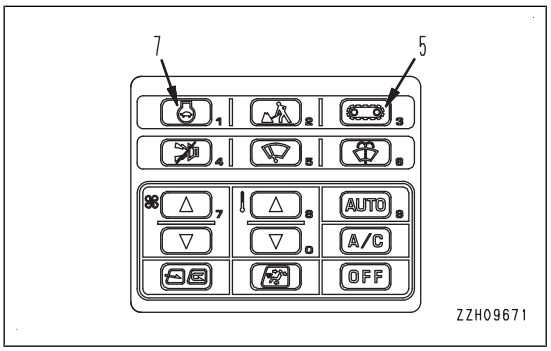
   Warm up the engine fully in cold weather.
6. Operate the lock lever (A) by red portion on the top, then securely set it to FREE position (F).
7. Press the travel speed selector switch (5) to set the travel speed to low (Lo lights up).

   The travel speed (Lo, Mi, Hi) is displayed on the travel speed display (6).

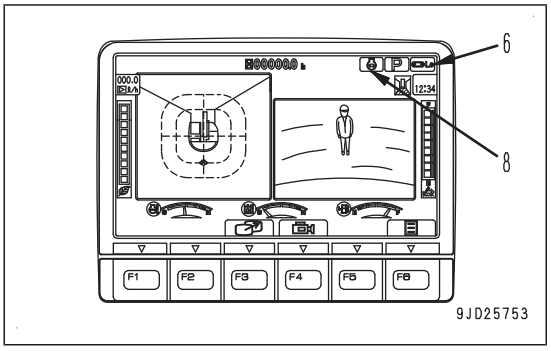


8. Turn off the auto-deceleration switch (7) and operate the fuel control dial to set the engine to low speed.

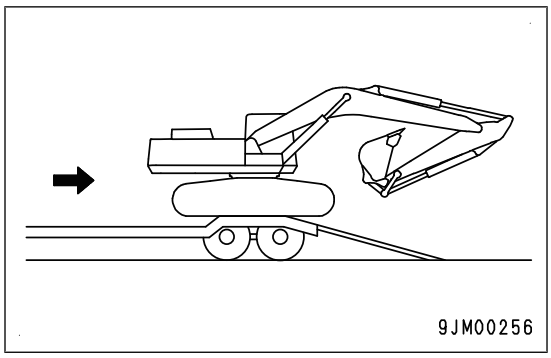
   Each time auto-deceleration switch (7) is pressed, it switches OFF to ON to OFF in turn.



   When the auto-deceleration switch (7) is turned off, the auto-deceleration pilot lamp (8) goes out.



9. Raise the work equipment, curl the arm under the boom, then move the machine slowly.
10. When the machine is horizontal on the top of the rear end of the trailer, stop the machine.

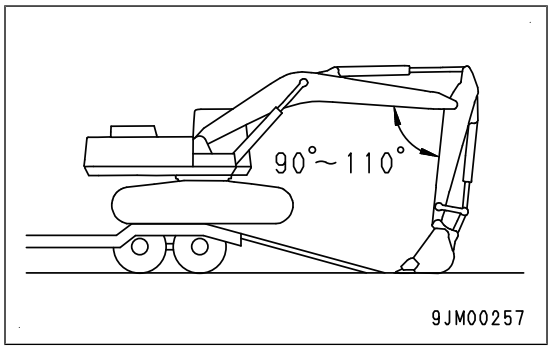


11. Set the angle between the arm and boom to 90 to 110 °.

    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.

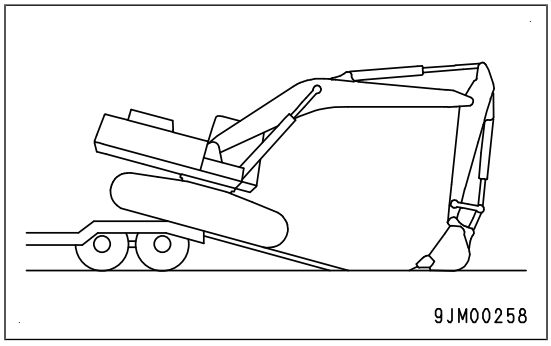


12. Lower the bucket to the ground.

    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.



How to Lift 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.**
- **When lifting, keep the machine horizontal.**
- **When performing lifting operations, set the lock lever to LOCK position to prevent the machine from moving unexpectedly.**
- **Never enter the area under or around a lifted machine.**

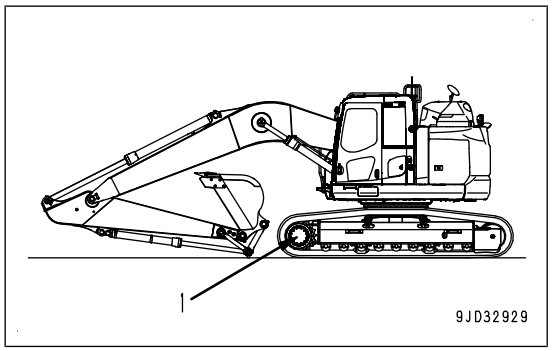
Never try to lift the machine in any posture other than the posture given in the following procedures nor using other lifting equipment.
There is a danger that the machine loses its balance.

NOTICE

This lifting method applies to the standard specification machine.
The lifting method differs depending on the attachments and options installed.
For the procedure for machines that are not the standard specification, consult your Komatsu distributor.

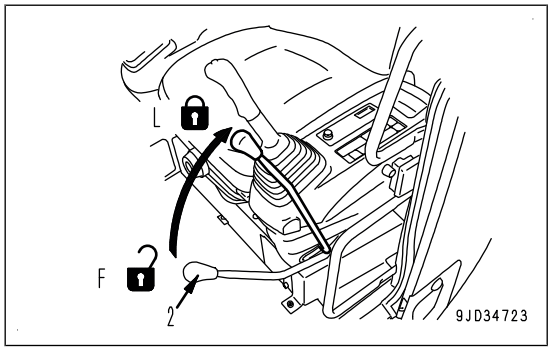
When lifting the machine, perform the operation on a flat ground according to the following procedure.

1. Start the engine.
2. Swing the upper structure 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. Be sure to operate the lock lever (2) by the red portion on the top, then set it 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.



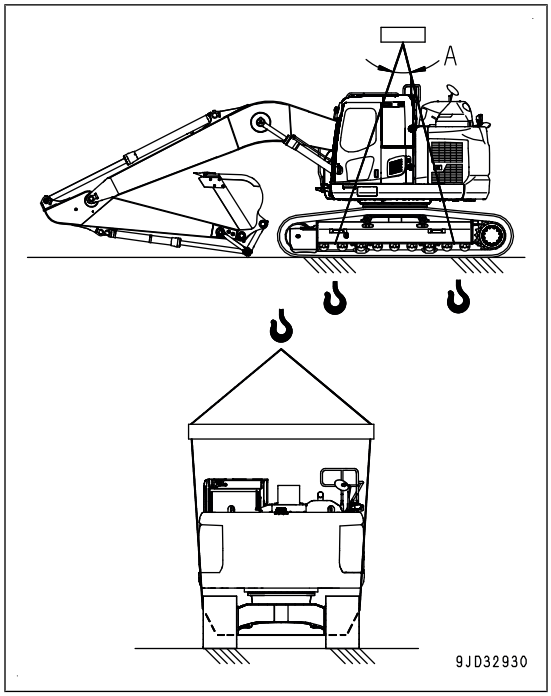
7. Pass the wire ropes between the 1st and 2nd track rollers from the front and between the 1st and 2nd track rollers from the rear.

   For the 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 the wooden block or backing metal between them.

8. Set the lifting angle (A) of the wire rope to 30 to 40 °, then lift up the machine slowly.

9. After the machine comes off the ground, check the hook condition and the lifting posture, and then lift up the machine slowly.



Cold Weather Operation

Cold Weather Operation Information

If the ambient temperature becomes low, it becomes difficult to start the engine, and the coolant may freeze. Follow the instructions described as follows.

Fuel and Lubricants

Change fuel and oil with ones of low viscosity for all components.

For the details of specified viscosity, see “How to Use Fuel, Coolant and Lubricants by Ambient Temperature”.

Coolant

⚠ WARNING

- **Coolant is toxic. Be careful not to get it into your eyes or on your skin. If it should get into your eyes or on your skin, wash it off with large 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. Komatsu recommends using Non-Amine Engine Coolant (AF-NAC).
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 “How to Use Fuel, Coolant and Lubricants by Ambient Temperature”.

DEF

NOTICE

- **DEF freezes at –11 °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).
- **If DEF or the machine equipped with DEF system cannot be stored at the outside temperature is lower than –11 °C, DEF in the tank may freeze. Ask your Komatsu distributor for discharging of DEF, and keep it in the condition free from freezing.**

Battery

⚠ WARNING

- **Do not bring any open flame near the battery. Otherwise, it may explode since the battery generates the flammable gas.**
- **Battery electrolyte is dangerous object. If it gets in your eyes or on your skin, wash it off with a large amount of water and consult a doctor.**
- **Battery electrolyte dissolves paint. If it gets on the bodywork, wash it off immediately with water.**
- **Do not charge the battery or start the engine with a different power source if the battery electrolyte is frozen. Battery may explode.**
- **Battery electrolyte is toxic. Do not let it flow into drainage ditches or spray it on to the ground surface.**

When the ambient temperature drops, the capacity of the battery will also drop. Maintain the battery charging rate as close as possible to 100 %. Insulate it against cold temperature to ensure that the machine can be started easily in the next morning.

REMARK

Measure the gravity of the electrolyte and calculate the charging rate from the following conversion table.

For the Komatsu maintenance-free battery (if equipped), check the indicator display and follow the instructions. See “CHECK KOMATSU MAINTENANCE-FREE BATTERY INDICATOR ” for how to read the indicator.

Electrolyte Temperature Charging Rate (%)	20 °C {68 °F}	0 °C {32 °F}	-10 °C {14 °F}	-20 °C {-4 °F}
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26

- When the ambient temperature is low, the capacity of the battery considerably drops. Cover it, or remove it from the machine to place it in the warm place. Restore it again before the operation.
- If the electrolyte level is low, add distilled water in the morning before beginning the work. Do not add water after the day's work to prevent diluted electrolyte in the battery from freezing during the night.
  For the Komatsu maintenance-free battery (if equipped), check the indicator display and follow the instructions. See “Examine Komatsu Maintenance-Free Battery Indicator” for how to read the indicator.

Precautions After Daily Work Ends in Cold Weather

⚠ WARNING

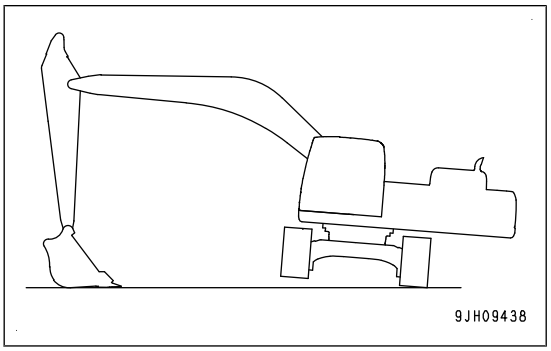
Performing idling of the tracks is dangerous, stay well away from the tracks.

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 “USE OF FUEL, COOLANT AND LUBRICANTS TO ACCORDING TO AMBIENT TEMPERATURE”.

If the machine is parked for long time in the cold weather condition, quality of DEF may be affected by repeated freeze, ask your Komatsu distributor to inspect.

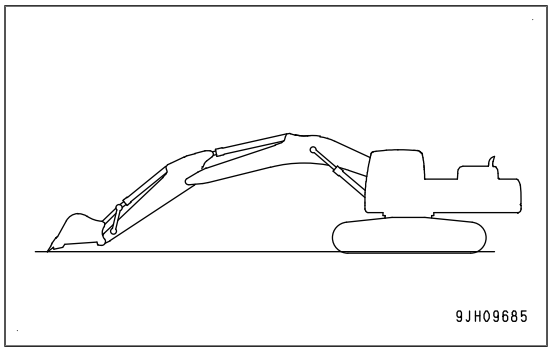
Precautions for Long-Term Storage

Prepare 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.
- After turning the starting switch to OFF position, check that the system operating lamp is not lit. Then set the battery disconnect switch to OFF position and remove the key. When storing the battery, cover it.
- 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 “How to Remove and Install Attachment”.
- 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.

Start 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.
- If the machine is stored for a long period with the battery disconnect switch OFF or the battery terminal disconnected, the clock information and radio tuning information may be lost. In this case, set again. For detail, see “Clock Adjustment” and “HANDLE RADIO”.

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”.
- Start the engine and check correctly.
  If SCR system has any abnormality, warning is displayed on the monitor screen and the audible alert sounds. If SCR system has any abnormality, stop the engine, and then start it again.
  If SCR system still has abnormality after the engine is restarted, contact your Komatsu distributor.
- If DEF is kept in DEF tank for more than 1 year, ask your Komatsu distributor for replacement.
  Dispose of drained DEF according to the local regulations and rules.
  Aged DEF may have smell of ammonia. Replace DEF in a well-ventilated place and take care not to inhale its vapor.

Troubles and Procedures

Procedures When You Run Out of Fuel

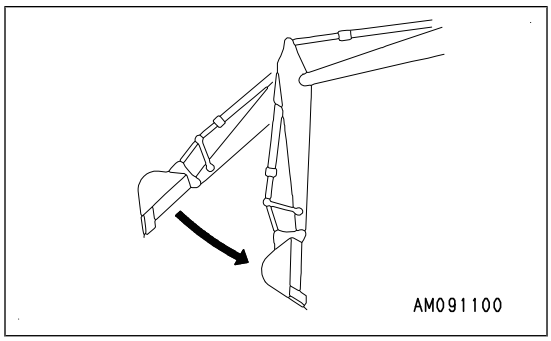
When starting the engine again after running out of fuel, fill it up with fuel and bleed air from the fuel system before stating.

Always check the fuel level to prevent running out of fuel.

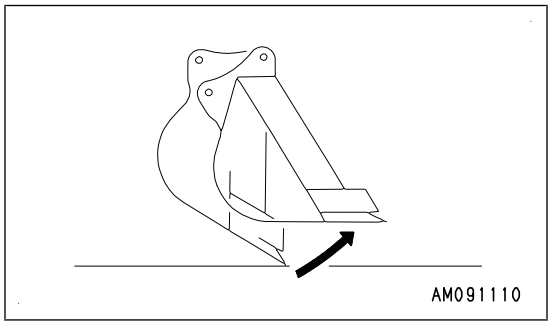
Phenomena that are Not Failures

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.



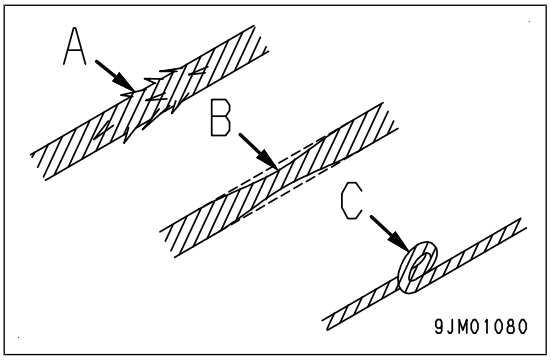
- When starting or stopping the swing, a noise is generated from the brake valve.
- When going down a steep slope at low speed, a noise is generated from the travel motor brake valve.

Precautions When You Tow Machine

⚠ WARNING

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

- **Always confirm that the wire rope or drawbar used for towing has ample strength for the weight of the machine being towed.**
- **Never use 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.**
- **Wear the leather gloves always when handling the wire ropes.**
- **Never tow a machine on a slope.**
- **During the towing operation, never stand between the towing machine and the machine being towed.**
- **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.**

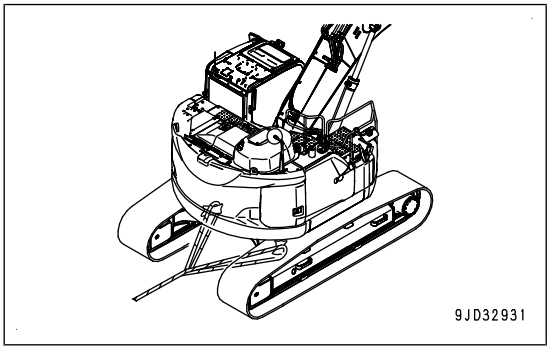


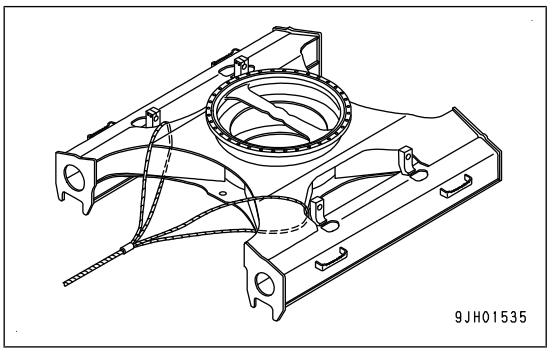
NOTICE

The maximum towing capacity for this machine is 142000 N{14600 kgf}.
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 1 km/h or lower for a distance of only a few meters to a place that is suitable for performing repairs.

  Perform this only in an emergency.





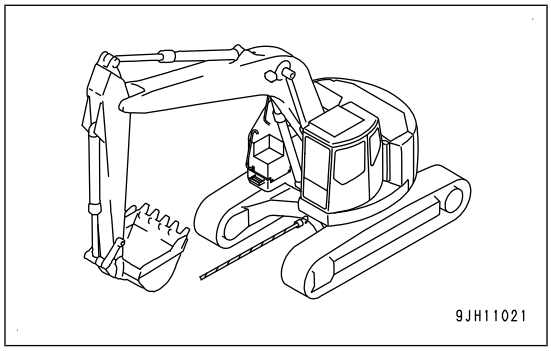
Precautions When You Use Lightweight Towing Hole

⚠ 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.**
- **Always use the shackle.**
- **Hold the wire rope level and set it straight to the track frame.**
- **Move the machine slowly and be careful not to apply any sudden load to the wire rope.**
- **Do not use the tie-down holes for towing the machine.**

There is a hole in the track frame to fit the shackle when towing light objects.

Permissible towing load: 58800 N or less {6000 kgf or less}



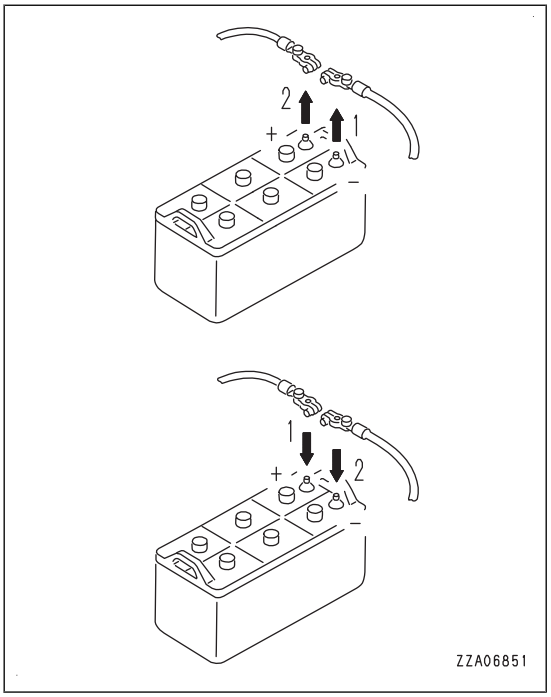
Precautions for Severe Work Condition

- 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 sulphuric 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 eyeglasses 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 any tool touches between the positive (+) terminal and the chassis, there is a hazard of sparks being generated. 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, be careful not to mistake the positive (+) terminal for the negative (-) terminal.**
- **After securing the battery, check that it does not move. If it moves, tighten it again securely.**

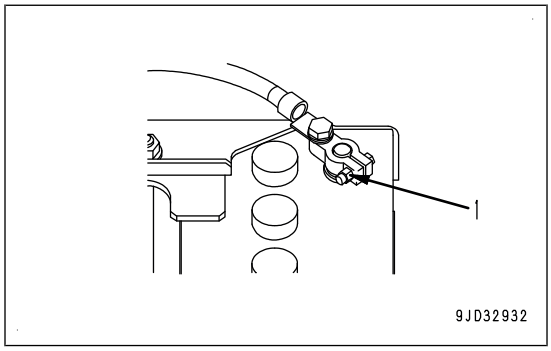


Precautions When You Remove and Install Battery

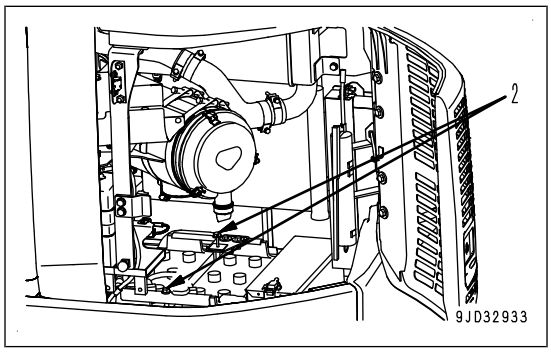
⚠ CAUTION

- **Disconnect the ground cable (normally connected to the negative (-) terminal) first. 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.**

1. Remove and install the battery cable
   - Loosen the nut (1) of the terminal and remove the wires from the battery.
   - Insert the hole of the terminal to the battery and tighten the nut (1).
     Tightening torque of the nut (1) : 9.8 to 11.8 Nm {1.0 to 1.2 kgfm}



2. Secure the battery
   - When installing the battery, secure it with the battery mounting hardware.
     Tightening torque of mounting bolt (2) : 9.8 to 11.8 Nm {1.0 to 1.2 kgfm}
   - After securing the battery, check that it does not move. If it moves, tighten it again securely.

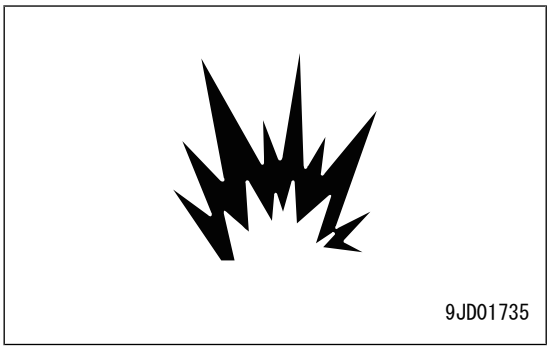


Precautions When You Charge Battery

⚠ 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.

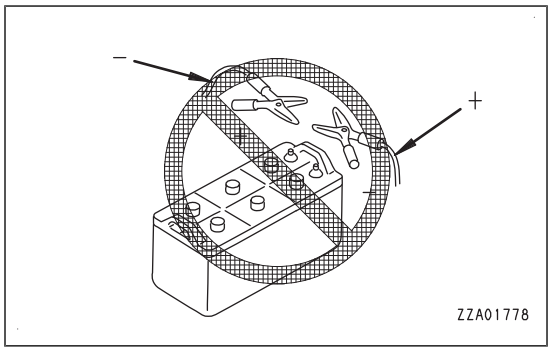
- **Set the voltage of the charger to match the voltage of the battery to be charged. If the correct voltage is not selected, the charger may overheat and cause an explosion.**
- **Connect the positive (+) charger clip of the charger to the positive (+) terminal of the battery, then connect the negative (-) charger clip of the charger to the negative (-) terminal of the battery. Be sure to attach the clips securely.**
- **In the case of a liquid stopper type, set the charge current to 1/10 or less of the value of the rated battery capacity. When you do the fast charging, set it to less than the rated battery capacity.**
  When you do the fast charging, set it to less than the rated battery capacity.
  For the Komatsu maintenance-free battery (if equipped), the charging current is less than 1/10 of the rated capacity of the battery. Do not do the fast charging.
  If the charger current is too high, the electrolyte will leak or 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.**
  There is a danger that this will ignite the battery electrolyte and cause the battery to explode.
- **Do not use or charge the battery if the battery electrolyte level is below the LOWER LEVEL line. It can cause explosion. Be sure to do the periodic inspection of the battery electrolyte level. In the case of a liquid stopper type, add purified water (such as a commercial battery fluid) to UPPER LEVEL line.**
  For the Komatsu maintenance-free battery (if equipped), check the indicator display and follow the instructions. See "CHECK KOMATSU MAINTENANCE-FREE INDICATOR" for how to read the indicator.



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.**



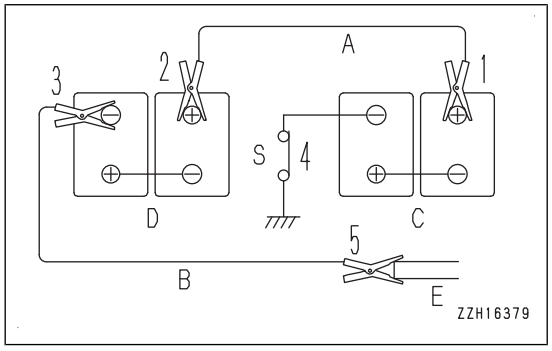
NOTICE

- **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 check that the system operating lamp is off. Then turn the battery disconnect switch key to OFF position before connecting the jumper cables.**

Procedure to Connect Jumper Cables

Turn the starting switch and battery disconnect switch of the failed machine, and the starting switch of the normal machine to OFF position.

1. Connect the clip of jumper cable (A) to the positive (+) terminal of battery (C) on the failed machine.
2. Connect the clip at the other end of jumper cable (A) to the positive (+) terminal of battery (D) on the normal machine.
3. Connect the clip of jumper cable (B) to the negative (-) terminal of battery (D) on the normal machine.
4. Turn the battery disconnect switch (S) of the failed machine to ON position.
5. Connect the other clip of jumper cable (B) to the revolving frame (E) of the failed machine.



How to Start Engine

1. Check both of normal machine and failed machine that the lock lever is set to LOCK position.

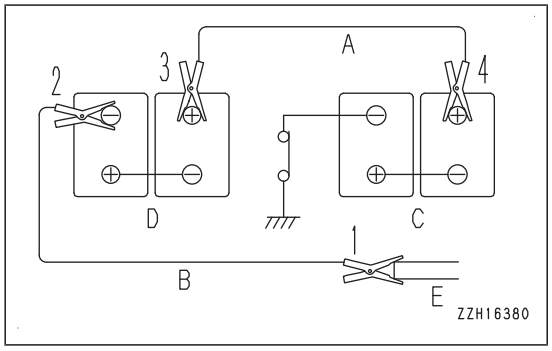
   Check also that all the control levers are in NEUTRAL position.
2. Make sure the clips are firmly connected to the battery terminals.
3. Start the engine of the normal machine and run it at high idle (max. speed).
4. Turn the starting switch of the failed machine to START position and start the engine.

   If the engine does not start, try again after at least 2 minutes.

Procedure to Disconnect Jumper Cables

After the engine has started, disconnect the jumper cables in the reverse of the order in which they were connected.

1. Remove the clip of jumper cable (B) from 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

Troubles and Procedures on Electrical System

- Consult your Komatsu distributor for the remedies shown with (*) in the remedy column.
- If there can be other problem or cause than the ones that follow, consult your Komatsu distributor for repair.

Problem	Main causes	Remedy
Lamp does not illuminate brightly even when the engine runs at maximum speed.	Wiring is defective, battery is deteriorated.	Check the loose terminal and wire breakage, repair them, and replace the battery. (*)
	Looseness and damage of belt	Check the tension of the fan belt, replace. (*)
Lamp flickers while engine is running.	Wiring is defective, battery is deteriorated.	Check the loose terminal and wire breakage, repair them, and replace the battery. (*)
	Looseness and damage of belt	Check the tension of the fan belt, replace. (*)
Charge level caution lamp does not go off even when engine is running.	Defective alternator	Replace. (*)
	Defective wiring	Check, repair. (*)
	Looseness of fan belt	Check the tension of the fan belt, replace. (*)
Unusual noise occurs from the alternator.	Defective alternator	Replace. (*)
Starting motor does not rotate even when starting switch is turned to the START position.	Defective wiring	Check, repair. (*)
	Starting motor is defective	Replace. (*)
	Battery charge is not sufficient.	Charge battery.
	Battery isolator switch is in the OFF position.	Turn it to the ON position.
	Engine shutdown secondary switch is at “ENGINE STOP” position.	Set it to “NORMAL” position. Put the cover on it.
Pinion of starting motor engages and disengages continuously (rattles).	Battery charge is not sufficient.	Charge battery.
	Safety relay is defective.	Replace. (*)
Starting motor cannot crank engine smoothly.	Battery charge is not sufficient.	Charge battery.
	Starting motor is defective	Replace. (*)
Starting motor disengages before engine starts.	Wiring is defective, ring gear and pinion are defective.	Check, repair. (*)
	Battery charge is not sufficient.	Charge battery.
Preheating pilot lamp does not light up.	Defective wiring	Check, repair. (*)
	Heater relay is defective.	Replace. (*)
	Defective monitor	Replace. (*)
Oil pressure caution lamp does not light up when engine is stopped (starting switch is at the ON position).	Defective monitor	Replace. (*)
	Engine oil pressure switch is defective.	Replace. (*)

Problem	Main causes	Remedy
Engine does not start easily at low temperature, or it is not felt warm when you touch the external part of the electric heater by hand immediately after it is preheated.	Defective wiring	Check, repair. (*)
	Open circuit in the electric heater	Replace. (*)
	Defective heater relay	Replace. (*)
	Fuse of heater is blown.	Replace. (*)
Engine does not start. (“L04” lights up on monitor.)	Data in the controller is damaged.	Check, repair. (*)
	Other system has problems.	Check, repair. (*)

Troubles and Procedures on Chassis

- For the remedies indicated with (*) in the remedy column, always contact your Komatsu distributor.
- In cases of problems or causes which are not listed below, ask your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Speed of travel, swing, boom, arm, bucket is slow	Lack of hydraulic oil	Set oil to specified level. See CHECKS BEFORE STARTING.
Pump generates abnormal noise. (sucking in air)	Clogged element in hydraulic tank strainer, lack of oil	Clean. See EVERY 2000 HOURS MAINTENANCE.
Excessive rise in hydraulic oil temperature	Loose fan belt	Check fan belt tension and replace. (*)
	Dirty oil cooler	Clean. See EVERY 500 HOURS MAINTENANCE.
	Lack of hydraulic oil	Set oil to specified level. See CHECKS BEFORE STARTING.
Track comes off.	Track too loose	Adjust track tension, see WHEN REQUIRED.
Abnormal wear of sprocket	Track too loose	Adjust track tension, see WHEN REQUIRED.
Boom rises slowly or does not rise.	Lack of hydraulic oil	Set oil to specified level. See CHECKS BEFORE STARTING.
Does not swing.	Swing lock switch still applied	Turn swing lock switch OFF.
	Swing brake system error	Check, adjust. (*)
		When move of machine to safe place is required, turn the swing parking brake cancel switch to ON position temporarily.

Troubles and Procedures on Engine

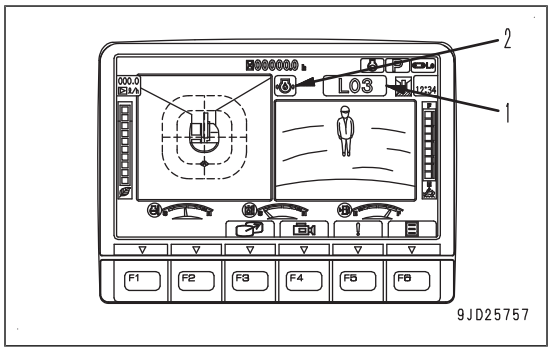
- Contact your Komatsu distributor for the remedies indicated with (*) in the remedy column.
- In cases of problems or causes which are not listed below, ask your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Engine oil pressure caution lamp lights up.	Insufficient oil in engine oil pan (sucking in air)	Make the oil level to the specified level. See CHECKS BEFORE STARTING.
	Improper oil is used. (Viscosity is improper.)	Replace oil by referring to USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE and RECOMMENDED FUEL, COOLANT, AND LUBRICANT.
	Oil filter cartridge is clogged.	Replace the cartridge by referring to EVERY 500 HOURS MAINTENANCE.
	Oil is leaked due to improper connection or breakage of oil pipe or pipe joint.	Check, repair. (*)
	Defective engine oil pressure sensor	Replace sensor. (*)
	Defective monitor	Replace monitor. (*)
Steam spurts out from top of radiator (pressure valve).	Insufficient coolant, water leakage	Check, add coolant, repair by referring to CHECKS BEFORE STARTING.
	Loose fan belt	Check fan belt tension, replace. (*)
	Accumulation of dirt or scale in cooling system	Change coolant, flush inside of cooling system by referring to WHEN REQUIRED.
	Clogged radiator fins or damaged fin	Clean or repair by referring to EVERY 500 HOURS MAINTENANCE.
	Defective thermostat	Replace thermostat. (*)
	Loose radiator filler cap (in high altitude operation)	Tighten cap or replace packing.
	Defective coolant level sensor	Replace sensor. (*)
	Defective monitor	Replace monitor. (*)

Problem	Main causes	Remedy
Radiator coolant level caution lamp lights up.	Insufficient coolant, water leakage	Check, add coolant, repair by referring to CHECKS BEFORE STARTING.
	Loose fan belt	Check fan belt tension, replace. (*)
	Accumulation of dirt or scale in cooling system	Change coolant, flush inside of cooling system by referring to WHEN REQUIRED.
	Clogged radiator fins or damaged fin	Clean or repair. See EVERY 500 HOURS SERVICE.
	Defective thermostat	Replace thermostat. (*)
	Loose 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 by referring to CHECKS BEFORE STARTING.
	Air in fuel system	Repair place where air is sucked in by referring to EVERY 500 HOURS MAINTENANCE.
	Defective fuel injection pump or defective nozzle	Replace pump or nozzle. (*)
	Starting motor turns engine sluggishly.	See PHENOMENA AND ACTIONS FOR ELECTRICAL SYSTEM.
	Preheating pilot lamp does not light up.	See PHENOMENA AND ACTIONS FOR ELECTRICAL SYSTEM.
	Defective compression (Incorrect valve clearance)	Adjust valve clearance. (*)
Exhaust gas color is white or bluish.	Water s mixed in KDPF.	Check, repair. (*)
	KDPF is broken.	Replace KDPF. (*)
	Excessive oil in oil pan	Make the oil level to the specified level. See CHECKS BEFORE STARTING.
	Improper fuel	Replace with specified fuel.
Exhaust gas turns black from time to time.	KDPF is broken.	Replace KDPF. (*)
Combustion makes breathing sound from time to time.	Defective nozzle	Replace nozzle. (*)
Abnormal noise is generated. (Combustion or mechanical noise)	Low grade fuel being used	Replace with specified fuel.
	Overheating	Refer to “Radiator coolant level caution lamp lights up” above.
	KDPF is broken internally.	Replace KDPF. (*)
	Excessive valve clearance	Adjust valve clearance. (*)

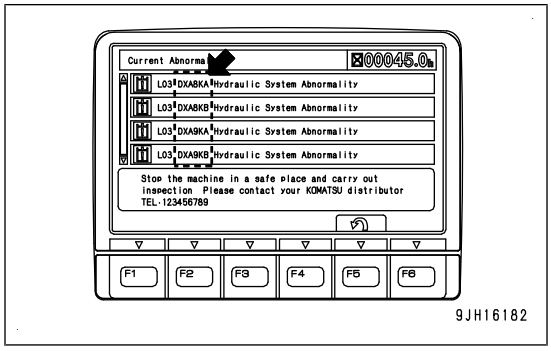
If Machine Monitor Shows Warning Display

When the action level display (1) or caution lamp (2) is shown on the display of the machine monitor, press the switch F5 to display the Current Abnormality and check the details and remedy.



- When “DXA8KA”, “DXA8KB”, “DXA9KA”, or “DXA9KB” is on the Current Abnormality screen, turning the pump secondary drive switch to upper (emergency) position enables operations temporarily.

  After that, immediately ask your Komatsu distributor for the inspection and repair.
- When “DW4GKA” or “DW4GKB” is on the Current Abnormality screen, turning the pump secondary drive switch to upper (emergency) position enables operations of work equipment (boom) temporarily.
  After that, immediately ask your Komatsu distributor for the inspection and repair.



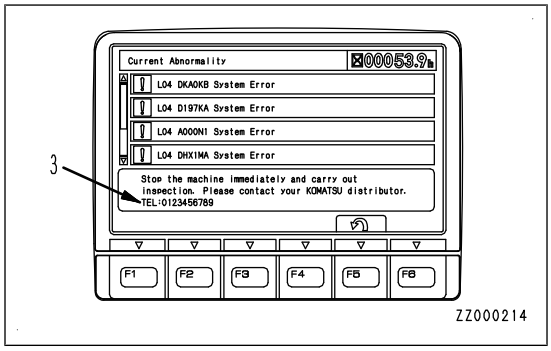
- If “CA2249” or “CA559” is displayed on the Current Abnormality screen although the machine has not run out of fuel, replace both of the fuel main filter and fuel prefilter immediately. For replacing method, see “How to Replace Fuel Prefilter Cartridge” and “METHOD FOR REPLACING FUEL MAIN FILTER CARTRIDGE”.
  If “CA2249” or “CA559” is not cleared even after the replacement, the machine still can perform normal operation, but ask your Komatsu distributor for inspection immediately.

The Contact Telephone Number If an Error Occurs

When an error screen is displayed on the monitor, press the switch F5 to display the Current Abnormality screen, and telephone number (3) for the point of contact is displayed in the message column at the bottom of the screen.

REMARK

If no point of contact telephone number is registered, no telephone number is displayed.
Ask your Komatsu distributor for the telephone number registration if necessary.



Maintenance

⚠ WARNING

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

Precautions for Maintenance

Do not perform any inspection and maintenance operation that are not found in this manual.

Examine 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.

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 When You Refill Oil or Fuel

If your machine is equipped with a strainer, do not remove it while filling oil or fuel.

Precautions When You Add DEF

Do not remove the strainer while adding DEF.

It is recommended to use a nozzle having a diameter and a length specified by ISO 22241-4 and an auto stop function to add DEF.

Precautions for Welding

- When 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 System

When hydraulic equipment is repaired or replaced, or the hydraulic piping is disconnected, the air must be bled from the circuit.

Precautions When You Install 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 Runs

- For details of the checks when the engine is running, see SAFETY, “TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING” 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.

Select Fuel and Lubricants by Ambient Temperature

It is necessary to select fuel or lubricant according to the ambient temperature.

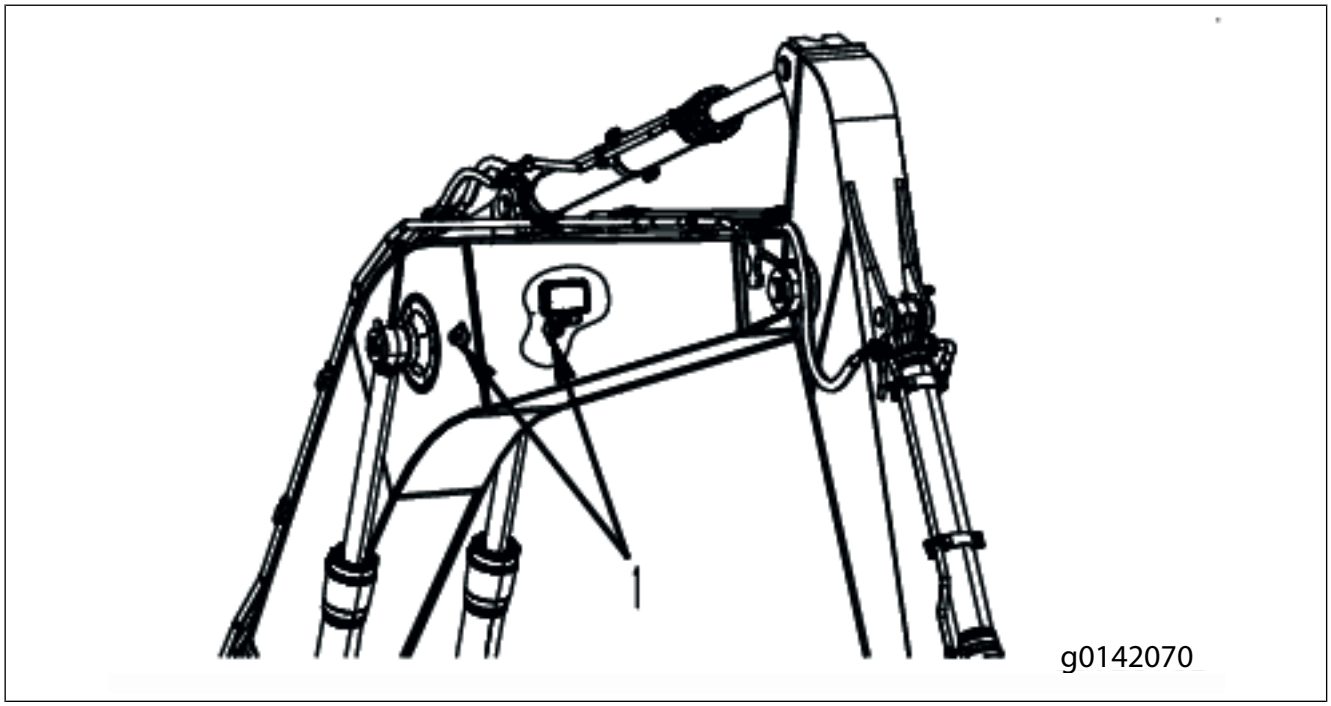
Close Engine Hood Securely

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.

Precautions When You Clean Work Equipment Control Lever

- If oil or detergent is attached on the resin parts that are used at the knob part of the work equipment control lever of the hydraulic excavator, it is hardened in a short period. If it is hardened, the horn switch or one-touch power maximizing switch cannot be pushed. Be careful not to let oil or detergent attach on the work equipment control lever.
- When dirt is attached on the work equipment control lever, wipe it off with a dry cloth or a cloth wet with water. If oil or detergent is attached on the lever, it can cause the deterioration. Do not use detergent or such.



Personal fall arrest equipment may be attached to the anchor point for tie-off (1).

This may be utilised when carrying out maintenance, however, take care of the following:

- Never work alone when using personal fall arrest equipment. In the event of a fall you may become stranded, resulting in serious injury or death.
- Always ensure that suitable access equipment is used.
- Do not use the tie-off point for any other purpose.

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)
Radiator	Non-Amine Engine Coolant (AF-NAC) (Komatsu genuine) (density: 30% or above)

Handle Oil, Fuel, Coolant, and Do Oil Clinic

Oil

- Oil is used in the engine and hydraulic equipment under extremely severe conditions (high temperature, high pressure), and deteriorates with use.
  Always use oil that matches the grade and maximum and minimum ambient temperatures recommended in Operation and Maintenance Manual.
  Even if the oil is not dirty, always change the oil at the specified interval.
- Oil corresponds to blood in the human body, always be careful when handling it to prevent any impurities (water, metal particles, dirt, etc.) from getting in.
  The majority of failures with the machine are caused by the entry of such impurities.
  Take particular care not to let any impurities get in when storing or adding oil.
- Never mix oils of different grades or brands.
- Always add the specified amount of oil.
  Having too much oil or too little oil are both causes of failures.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit. In such cases, consult your Komatsu distributor.
- When changing the oil, always replace the related filters at the same time.
- We recommend that you have an oil analysis periodically to check the condition of the machine. For those who wish to use this service, consult your Komatsu distributor.
- When using commercially available oil, it may be necessary to reduce the oil change interval. We recommend that you use the Komatsu oil clinic to check the characteristics of the oil in detail.

NOTICE

Komatsu recommends using Komatsu genuine engine oil for KDPF. If engine oil other than Komatsu genuine oil for KDPF is used, it may shorten cleaning interval of KDPF filters, adversely affect the engine such as deteriorated oil may reduce lubricating function, and it may cause failure, shortening of the machine life, lowering of performance and increase of fuel consumption.

Fuel

- To prevent water formation inside the fuel tank because of condensation caused by the moisture in the air, fill the tank with fuel after the day's work is completed.
- The fuel pump is a precision instrument. If fuel which contains water or dirt is used, it cannot work correctly.
- Be very careful not to let foreign material get in when you store or add fuel.
- Be sure to use the fuel that agrees with the temperature as in the Operation and Maintenance Manual.
  - If the fuel is used at the temperatures lower than the specified temperature (particularly at temperatures below -15 °C), the fuel will solidify.
  - If the fuel is used at temperature higher than the operating temperature, the viscosity will decrease, and it can result in failures such as a drop of output.
- Before you start the engine, or after 10 minutes of refuel, drain the sediment and water from the fuel tank.
- When you run out of fuel or replace the filters, it is necessary to bleed air from the circuit.
- If foreign material is mixed in the fuel tank, clean the tank and fuel system.

NOTICE

Be sure to use the ultra-low sulfur diesel fuel.
To get good fuel consumption properties and exhaust gas properties, the engine mounted on this machine uses an electronically controlled high-pressure fuel injection device and emission gas control system (KDPF). The high-pressure fuel injection device requires high precision parts and lubrication. If low viscosity fuel with low lubrication quality is used, its durability can decrease significantly. Also, if fuel with high sulfur content is used, it can deteriorate the engine parts and KDPF catalyzer, and can cause failures, decrease of the service life, and degradation in performance.

Bio-Fuel

The biofuel is a fuel that is formed in a transesterification reaction of vegetable oil, animal fat, and edible oil.

The ASTM D975 diesel fuel can contain 5 % or less of biofuel.

Use the biofuel conforming to ASTM D7467 if its mixing ratio is between 6% to 20%.

The EN590 diesel fuel can contain 7 % or less of biofuel.

When you use 100% biofuel for mixing, it needs to conform to ASTM D6751 or EN14214.

In the United States, purchase the biofuel from the dealer certified by BQ-9000.

In the EU, purchase the biofuel from the member companies of European Biodiesel Board (EBB).

In other countries or regions, purchase the biofuel from the dealer that guarantees the same quality as BQ-9000 or EBB.

NOTICE

When you use biofuel other than the preceding diesel fuel and its mixing ratio is up to 20 %, obey the precautions that follow.

- **It is necessary to consult with the local regulatory authorities of engine exhaust gas regulation whether the biofuel can be used or not.**
- **The fuel can possibly leak because of the deterioration of rubber material of the fuel hose. Replace it with the fuel hose applicable for biofuel. Consult your Komatsu distributor for replacement of the fuel hose.**
- **Biofuel cannot be stored for a long time because it is easy to deteriorate and change in quality. Use the fuel in the storage tank or the fuel tank of the machine within 6 months. If the deteriorated and altered biofuel is used, it can cause bad effects on the engine parts. When you store the machine which uses the diesel fuel mixed with the biofuel for more than 3 months, do the procedure that follows.**
  - **Replace it with pure diesel fuel or the new diesel fuel mixed with the biofuel at the lowest possible mixing ratio.**
  - **After you change the fuel, run the engine for a minimum of 30 minutes before you store the machine.**
- **Because the biofuel dissolves the materials sticking to the fuel tank and fuel line, the fuel filter can be clogged with them. When you change the diesel fuel to the biofuel, replace the fuel main filter cartridge and fuel prefilter cartridge with new ones. When you replace the fuel main filter cartridge and fuel prefilter cartridge, make the replacement interval half the normal time until the second replacement after you change the diesel fuel to the biofuel.**
- **Because the biofuel absorbs moisture easily, it can possibly cause a growth of microorganism. When the microorganism grows in the biofuel, it can cause corrosion of the fuel system and the clogging of the fuel filter. Drain the water from the fuel tank before you start the operation. When you complete the operation, fill the fuel tank to reduce the air layer.**
- **If the biofuel is used in the conditions of the specific operation, the fuel can possibly get mixed into the engine oil. The fuel level in the engine oil must not exceed 5 %. Deteriorated engine oil can cause adverse effects on the engine parts such as a reduction of lubricating function. It is recommended to take a sample of the oil on a periodic basis.**
- **The characteristics of the biofuel change when outside air temperature is low. The fuel filter can be clogged and the fuel inside the fuel tank can be solidified. Store the biofuel in the warm building or in the storage tank.**

Ash is easy to be accumulated in KDPF when the biofuel is used. Thus, the regeneration of KDPF can possibly become more frequent if the mixing ratio of the biofuel is high.

The energy density of the biofuel becomes lower by 7 to 10% with that of the diesel fuel. Fuel consumption and output can possibly be lowered when the mixing ratio is high.

Fuel hose quality can change as time passes due to the influence of material of bio when using BDF that mixing ratio is over 20% and they are likely to wear out or deteriorate.

Strongly recommend to replace Fuel hose every 2 years or every 4000 hours, whichever comes sooner.

Paraffin-based Fuel

The paraffin-based fuel is generated by natural gas, coal, vegetable oil, and animal and plant fat, and its main constituent is paraffin.

The paraffin-based fuel has almost the same characteristics as the diesel fuel.

Vegetable oil and fat-derived fuel are called renewable diesel (RD) and hydrogenated vegetable oil (HVO).

The fuel synthesized from natural gas is called gas-to-liquid (GTL).

NOTICE

Use the paraffin-based fuel which agrees with EN15940:2016 and ASTM D975.
As long as the fuel agrees with EN15940:2016 and ASTM D975, its mixing ratio can be up to 100%.

The energy density of the paraffin-based fuel becomes lower up to 10% with that of the diesel fuel. Thus, fuel consumption and output can possibly be lowered.

Coolant 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.
  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 vapour 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.

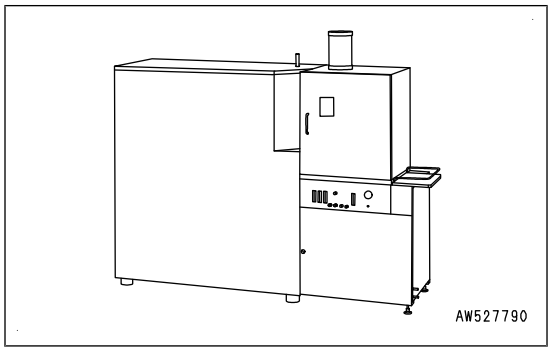
Thanks to long term experience and ample data accumulated, we can grasp condition of your machine accurately and provide proper recommendation.

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.

Analysis Items

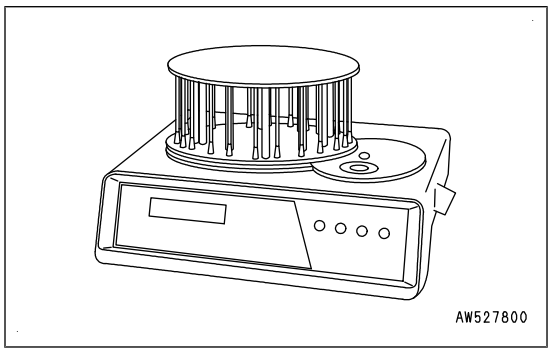
Measurement of metallic powder concentration

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 Collection Interval

500 hours

Precautions When You Collect Oil

- 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.

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.**
- **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

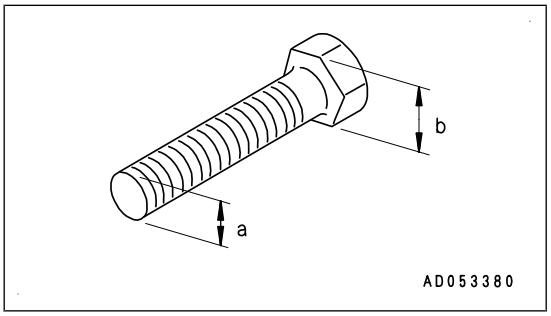
Tightening Torque List

⚠ 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.

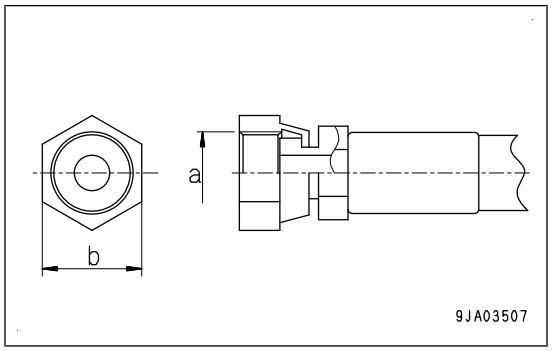
If it is necessary to replace any nut or bolt, Komatsu recommends using Komatsu genuine part of the same size as the part that is removed.



Thread diameter of bolt "a" (mm)	Width across flats "b" (mm)	Tightening torque					
		Target value			Allowable range		
		Nm	kgfm	lbft	Nm	kgfm	lbft
6	10	13.3	1.35	9.8	11.8 to 14.7	1.2 to 1.5	8.7 to 10.8
8	13	31	3.2	22.8	27 to 34	2.8 to 3.5	20.3 to 25.3
10	17	67	6.8	48.8	59 to 74	6 to 7.5	43.4 to 54.2
12	19	111	11.3	81.4	98 to 123	10 to 12.5	72.3 to 90.4
14	22	172	17.5	127	153 to 190	15.5 to 19.5	112 to 141
16	24	260	26.5	192	235 to 285	23.5 to 29.5	170 to 213
18	27	360	37	268	320 to 400	33 to 41	239 to 297
20	30	510	52.3	378	455 to 565	46.5 to 58	336 to 420
22	32	688	70.3	508	610 to 765	62.5 to 78	452 to 564
24	36	883	90	651	785 to 980	80 to 100	579 to 753
27	41	1295	133	957	1150 to 1440	118 to 147	853 to 1060
30	46	1715	175	1265	1520 to 1910	155 to 195	1120 to 1410
33	50	2205	225	1630	1960 to 2450	200 to 250	1450 to 1810
36	55	2745	280	2025	2450 to 3040	250 to 310	1810 to 2240
39	60	3260	333	2405	2890 to 3630	295 to 370	2130 to 2680

Torque List for Hoses

Tighten the hoses by the following torque shown in the table.



Taper Seal

Nominal No. of hose	Thread size "a" (mm)	Width across flats "b" (mm)	Tightening torque					
			Target value			Allowable range		
			Nm	kgfm	lbft	Nm	kgfm	lbft
02	14	19	44	4.5	32.5	34 to 63	3.5 to 6.5	25.3 to 47
03	18	24	78	8.0	57.9	59 to 98	6.0 to 10.0	43.4 to 72.3
04	22	27	103	10.5	75.9	84 to 132	8.5 to 13.5	61.5 to 97.6
05	24	32	157	16.0	116	128 to 186	13.0 to 19.0	94 to 137
06	30	36	216	22.0	159	177 to 245	18.0 to 25.0	130 to 181
10	33	41	216	22.0	159	177 to 245	18.0 to 25.0	130 to 181

Face Seal

Nominal No. of hose	Nominal size - thereads per inch"a"	Width across flats "b" (mm)	Tightening torque					
			Target value			Allowable range		
			Nm	kgfm	lbft	Nm	kgfm	lbft
02	$^{9}/_{16}$ -18UN	19	44	4.5	32.5	34 to 54	3.5 to 5.5	25.3 to 39.8
03	$^{11}/_{16}$ -16UN	22	74	7.5	54.2	54 to 93	5.5 to 9.5	39.8 to 68.7
04	$^{13}/_{16}$ -16UN	27	103	10.5	75.9	84 to 132	8.5 to 13.5	61.5 to 97.6
05	1 -14UNS	32	157	16.0	116	128 to 186	13.0 to 19.0	94.0 to 137.4
06	1 $^{3}/_{16}$ -12UN	36	216	22.0	159	177 to 245	18.0 to 25.0	130.2 to 180.8

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”.
- 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.
- Contact your Komatsu distributor for changing the maintenance interval of the machine monitor.

Maintenance Schedule Table

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

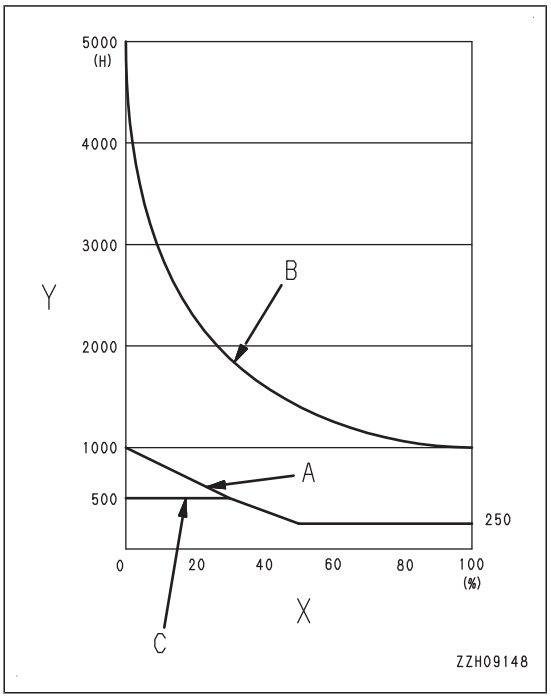
Change the oil according to the table.

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.

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.



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.

Maintenance Procedure

When Required

How to Examine, Clean and Replace 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.**

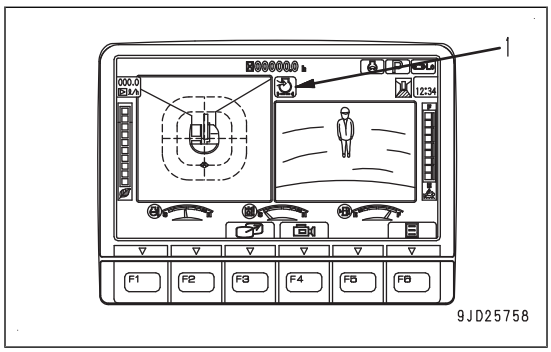
NOTICE

- **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.**

How to Examine 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.



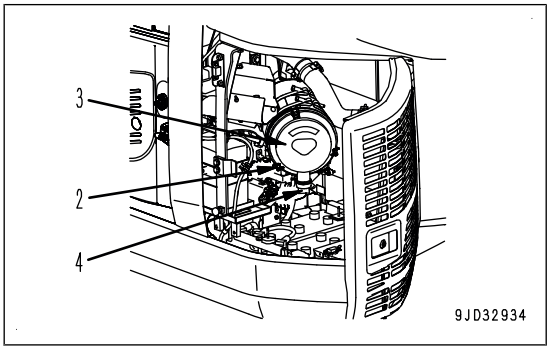
How to Clean Air Cleaner Outer Element

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.**

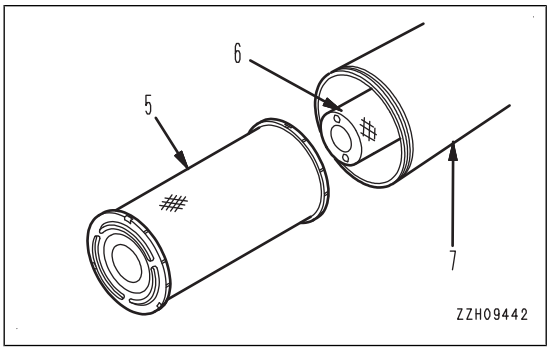
Clean the outer element in the following procedure.

1. Open the door at the rear left side of the machine, remove the hooks (2) (3 places), and remove the cover (3).

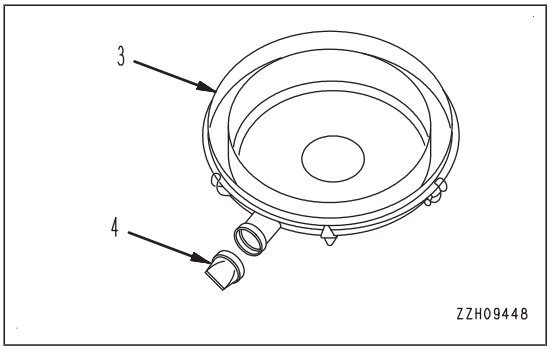


2. Hold the outer element (5), rock it lightly up and down and to the right and left, and pull it out while turning it to the right or left.
3. When the outer element (5) is removed, check that the inner element does not come out of position and is not at an angle.

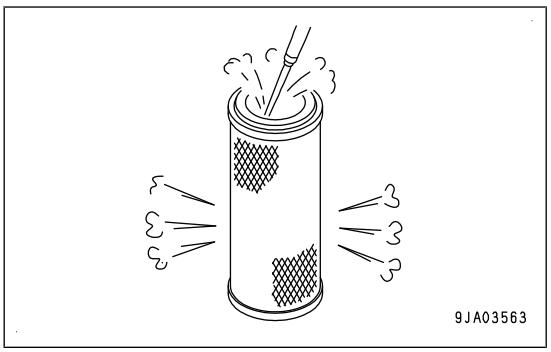
   If it is at an angle, push it straight to the bottom with your hand.
4. After removing the outer element (5), cover the inner element (6) with a clean cloth or tape to prevent dirt or dust from entering.



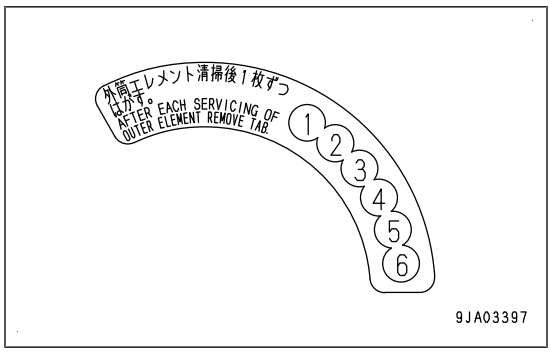
5. Clean the dust sticking inside the air cleaner body (7) and on the cover (3) by using a clean cloth or brush.
6. If any dust is attached to the vacuator valve (4) installed to the cover (3), remove it.
7. When outer element has been cleaned 6 times or used for 1 year, replace it.
   - When the element needs to be replaced
     Replace the inner and outer elements with new ones by referring to 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 (0.2 MPa or less {2.1 kgf/cm^2 or less}) from the inside of the outer element along the pleats.
9. Blow along the pleats from the outside, then blow again from the inside.



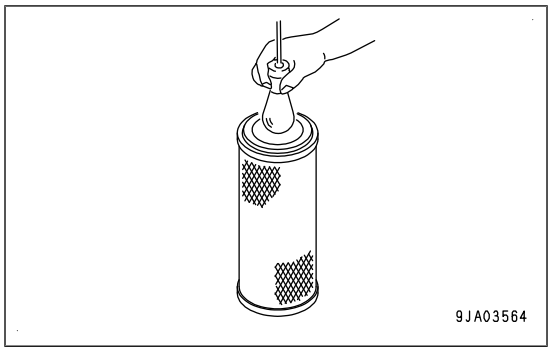
10. Peel off a seal after cleaning the element each time.



11. After the cleaning, illuminate the inside of the element with an electric bulb to check.

    If any hole or thin place is found, replace the inner and outer elements.

12. Remove the cover of cloth or tape attached to inner element (6).



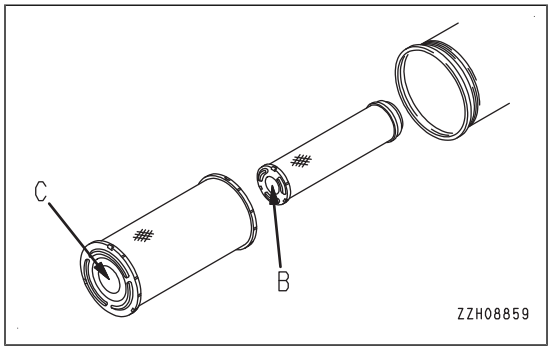
NOTICE

- **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 bottoms (B) and (C) of the air cleaner element (face where no hole is drilled) come to the 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 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 will be damaged, so be careful when installing.**

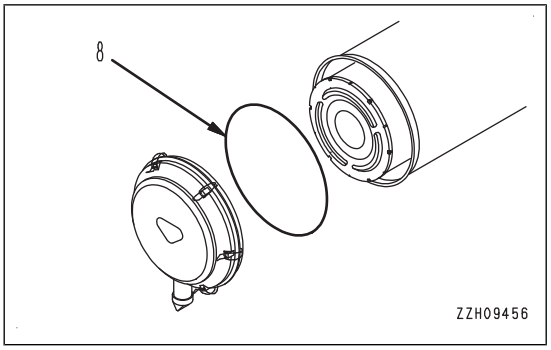


14. Push the outer element in straight with your hand when installing it to the air cleaner body.

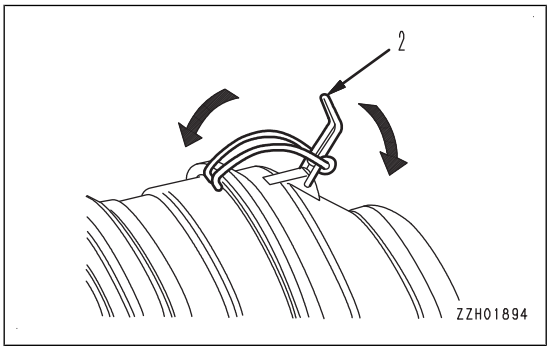
    Hold the outer element, and rock it lightly up and down and to the right and left while pushing it in, the outer element can be inserted easily.

15. Install the cover (3) according to the following procedure.

1) Check that the O-ring (8) is fitted to the cover (3).
2) Align the cover (3) with the element.

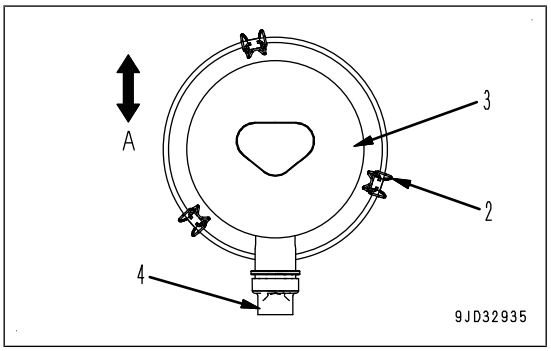


3) Lock the tip of hook (2) on the protrusion of the air cleaner body.
4) Lock the hooks (2) diagonally, (top and bottom, right and left) in the same way as when tightening the bolts.



5) Always install the cover (3) so that vacuator (4) faces the ground (A).
6) When the 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 the cover (3), and then install it again.



16. Check the air cleaner clogging caution lamp on the machine monitor.

    If it lights up just after cleaning of the elements has been finished, replace the inner and outer elements.

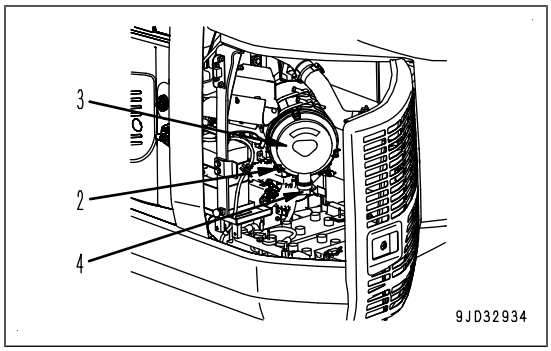
How to Replace Air Cleaner Element

NOTICE

- **Do not clean and reuse the inner element. Replace it with a new one at the same time when the outer element is replaced.**
- **If the outer element and cover are installed while the inner element is not installed properly, the outer element will 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 an improper part.**

Replace the element in the following procedure.

1. Open the door at the rear left side of the machine, remove the hooks (2) (3 places), and remove the cover (3).

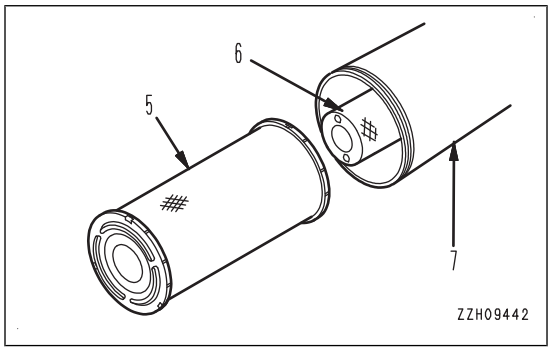


2. Hold the outer element (5), rock it lightly up and down and to the right and left, and pull it out while turning it to the right or left.

   Do not remove the inner element (6) at this time.

3. When the 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.

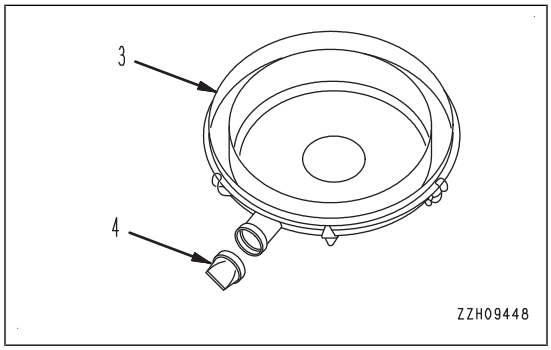


4. Clean the dust sticking inside the air cleaner body (7) and on the cover (3) by using a clean cloth or brush.
5. If any dust is attached to the vacuator valve (4) installed to the cover (3), remove it.
6. Remove the inner element (6), then install the new inner element immediately.

   Install the inner element securely so that it does not move.

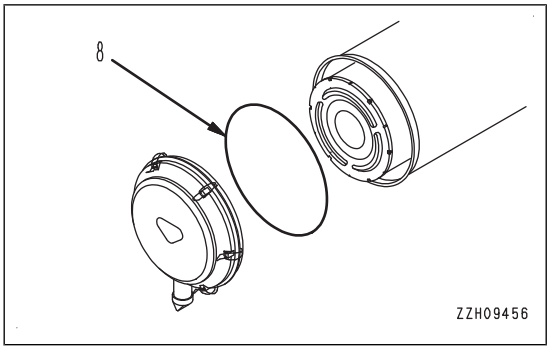
7. Push new outer element (5) in straight with your hand into the air cleaner body (7).

   Hold the element, and shake it lightly up and down and to right and left while pushing it in so that the element can be easily inserted.

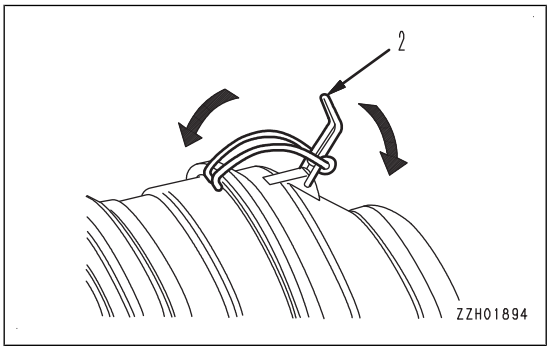


8. Install the cover (3) according to the following procedure.

1) Check that the O-ring (8) is fitted to the cover (3).
2) Align the cover (3) with the element.

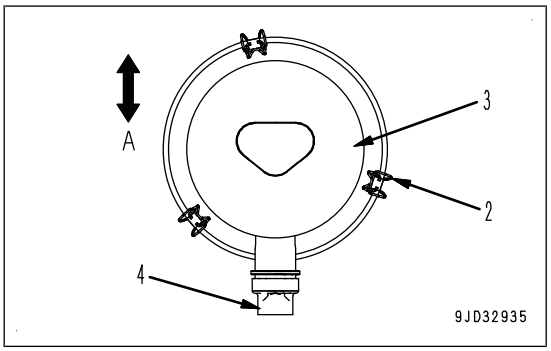


3) Lock the tip of hook (2) on the protrusion of the air cleaner body (7).
4) Lock the hooks (2) diagonally, (top and bottom, right and left) in the same way as when tightening the bolts.

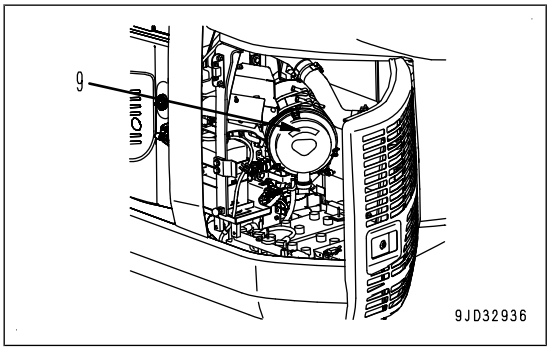


5) Always install the cover (3) so that the vacuator valve (4) faces the bottom (A).
6) When the cover (3) is installed, check that the clearance between the air cleaner body (7) and cover (3) is not too large.

   If the clearance is too large, remove the cover (3), and then install it again.



9. Replace the seal (9) on the cover (3) with a new one.



Examine 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.

How to Clean Inside of Cooling System

⚠ WARNING

- **Immediately after the engine is stopped, the coolant is still hot and the pressure is accumulated in the radiator. You may get burn injury if you remove the cap to perform draining in this state. Always wait for the temperature to go down, and 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 the rear 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 years 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.

As a rule, Komatsu does not recommend the use of the coolant other than 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 the coolant, investigate the lowest temperature in the past and decide the density for the coolant from the coolant density table below.

When deciding the density for the coolant, set it for a temperature 10 °C {18 °F} below the actual lowest temperature in the working area.

The coolant density varies according to the ambient temperature, but it must be 30 % or more.

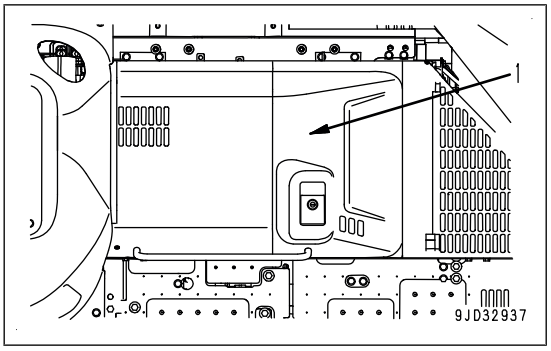
Coolant Density Table

Min. atmospheric temperature	°C	-10 or more	-15	-20	-25	-30	-35	-40	-45	-50
	°F	14 or more	5	-4	-13	-22	-31	-40	-49	-58
Density (%)		30	36	41	46	50	54	58	61	64

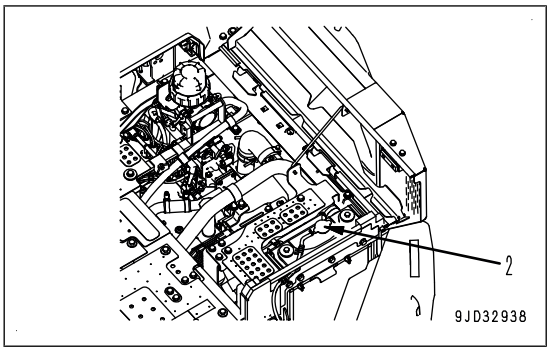
Clean the inside of the cooling system according to the following procedure.

1. Place the machine on a level ground, then stop the engine.

2. Open the engine hood (1).

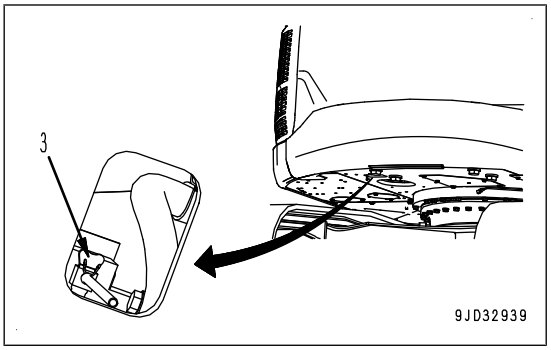


3. Check that the coolant temperature is low enough to touch the radiator cap surface by bare hand, turn the radiator cap (2) slowly until it hits the stopper, and release the pressure.
4. While pushing the radiator cap (2), turn it until it hits the stopper, then remove it.

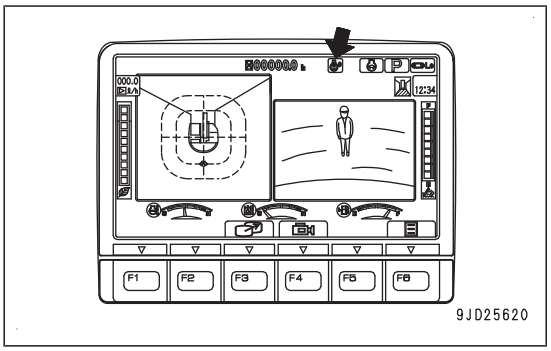


5. Remove the undercover, then place the container under drain valve (3) to receive the coolant.
6. Open the drain valve (3) to drain the coolant.
7. After draining the coolant, close the drain valve (3) and add city water.

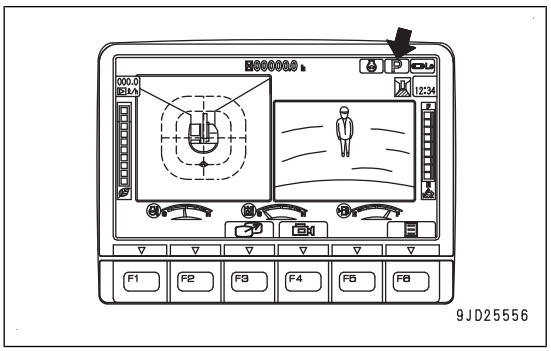
   Pour the water until it fills the radiator.
8. Start the engine.
9. Run the engine at low idle for approximately 10 minutes.



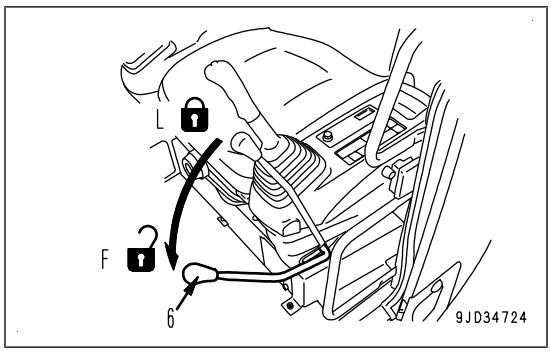
10. Set the swing lock switch to ON position and check that the swing lock pilot lamp is lit.



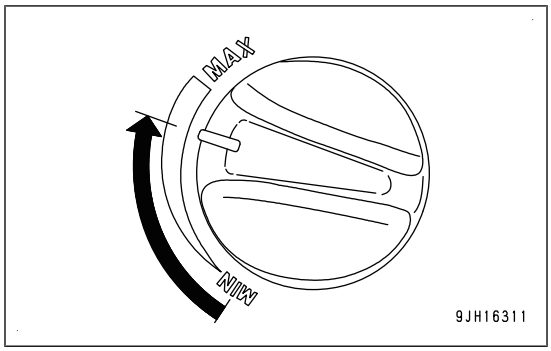
11. To complete the warm-up operation of the hydraulic component more quickly, set the working mode to P mode (heavy-duty mode).



12. Operate the lock lever (6) by the red portion on the top, slowly and securely set it to FREE position (F), then raise the bucket from the ground.



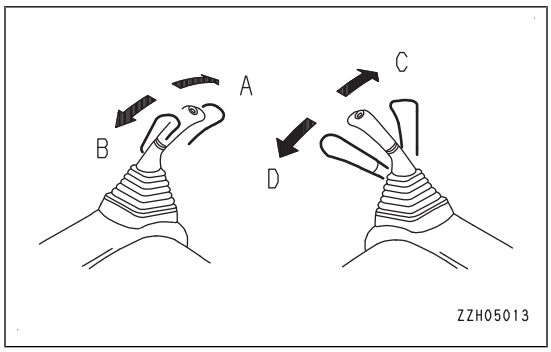
13. Turn the fuel control dial to a point of 2/3 between Low idle (MIN) position and High idle (MAX) position.



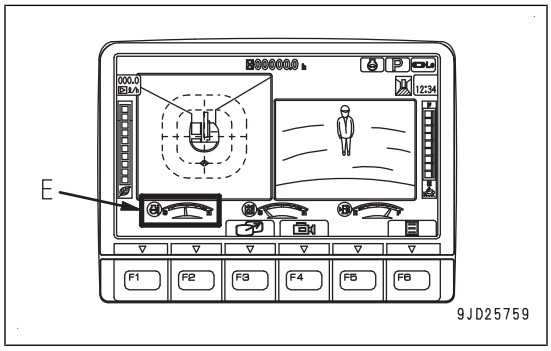
NOTICE

When the work equipment is operated, take care that it does not interfere with the machine or ground.

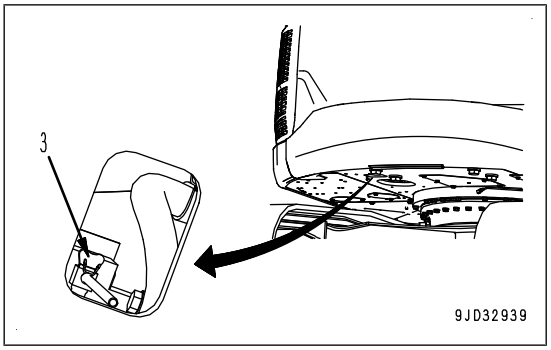
14. Operate the work equipment control levers according to the following procedure.
    1) Move the R.H. work equipment control lever (5) slowly in the direction of the bucket CURL position (D). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.
    2) Move the R.H. work equipment control lever slowly in the direction of the bucket DUMP position (C). Operate the lever to the end of its stroke 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 position (B). Operate the lever to the end of its stroke 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 position (A). Operate the lever to the end of its stroke and hold it in position for 30 seconds.



By repeating the steps 1) to 4), the pointer of engine coolant temperature gauge rises, and it stops at around the center of the scale (E) once. Continue the operation for approximately 10 minutes after that.



15. Stop the engine and open the drain valve (3) to drain the water.



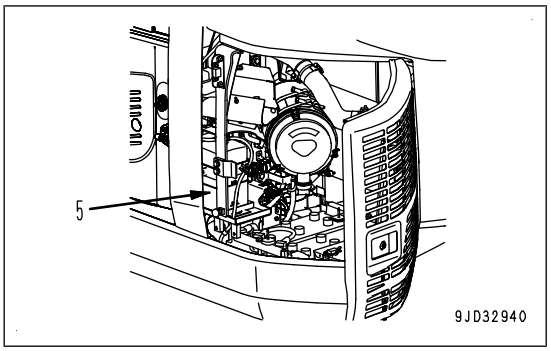
16. Open the door at the rear left of the machine, drain the coolant from the reservoir tank (5), clean the inside of the reservoir tank, then fill with coolant up to the middle between FULL and LOW marks.

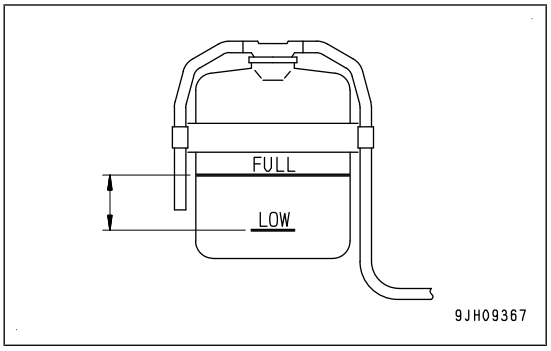
    NOTICE

    If it 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 the drain valve (3).
19. Install the undercover.
20. Fill with coolant through the coolant filler port of the radiator up to the mouth of the port.

    For the coolant density, see “coolant density table”.

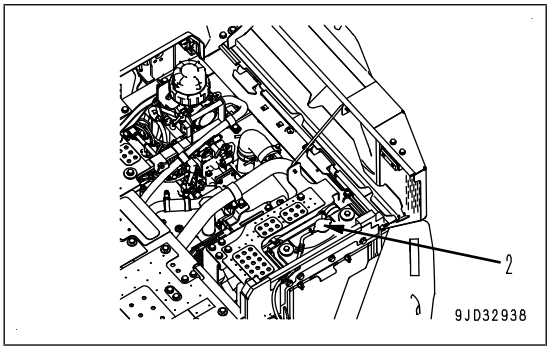




21. Run the engine at low idle for 5 minutes to remove the air from the coolant, then run it at high idle for further 5 minutes.

    Keep the radiator cap (2) removed during the above operations.

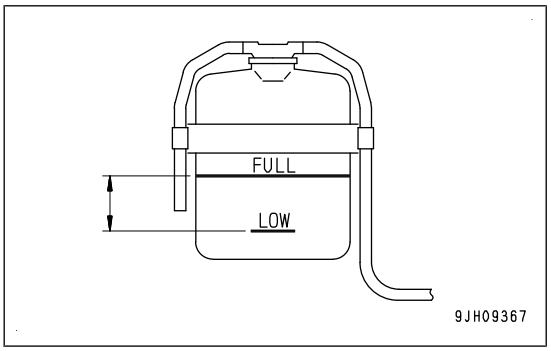
22. Stop the engine, wait for approximately 3 minutes, add coolant up to the mouth of the filler port, and tighten the radiator cap (2).



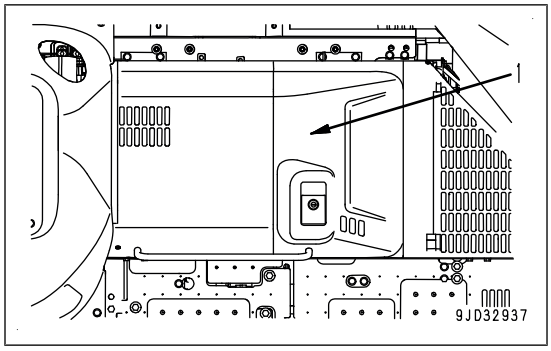
23. Check the coolant level in reservoir tank.

    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 the engine hood (1).



Examine Komatsu Maintenance-Free Battery Indicator

(if equipped)

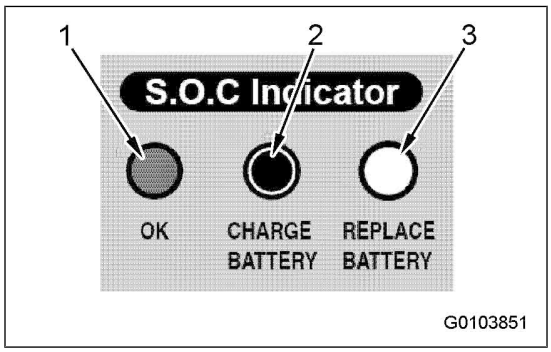
Perform this check before operating the machine.

⚠ WARNING

- **Do not let an open flame be near the battery. The battery releases the flammable gas, and it can cause an explosion.**
- **Battery electrolyte is dangerous object. Be careful not to let it get in your eyes or on your skin. If it gets on you, wash it off with a lot of water and consult a doctor.**
- **Battery electrolyte cannot be topped up.**

- Indicators that show the charging state and battery electrolyte level are located on the top of the battery.
- Check the display status and follow the instructions.
- The indicator display can not be correct at low temperatures.
- Use the supplied mirror to see the indicator because you cannot easily see it directly.

1. Green: Normal
2. Black: Charging is required. Follow the instruction manual for the battery charger and charge it correctly.
3. White: Battery electrolyte is insufficient. Replace the battery with a new one. Battery electrolyte cannot be topped up.

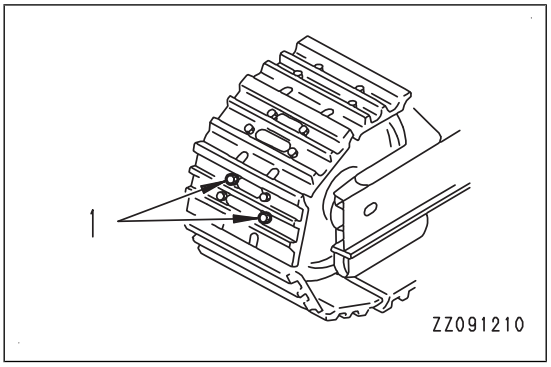


How to Examine Looseness and Tighten Track Shoes Bolts

NOTICE

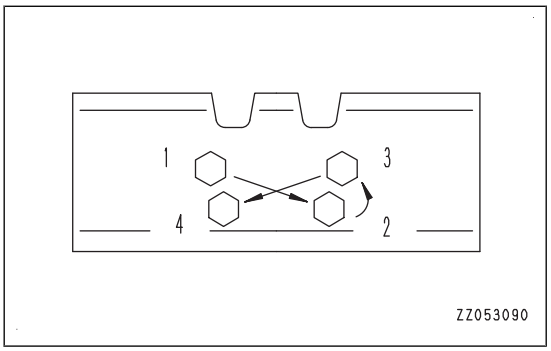
If the machine is used with track shoe bolts loose, they will break. If any looseness of the shoe bolt is found, retighten it.

1. Check for looseness of the shoe bolt (1).



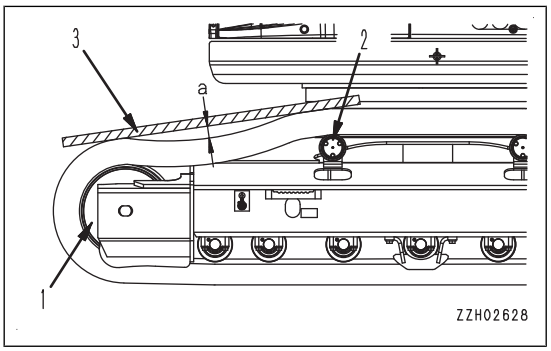
2. If any looseness of the bolt is found, tighten it in order shown in the figure.

   Tightening torque: 490 ± 49 Nm {50 ± 5 kgfm, 362 to 36 lbft}
3. Check that the nut and shoe are in close contact with the link contact surface.
4. After checking, tighten a further 120 ± 10 °.



How to Examine and Adjust 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.



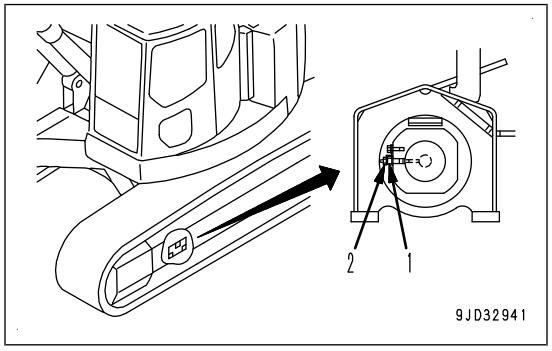
If the deflection is out of the standard value range, adjust it into the standard value range.

How to Increase Track Tension

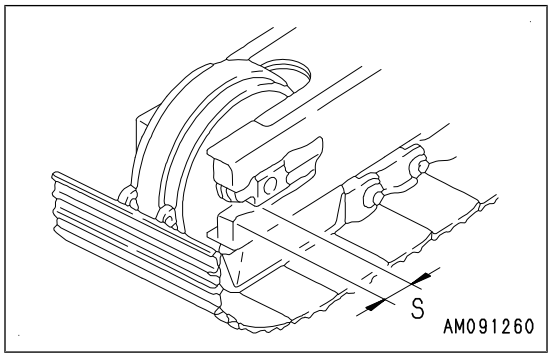
Items to be prepared

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. Run the engine at low idle, move the machine slowly forward (by the length of track on the ground), then stop the machine, so that the you can check that the tension is correct.
3. Check the track tension again, and if the tension is not correct, adjust it again.



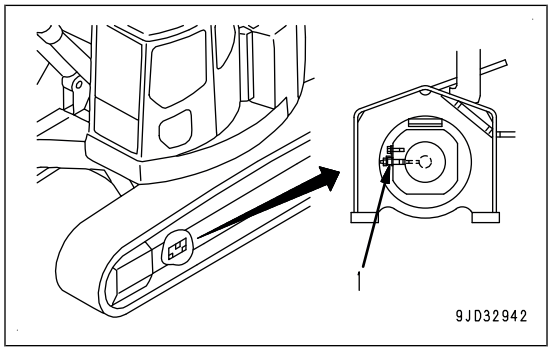
4. Continue to pump in grease until the dimension S becomes 0 mm. If the tension is still loose, the pins and bushings are excessively worn, so they must be inverted or replaced. Ask your Komatsu distributor for repair.



How to Decrease Track Tension

⚠ WARNING

Never loosen the plug (1) more than 1 turn.
If plug (1) 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) at this time. And never put your face in the mounting direction of plug (1).



1. Loosen the plug (1) gradually to discharge the grease.
2. If the grease does not come out smoothly, move the machine forward and backward a short distance.
3. Tighten the plug (1).
4. Run the engine at low idle, move the machine slowly forward (by the length of track on the ground), then stop the machine, so that the you can check that the tension is correct.
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.

How to Replace Bucket Teeth (Vertical Pin Type)

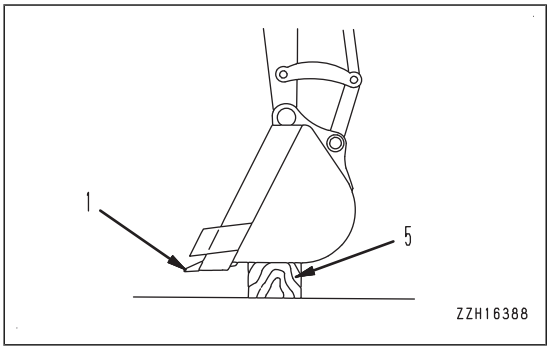
Replace the bucket teeth before the adapter starts to wear.

⚠ WARNING

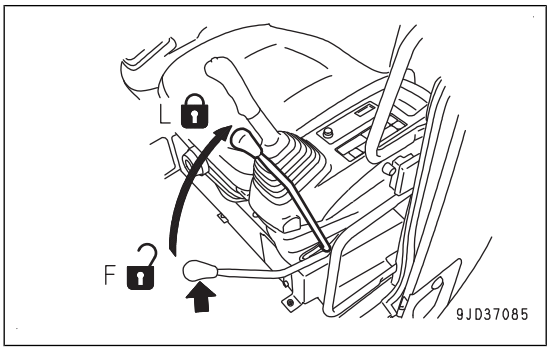
- **It is dangerous if the work equipment moves by mistake when the tooth is being replaced. Set the work equipment in a stable condition, set the lock lever securely to LOCK position, and stop the engine.**
- **As the pin is driven out with strong force, it is dangerous that the pin may fly out. Check that there is no people around the machine.**
- **Broken pieces may fly during the replacement work, so always wear the protective equipment such as protective eyeglasses and gloves.**

Items to be prepared
- Hammer
- Bar

1. To make it possible to drive out a pin of tooth (1), put block (5) under the bottom of the bucket, and make the bottom of the bucket horizontal.



2. Check that the work equipment is in a stable condition, operate the lock lever by the red portion on the top, and set it to LOCK position (L).

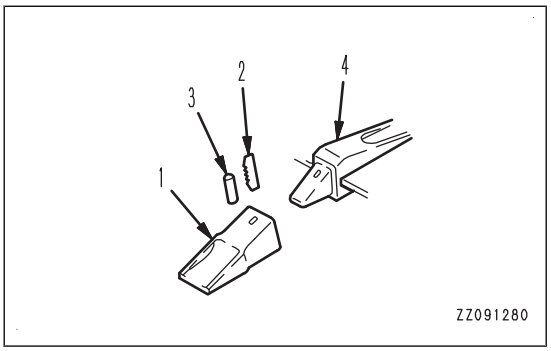


3. Use a hammer and bar to drive out lock pin (2).

   If the bar is set against rubber pin lock (3) when it is hit, the rubber pin lock may break. Set it against the back of the pin.

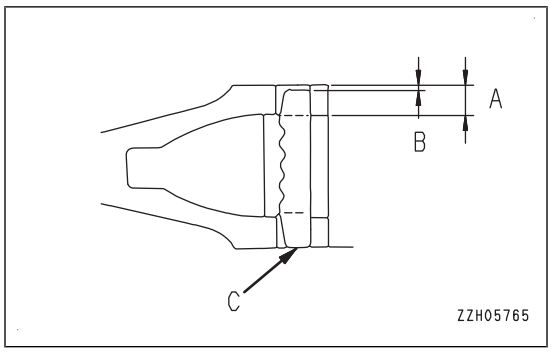
4. After removing lock pin (2) and rubber pin lock (3), check them.

   If lock pin (2) and rubber pin lock (3) are used in the condition below, it will cause tooth (1) to come off during operation. Check the shape of the parts. If they have any damage, replace them.



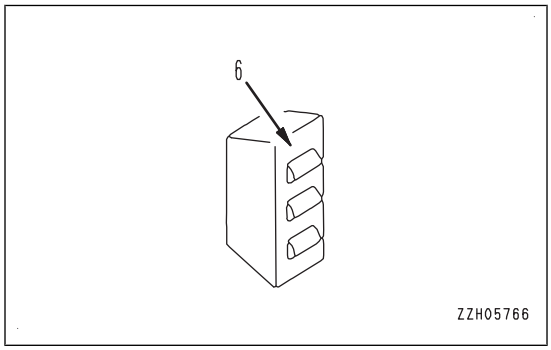
- Lock pin (2) is too short.

  Dimension (B) is 1/3 or more of dimension (A) when lock pin (2) is aligned with bottom face (C).



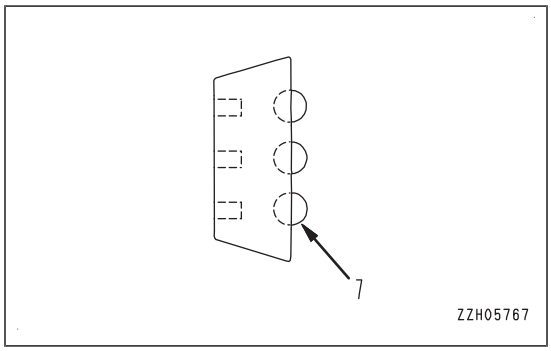
- The steel ball is about to come off.

  Rubber (6) of the rubber pin lock is broken.



- The steel ball sinks.

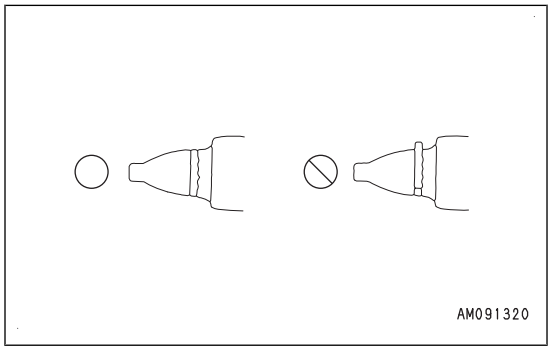
  The rubber of the rubber pin lock is deteriorated and steel ball sinks into it when you press it.



5. Remove the soil stuck to adapter (4) by using a putty knife.
6. Use your hand or a hammer to push rubber pin lock (3) into the hole of adapter (4).

   When doing this, be careful that rubber pin lock (3) does not fly out from the adapter surface.
7. Clean the inside of 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.

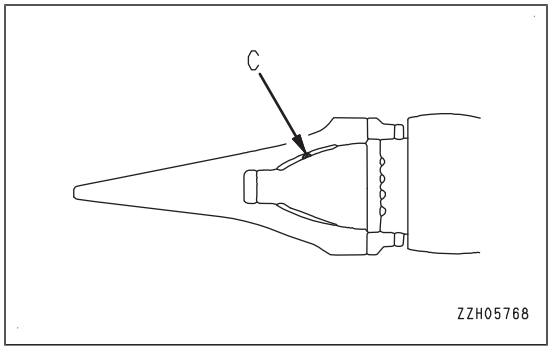


8. Fit tooth (1) to adapter (4), and check that when tooth (1) is pressed strongly, the rear face of the hole for the pin of teeth (1) is at the same level as the rear face of the hole for the pin of adapter (4).

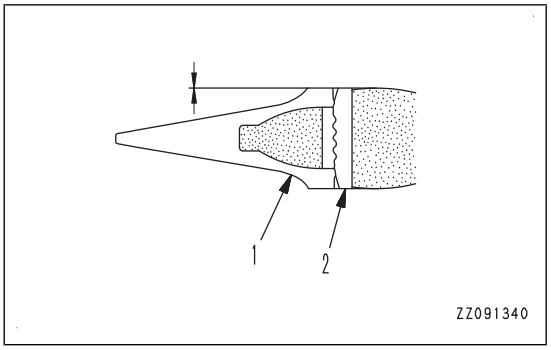
   If the rear face of the pin hole of tooth (1) protrudes in front of the rear face of the pin hole of adapter (4), do not knock the pin in.

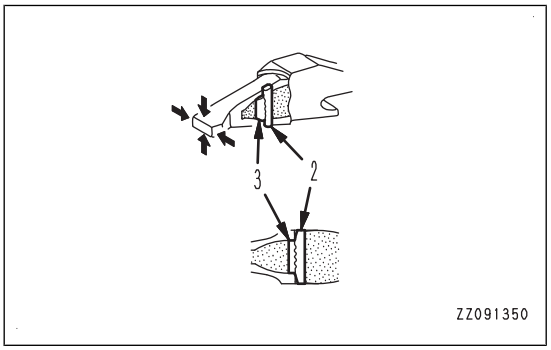
   There is sticking matter (C) which prevents tooth (1) from fitting into adapter (4) perfectly.

   Find out remove the sticking matter and fit tooth (1) into adapter (4) sufficiently, and then drive lock pin (2).



9. Insert lock pin (2) in the pin hole in tooth (1), and knock it in so that the top surface of lock pin (2) is the same height as the surface of tooth (1).





10. After replacing a bucket tooth, always check the following.
    - After 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 driven in.
    - Lightly hit the tip of tooth (1) from above and below, and hit its sides from right and left.
    - Rubber pin lock (3) and lock pin (2) are set as shown in the figure.

REMARK

If tooth (1) is turned, the wear will become uniform. This will extend the service life of the tooth and reduce the frequency of replacement.
When replacing tooth (1), replace rubber pin lock (3) and lock pin (2) with new ones as well. This will prevent tooth (1) from falling out.

Replace Bucket Teeth (Horizontal Pin Type)

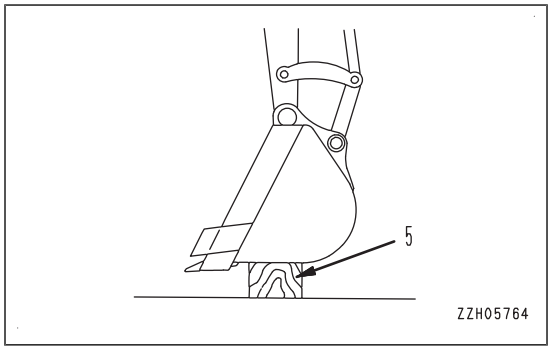
Replace the bucket teeth before the adapter starts to wear.

⚠ WARNING

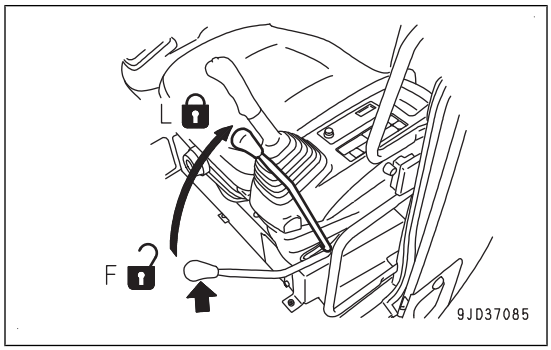
- **It is dangerous if the work equipment moves by mistake when the tooth is being replaced. Set the work equipment in a stable condition, set the lock lever securely to LOCK position, and stop the engine.**
- **As the pin is driven out with strong force, it is dangerous that the pin may fly out. Check that there is no people around the machine.**
- **Broken pieces may fly during the replacement work, so always wear the protective equipment such as protective eyeglasses and gloves.**

Items to be prepared
- Hammer
- Bar

1. To pull out pin (1) of tooth (2), put block (5) under the bottom of the bucket, and make the bottom surface of the bucket horizontal.

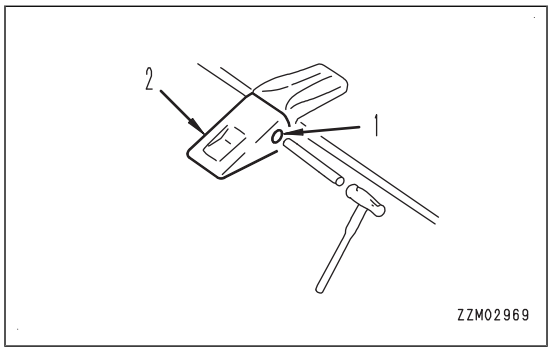


2. Check that the work equipment is in a stable condition, operate the lock lever by the red portion on the top, and set it to LOCK position (L).

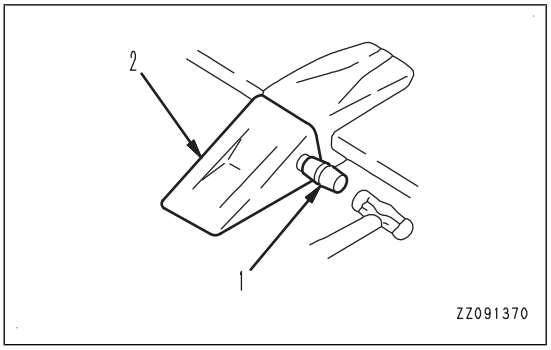


3. Place a bar on the head of pin (1), hit the bar with a hammer to knock out the pin, then remove the tooth (2).

   REMARK
   - The bar must be round and thinner than the pin.
   - If it cannot be removed by this method, ask your Komatsu distributor to have the replacement performed.



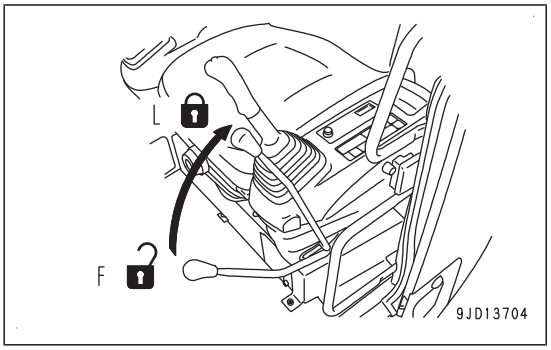
4. Clean the mounting face and fit new tooth (2) to the adapter.
5. Insert pin (1) halfway, and drive it with the hammer to install it to the bucket.



How to Adjust 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, set the lock lever securely to LOCK position (L), and stop the engine.



1. Set the work equipment in the posture shown in the figure, set the lock lever securely to LOCK position (L), and stop the engine.
2. Shift the 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 feeler gauge for easy and accurate measurement.
3. Loosen the plate mounting bolts (2) (4 pieces) and loosen the plate (3).

   The shim is a split type, so the work can be performed without removing the bolts.
4. Remove the shim (4) corresponding to the amount of play (a).

   For the shim (4), 2 types of 1.0 mm and 0.5 mm are installed.

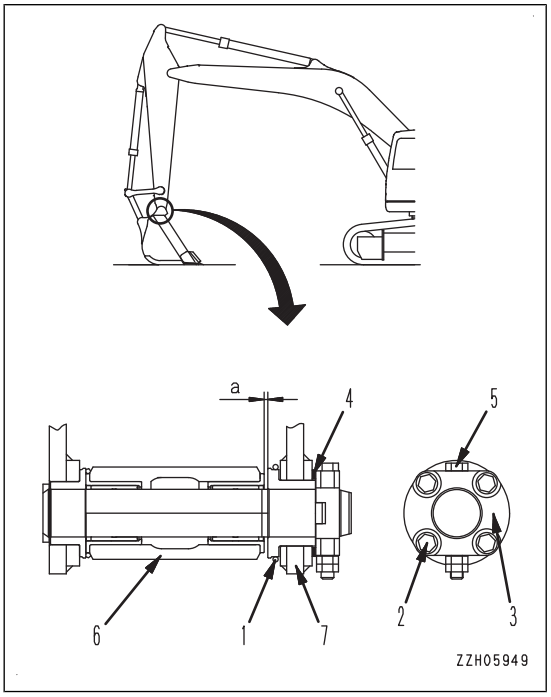
   When play (a) is smaller than 1 shim, do not adjust it.
5. Tighten the bolts (2) (4 pieces).

   If bolts (2) are too stiff to tighten, pull out the pin stopper bolt (5) for easier tightening.

   (6) Arm

   (7) Bucket

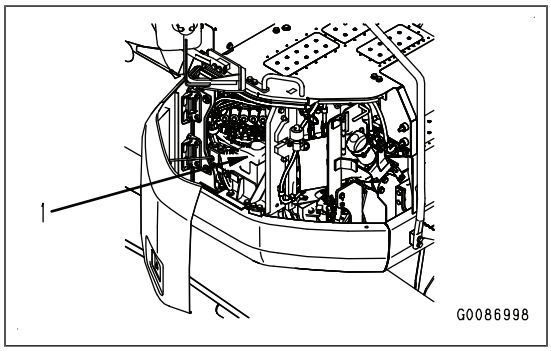
[Example] If the play is 3 mm, remove 1.0 mm (2 pieces) shims and 0.5 mm (1 piece) shim. The play becomes 0.5 mm.



How to Examine Window Washer Fluid Level, Add 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 the fluid.



Mixture Ratio of Pure Washer Fluid and Water

The mixing proportion differs according to the ambient temperature, so add the window washer fluid diluted with water as follows.

Area, season	Mixing proportion	Freezing temperature
Normal	Washer fluid 1/3: water 2/3	-10 °C {14 °F}
Winter in cold district	Washer fluid 1/2: water 1/2	-20 °C {-4 °F}
Winter in extremely cold district	Pure washer fluid	-30 °C {-22 °F}

There are 2 types of -10 °C {14 °F} (for general use) and -30 °C {-22 °F} (for cold district). Use them properly according to the area and season.

How to Examine and Do Maintenance Air Conditioner

Examine and Maintenance Items

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, AFTERCOOLER FINS, FUEL COOLER FINS, AND AIR CONDITIONER CONDENSER FINS”
Compressor	Operating condition	Every 4000 hours
V-belt	Damage, tension	Every 250 hours “METHOD FOR CHECKING AND ADJUSTING AIR CONDITIONER COMPRESSOR BELT TENSION”
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.

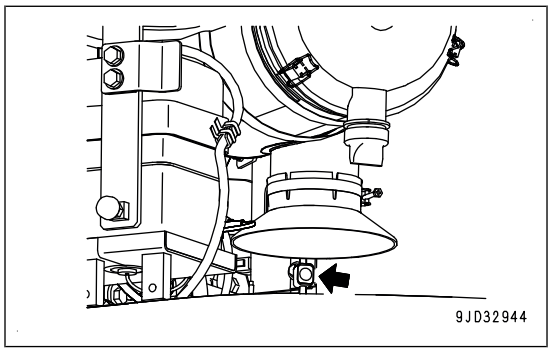
Examine Refrigerant Level of Air Conditioner (Gas)

⚠ WARNING

If the refrigerant used in the air conditioner gets into your eyes or is splashed on your hands, it may cause loss of sight or frostbite. Never touch the refrigerant.
Do not loosen any part of the refrigerant circuit.
Do not bring any open flame close to any point where the refrigerant gas is leaking.

If the refrigerant (gas) is insufficient, the cooling ability becomes poor. Check the level while the engine is running at full speed and the air conditioner is operated in Max. cooling.

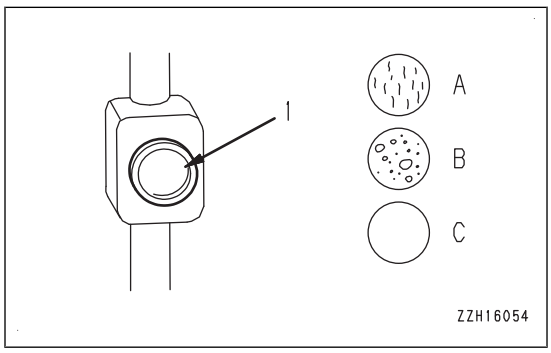
Check the condition of the refrigerant gas (Hydrofluorocarbons HFC-134a) that circulates the refrigerant circuit, through sight glass (1) (inspection window) at the refrigerant hose fitting.



(A) No bubbles in refrigerant flow: Suitable

(B) Some bubbles in refrigerant flow: Insufficient (bubbles pass continuously)

(C) Colourless, transparent: No refrigerant



REMARK

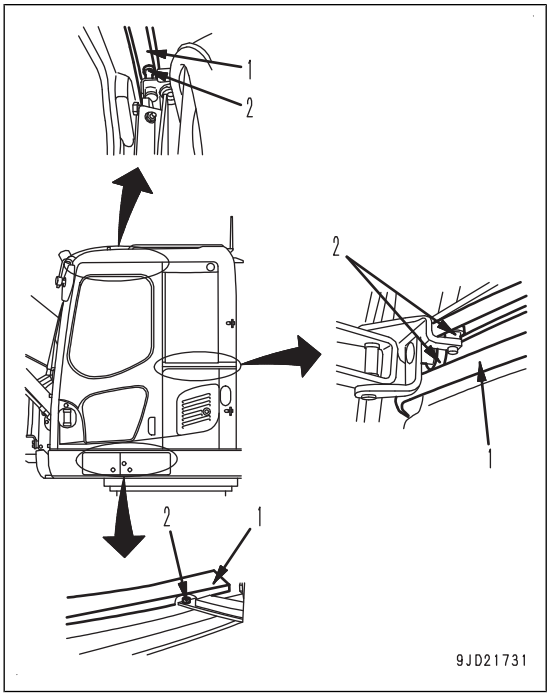
When there are bubbles, the refrigerant gas level is low. Contact your Komatsu distributor to have refrigerant added. If the operation is continued while the refrigerant gas is insufficient, it may cause breakage of the compressor.

How to Examine, Clean and Lubricate Slide Door Rail and Roller

How to Examine Slide Door Rail and Roller

Open and close the sliding door and check if mud, etc. is stuffed between sliding door rail (1) and roller (2) at the 3 places in the figure.
If mud, etc. is stuffed, the door does not move smoothly.

If the door does not slide smoothly due to stuffed mud, etc., clean and grease the sliding door rail (1) and roller (2).



How to Clean Slide Door Rail

1. Open and close the sliding door, and use a brush to remove any dirt from rail (1).
2. Use a cloth to wipe off any dirt from rail (1).

How to Lubricate Slide Door Rail and Roller

NOTICE

Do not use high-viscosity lubricating oil.

Recommendation by manufacturer: “PANDO 18C” manufactured by THREEBOND

Prepare lubricant.

1. Spray rail (1) and roller (2) thoroughly with lubricant.
2. After spraying with lubricant, slide the door and check that the door opens and closes smoothly.
   If the movement is not smooth, consult your Komatsu distributor.

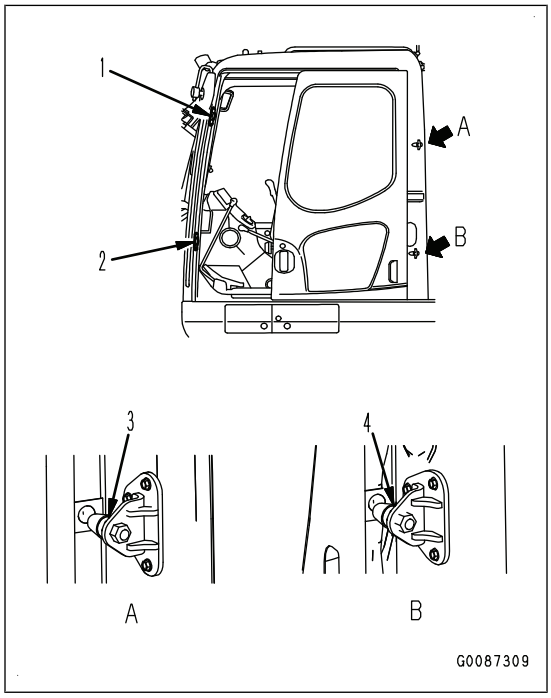
How to Examine, Clean and Lubricate Slide Door Stopper

Prepare the lubricating oil.

Lubricant recommended by manufacturer: Lithium grease

1. Check that the stoppers (1) and (2) of the slide door do not creak, or the slide door is not hard to be closed.
2. If they creak or the slide door becomes hard to be closed, wipe off the stain at the stoppers.
3. Lubricate the stoppers.

   If the stoppers are worn, consult your Komatsu distributor.
4. If it is difficult to lock the slide door or if the slide door is rattled while it is locked, you need to adjust the slide door stoppers (3) and (4). Consult your Komatsu distributor.



How to Examine Clearance at Stopper When You Pull Up Front Window

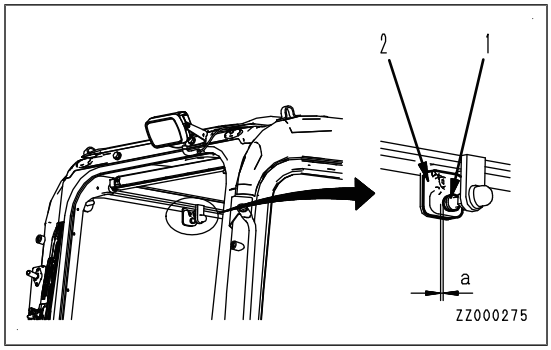
⚠ WARNING

- **When opening or closing the front window, lower window, or door, always set the lock lever to LOCK position.**
  If the lock lever is at FREE position and the control lever or control switch is touched by mistake, It is dangerous and may cause serious personal injury or death.
- **When opening or closing the front window, stop the machine on a level ground, lower the work equipment to the ground, stop the engine, then perform the operation.**
- **When opening the front window, hold the handle securely with both hands, pull up, and do not let go until the lock catch is locked.**
- **When closing the front window, the window will move quicker under its own weight. Hold the handles securely with both hands when closing it.**

If the front window has backlash when it is pulled up, perform the following.

Check if there is clearance (a) between rubber stopper (1) and plastic guide (2).
Rubber stopper (1) may be worn partially, but it does not affect the function as long as there is no backlash or clearance.

If there is any clearance, consult your Komatsu distributor.



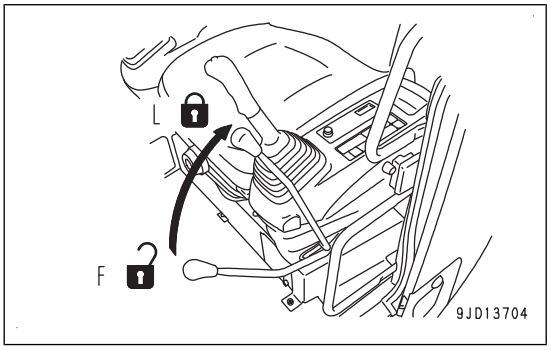
How to Wash Washable Floor

On the washable cab floor, it is possible to flush out the dirt directly with water.

⚠ WARNING

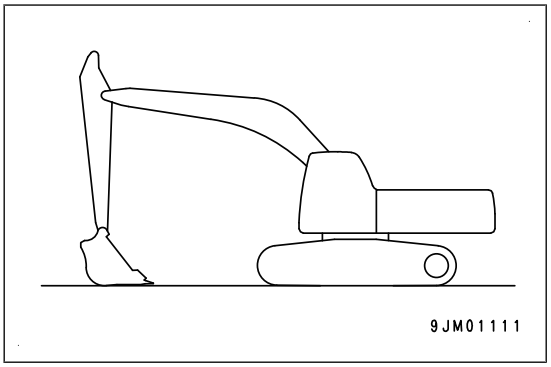
The machine may move suddenly if the control lever is touched by accident. This may lead to a serious injury or death. Set the lock lever securely to LOCK (L) position always before leaving the operator's seat.

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.



How to Clean 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.



How to Clean Cab Floor

NOTICE

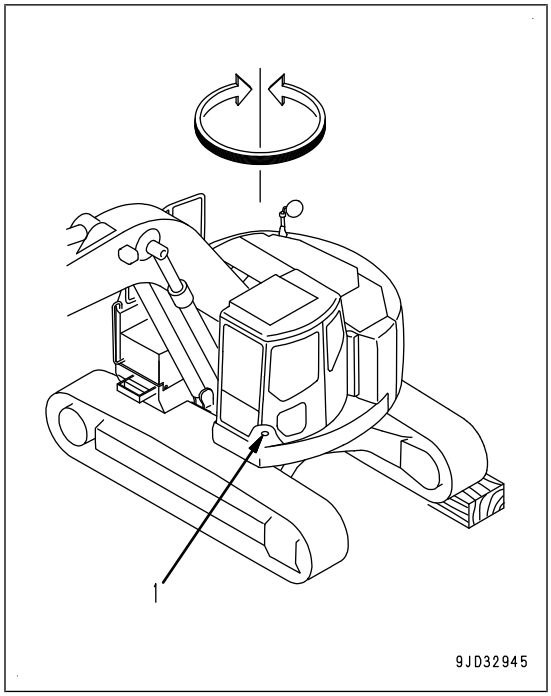
Do not let the monitors, connectors, air conditioner and the filters inside the operator cab get wet during the cleaning.

1. Set the machine at angle.

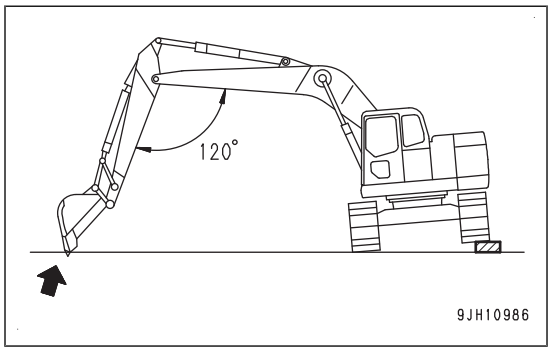
   Referring to “METHOD FOR SETTING MACHINE AT ANGLE”, select a safe method, depending on the state of the machine.

   In this example, the machine is set at angle by using blocks.

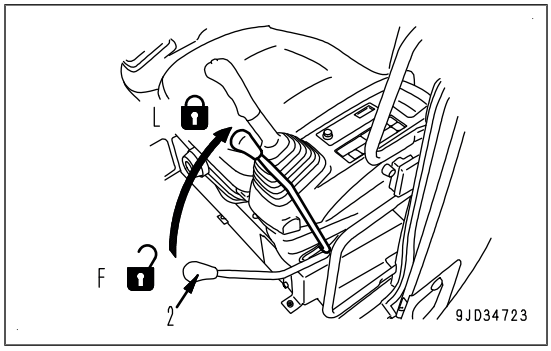
2. Swing the upper structure slowly so that water drain holes (1) in the cab floor are at a low position.



3. Lower the work equipment to the ground and set the machine in a stable condition.



4. Be sure to operate the lock lever (2) by the red portion on the top, then set it to LOCK position (L).
5. Stop the engine.
6. Remove the floor mat.
7. Flush out the dirt on the floor directly with water through water drain hole (1).
8. After finishing the cleaning, install the floor mat.



Tilt Machine

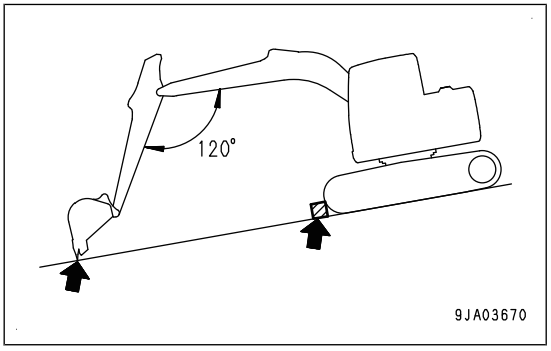
You can set the machine at an angle by using a slope or blocks. Consider the condition of the machine and select the safe method.

How to Use a 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.

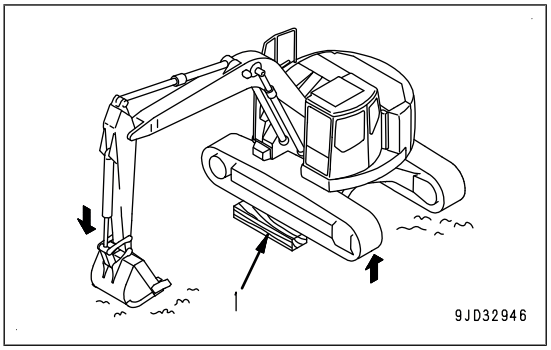


When You Use Blocks

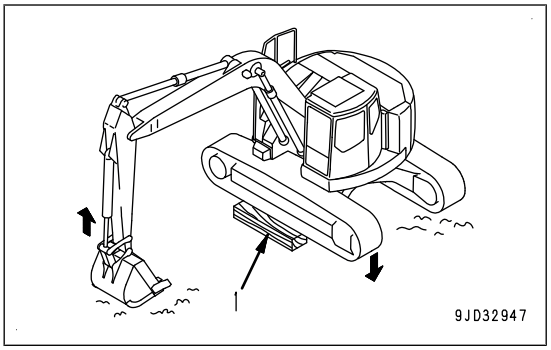
⚠ WARNING

Select a firm flat place.
Put strong blocks under the undercarriage to stabilize the machine and be extremely careful when performing the operation.

1. Raise the machine off the ground by using the boom and arm.
   When doing this, operate the levers slowly.
2. Place block (1) under the raised track and make sure that the machine is stable.



3. Operate the boom slowly and lower the machine.
   When doing this, check that the machine is always stable.



How to Examine Gas Spring

⚠ WARNING

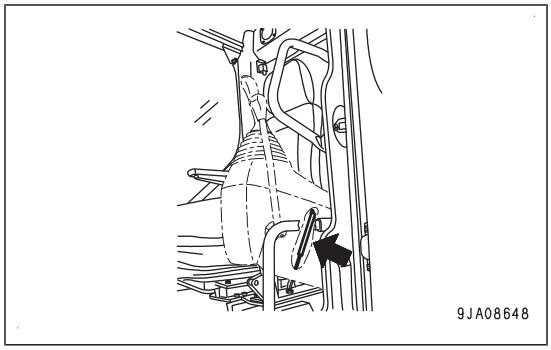
The gas spring is charged with high-pressure nitrogen gas, so improper handling may cause an explosion resulting in serious personal injury or death. When handling, always observe the following.

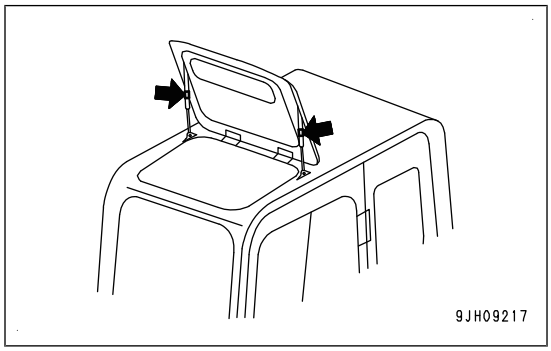
- **Do not disassemble.**
- **Do not bring it near open flame or dispose of it in fire.**
- **Do not perform drilling, welding or flame-cutting.**
- **Do not hit or roll it, or subject it to any impact.**
- **When disposing of it, the gas must be released. Ask your Komatsu distributor to perform this work.**

The gas springs are installed inside the left console (1 place) and at the cab ceiling window (2 places).

In the following cases, ask your Komatsu distributor for inspection, repair, and replacement.

- The lock lever cannot be pulled up lightly or the cab ceiling window cannot be opened lightly.
- The lock lever does not stay at LOCK position.
- The cab ceiling window does not stay open.
- Oil or gas is found to be leaking from the gas spring.





How to Bleed Air from Hydraulic Circuit

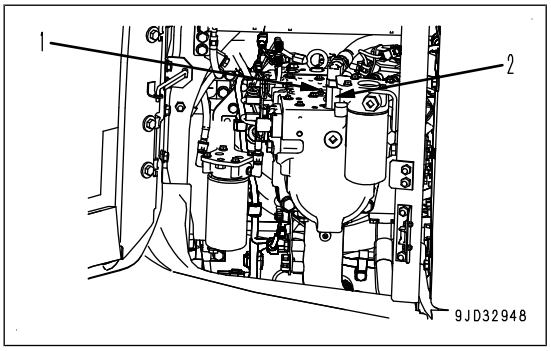
How to Bleed Air from Pump

NOTICE

If the drain hose is installed first, oil will spurt out from the air bleeder (1) hole.
Abnormal heat will be generated if the pump is operated without filling the pump case with hydraulic oil. It may cause a premature damage to the pump.

1. Loosen the air bleeder (1) and check that oil oozes out from the air bleeder.
2. If oil does not ooze out, remove the drain hose (2) from the pump case and fill the pump case completely with hydraulic oil through the 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 bleeding operation, tighten the air bleeder (1) and install the drain hose.



How to Start 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.

How to Bleed Air from Cylinder

NOTICE

If the engine runs at high speed immediately after the startup, or if a cylinder is pushed up to its stroke end, the air mixed into the cylinder may cause damage to the piston packing, etc.

1. Start the engine.
2. Turn the fuel control dial to Low idle (MIN) position.
3. Operate each cylinder of the work equipment to approximately 100 mm before the stroke end 4 to 5 times.

   Take care not to move the cylinder to the stroke end.
4. Operate each cylinder 3 to 4 times to the stroke end.
5. Operate each cylinder 4 to 5 times to the stroke end to remove the air completely.

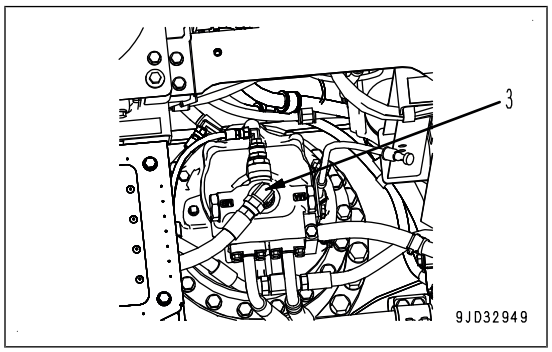
How to Bleed Air from Swing Motor

NOTICE

- **When bleeding air, do not operate the swing.**
- **If the air is not bled from the swing motor, the motor bearings will be damaged.**

1. Run the engine at low idle, loosen the hose (3) at port S, and check that oil oozes out from the port S hose (3).
2. If oil does not ooze out, stop the engine, remove the port S hose (3), and fill the motor case with hydraulic oil.
3. After completely bleeding the air from the swing motor, tighten the 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.

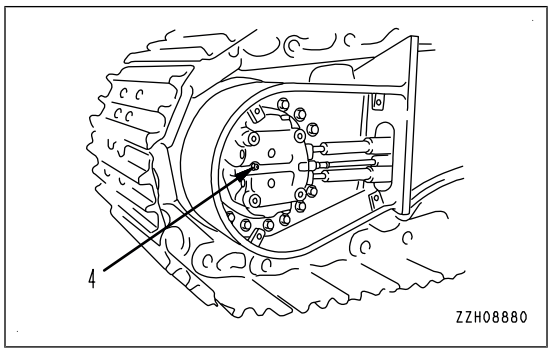


When replacing the swing motor safety valve, ask your Komatsu distributor for the replacement and the air bleeding.

How to Bleed Air from Travel Motor

(Bleed air only when the oil inside the travel motor case is drained.)

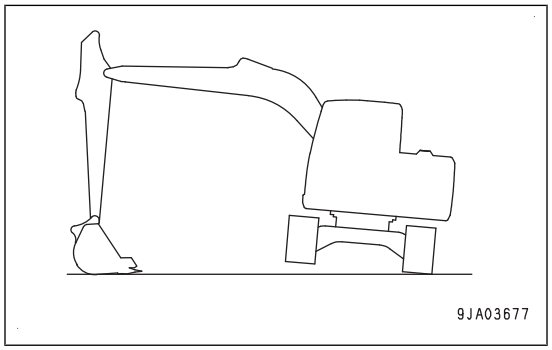
1. Run the engine at low idle, loosen air bleeder (4), and tighten it when oil flows out.
2. Run the engine at low idle and swing the upper structure 90 ° to bring the work equipment to the side of the track.



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.



How to Bleed Air from Attachment (When Attachment is Installed)

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 or longer before starting operations. This will remove the air bubbles in the oil inside the tank.**
- **Immediately after the attachment is replaced, air can be mixed into the attachment 2 variable relief pressure valve, and the pulsation of drain hose can occur. This will be solved by a complete air bleeding.**

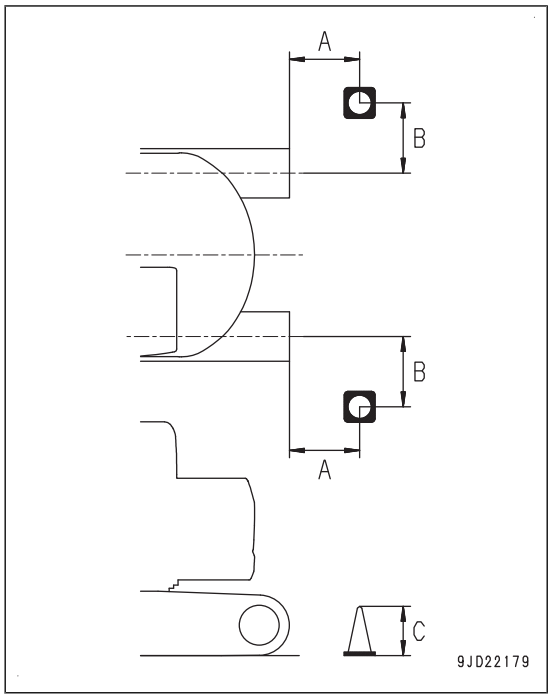
If an attachment is installed such as a breaker, do the air bleeding until the air is completely bled from the attachment circuit.

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 bleeding air, check the hydraulic oil level, and add oil if the oil level is low.

How to Examine Camera Visibility

The direction of camera may be changed by a shock to the camera. Check the visibility of the camera.

Put the traffic cone of approximately 70 cm height (C) to the position at the rear outside of the machine, where the distance (A) is approximately 1 m behind the centerline of a track and also the distance (B) is approximately 1 m outside of it.
If the traffic cone can be seen on the monitor screen, it is normal.



If the traffic cone cannot be seen on the monitor screen, ask your Komatsu distributor for adjustment of the camera image.

Checks Before You Start

For the following items, see OPERATION, “METHOD FOR CHECKING BEFORE STARTING”.

- Precautions for refuel pump
- 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

How to Lubricate Work Equipment

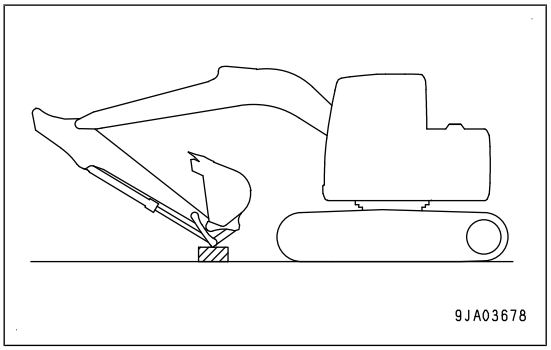
NOTICE

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.

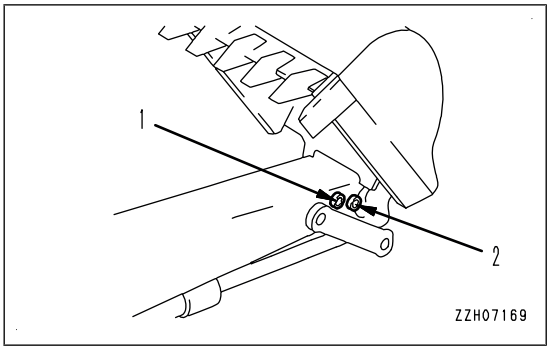
Items to be prepared

Grease pump

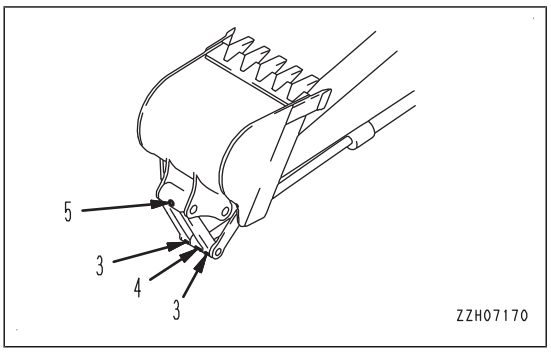
1. Park the machine on a level and firm ground, lower the work equipment to the ground in the posture shown in the figure, and stop the engine.



2. By using a grease pump, pump in grease through the grease fitting shown by arrow.
   (1) Arm and link connection pin (1 place)
   (2) Arm and bucket connection pin (1 places)



   (3) Link connection pin (2 places)
   (4) Bucket cylinder rod end (1 place)
   (5) Bucket and link connection pin (1 place)



3. After greasing, wipe off any old grease that is pushed out.

Every 250 Hours Maintenance

How to Examine 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

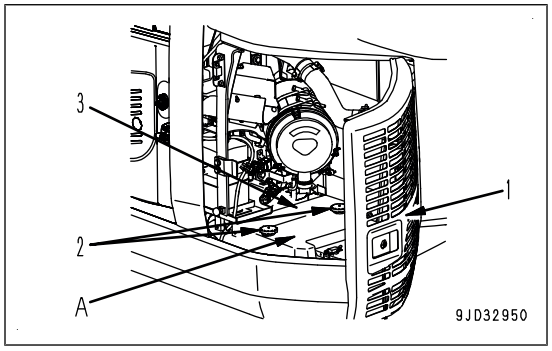
Do not use the battery if the battery electrolyte level is below LOWER LEVEL line. If you do so, it will deteriorate the battery inside and reduce the service life of the battery. In addition, it may cause an explosion.
Do not bring any open flame near the battery. Otherwise, it may explode since the battery generates the flammable gas.
Battery electrolyte is dangerous object. If it gets in your eyes or on your skin, wash it off with a large amount of water and consult a doctor.
Do not use a direct air blow or dry cloth to clean the battery. A wet cloth will prevent fire or explosion from static electricity.

NOTICE

Do not add the electrolyte to the battery exceeding UPPER LEVEL line. It may leak and cause damage to the paint surface or corrode other parts.
If the battery water may freeze after refilling with the purified water (such as a commercial battery fluid), do the replenishment before the day's work on the next day.

Open the cover (1) at the rear left of the machine, and the battery is installed at position (A).

Remove the nuts (2) (2 places) on the battery top surface, and remove the covers (3) (2 places).



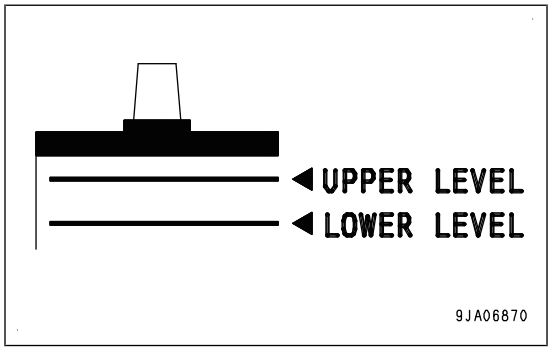
REMARK

The threaded parts of nuts (2) are made of resin, and the thread face returns to the original condition even if the nuts are tightened repeatedly. The tightening force remains unchanged all the time and does not become light. This is not an abnormal condition.

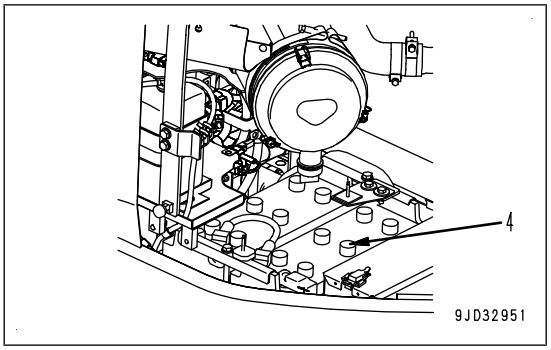
How to Examine Electrolyte Level from Side of Battery

If it is possible to check the electrolyte level from the side of the battery, check as follows.

1. Use a cloth wet with water 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 the cap (4) and add the purified water (such as a commercial battery fluid) to U.L. line.
3. After adding the purified water, tighten the cap (4) securely.



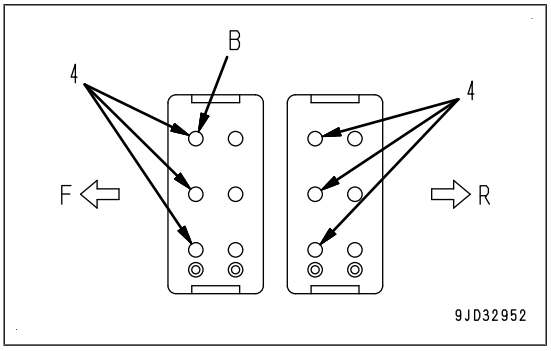
REMARK

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.

REMARK

Large capacity battery

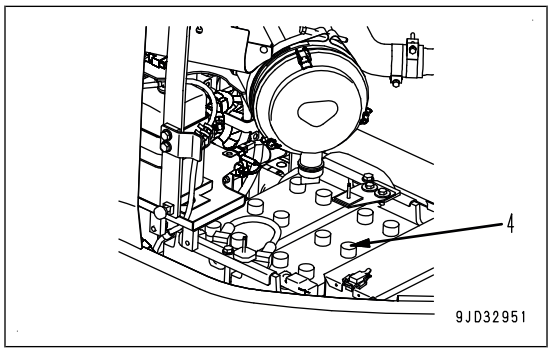
- Check the cell at the rear of the machine (R) from the side of the battery. If the battery electrolyte is not up to upper level line (U.L), add the distilled water to upper level line (U.L).
- Remove the cap (4) at the top of the battery and check the cell at the front of the machine (F). If the battery electrolyte is not up to UPPER LEVEL line (U.L), add the distilled water to UPPER LEVEL line.
- However, only for part (B), it is difficult to check the electrolyte level from the side, so check by the supplied mirror.



How to Examine Electrolyte Level When It is Not Possible to Examine 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.

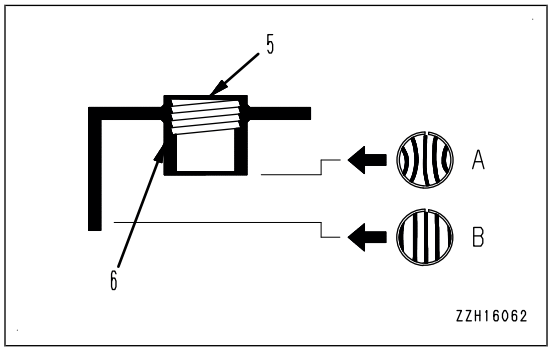
1. Remove the cap (4) at the top of the battery and check the electrolyte level through electrolyte filler port (5).



2. If the electrolyte does not reach the sleeve (6), always add the purified water (such as a commercial battery fluid) 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 the cap (4) securely.

   REMARK

   If the purified water is added to above the bottom of the sleeve, use a syringe to remove the 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.

How to Examine Electrolyte Level When It is Possible to Use Indicator to Examine Electrolyte Level

If it is possible to use an indicator to check the electrolyte level, follow the instructions given.

In the case of the Komatsu maintenance-free battery (if equipped), indicators that show the charging state and battery electrolyte level are installed to the top of the battery. See “Examine Komatsu Maintenance-Free Battery Indicator” for how to read the indicator.

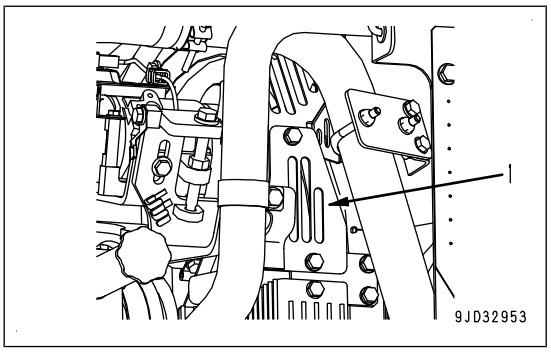
Use the supplied mirror to see the indicator because you cannot easily see it directly.

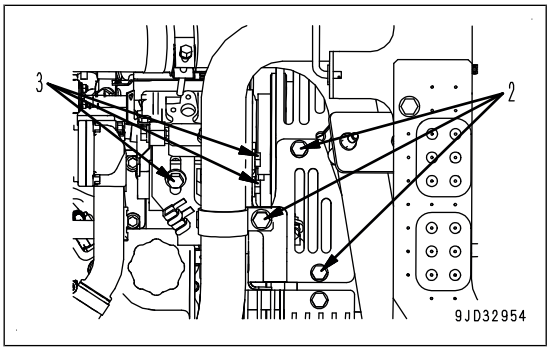
How to Examine and Adjust Air Conditioner Compressor Belt Tension

The followings are the periodic maintenance items for the air conditioner. Perform inspection and maintenance to use the air conditioner effectively.

How to Examine Air Conditioner Compressor Belt

1. Remove the bolts (2) (3 pieces).
2. Remove the guard (1).

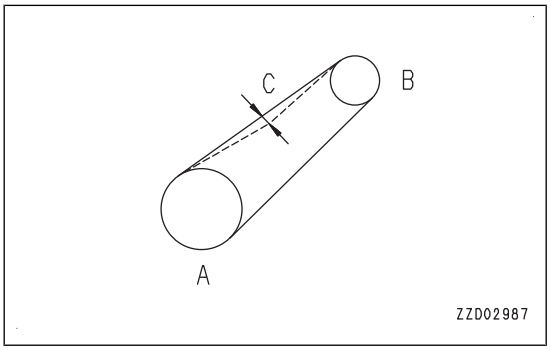




3. Press the midpoint between the drive pulley (A) and compressor pulley (B) with a finger (approximately 60 N {6.1 kgf}).

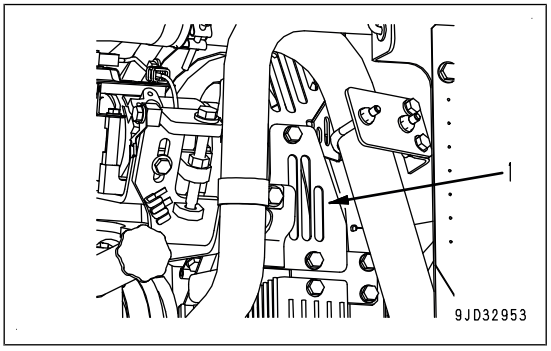
   If the deflection (C) is 6.0 to 9.0 mm, the belt tension is normal.

   If the deflection is out of the standard, adjust it to the standard value.



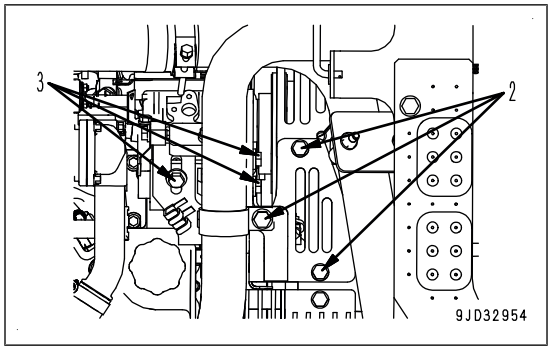
How to Adjust Air Conditioner Compressor Belt

1. Remove the bolts (2) (3 pieces).
2. Remove the guard (1).



3. Loosen the bolts (3) (3 pieces).

   There is no need of removing bolts (3). Do not loosen it too far.

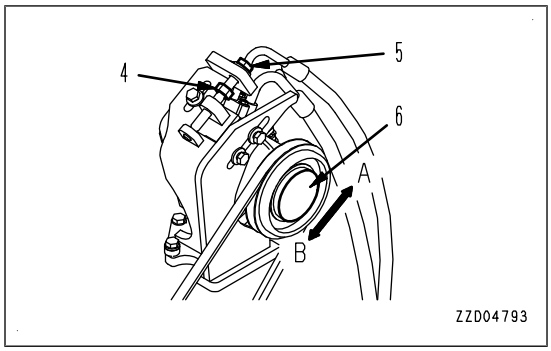


4. Loosen the nut (4) in direction (A).

   Nut (4) is provided to prevent loosening of jack bolt (5).

5. Tighten the jack bolt (5).

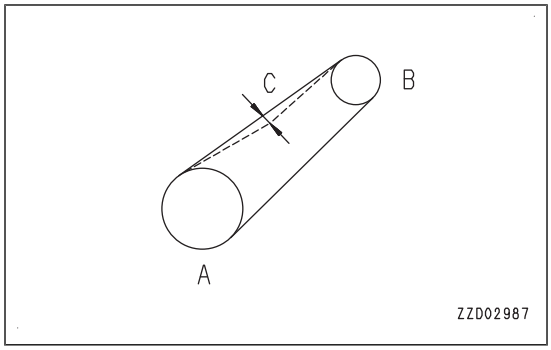
   Compressor (6) moves in direction (A), and the compressor belt is tensed.



6. Press the midpoint between the drive pulley (A) and compressor pulley (B) with a finger (approximately 60 N {6.1 kgf}).

   If the deflection (C) is 6.0 to 9.0 mm, the belt tension is normal.

   If the deflection is out of the standard, adjust it to the standard value by repeating the steps 4 to 6.



7. When the belt tension becomes appropriate, tighten the bolts (3) (3 pieces) to fix.

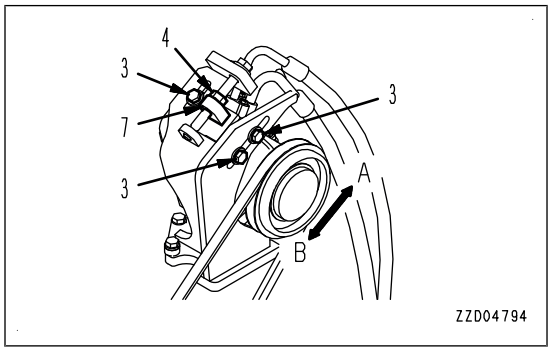
   Tightening torque: 59 to 74 Nm {6.0 to 7.5 kgfm}

8. After tightening the nut (4) until it touches the 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 kgfm}

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

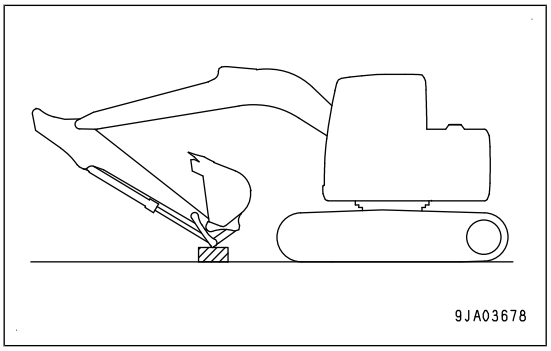
Maintenance for every 100 and 250 hours should be performed at the same time.

How to Lubricate

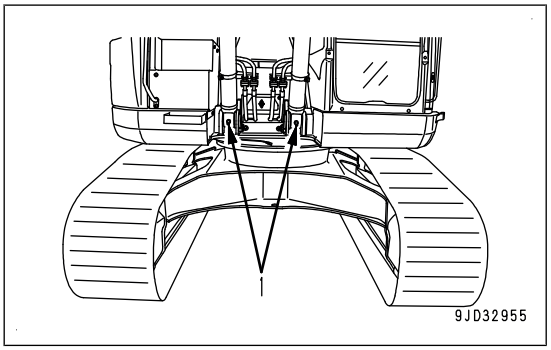
NOTICE

- **If any unusual noise is generated from any greasing point, perform the greasing regardless of the greasing interval.**
- **Perform the 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 the heavy-duty operations, such as hydraulic breaker operations, perform the greasing every 100 hours.**

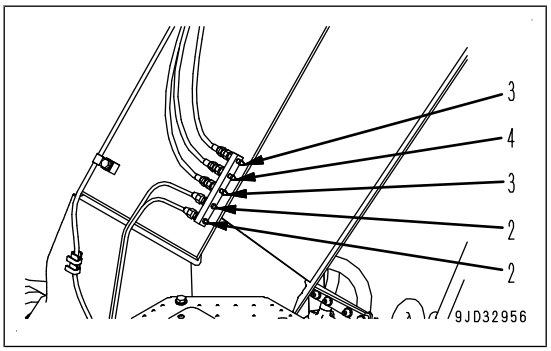
1. Set the work equipment on the level and firm ground in the maintenance posture as shown in the figure, then lower it to the ground and stop the engine.



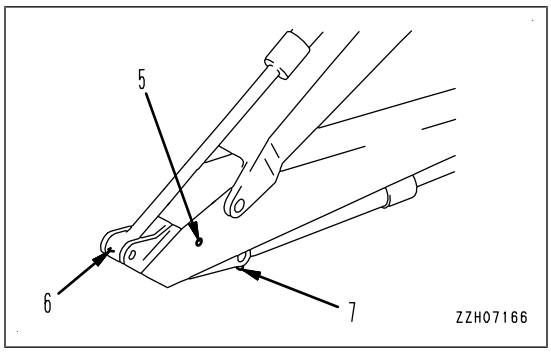
2. By using a grease pump, pump in grease through the grease fitting shown by arrow.
   (1) Boom cylinder foot pin (2 places)



   (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 places)
(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.

How to Change Oil in Engine Oil Pan and Replace Engine Oil Filter Cartridge

⚠ WARNING

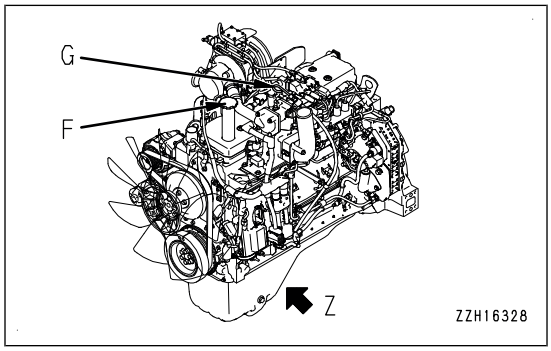
Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.

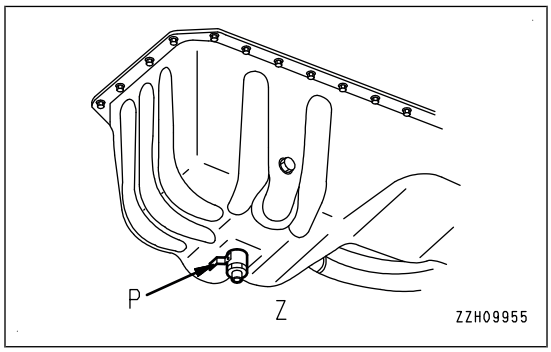
Refill capacity of oil pan: 23.1 ℓ

Items to be prepared

- Container to catch drained oil
- Filter wrench

1. Remove the undercover just under the engine of the machine and put a container under drain valve (P) to catch 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.

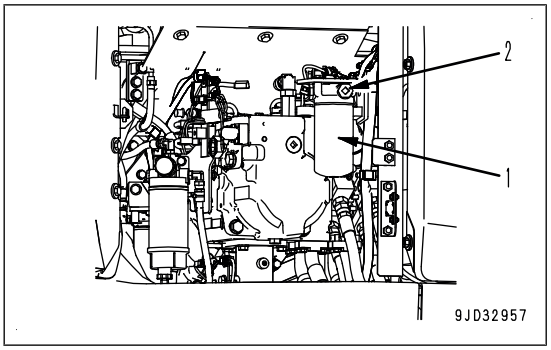




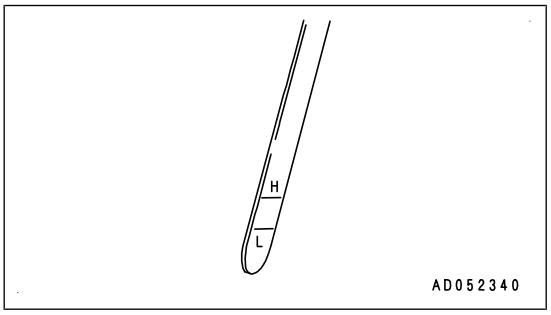
3. Open the rear right cover.
4. Turn the filter cartridge (1) counterclockwise by using the filter wrench, and remove it.
5. Clean the filter head (2), fill the new filter cartridge with clean engine oil, coat the thread and packing surface of the new filter cartridge with clean engine oil (or thinly apply the grease), then install it to the filter head.

   REMARK

   Check that there is no old packing stuck to the 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 head (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. Check that the oil level is between H and L marks on the dipstick.
9. Close the rear right cover.
10. Install the undercover.



REMARK

When the ambient temperature is low, water or emulsified matter may stick to the dipstick and oil filler cap, etc. or the drained oil may be milky white. 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 the oil.

How to Replace Fuel Prefilter Cartridge

⚠ WARNING

- **Do not replace the filter immediately after the engine is stopped. The parts are still very hot. Wait for all of parts to cool down before starting the work.**
- **High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.**
- **Do not bring any open flame close.**

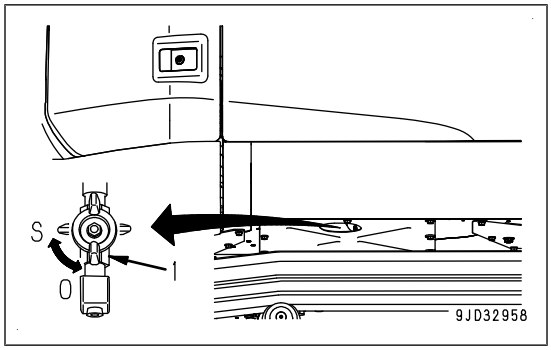
NOTICE

- **Komatsu genuine fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the parts, Komatsu recommends using Komatsu genuine parts.**
- **The common rail fuel injection system used on this machine consists of more precise parts than those in the conventional injection pump and nozzles. If any cartridge other than a Komatsu genuine filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Never use a substitute.**
- **When performing the inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt sticks to any part, use fuel to wash it off completely.**

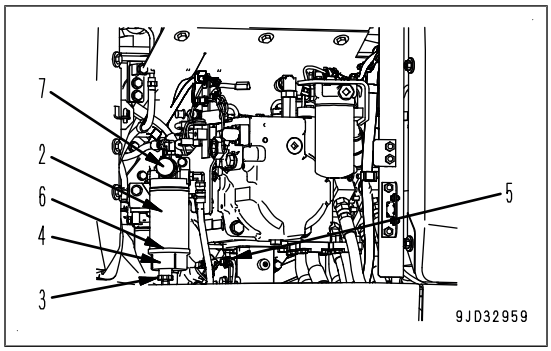
Items to be prepared

- Container to catch drained oil
- Filter wrench

1. Turn the valve (1) at the bottom of the fuel tank to CLOSE position (S).
2. Open the door on the rear right side of the machine.

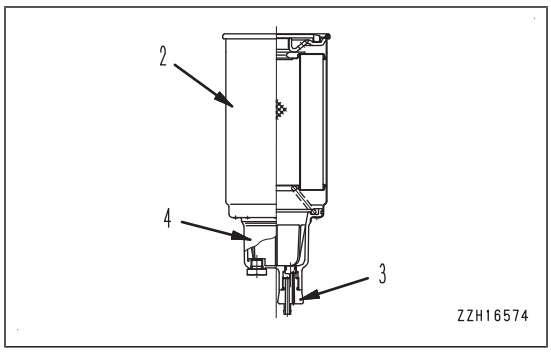


3. Place a container to catch the fuel under the fuel prefilter cartridge (2).
4. Loosen the drain valve (3) and drain the water and sediments from transparent cup (4), and also drain all the fuel accumulated in the filter cartridge (2).
5. Remove the connector (5). Wrap the removed connector with a plastic bag, etc. to prevent fuel, oil or water from getting on the connector.



6. Turn the transparent cup (4) counterclockwise to remove it by using the filter wrench. The transparent cup (4) will be used again.
7. Turn filter cartridge (2) counterclockwise by using the filter wrench, and remove it.
8. Install the currently removed transparent cup (4) to the bottom of the new filter cartridge.

   At this time, be sure to replace the O-ring (6) with a new one.

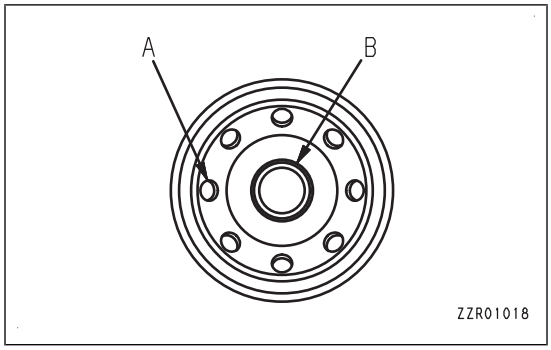


9. Make sure that the drain valve (3), which is provided in the lower part of transparent cup (4) of the new filter cartridge, is firmly tightened.

   Tightening torque: 2.5 to 3.4 Nm {0.25 to 0.35 kgfm}
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 the cap (B) at center. Always fill with fuel from small holes (A) (8 places) on the dirty side.**
- **After filling with fuel, remove the cap (B) at center 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 the 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 turns.

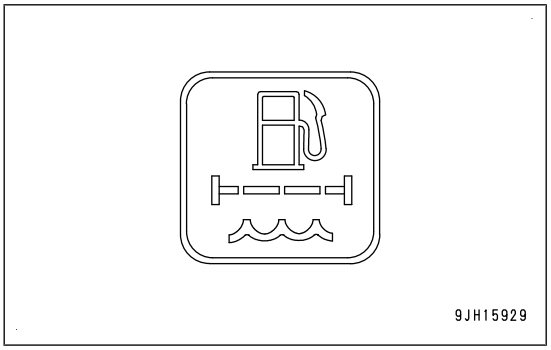
    REMARK

    If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is tightened too loose, fuel will also leak from the packing, so always tighten to the specified angle.
    When tightening with a filter wrench, be extremely careful not to dent or damage the filter.

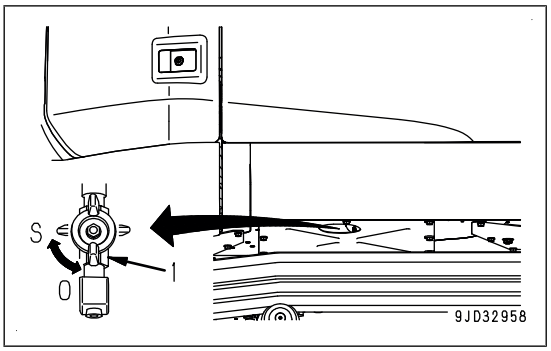
12. Check that the drain valve (2) is tightened securely.
13. Remove the plastic bag which wraps the connector (5), and connect the connector (5).

    REMARK

    - If water gets on the connector (5), the sensor may malfunction and the water separator caution lamp may light up. When removing the connector (5), be extremely careful not to let water get on the connector.
    - If water gets on the 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 the drain hose.
16. Fill up the fuel tank with fuel (to the level where the float is at the highest position).

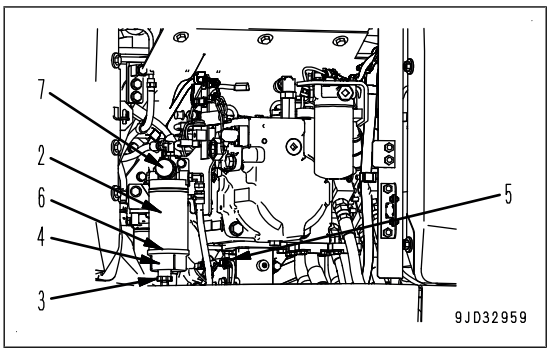


17. Loosen the knob of feed pump (7), pull it out, then pump it in and out until the movement becomes heavy.

    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 the 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 from the filter seal surface and transparent cup mounting face.



    If any leakage is found, check the filter cartridge for its tightening condition.
    If leakage is still found, repeat the steps 1 to 6 to remove the filter cartridge, and if any damage or pinched foreign material on the packing surface is found, replace it with a new filter cartridge and repeat the steps 7 to 12 to install it.

21. Close the door on the right side of the machine.

REMARK

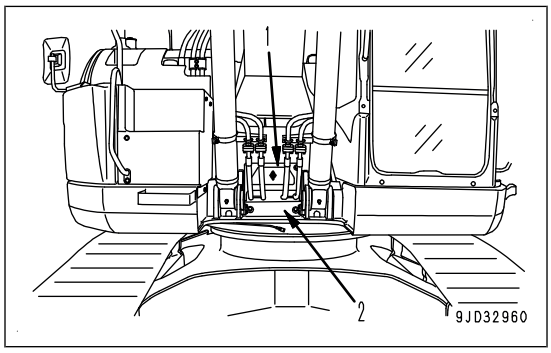
When bleeding air, air may remain inside of the water separator. However, the engine can be started after pumping the feed pump (7) in and out until it becomes heavy. Leave it as it is for a while after stopping the engine, and air is bled spontaneously.

How to Examine Swing Pinion Grease Level, Add Grease

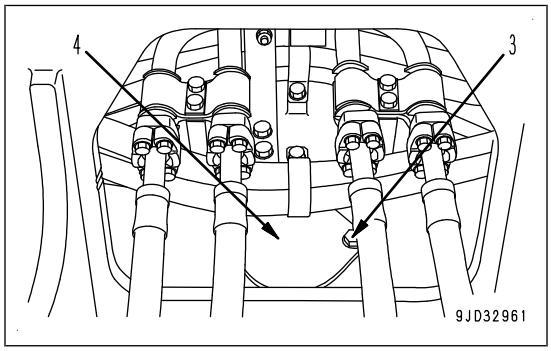
Items to be prepared

Scale

1. Remove the covers (1) and (2).



2. Remove the bolts (3) (2 pieces) on top of the revolving frame, and remove the cover (4).



3. Insert the ruler (5) into the grease through the inspection and adjustment hole (A). Check that the grease amount (S) in the area where the pinion passes is 9mm.

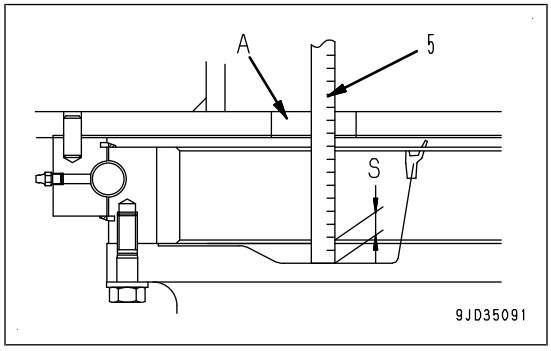
   Add grease if the level is low.

4. Check that the grease is not milky white.

   If it is milky white, it is necessary to change the grease. Ask your Komatsu distributor for change.

   Total amount of grease:14.6ℓ{13.1 kg}

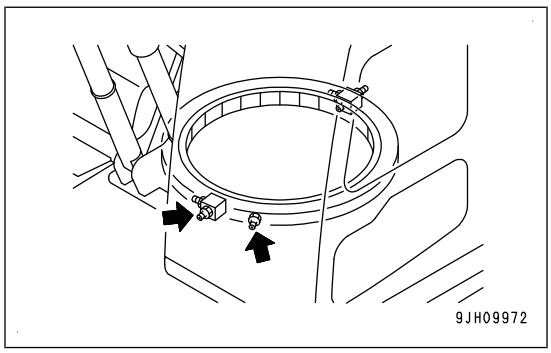
5. Install the cover (4) with bolt (3).
6. Install the covers (1) and (2).



Lubricate 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.



How to Examine and Clean Radiator Fins, Oil Cooler Fins, Aftercooler Fins, Fuel Cooler Fins, and Air Conditioner Condenser Fins

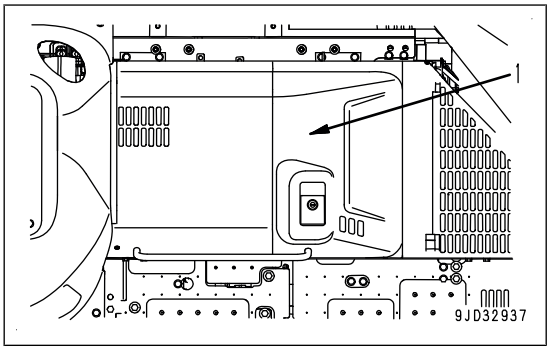
⚠ WARNING

If the compressed air, high-pressure water, or steam hits your body directly or dirt is scattered by use of it, there is a danger of personal injury. Wear the protective equipment such as the protective eyeglasses and dust mask.

NOTICE

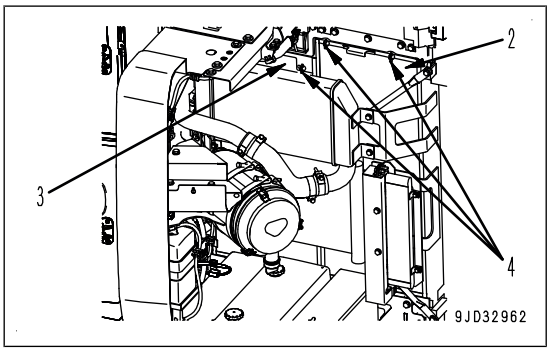
When using the compressed air, blow it from some distance to avoid damaging the fins. Damage on the fins can cause water leakage and overheating. In a dusty job site, check the fins every day, regardless of the maintenance interval.

1. Open the engine hood (1).



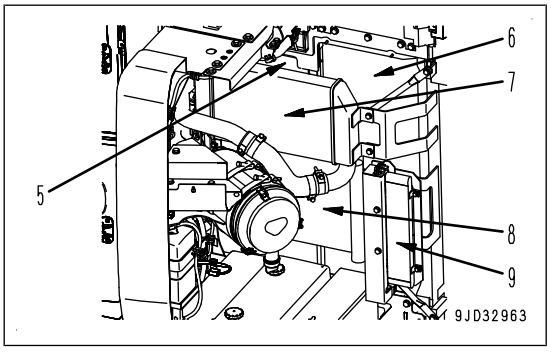
2. Remove the screws (4) at 3 places and pull up the nets (2) and (3).
3. Clean the nets (2) and (3) that you pulled up.

   (They will be installed again in the step 7.)
4. Check the front and rear surfaces of oil cooler fins (5), radiator fins (6), aftercooler fins (7), air conditioner condenser fins (8), and fuel cooler fins (9). If there is any mud, dirt, or leaves stuck to the fins, blow it off with compressed air.



   NOTICE

   Steam or water may be used instead of the compressed air. However, when performing powerful steam cleaning (high-pressure machine wash) of the heat exchange equipment (radiator, oil cooler, aftercooler, fuel cooler, and air conditioner condenser), maintain sufficient distance from the machine when performing the work. If steam cleaning (high-pressure machine wash) is performed at close distance, there is a danger that the internal fins of the heat exchange equipment will be deformed, and this will cause early clogging and breakage of the equipment.

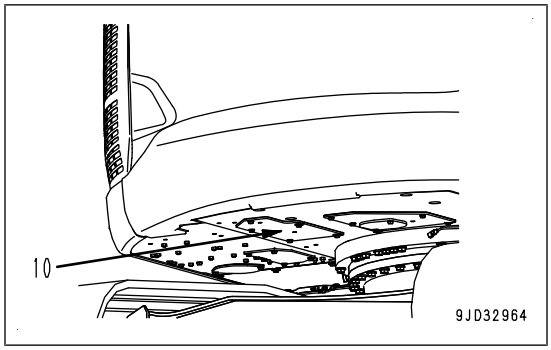


5. Visually check the rubber hose connected to the heat exchange equipment. Check the hose clamp for looseness as well.

   If the rubber hose is cracked or becomes fragile, ask your Komatsu distributor for the replacement.

   If the hose clamp is loose, tighten it.

6. Remove the undercover (10) and blow out the mud, dirt, and leaves to the outside.
7. Push in the cleaned nets (2) and (3) back to the original places and install them with screws (4).



How to Clean 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.**
- **Always check that the slide door is locked at the open or closed position before cleaning FRESH or RECIRC air filter. If the slide door is free, there is a danger that it may suddenly move and catch your fingers or break the cover.**

NOTICE

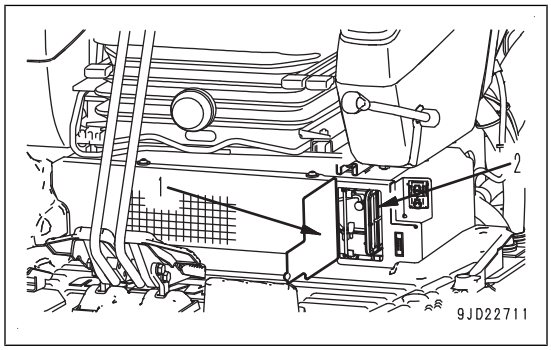
- **As a guideline, the filters should be cleaned every 500 hours, but on dusty jobsites, clean the filters more frequently.**
- **To clean the recirculation air filter, stop the air conditioner, and remove the recirculation air filter from the cab. If water gets to the recirculation air filter while it is installed in the cab, it can cause a failure of the air conditioner.**
- **When you clean the floor, do not let water get on the filter.**

How to Clean Recirculation Air Filter

1. Open cover (1) at the front bottom left of the operator's seat.
2. Take out recirculation air filter (2).
3. Clean recirculation air filter (2) with compressed air.

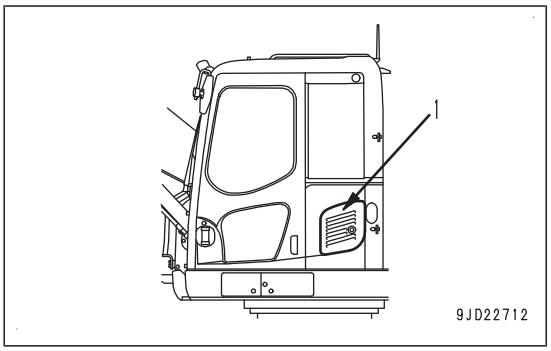
   If there is oil on the filter, or if the filter is extremely dirty, wash it in a neutral detergent. After rinsing it in water, dry it thoroughly before using it again.

   Replace the filter with a new one every year. If the clogging of the filter cannot be removed by blowing with air or washing in water, replace the filter immediately.
4. Return cleaned recirculation air filter (2) and close cover (1).



How to Clean Fresh Air Filter

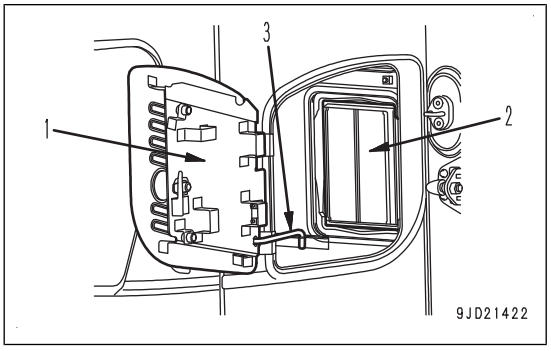
1. Unlock cover (1) at the rear left of the operator's cab with the starting switch key.



2. Open cover (1) with the hand.
3. Fix the cover with cover support lever (3).
4. Remove fresh air filter (2).
5. Clean fresh air filter (2) with compressed air.

   If there is oil on the filter, or if the filter is extremely dirty, wash it in a neutral detergent. After rinsing it in water, dry it thoroughly before using it again.

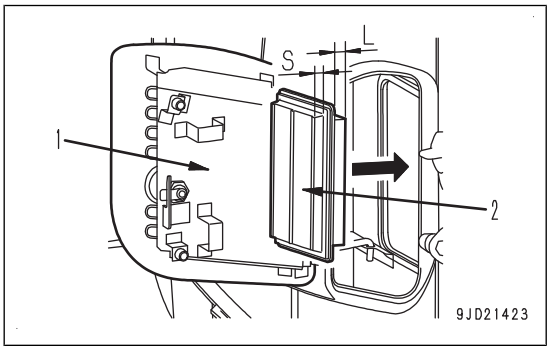
   Replace the filter with a new one every year. If the clogging of the filter cannot be removed by blowing with air or washing in water, replace the filter immediately.



6. Return fresh air filter (2).

   REMARK

   - The fresh air filter must be installed facing it in the correct direction.
     When installing, insert the long (L) end of filter (2) into the filter case first. If the short (S) end is installed first, cover (1) will not close.
   - Install the fresh air filter by fitting at 4 corners.



7. Release cover support lever (3).
8. Close cover (1).
9. Lock with the starting switch key.

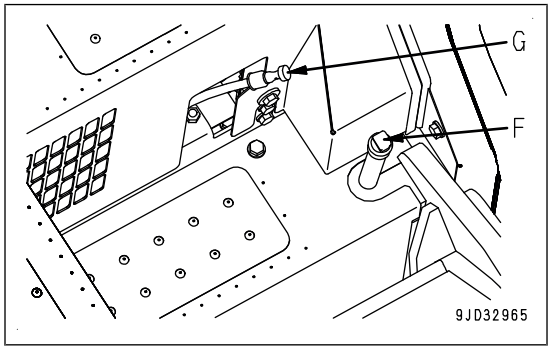
   Do not forget to remove the starting switch key after locking.

How to Examine Oil Level in Swing Machinery Case, Add Oil

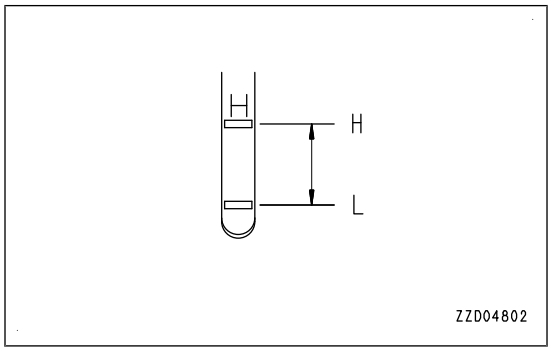
⚠ WARNING

Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.

1. Remove the dipstick (G) and wipe off oil on it with a cloth.
2. Insert the dipstick (G) fully into guide.

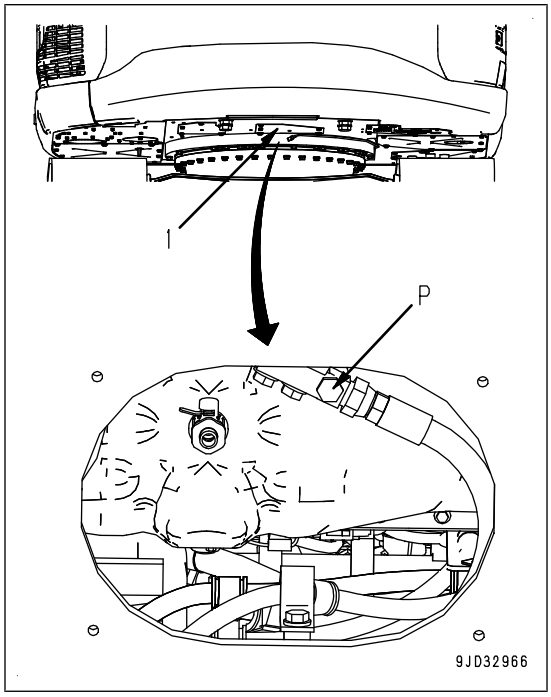


3. Remove the dipstick (G) and check that the oil level is between the (H) and (L) marks on the dipstick.
4. If the oil level is below (L) mark on dipstick (G), add oil through the oil filler port (F).



5. If the oil level is above the mark (H) on dipstick (G), remove the cover (1), loosen the drain valve (P) to drain the excessive oil.

   Set a container to catch the oil under drain valve (P) before draining the oil.
6. After checking the oil level or adding oil, insert the cap of dipstick (G) into the hole.



How to Examine Oil Level in Final Drive Case, Add 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

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. Remove plug (F) by using the handle.

   When the oil level is within the range of 10 mm below the lower edge of the plug hole, the oil level is appropriate.

   If the oil level is low, check it again according to the following procedure.

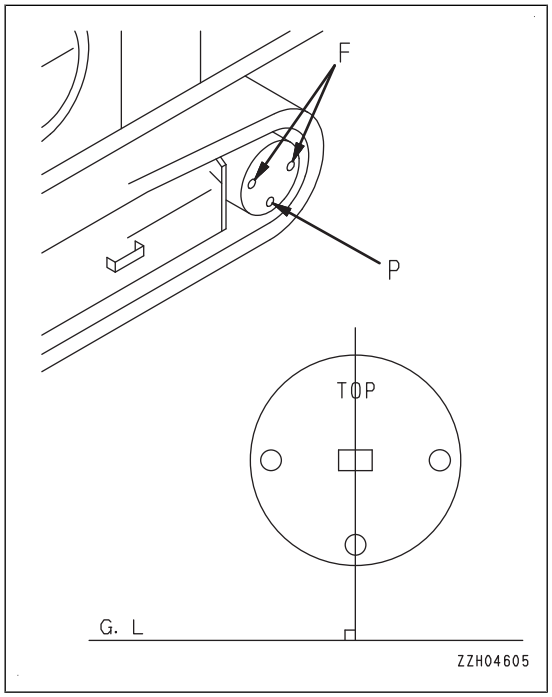
   1) Install plug (F).
   2) Operate the travel lever to move the machine forward or reverse and rotate the sprocket by 1 turn.
   3) Check in the procedure of 2.
3. If the oil is insufficient, add oil through plug (F) hole.

   Add oil until oil overflows from the hole of plug (F).
4. After the inspection, install plug (F).

   Tightening torque of plugs (F): 58.8 to 78.4 Nm {6 to 8 kgfm}

   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.

How to Replace Hydraulic Oil Filter Element

⚠ WARNING

- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When removing the oil filler cap, the oil may spurt out. Turn it slowly to release the internal pressure, then remove it carefully.**

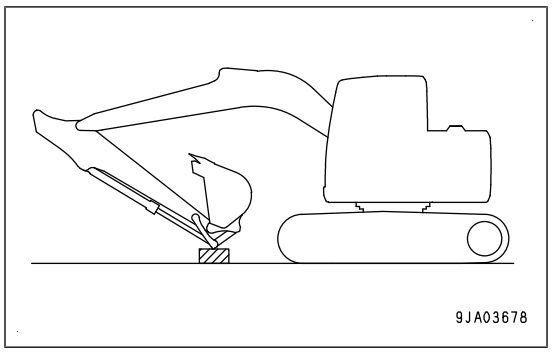
NOTICE

If the machine is equipped with a hydraulic breaker, the hydraulic oil deteriorates faster than in the normal bucket digging operation. Accordingly, perform the maintenance by referring to "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER".

Items to be prepared

Container to catch drained oil

1. Set the work equipment on the level and firm ground in the maintenance posture as shown in the figure, then lower it to the ground and stop the engine.



2. Remove the cap of hydraulic tank oil filler port (F), and release the internal pressure.
3. Loosen the bolts (5 pieces) and remove the cover (1).
4. Loosen the bolts (6 pieces) and remove the cover (2).

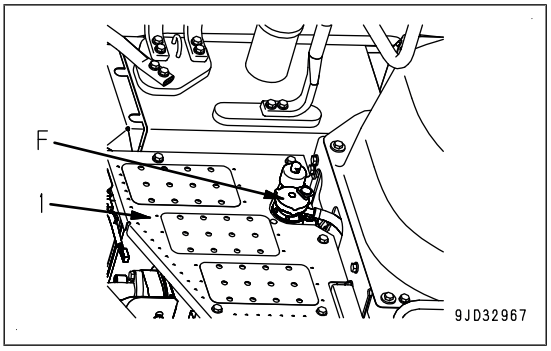
   At this time, the cover may jump out under the force of spring (3), so hold the cover down when removing the bolts.
5. After removing the spring (3), valve (4) and strainer (5), take out the element (6).

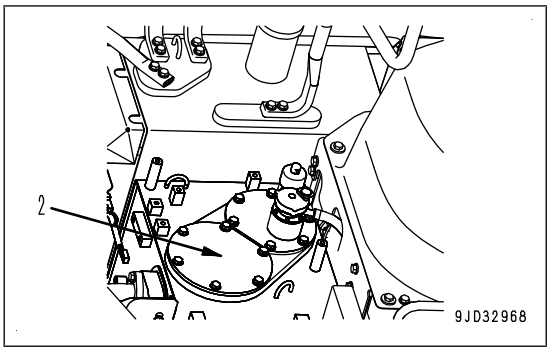
   Check the bottom of the filter case for dirt or other material, and remove any if found. When doing this, take extreme care that the dirt does not fall into the hydraulic tank.
6. Clean the removed parts by using the flushing oil.
7. Install the new element in the place where the old element (6) has been installed.
8. Place the strainer (5), valve (4) and spring (3) onto the element.
9. Set the cover (2) in position, press it down by hand, and install the cover with the mounting bolts.
10. Install the oil filler port cap.

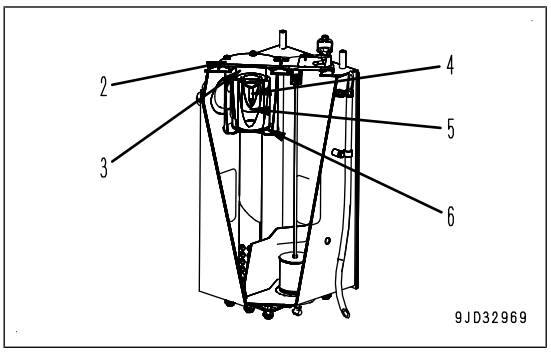
    For the installation procedure of the oil filler cap, see “Install Hydraulic Oil Filler Port Cap”.
11. Set the cover (1) in position, press it down, and install the cover with the mounting bolts.
12. Start the engine and run it at low idle for 10 minutes to bleed air.
13. Stop the engine.

    REMARK

    Leave the machine as it is for at least 5 minutes, and then start the operation. This will remove the air bubbles in the oil inside the tank.
14. Check that there is no leakage of oil and wipe off any oil that is spilled.







How to Change Oil in Swing Machinery Case

⚠ WARNING

Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.

Refill capacity: 6.5 ℓ

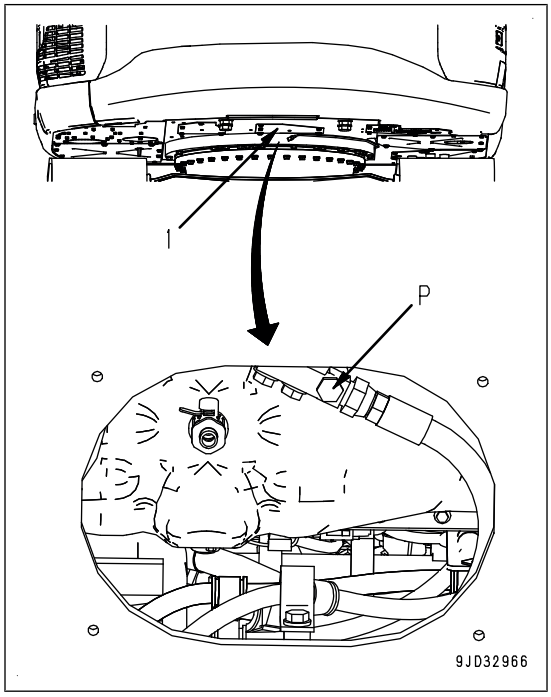
Items to be prepared

Container to catch drained oil

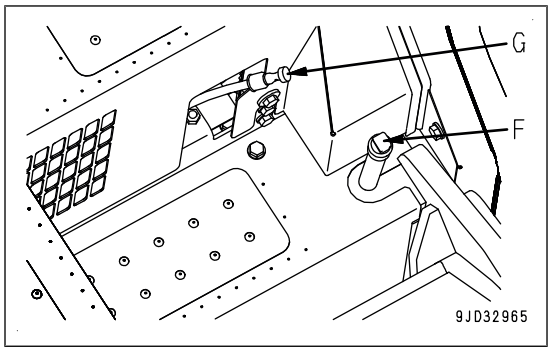
1. Remove the cover (1) of the inspection hole.
2. Place a container under the drain plug (P) on the underside of the machine to catch oil.
3. Loosen the drain valve (P) at the bottom of the machine, drain the oil, then tighten the drain valve again.

   REMARK

   - If the oil becomes thin thread condition, there is no problem to stop the draining operation.
   - When the ambient temperature is low, swing the upper structure to raise the oil temperature slightly before starting the oil draining operation. Never swing the upper structure while draining the oil. This may 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 by referring to “METHOD FOR CHECKING OIL LEVEL IN SWING MACHINERY CASE, ADDING OIL”.



How to Examine Oil Level in Damper Case and Add Oil

⚠ WARNING

Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.

NOTICE

When checking the oil level, place the machine on a level ground, and wait at least 30 minutes after the engine has stopped.

1. Open the door on the right side of the machine.
2. Remove the plug (G).

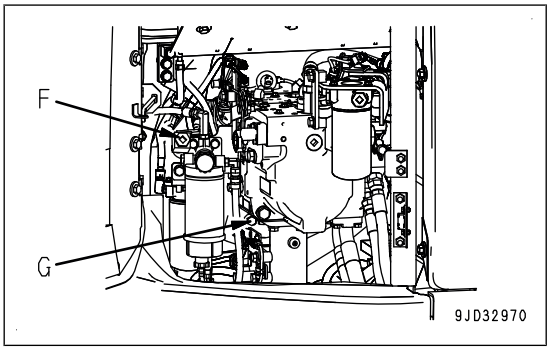
   If the oil is insufficient, add it according to the following procedure.

   1) Remove the plug (F).
   2) Add oil through the hole of plug (F) until it reaches to the lower edge of the hole of plug (G).

   NOTICE

   If excessive oil is supplied, drain it to the specified amount to avoid overheating.

   If the oil level is close to the lower edge of the plug hole, the oil level is appropriate.



3. Install the plugs (G) and (F).
4. Close the door.

How to Replace Fuel Main Filter Cartridge

⚠ WARNING

- **Do not replace the filter immediately after the engine is stopped. The parts are still very hot. Wait for all of parts to cool down before starting the work.**
- **High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.**
- **Do not bring any open flame close.**
- **When opening the air bleeding plug of the fuel filter head, take care. There may be remaining pressure and the fuel may spurt out.**

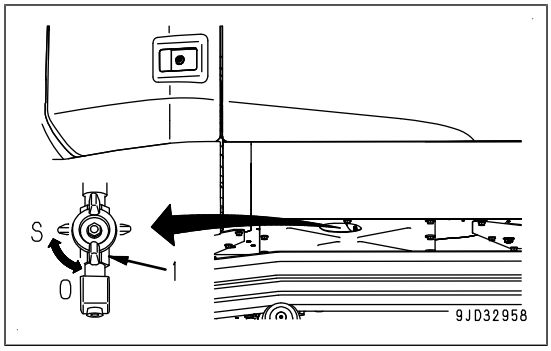
NOTICE

- **Komatsu genuine fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the parts, Komatsu recommends using Komatsu genuine parts.**
- **The common rail fuel injection system used on this machine consists of more precise parts than those in the conventional injection pump and nozzles. If any cartridge other than a Komatsu genuine filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Never use a substitute.**
- **When performing the inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt sticks to any part, use fuel to wash it off completely.**

Items to be prepared

- Container to catch drained oil
- Filter wrench

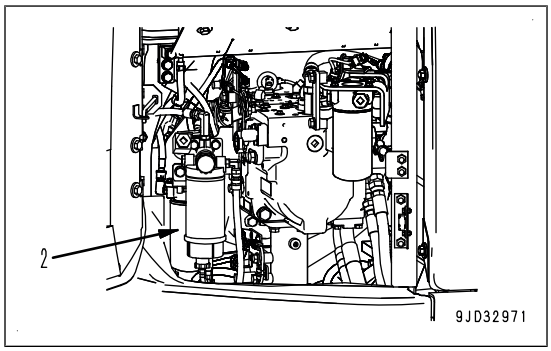
1. Turn the valve (1) at the bottom of the fuel tank to CLOSE position (S).
2. Open the door on the right side of the machine.
3. Place a container under the filter cartridge (2) to catch the fuel.



4. Turn the filter cartridge (2) counterclockwise by using the filter wrench, and remove it.

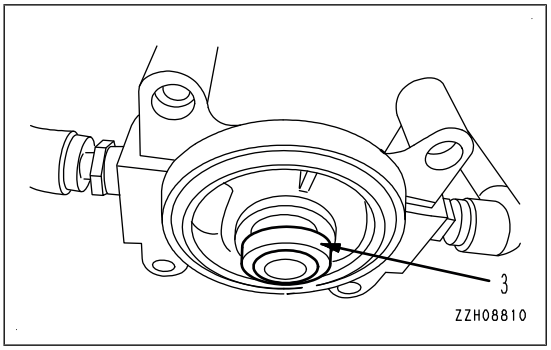
   After removing the filter cartridge, fuel drops from the filter head.

   In order to prevent the fuel from flowing out, be sure not to leave the machine without the filter cartridge.



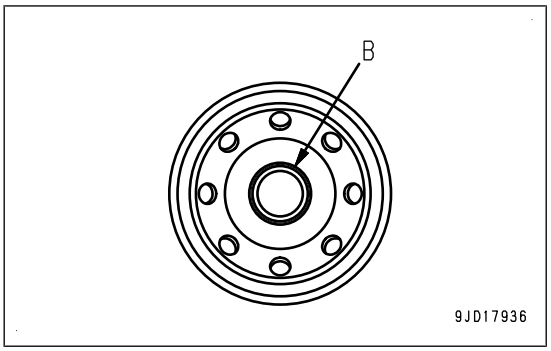
5. Clean the filter head. Thinly apply oil to the packing of the new filter cartridge and install the cartridge to the filter head.

   Replace the inner seal (3) with a new one.



NOTICE

- **Do not fill the new filter cartridge with fuel.**
- **Remove the cap (B) at center and install the filter cartridge.**

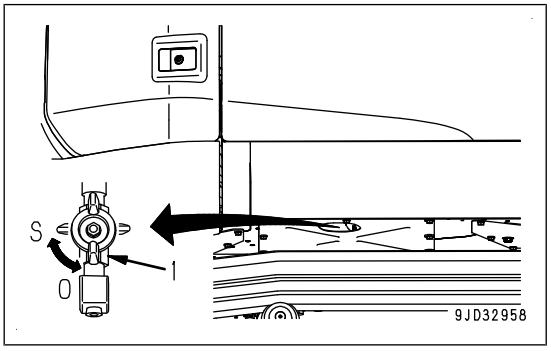


6. When installing the cartridge, tighten it until the packing surface contacts the sealing surface of the filter head, then tighten it 3/4 of a turn.

   If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is tightened too loose, fuel will also leak from the packing, so always tighten to the specified angle.

   When tightening by using a filter wrench, be extremely careful not to dent or damage the filter.

7. Turn the valve (1) at the lower part of the fuel tank to OPEN position (O).
8. After completing the replacement of filter cartridge (2), bleed air from the circuit.

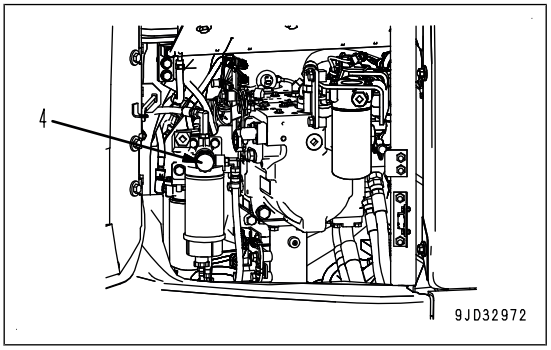


If Engine Does Not Start

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 the steps 2 and 3.

   Keep away from the engine while it is being started and running.



5. Check the filter seal surface for leakage.

   If any leakage is found, check the filter cartridge for its tightening condition.

   If leakage is still found, remove the filter cartridge.

   If foreign material is caught, replace the cartridge with a new one.

   For details, see “METHOD FOR REPLACING FUEL MAIN FILTER CARTRIDGE”.

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.

REMARK

When bleeding air, air may remain inside of the water separator. However, the engine can be started after pumping the feed pump (4) in and out until it becomes heavy. Leave it as it is for a while after stopping the engine, and air is bled spontaneously.

How to Examine 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.

How to Examine and Release Nitrogen Gas Charge Pressure in Accumulator (For Breaker)

(if equipped)

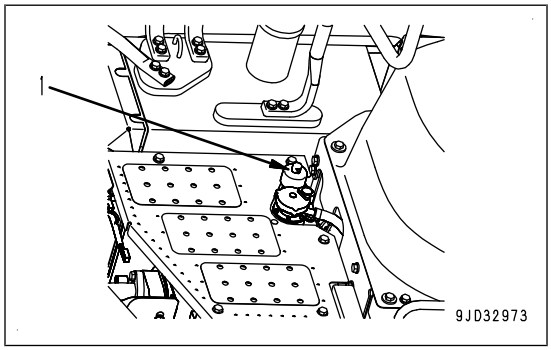
A special tool is needed for checking and charging of nitrogen gas. Ask your Komatsu distributor to perform this work.

How to Replace Hydraulic Tank Breather Element

⚠ WARNING

- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When removing the oil filler cap, the oil may spurt out. Turn it slowly to release the internal pressure, then remove it carefully.**

1. Remove the nut (2) of breather assembly (1) at the top of the hydraulic tank.

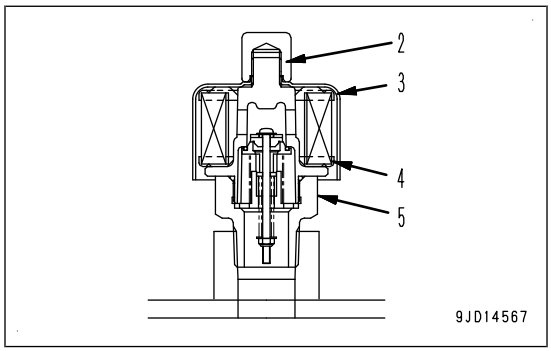


2. Remove the cover (3).
3. Replace the filter element (4) with a new one.
4. Install the cover (3) and nut (2).

   Tightening torque of the nut (2): 10 to 14 Nm {1.0 to 1.4 kgfm}

   NOTICE

   If the breather assembly (1) is removed for replacement, apply a tool to the bolt (5) and tighten it.
   Tightening torque: 30 to 40 Nm {3.1 to 4.1 kgfm}



How to Replace DEF Tank Breather Element

⚠ WARNING

Do not replace the element immediately after the engine is stopped.

NOTICE

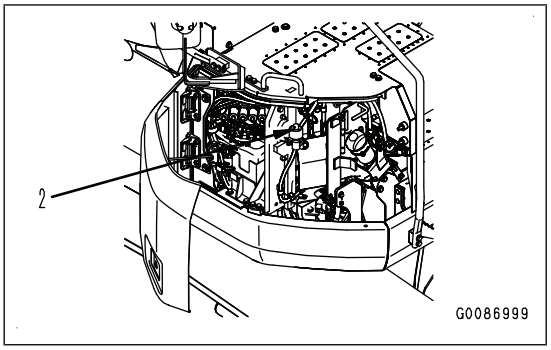
- **Komatsu recommends using Komatsu genuine parts for replacement parts.**
- **If the machine is operated without the DEF tank breather element attached, or with the element other than Komatsu genuine parts, foreign materials may enter the DEF pump and DEF injector which will cause failure of the machine. Never operate the machine without the DEF 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 the DEF tank. Never reuse the element.**
- **Always stop the engine and clean around the DEF tank before replacing.**
- **After the engine is stopped, the DEF system devices automatically purge the DEF in the DEF injector and DEF pump and return it to the DEF tank to prevent malfunction of the devices caused by freezing of the DEF or deposition of urea.**
  After the engine is stopped, the devices are operated for a few minutes. Replace the element after the DEF system devices stop.
- **Improper assembly of the DEF tank breather element may cause leakage of the DEF. Replace the element in the correct procedure.**

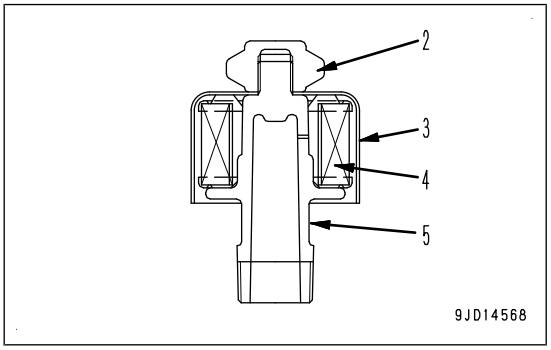
1. Open the right side cover of the machine.
2. Remove the nut (2) of breather assembly (1), and then remove the cover (3).
3. Replace the breather (4) with a new one.
4. Install the cover (3) and nut (2).

   In order not to damage the threaded portion of nut, tighten the nut (2) by hand until it is seated, then tighten it 15 to 25 ° by using a tool.

   NOTICE

   If the breather assembly (1) is removed for replacement, apply a tool to the bolt (5) and tighten it.
   Tightening torque: 6.5 to 8.5 Nm{0.66 to 0.87 kgfm,4.8 to 6.3 lbft}
5. Close the cover on the right side of the machine.





How to Examine Fan Belt Tension and Auto-Tensioner and Replace Auto-Tensioner

Special tools are required for inspection and replacement of the auto-tensioner belt. Ask your Komatsu distributor for inspection and replacement.

REMARK

As the fan belt tension has been automatically adjusted by the auto-tensioner, no adjustment is required.

Every 2000 Hours Maintenance

Maintenance for every 100, 250, 500 and 1000 hours service should be performed at the same time.

How to Change 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) 5ℓ

Items to be prepared

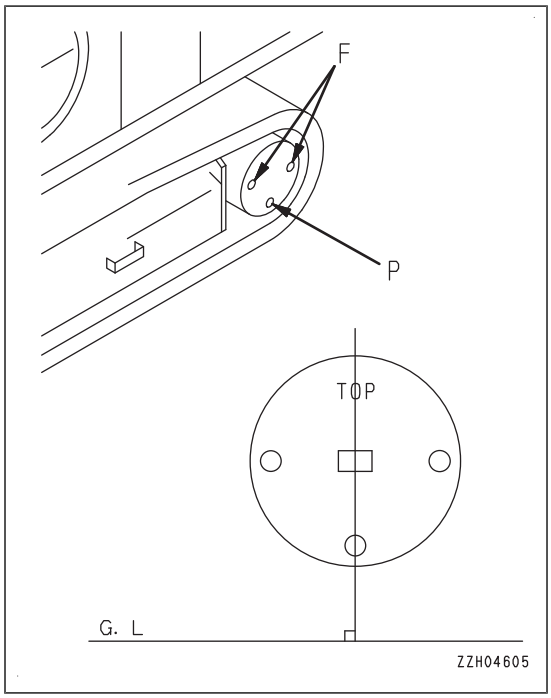
- Container to receive drained oil
- Handle

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 {6.0 to 8.0 kgfm, 43.4 to 57.9 lbft}



How to Clean Hydraulic Tank Strainer

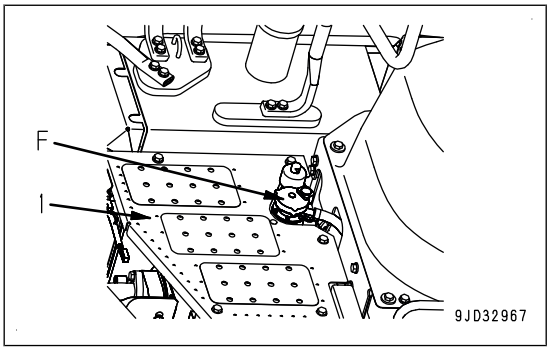
⚠ WARNING

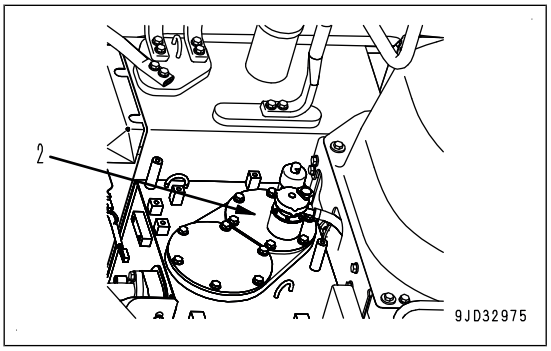
- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When removing the oil filler cap, the oil may spurt out. Turn it slowly to release the internal pressure, then remove it carefully.**

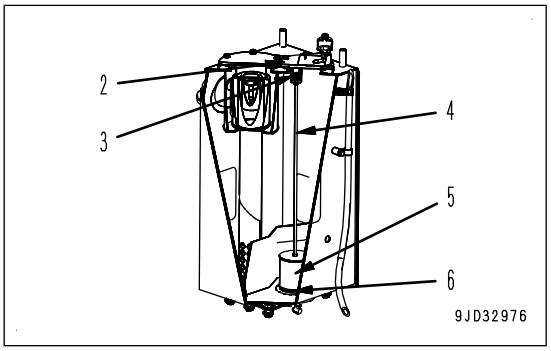
1. Remove the cap of hydraulic tank oil filler port (F), and release the internal pressure.
2. Loosen the bolts (5 pieces) and remove the cover (1).
3. Remove the bolts (6 pieces), and remove the cover (2).

   Hold the cover down at this time otherwise the cover may jump out under the force of spring (3) when removing the bolts.
4. Hold the top of rod (4), pull it up, and take out the spring (3) and strainer (5).
5. Remove any dirt stuck to the strainer (5), then wash it in flushing oil.

   If the strainer (5) is damaged, replace it with a new one.
6. When installing, insert the strainer (5) into the protruding portion (6) of the tank.
7. Install the cover (2) so that the protruding part at the bottom of cover (1) holds the spring (3), then fasten the cover with the bolts.
8. Set the cover (1) in position, and install the cover with the mounting bolts.







How to Examine Function of Accumulator for Control Circuit and Release Internal Pressure in Hydraulic Circuit

⚠ WARNING

The accumulator is charged with high-pressure nitrogen gas, so improper operation may cause an explosion, which will lead to serious injury or death. For handling, always observe the following.

- **The pressure in the hydraulic circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when performing the operation. In addition, loosen the bolts slowly when performing the work.**
- **Do not disassemble it.**
- **Do not bring open flame close to it or do not dispose of it in fire.**
- **Do not perform drilling, welding or flame-cutting.**
- **Do not hit or roll it, or subject it to any impact.**
- **When disposing of it, the gas must be released. Ask your Komatsu distributor to have this work performed.**

NOTICE

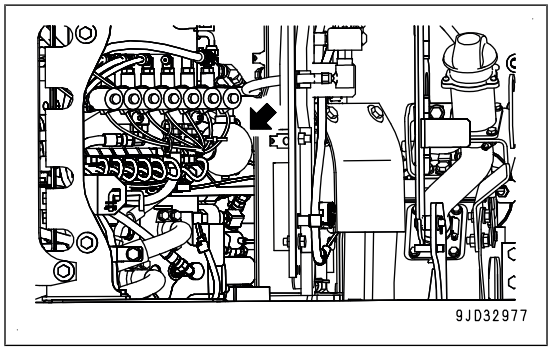
If the nitrogen gas charge pressure in the accumulator is low and operations are continued, it becomes impossible to release the remaining pressure inside the hydraulic circuit if a failure occurs on the machine.

Function of Accumulator

Accumulator has a function to store the pressure in the control circuit. Even after the engine is stopped, the control circuit can be operated for a while, so the following actions are possible.

- If the control lever is operated in the direction to lower the work equipment, it is possible for the work equipment to go down under its own weight.
- The pressure in the hydraulic circuit can be released.

The accumulator is installed to the position shown in the figure.



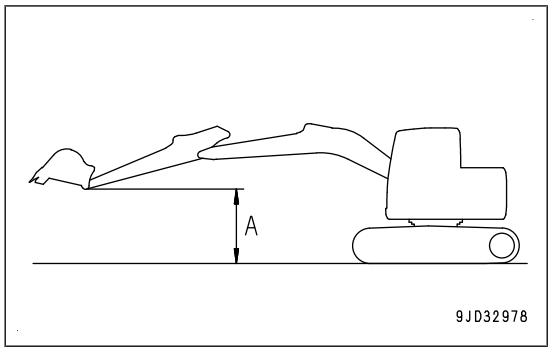
How to Examine Function of Accumulator

⚠ CAUTION

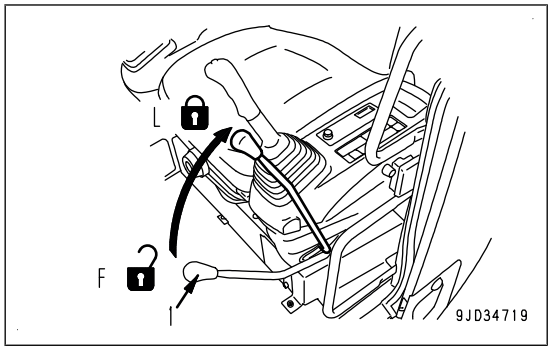
Be sure that no person or obstacle is around the machine before performing the inspection.

Check the nitrogen gas charge pressure as follows.

1. Place the machine on a firm, level 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.



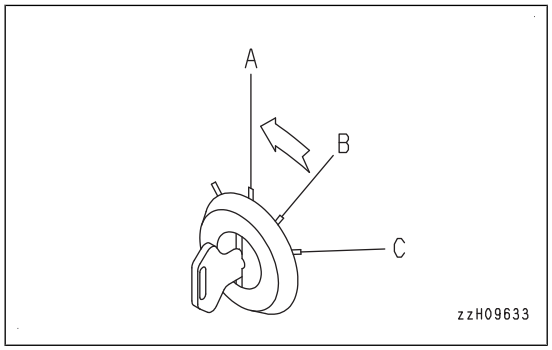
3. Be sure to operate the lock lever (1) by the red portion on the top, then set it to LOCK position (L).



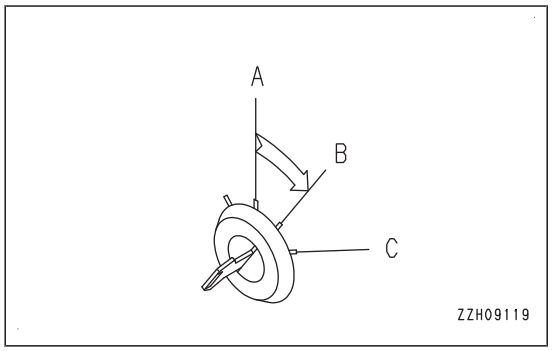
4. Perform the following procedure within 15 seconds.

   When the engine is stopped, the pressure inside the accumulator gradually goes down. This inspection can be performed only immediately after the engine is stopped.

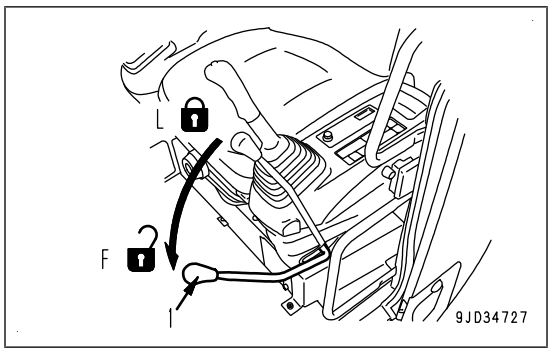
   1) Keep the work equipment at the maximum reach posture, turn the starting switch to OFF position (A), and stop the engine.



   2) Turn the starting switch to ON position (B).

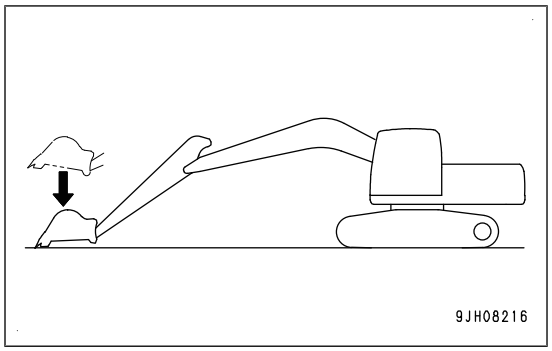


3) Operate the lock lever (1) by the red portion on the top, then set it to FREE position (F). Operate the work equipment control lever fully in boom LOWER direction, and check that the work equipment is lowered to the ground.



If the work equipment goes down under its 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.



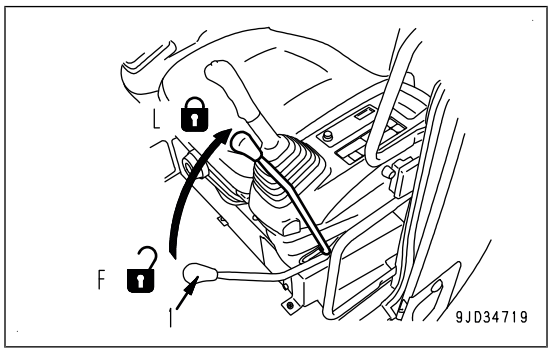
At this time, inspection has finished. After completion of the inspection, set the lock lever to LOCK position and turn the starting switch to OFF position.

How to Release Internal Pressure in Hydraulic Circuit

1. Lower the work equipment to the ground.

   Keep the crusher attachment jaws, etc. closed.

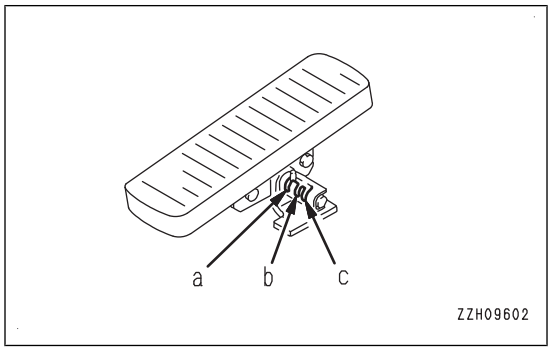
2. Be sure to operate the lock lever (1) by the red portion on the top, then set it to LOCK position (L).



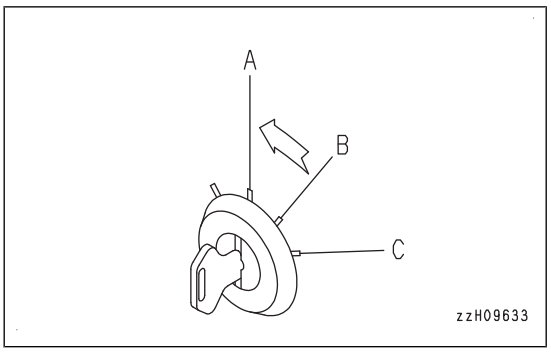
   If an attachment is installed, set the lock pin of the attachment control pedal to position (c) where you can operate the pedal.

3. Perform the following procedure within 15 seconds.

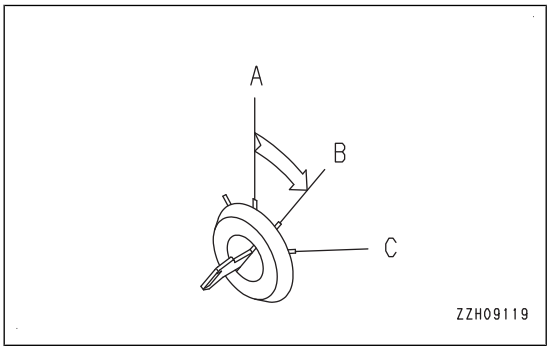
   When the engine is stopped, the pressure inside the accumulator gradually goes down. This inspection can be performed only immediately after the engine is stopped.



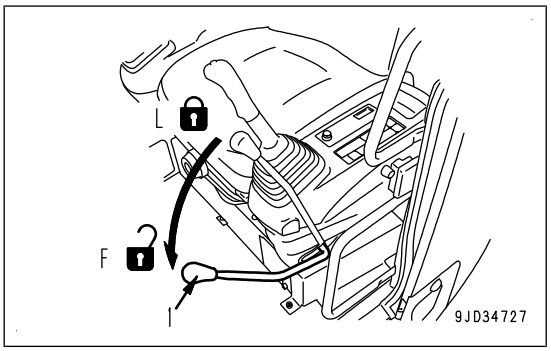
1) Turn the starting switch to OFF position (A), and then stop the engine.



2) Turn the starting switch to ON position (B).

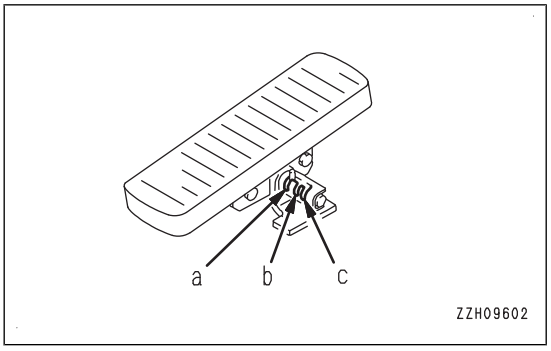


3) Operate the lock lever (1) by the red portion on the top, then set it to FREE position (F). Operate the work equipment control levers and the attachment control pedal (if equipped) fully to forward, backward, right, and left to release the pressure in the control circuit.



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.



How to Examine Alternator

Ask your Komatsu distributor to have the alternator checked.

If the engine is started frequently, have this inspection performed every 1000 hours.

How to Examine and Adjust Engine Valve Clearance

Special tools are necessary for inspection and maintenance. Ask your Komatsu distributor to perform this work.

How to Replace KCCV Filter Element

⚠ WARNING

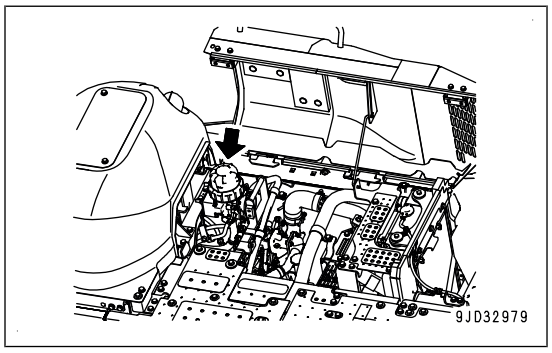
Do not replace the element immediately after the engine is stopped. The parts are still very hot. Wait for all of parts to cool down before starting the work.

NOTICE

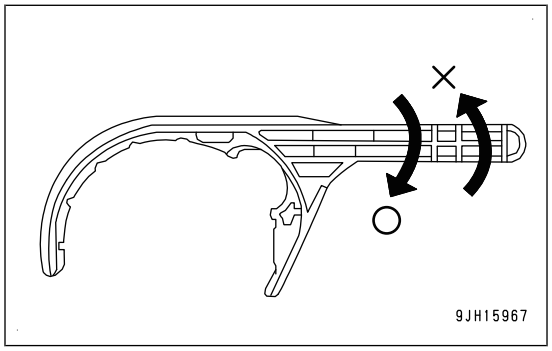
- **If the engine is operated without the filter element, the turbocharger and aftercooler become dirty and their performance will lower and that can cause engine problems such as overrun caused by suction of oil. Therefore, never start the engine without the filter element.**
- **The filter element cannot be cleaned. Flushing or regenerating of the filter element will degrade the 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

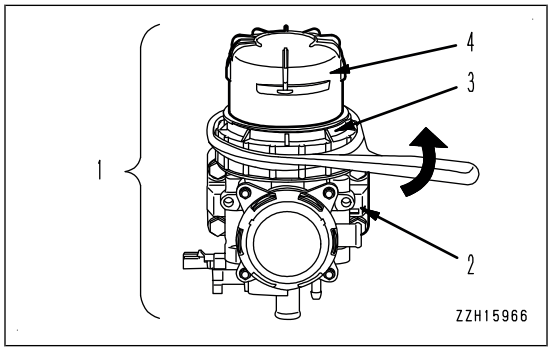
The KCCV ventilator is located in the position shown in the figure.



For the use of the special wrench, see the figure.



1. By using the special wrench, loosen the ring (3) of the KCCV ventilator (1).

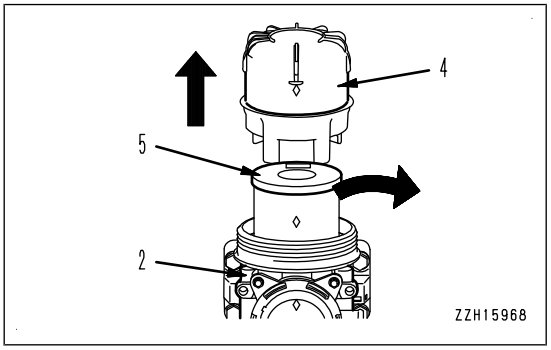


2. After the ring (3) comes off, remove the case (4) from body (2), and remove the element (5).

   Oil may be accumulated in or sticking to the case and element. When replacing the element, be careful not to spill out the oil.

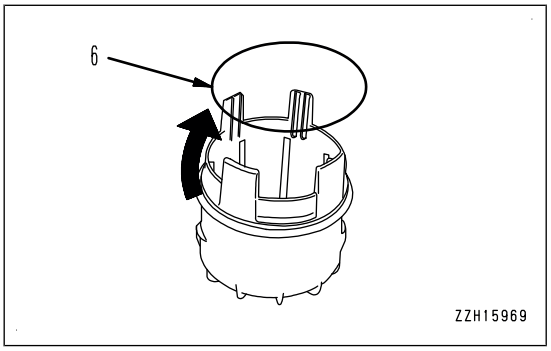
   REMARK

   When the ambient temperature is low, water or emulsified matter may stick to the inside of KCCV because of condensation of water vapour in the blowby gas. However, as far as the coolant level is normal, it is not a problem.

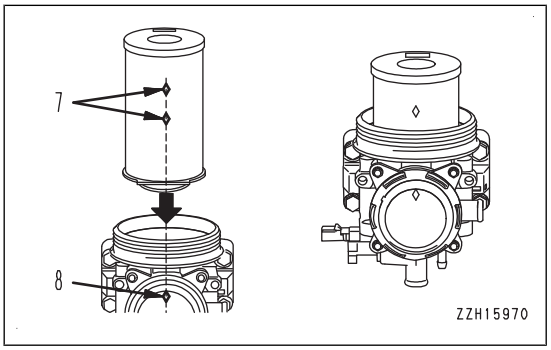


3. Remove the used O-ring (6) sticking to the case (4) and install a new O-ring contained in the service kit.

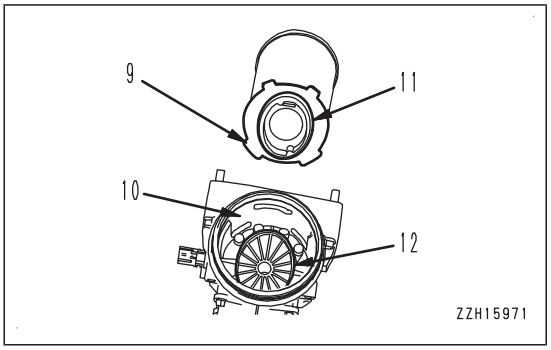
   Apply the engine oil to the new O-ring.



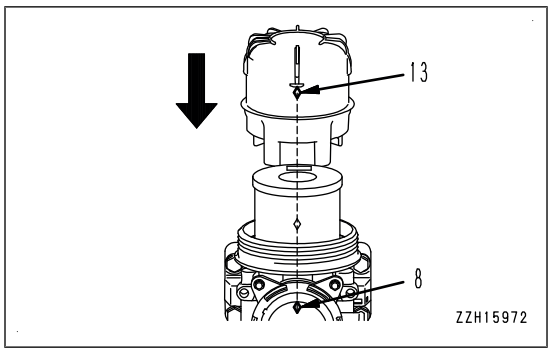
4. While matching the ◇ marks (7) of the new element with the ◇ mark (8) of the body label, insert the element firmly into the end of the body.



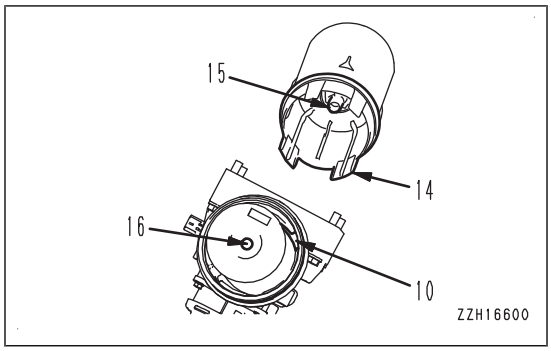
   The element can be installed only when its claws (9) are correctly inserted in grooves (10) of the filter body. Bases (11) and (12) are oval. When inserting, take extreme care so that those bases are matched with each other.



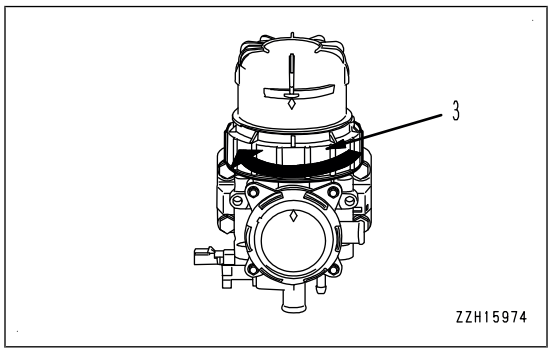
5. Align the position of ◇ mark (13) on the case with that of ◇ mark (8) of the filter body label, then install the case to the filter body.



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 the protrusion (15) in the case fits to the rubber lip (16) of the element.

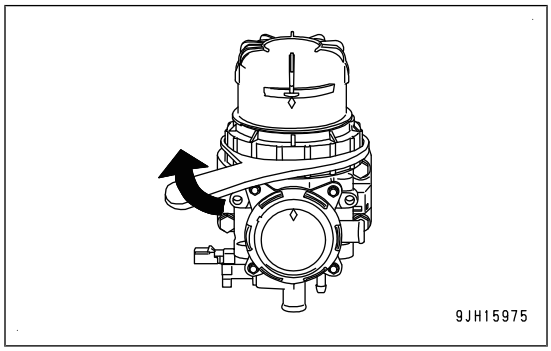


6. Fit the ring (3) to the threaded part of the body and tighten it by hand firmly until it stops.



7. Tighten the ring 1/15 to 2/15 turns further (1 to 2 ridges of the ring) by using the special wrench.

   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.

How to Replace DEF Filter

⚠ WARNING

Do not replace the filter immediately immediately after the engine is stopped. The parts are still very hot. Wait for all of parts to cool down before starting the work.

NOTICE

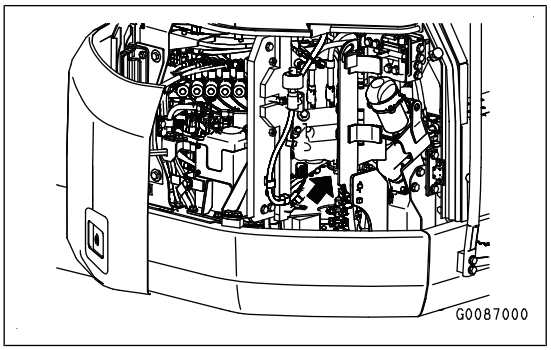
- **Komatsu recommends using Komatsu genuine parts for replacement parts.**
- **If the machine is operated without the DEF filter attached, or with the filter other than Komatsu genuine parts, foreign materials may enter the DEF pump and DEF injector which will cause failure of the machine. Never operate the machine without the DEF filter attached, nor use the filter other than Komatsu genuine parts.**
- **The DEF filter cannot be flushed. Flushing or regenerating of it will degrade the performance of filter, and will cause the breakage of the DEF tank. Never reuse the element.**
- **Improper assembly of the DEF filter may cause leakage of the DEF. Replace the DEF filter in the correct procedure.**
- **DEF freezes at -11 °C. If it is frozen, replacement of the filter becomes difficult. Replace the filter when the temperature around the DEF pump is higher than -11 °C, and in the condition that the DEF is not frozen.**

After the engine is stopped, the DEF system devices automatically purge the DEF in the DEF injector and DEF pump and return it to the DEF tank to prevent malfunction of the devices caused by freezing of the DEF or deposition of urea.

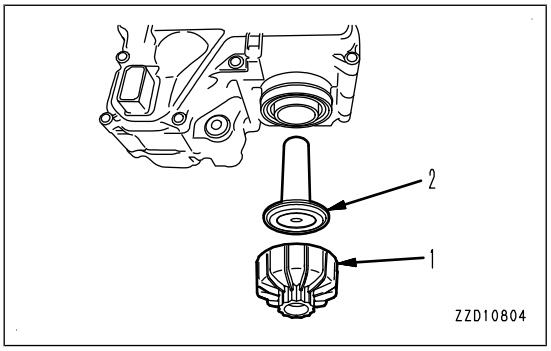
After the engine is stopped, the devices are still operated for a few minutes. Before replacing the filter, clean around the DEF pump first after the DEF system devices stop.

Items to be prepared
- DEF filter removal tool

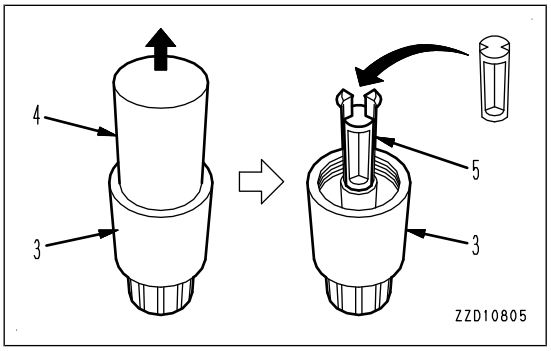
The DEF filter is located at the position shown in the figure.



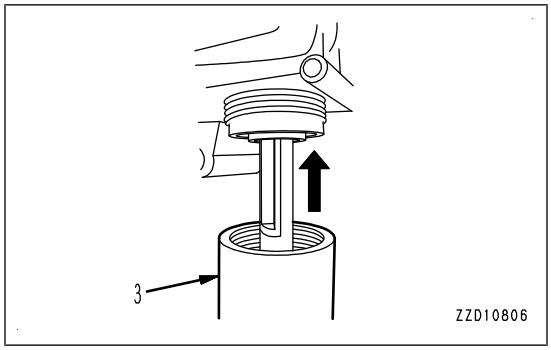
1. Remove the filter cap (1) at the bottom of the DEF pump, and remove the equalizing element (2).



2. Turn the cap (4) of filter removal tool (3) and remove it.
3. Check the installation of spacer (5).

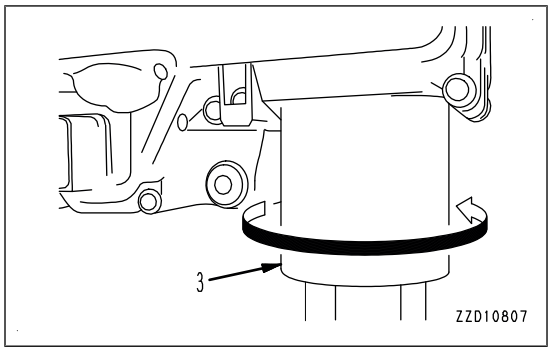


4. Insert the filter removal tool (3) into the lower part of the DEF pump and thrust in by hand.



5. Check that the filter removal tool (3) is fully inserted to the end.

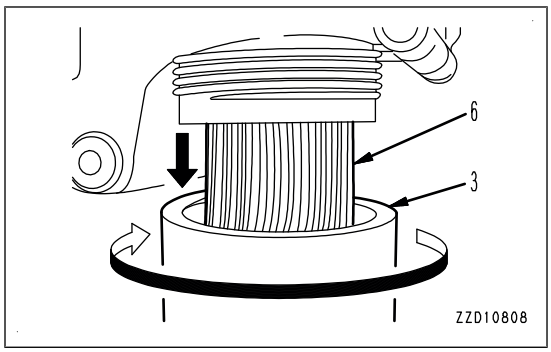
   Insert the filter to the end where you cannot thrust it in any further.



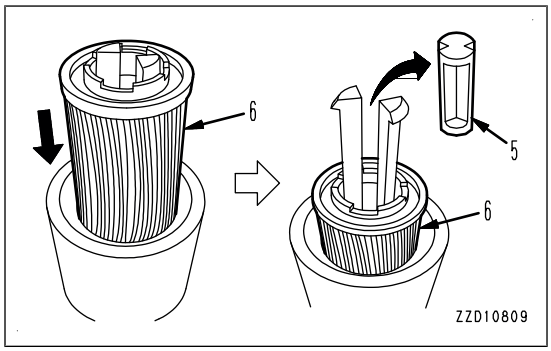
6. Turn the filter removal tool (3) in reverse, and remove the filter (6).

   Filter (6) is removed and you can take it out together with the filter removal tool (3).

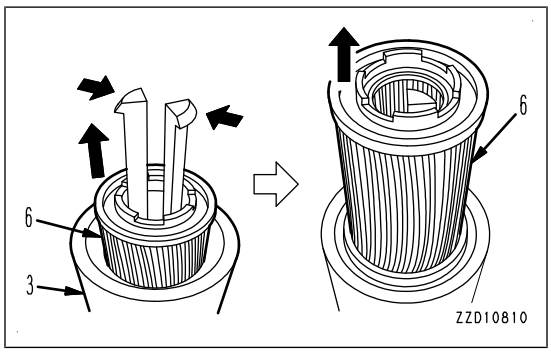
   If filter (6) cannot be removed from the DEF pump, grip the filter removal tool (3), pull it down, then it will be removed.



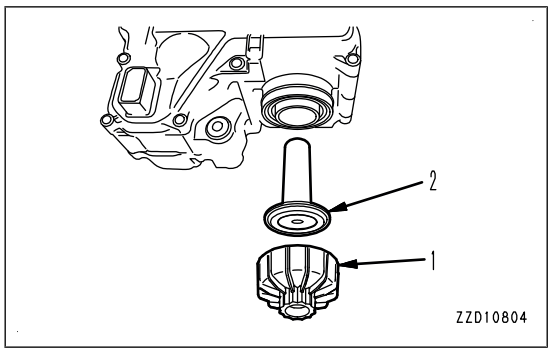
7. Slide the filter (6) down, and remove the spacer (5) from the filter removal tool (3).



8. Pull the filter (6) up while pushing in the tip of filter removal tool (3), and remove it.
9. Return the removed spacer (5) to the filter removal tool (3), and keep them.
10. Insert a new filter and a new equalizing element (2) into the bottom of the DEF pump, and lightly tighten them by hand.



11. Tighten the filter cap (1).
    Tightening torque: 20 to 25 Nm {2.0 to 2.5 kgfm}

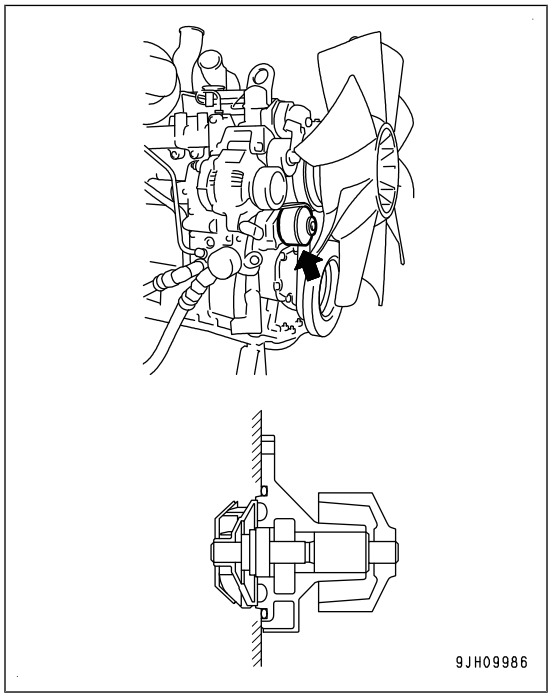


Every 4000 Hours Maintenance

Maintenance for every 100, 250, 500, 1000 and 2000 hours service should be performed at the same time.

Examine 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.



How to Examine Vibration Damper

Ask your Komatsu distributor for inspection of the vibration damper.

How to Examine Starting Motor

Consult your Komatsu distributor for inspection of the starting motor.

If you start the engine frequently, consult for inspection every 1000 hours.

How to Replace Accumulator (For Control Circuit)

⚠ WARNING

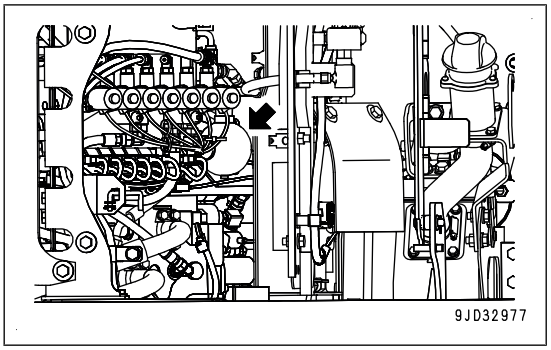
The accumulator is charged with high-pressure nitrogen gas. Observe the following for handling it, otherwise improper operation may cause an explosion which will lead to serious injury or death.

- **Do not perform any work in the direction of the oil spurting out. When loosening the screw, do it slowly. The pressure in the hydraulic circuit cannot be completely released.**
- **Do not disassemble.**
- **Do not bring an 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 to replace it.
The accumulator is installed to the position shown in the figure.



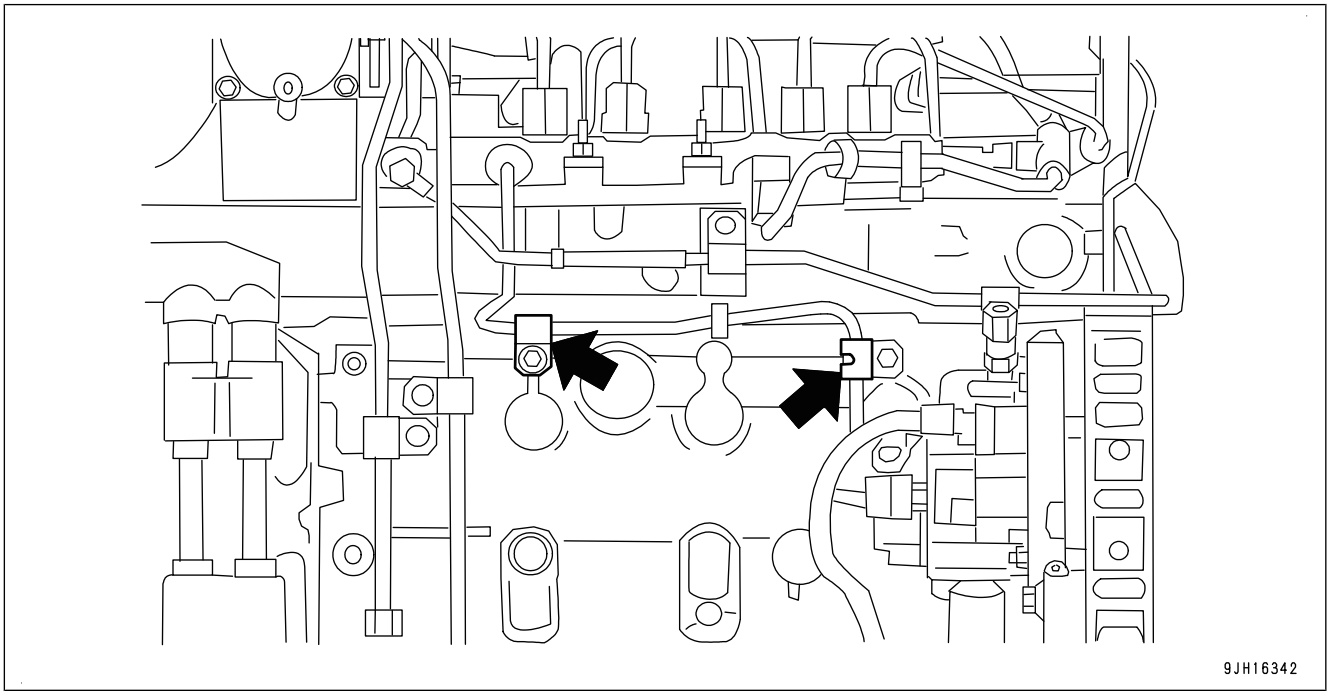
Examine Operation of Air Conditioner Compressor

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.

How to Examine for Looseness of Engine High-Pressure Piping Clamp, Hardening of Rubber

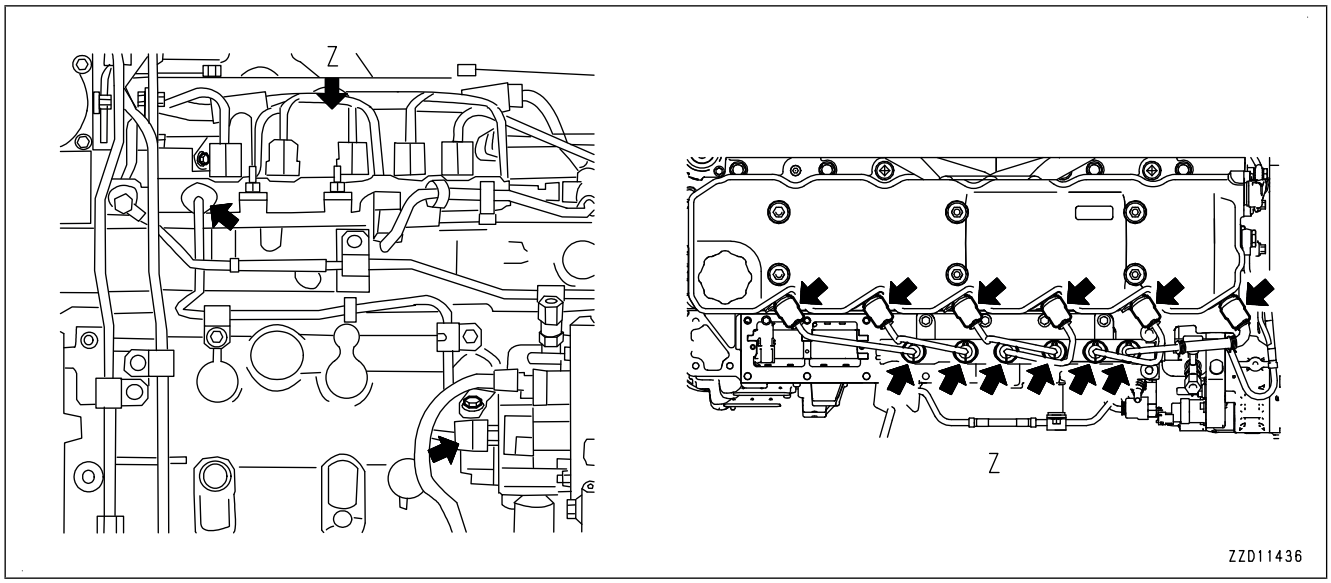


Check visually and touch by hand to check that there is no hardening of the rubber and no loose bolts of the mounting clamps (2 places) for the high-pressure piping between the supply pump and the common rail.
Replacement of the high-pressure piping must be made as an assembly.

If there are any problems, the parts must be replaced. Ask your Komatsu distributor for replacement.

How to Examine 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.



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.

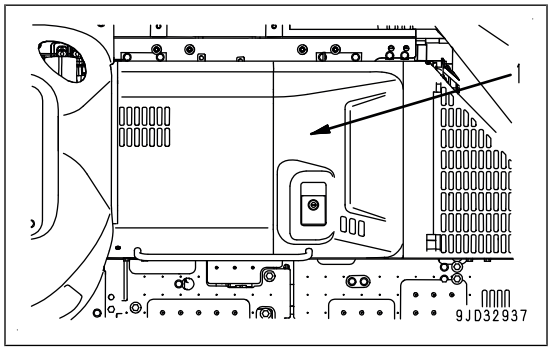
If there are any problems, the related parts must be replaced. Ask your Komatsu distributor for replacement.

How to Replace Radiator Cap

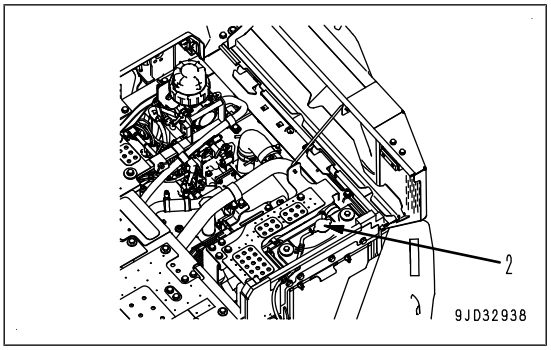
⚠ WARNING

Immediately after the engine is stopped, the coolant is still hot and the pressure is accumulated in the radiator. You may get burn injury if you remove the cap to perform draining in this state. Always wait for the temperature to go down, and turn the cap slowly to release the pressure.

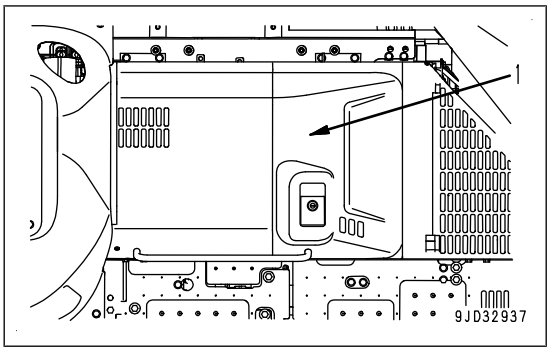
1. Place the machine on a level ground, then stop the engine.
2. Open the engine hood (1).



3. Check that the coolant temperature is low enough to touch the radiator cap surface by bare hand, turn the radiator cap (2) slowly until it hits the stopper, and release the pressure.
4. While pushing the radiator cap (2), turn it until it hits the stopper, then remove it.
5. Replace the radiator cap (2) with the new one, and tighten it.



6. Close the engine hood (1).



Every 4500 Hours Maintenance

Maintenance for every 100, 250 and 500 hours should be performed at the same time.

How to Clean KDPF

Contact your Komatsu distributor for cleaning of the KDPF.

Replace KCCV Hose

Ask your Komatsu distributor for replacement of the KCCV hose.

How to Clean DEF Tank

Ask your Komatsu distributor for cleaning of the DEF tank.

How to Replace DEF Tank Filler Port Filter

Ask your Komatsu distributor for replacement of the DEF tank filler port filter.

Every 5000 Hours Maintenance

Maintenance for every 100, 250, 500 and 1000 hours service should be performed at the same time.

How to Change Oil in Hydraulic Tank

⚠ WARNING

- **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When removing the oil filler cap, the oil may spurt out. Turn it slowly to release the internal pressure, then remove it carefully.**

NOTICE

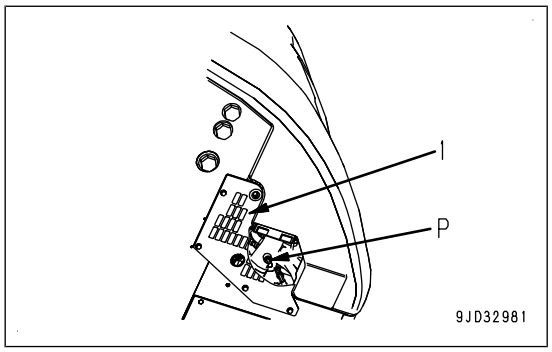
If the machine is equipped with a hydraulic breaker, the hydraulic oil deteriorates faster than in the normal bucket digging operation. Accordingly, perform the maintenance by referring to "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER".

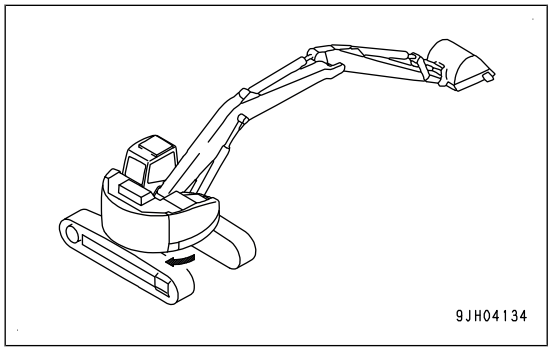
Refill capacity: 126 ℓ

Items to be prepared

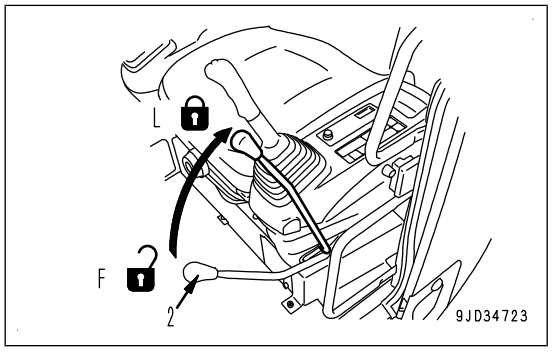
- Container to catch drained oil
- Socket wrench handle

1. Swing the upper structure so that the drain plug (P) on the lower side of the suction tube comes to the middle between the right and left tracks.
2. Retract the arm and bucket cylinder rods, then lower the boom to lower the tooth to the ground.

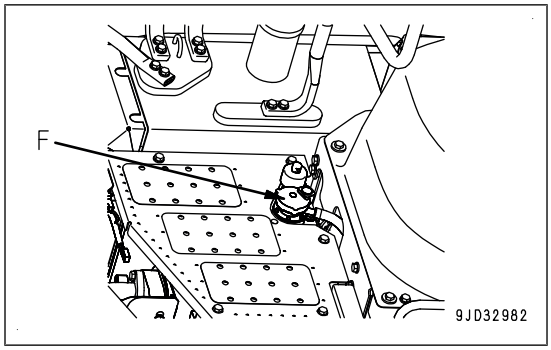




3. Be sure to operate the lock lever (2) by the red portion on the top, then set it to LOCK position (L).
4. Stop the engine.



5. Remove the cap of oil filler port (F).

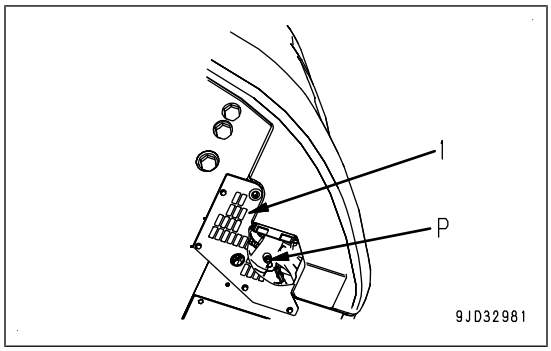


6. Remove the undercover (1).
7. Place an oil container to catch oil under the drain plug (P).

   When removing the drain plug (P), be careful not to get oil on yourself.
8. Remove the drain plug (P), and drain the oil.

   Check the installed O-ring for damage. Replace the O-ring with a new one if necessary.
9. After draining the oil, tighten the drain plug (P).

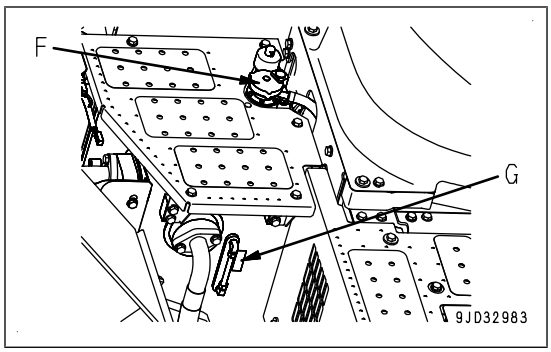
   Tightening torque: 58.8 to 78.4 Nm {6.0 to 8.0 kgfm}



10. Add the refill capacity of oil through the oil filler port (F).
11. Check that the oil level is between H and L lines on sight gauge (G).

    For applicable oils, see “METHOD FOR USING FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE”.
12. Bleed air from the hydraulic circuit.

    For the air bleeding procedure of hydraulic circuit, see “METHOD FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT”.
13. Install the 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.

How to Replace 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.

How to Replace DEF Hose

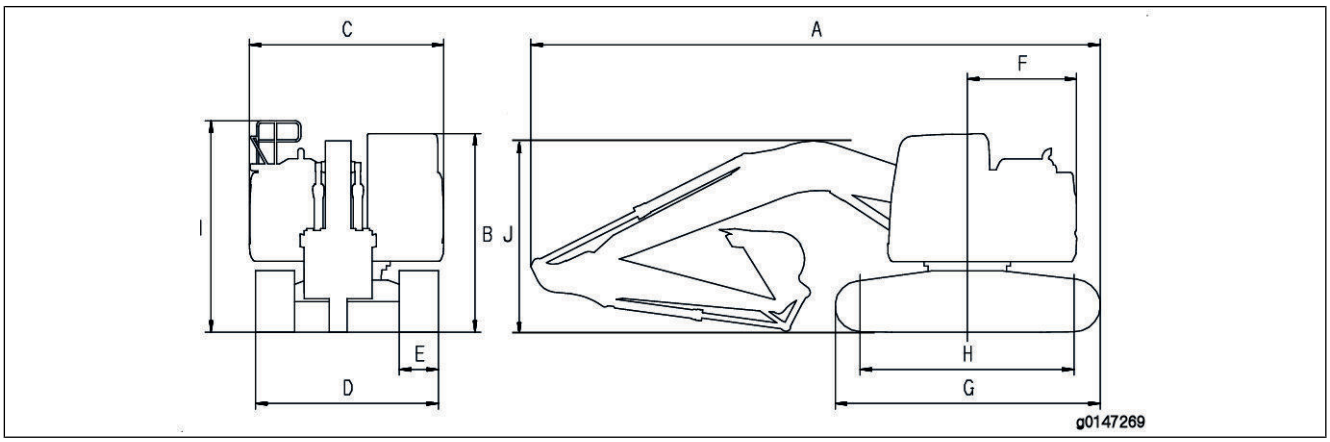
Ask your Komatsu distributor for replacement of the DEF hose.

Specifications

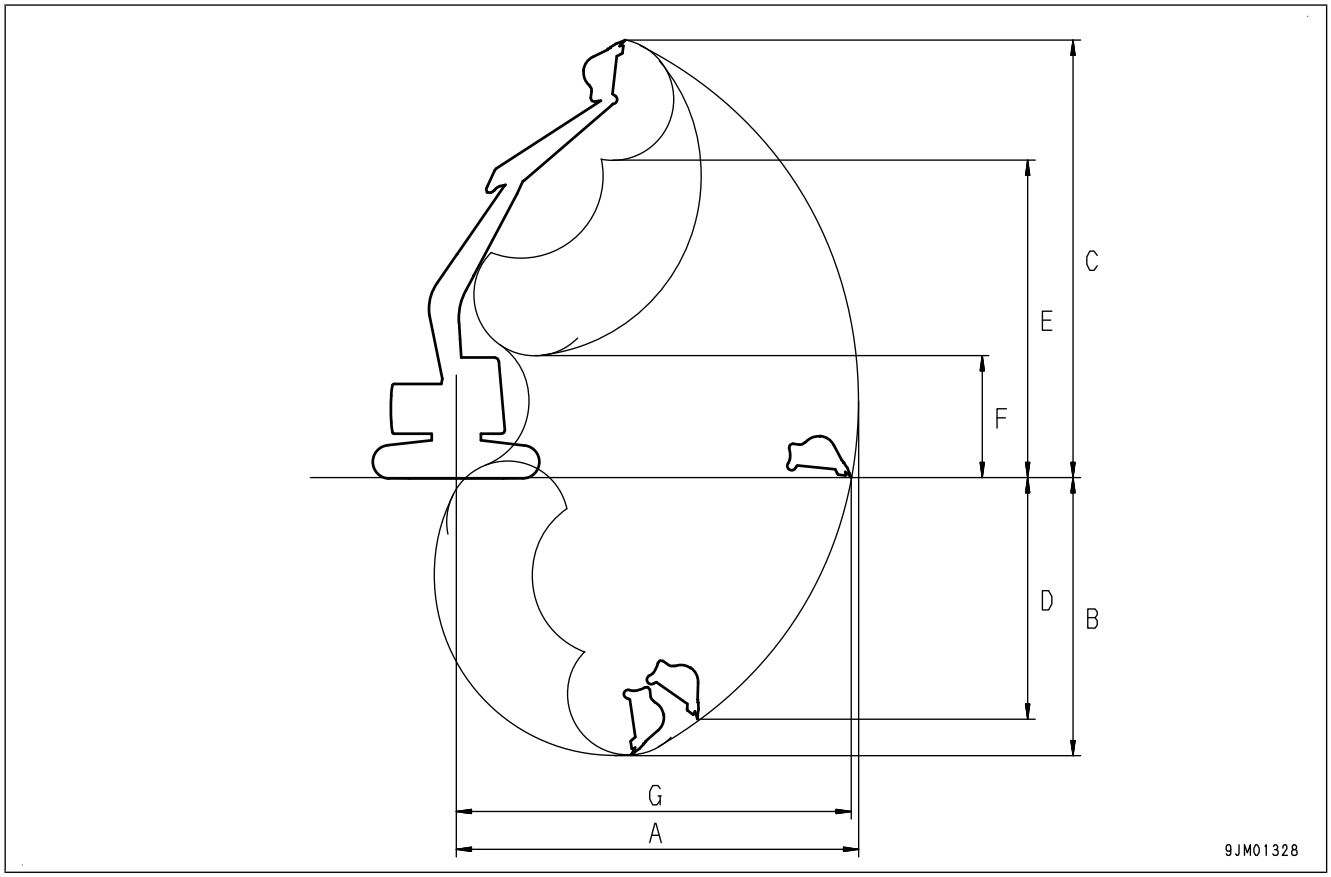
Specifications

Specifications: PC228USLC-11E0

	Item		Unit	PC228USLC-11E0
	Operating weight		kg {lb}	24350 {53683}
	Bucket capacity		m^3 {cu/yd}	0.8 {1.0}
	Engine model		-	Komatsu SAA6D107E-3 diesel engine
	Rated horse-power	SAE J1995 (gross)	kW {HP} / min^{-1} {rpm}	123.2 {165} / 2000 {2000}
		ISO14396		123 {165} / 2000 {2000}
		ISO 9249/SAE J1349 *(net)		123 {165} / 2000 {2000}
A	Overall length		mm {ft in}	8920 {29' 2"}
B	Cab height		mm {ft in}	3050 {10' 0"}
	Overall width		mm {ft in}	2980 {9' 9"}
C	Upper structure width		mm {ft in}	2980 {9' 9"}
D	Overall width of track		mm {ft in}	2980 {9' 9"}
E	Shoe width		mm {ft in}	600 {2' 0"}
F	Tail swing radius		mm {ft in}	1785 {5' 10"}
G	Overall length of track		mm {ft in}	4450 {14' 7"}
H	Distance between tumbler centers		mm {ft in}	3655 {12' 0"}
I	Height of handrail		mm {ft in}	3240 {10' 8"}
J	Overall height (work equipment)		mm {ft in}	3106 {10' 2"}
	Minimum ground clearance		mm {ft in}	440 {1' 5"}
	Travel speed (Lo/Mi/Hi)		km/h {MPH}	3.0/4.1/5.5 {1.9/2.5/3.4}
	Swing speed		rpm	11.0



	Working ranges	Unit	PC228USLC-11E0
A	Maximum digging reach	mm {ft in}	9875 {32' 5"}
B	Maximum digging depth	mm {ft in}	6620 {21' 9"}
C	Maximum digging height	mm {ft in}	10700 {35' 1"}
D	Maximum vertical wall digging depth	mm {ft in}	5980 {19' 7"}
E	Maximum dumping height	mm {ft in}	7825 {25' 8"}
F	Minimum dumping height	mm {ft in}	2940 {9' 8"}
G	Maximum reach at ground level	mm {ft in}	9700 {31' 10"}



Explanation of Lift Capacity Chart (1-Piece Boom Specification)

1-Piece Boom - PC228USLC-11E0

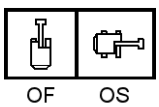
LEGEND

A: Reach from swing centre

B: Bucket hook height

OF: Lifting capacity (rating overfront)

OS: Lifting capacity (rating overside)



LEGEND

(1) Position of lifting point

(2) Arm length

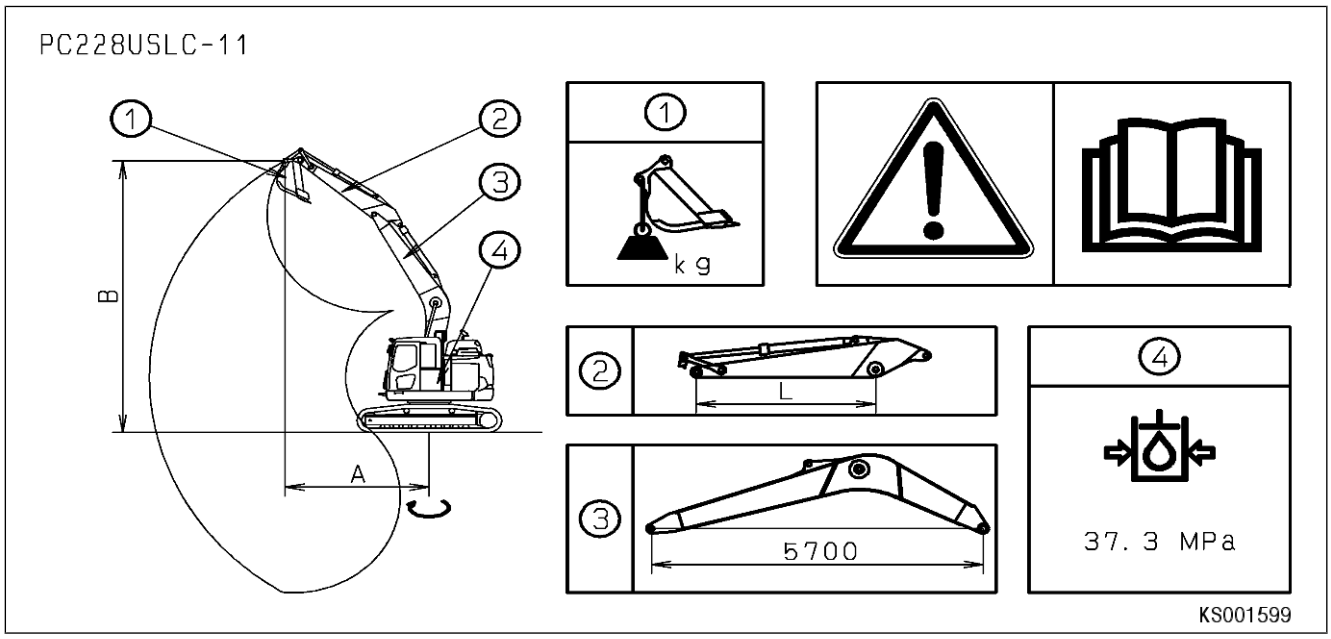
(3) Boom length

(4) Hydraulic pressure

WORKING CONDITIONS:

- WITH BUCKET 650 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

Loads do not exceed 87% of hydraulic capacity or 75% of tipping capacity (* load limited by hydraulic capacity rather than tipping).



PC228USLC-11E0

L	A / B	kg MAX		7.5m		6.0m		4.5m		3.0m		1.5m	
2.9m	6.0m	*2690	*2690	*3040	2860								
	4.5m	*2710	2340	4740	2810	*5790	4280						
	3.0m	*2860	2070	4590	2660	6770	3980	*9140	6480	*13640	12910		
	1.5m	*3150	1950	4420	2510	6450	3700	10600	5860	*6790	*6790		
	0.0m	3590	1970	4290	2390	6200	3470	10120	5460	*5130	*5130		
	-1.5m	3920	2160	4220	2330	6060	3350	9930	5300	*9240	*9240	*5110	*5110
	-3.0m	4710	2620			6070	3360	9990	5360	*16220	11050	*9670	*9670
	-4.5m	6800	3800					10260	5570	*15800	11450		
2.4m	6.0m	*4180	3250			*5640	4360						
	4.5m	*4240	2600	4640	2710	*6330	4150	*7410	6840				
	3.0m	4010	2270	4500	2580	6620	3840	*10080	6240				
	1.5m	3840	2140	4350	2440	6330	3590	10350	5640				
	0.0m	3940	2180	4240	2340	6110	3400	9960	5330	*7290	*7290		
	-1.5m	4370	2410	4220	2330	6020	3320	9870	5250	*9590	*9590	*8000	*8000
	-3.0m	5450	3030			6090	3380	10020	5370	*17330	11160	*12850	*12850
	-4.5m	*8740	4840					*9970	5680	*14030	11400		

KS001600

Attachments and Options

⚠ WARNING

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

Precautions When You Use Attachments and Options Safely

⚠ 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 You Select

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 You Remove and Install

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 applicable devices such as a crane when you handle heavy objects that can cause death, personal injury, or other accidents.
  (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 for Use

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", 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).

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 Operation

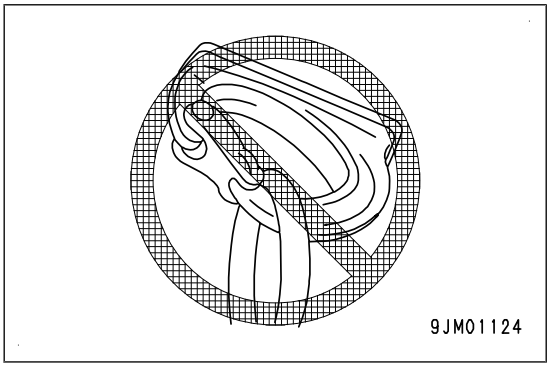
If lifted load largely swings, it is dangerous. During lifting operations, reduce the engine speed and perform the operation in L mode.

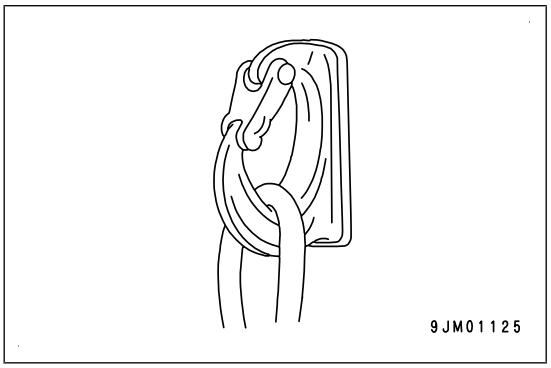
The wire or sling may come off the hook, depending on the working posture. Pay sufficient attention to the hook angle so that the sling does not come off.

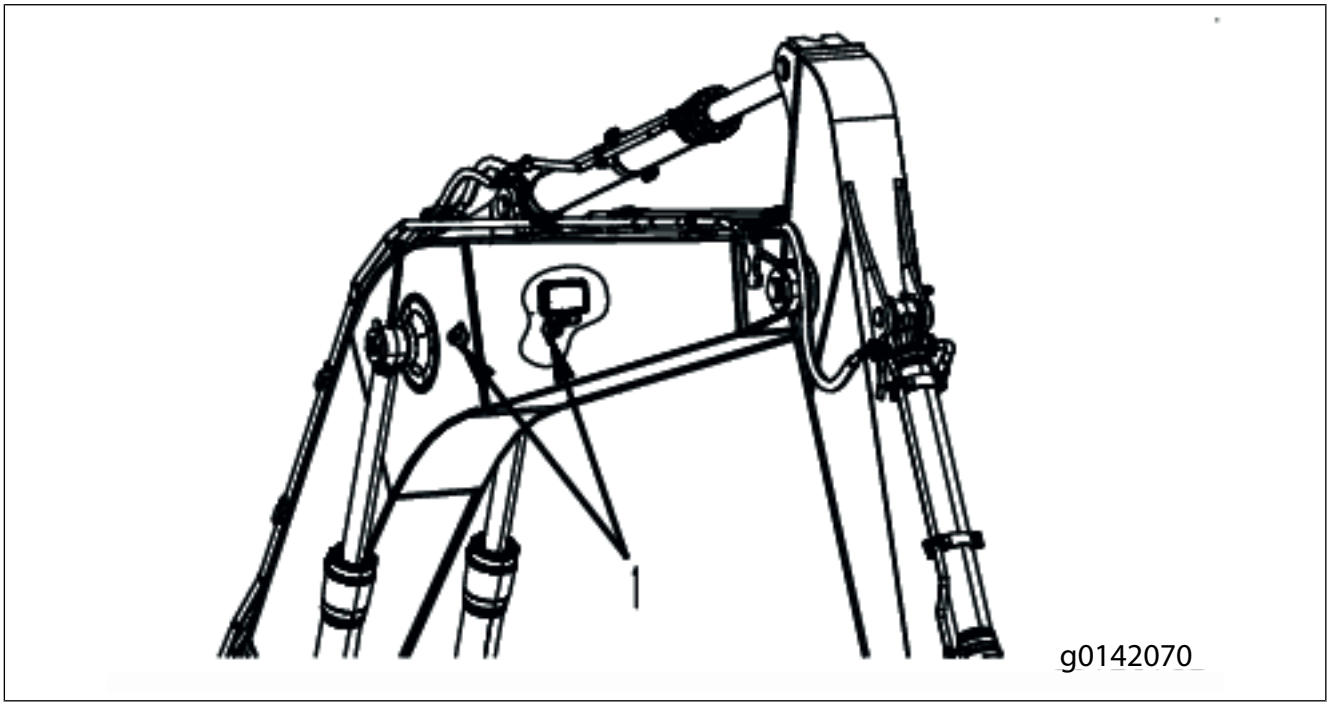
Never drive the machine while lifting a load.

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.







Personal fall arrest equipment may be attached to the anchor point for tie-off (1).

This may be utilised when carrying out maintenance, however, take care of the following:

- Never work alone when using personal fall arrest equipment. In the event of a fall you may become stranded, resulting in serious injury or death.
- Always ensure that suitable access equipment is used.
- Do not use the tie-off point for any other purpose.

Quick Coupler System

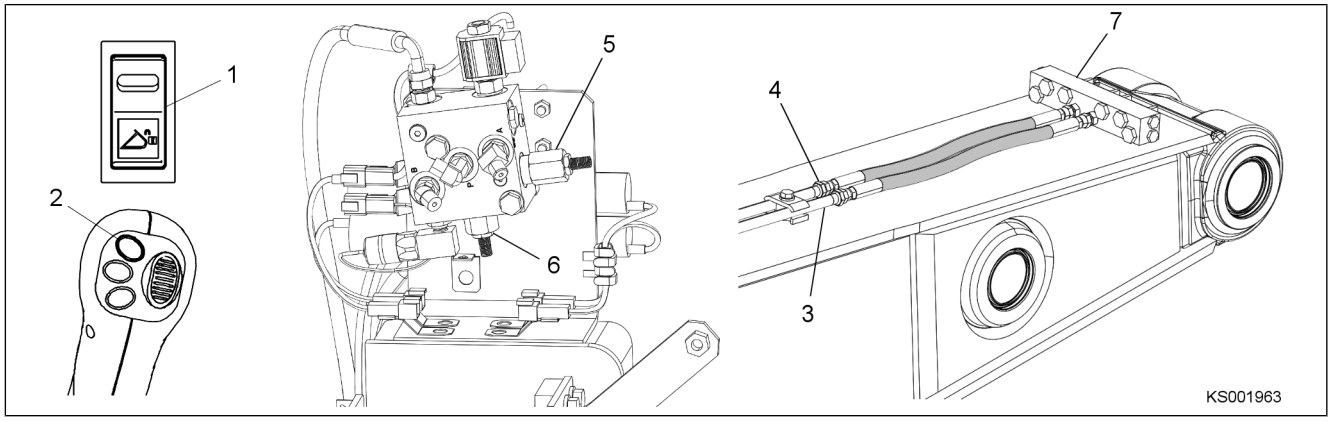
Handle Quick Coupler

⚠ WARNING

Quick coupler operation can be dangerous. There is a risk of death to exposed persons. Follow these instructions strictly.

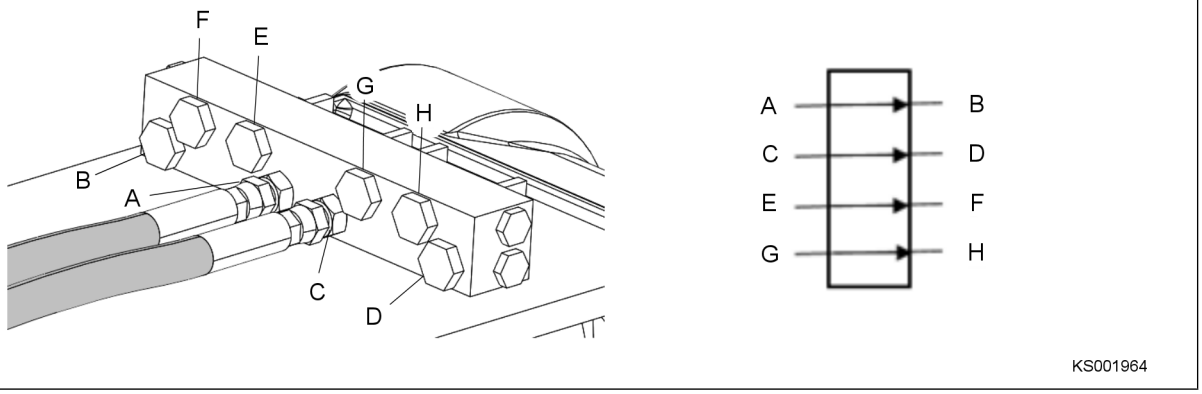
- Use only quick couplers which comply with European standard EN474. In particular, it must be possible to confirm from the operator's position that the locking of the attachment or bucket has been completed.
- Use only quick couplers which include a pilot operated check valve in the locking cylinder. 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^2)
- 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
(2) Button - Quick coupler
(3) Piping (quick coupler lock)
(4) Piping (quick coupler unlock)
(5) Adjustable pressure regulating valve (lock)
(6) Adjustable pressure regulating valve (unlock)
(7) Quick coupler manifold (if equipped)

Quick Coupler Manifold Port Location and Hydraulic Connections



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

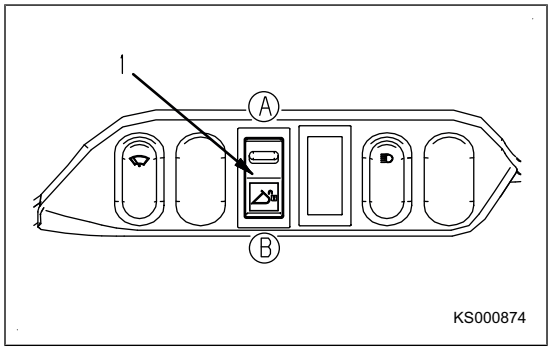
   The switch has a safety lock mechanism to prevent accidental operation. Slide the lock towards you then rock the switch. The lamp on the switch will come on and a warning buzzer will sound.

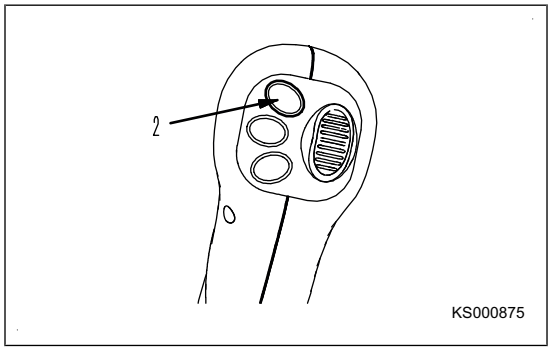
   NOTICE

   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)



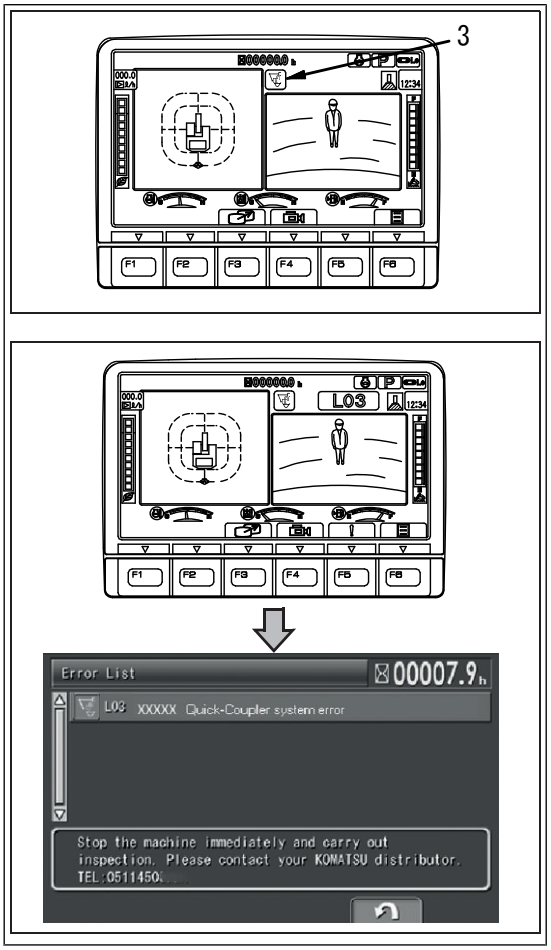


2. With switch (1) in position “B” press and hold button (2) on the left hand lever to activate quick coupler.

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”



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

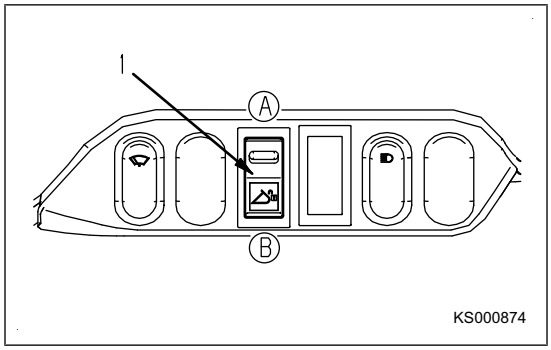
- **Check daily that the hoses and fittings in the quick coupler piping system are in good condition. Pay particular attention to the hoses and fittings at the arm end as these can be damaged easily. In case of damage or leakage of oil stop work. Loss of oil could lead to the bucket or attachment falling 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.

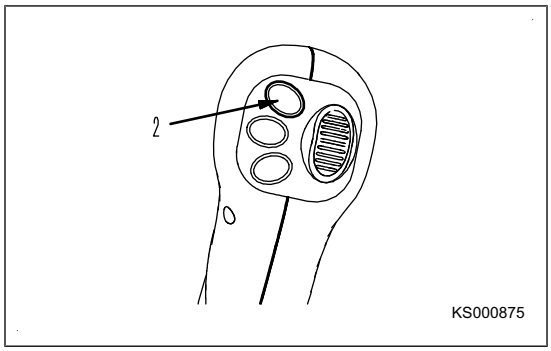
   NOTICE

   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 (3-94)” . The quick coupler will move to released position.
4. Position the quick coupler in the mating portion of the bucket or attachment, moving the bucket cylinder, arm and boom as necessary.

   Follow the quick coupler manufacturer's instructions.



5. Release button (2).

   If the bucket or attachment needs a connection to the hydraulic system of the machine, follow all instructions in ATTACHMENT REMOVAL AND INSTALLATION.

   The quick coupler will lock onto the bucket or attachment, if necessary operate one of the machine control levers to raise the system pressure.

⚠ WARNING

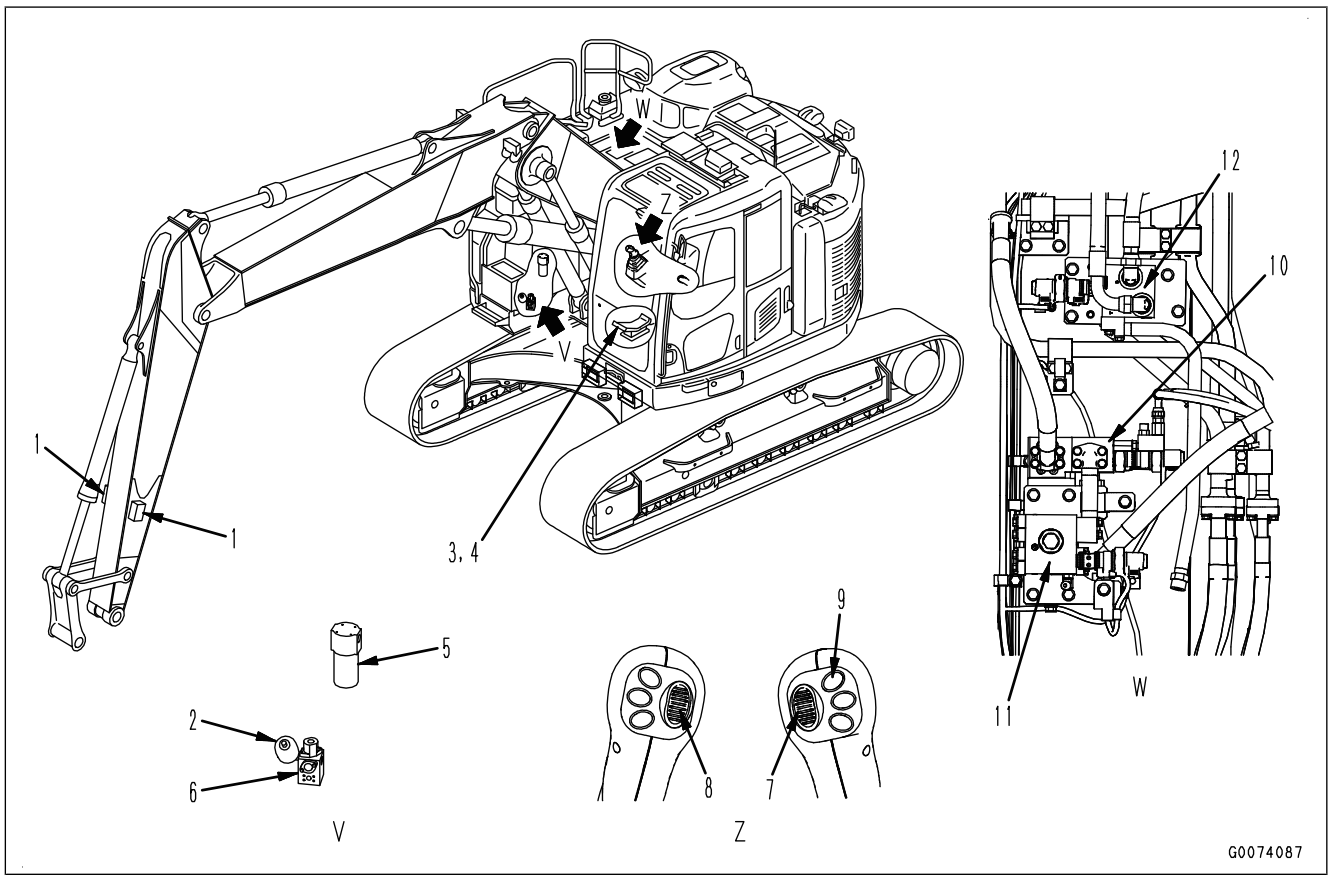
European safety standards require that it is possible to check the locked position of the quick coupler from the operator's position. Failure to check could cause the death of exposed persons. Check carefully that all the locking of the quick coupler is complete and secure. Follow the manufacturer's instructions carefully, including the installation of any safety device, if required.

6. Return switch (1) to position “A” (OFF).

   The lamp will go off and the buzzer stop.

Handle Machine Ready for Installation of Attachment

Explanation of Components on Machines with Attachment



(1) Stop valve
(2) Selector valve
(3) Attachment control pedal
(4) Lock pin
(5) Additional filter for breaker
(6) Accumulator (for low pressure)
(7) Attachment 1 proportional switch
(8) Attachment 2 proportional switch
(9) Breaker mode switch
(10) ATT bypass solenoid
(11) Attachment 1 variable relief pressure valve
(12) Attachment 2 variable relief pressure valve

(10), (11), (12): For the machines with attachment control function

Stop Valve

The stop valve stops the flow of the hydraulic oil.

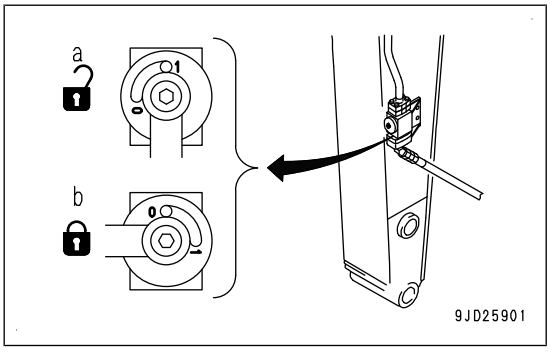
(a) FREE

Hydraulic oil flows. (direction of arrow is parallel to longitudinal direction of arm)

(b) LOCK

Hydraulic oil stops. (direction of arrow is perpendicular to longitudinal direction of arm)

When removing or installing the attachments, set this valve to LOCK position.



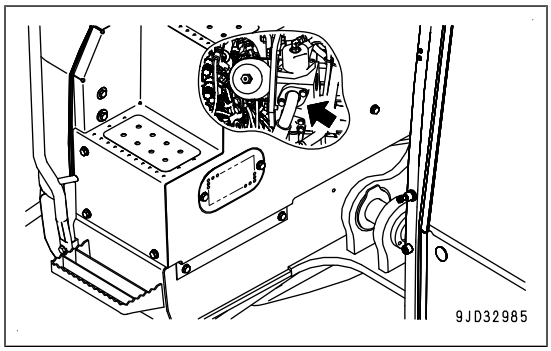
Selector Valve

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 “How to Change-over and Connect Hydraulic Circuit for Machine Ready for Installation of Attachment”

NOTICE

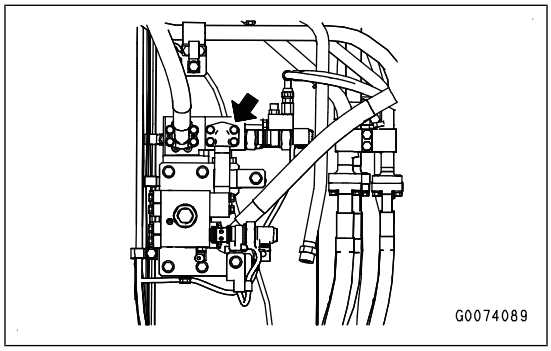
If a service circuit from the attachment manufacturer is added, the return circuit may not switch automatically.



ATT Bypass Solenoid

(if equipped)

When the attachment control function is installed to the machine, the pressure to the attachment will be held by setting the pedals at NEUTRAL position.

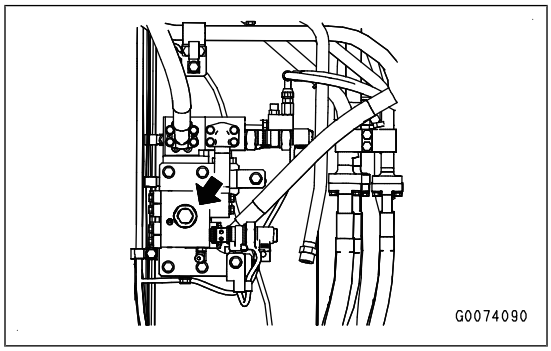


Attachment 1 Variable Relief Pressure Valve

(if equipped)

When the attachment control is installed to the machine, the attachment set pressure which is selected with the machine monitor will be outputted.

The pressure automatically changes by the attachment to be selected.

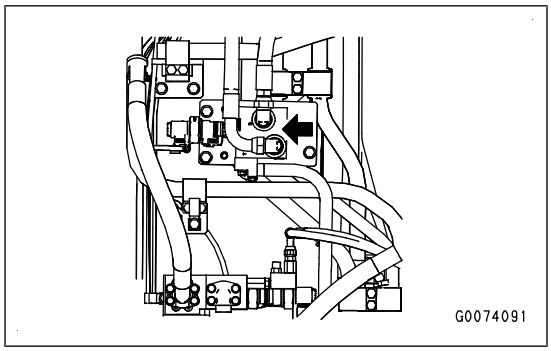


Attachment 2 Variable Relief Pressure Valve

(if equipped)

When the attachment control function by attachment 2 is installed to the machine, the attachment set pressure which is selected with the machine monitor will be outputted.

The pressure automatically changes by the attachment to be selected.



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.

When the attachment operation is performed, the screen on the machine monitor is automatically switched to the bird's eye view display of KomVision.

Control pedal (3) is used to control the attachment.

When the front, centre (neutral), and rear of the pedal are depressed, the movement of the attachment is as follows.

Hydraulic breaker

Front of pedal (A)

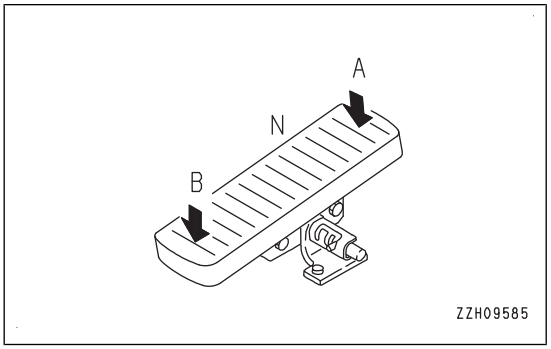
Actuated

Centre of pedal (neutral) (N)

Stopped

Rear of pedal (B)

Stopped



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)

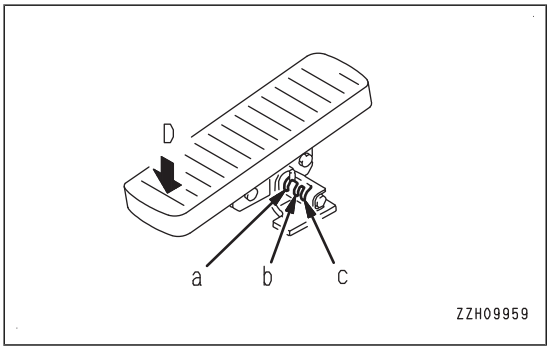
Lock

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

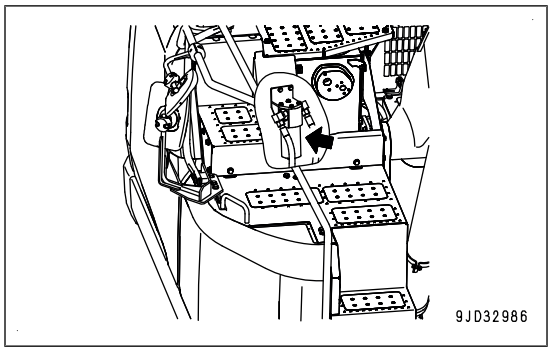
NOTICE

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.

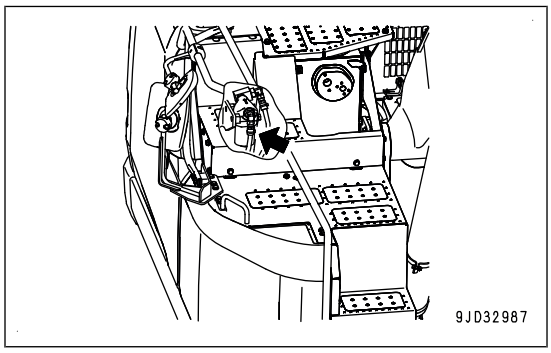
REMARK

Oil flows only when B mode is selected on the monitor.



Additional Pilot Filter for Breaker

The additional pilot filter for breaker is installed in the pilot circuit for the electromagnetic valve and prevents the entry of dirt or foreign material into the electromagnetic valve.



Accumulator

⚠ WARNING

The accumulator is charged with high-pressure nitrogen gas. Observe the following for handling it, otherwise improper operation may cause an explosion which will lead to serious injury or death.

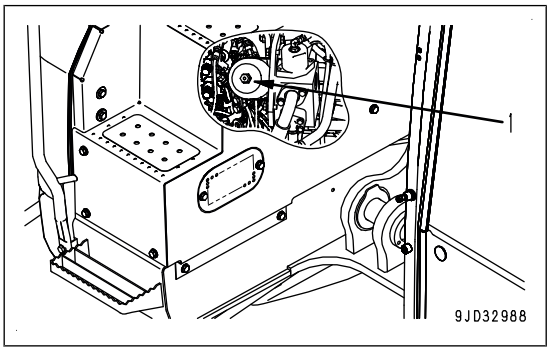
- **The pressure in the hydraulic circuit cannot be completely released. When removing the hydraulic equipment, do not perform any work in the direction of the oil spurting out. When loosening the screw, do it slowly.**
- **Do not disassemble.**
- **Do not bring an open flame close to it or do not dispose 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.**

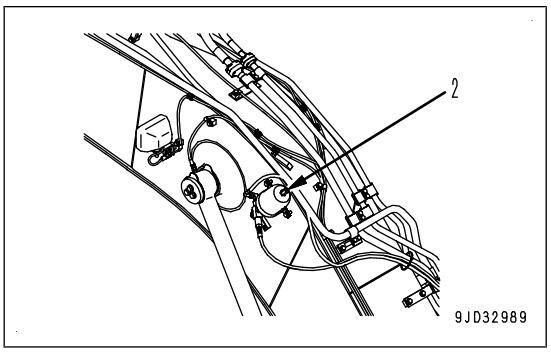
NOTICE

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 (1) and (2) 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 “How to Examine and Release Nitrogen Gas Charge Pressure in Accumulator (For Breaker)”.





Attachment 1 Proportional Switch

⚠ WARNING

Lock the pedal with the lock pin in order to prevent the attachment from moving incidentally when operating the attachment by using the rolling switch.

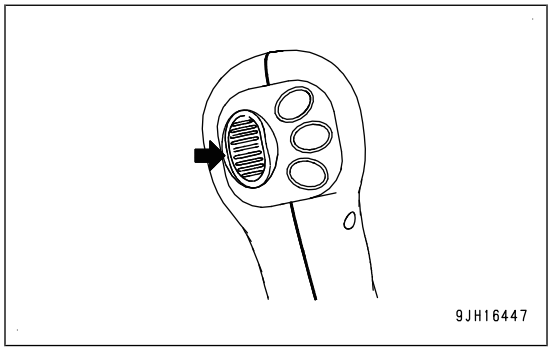
When the attachment operation is performed, the screen on the machine monitor is automatically switched to the bird's eye view display of KomVision.

The attachment 1 proportional switch is a roller proportional control switch.

This switch actuates the attachment 1 proportional circuit (e.g. the crusher).

Rolling up the switch makes the attachment move. Rolling down the switch makes the attachment move in an opposite direction.

Operate the roller slightly, and the attachment moves slightly. Operate the roller fully, and the attachment moves quickly.



Attachment 2 Proportional Switch

(if equipped)

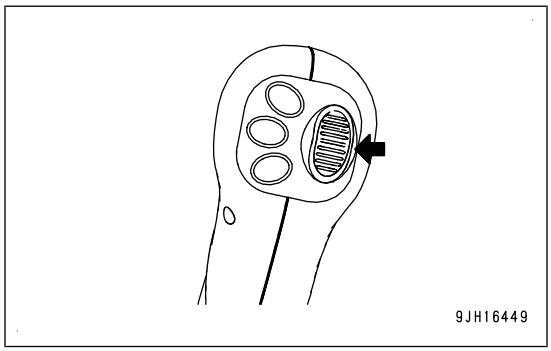
When the attachment operation is performed, the screen on the machine monitor is automatically switched to the bird's eye view display of KomVision.

The attachment 2 proportional switch is a roller proportional control switch.

This switch actuates the attachment 2 proportional circuit (e.g. rotating the clamshell).

Rolling up the switch generates the attachment movement in one direction. Rolling down the switch generates the attachment movement in an opposite direction.

Operate the roller slightly, and the clamshell moves slightly. Operate the roller fully, and the clamshell moves quickly.



REMARK

Ask your Komatsu distributor to have the monitor setting changed so that two attachments are available if the attachment 2 system is to be equipped as a field kit.

Breaker Mode Switch

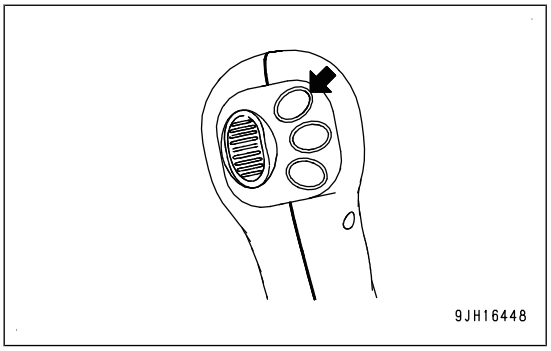
⚠ WARNING

Lock the pedal with the lock pin in order to prevent the breaker from moving incidentally when operating the breaker by using the breaker mode switch.

When the attachment operation is performed, the screen on the machine monitor is automatically switched to the bird's eye view display of KomVision.

The breaker mode switch actuates the breaker.

Press this switch, and the breaker is actuated. Release this switch, and the breaker is stopped.



How to Change-over and Connect Hydraulic Circuit for Machine Ready for Installation of Attachment

NOTICE

When a breaker is installed, the oil in the return circuit must return directly to the return filter. Do not use other working modes than the B mode.
The standard set pressure for the safety valve of service valve could need adjustment by the attachment. Consult your Komatsu distributor for adjustment.
When the attachment control is installed to machine, select the attachment mode of which the setting pressure is applicable for the attachment, or the breaker mode.
If the attachment mode of which the setting pressure is applicable for the attachment is not available on the machine monitor, consult your Komatsu distributor for the pressure setting.

Connect Hydraulic Circuit

When installing the attachment, connect the hydraulic circuit as follows.

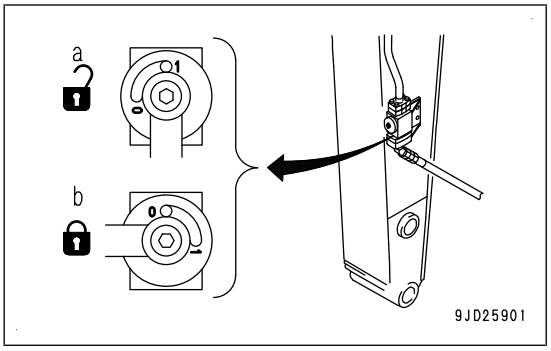
1. Check that the stop valve is located at LOCK position (b).

   (a) FREE

   Hydraulic oil flows. (direction of arrow is parallel to longitudinal direction of arm)

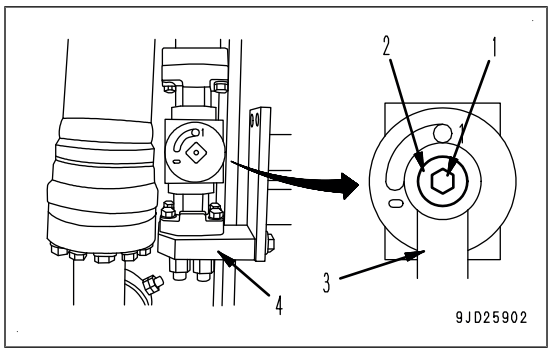
   (b) LOCK

   Hydraulic oil stops. (direction of arrow is perpendicular to longitudinal direction of arm)



Follow the procedure below for setting the stop valve to LOCK position (b).

1) Remove the bolt (1) and washer (2).
2) Attach the lever (3).
3) Turn the lever (3) to rotate the valve to LOCK position (b) at the clockwise end or the counterclockwise end.
4) Remove the lever (3).
5) Install the bolt (1) and washer (2) again.



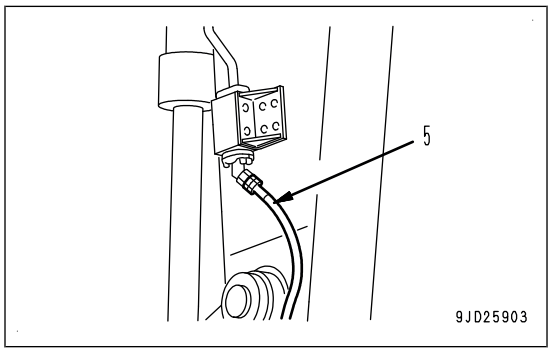
2. Remove the plate (4) at the tip of the stop valve piping. (2 places on the right and left)

   Be careful not to lose or damage the removed parts.

3. Connect the attachment piping (5) provided by the attachment manufacturer to the part from where the plate (4) is removed.

   REMARK

   Method of connection varies depending on the attachment manufacturer because size of the fitting, added accumulator, etc. are different. Consult your Komatsu distributor.



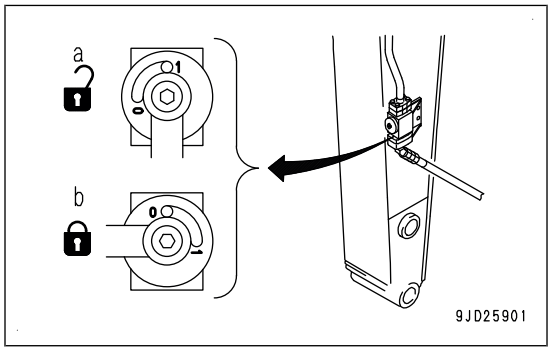
4. Set the stop valve to FREE position (a).

   (a) FREE

   Hydraulic oil flows. (direction of arrow is parallel to longitudinal direction of arm)

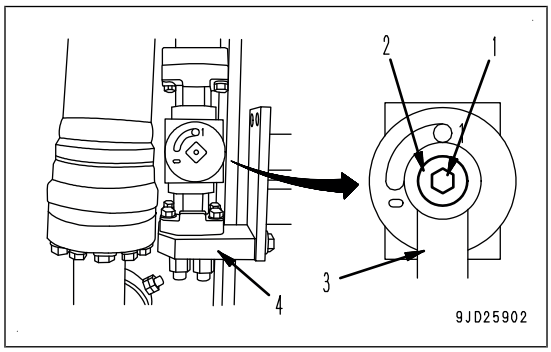
   (b) LOCK

   Hydraulic oil stops. (direction of arrow is perpendicular to longitudinal direction of arm)



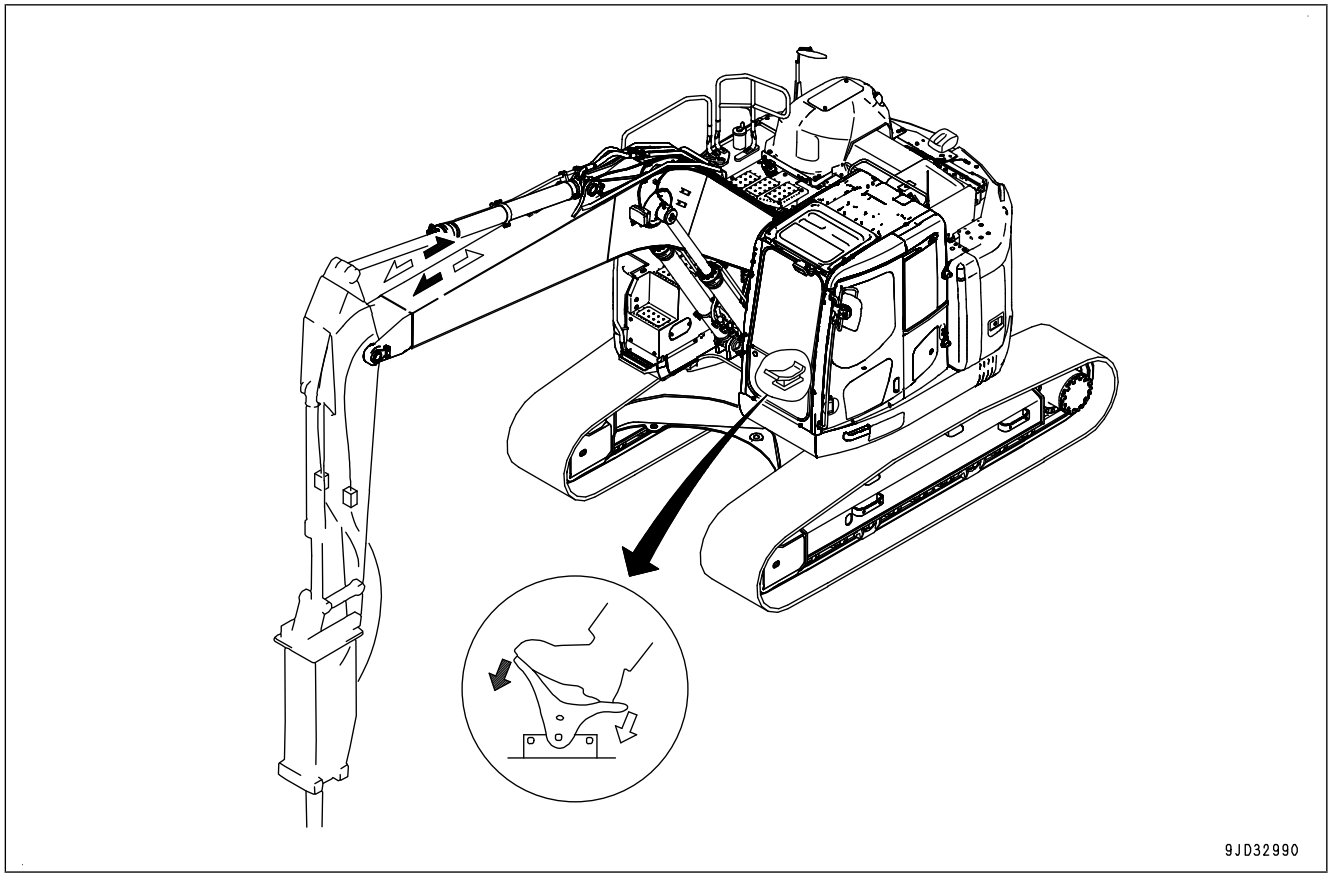
Follow the procedure below for setting the stop valve to FREE position (a).

1) Remove the bolt (1) and washer (2).
2) Attach the lever (3).
3) Turn the lever (3) to rotate the valve to FREE position (a) at the clockwise end or the counterclockwise end.
4) Remove the lever (3).
5) Install the bolt (1) and washer (2) again.



Pedal Operation and Oil Flow of Machines to Which Attachment is Installed

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.

How to Change over Hydraulic Circuit

Depending on the type of attachment, set the working mode on the monitor.

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”.

Change 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 the additional filter for breaker. Pressure of relief valve is set to low. Maximum oil flow can be adjusted in the user mode.

Set pressure of safety valve of service valve (when shipped from plant): 24.6 MPa {250 kgf/cm^2}

Change 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 the additional filter for breaker. Pressure of relief valve is set to high. Maximum oil flow can be adjusted in the user mode.

Set pressure of safety valve of service valve (when shipped from plant): 29.9 MPa {305 kgf/cm^2}

How to Remove and Install Attachment

⚠ WARNING

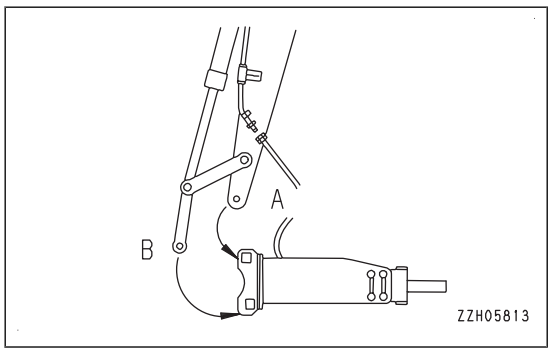
Lower the attachment to the ground and stop the engine.

How to Install Attachment

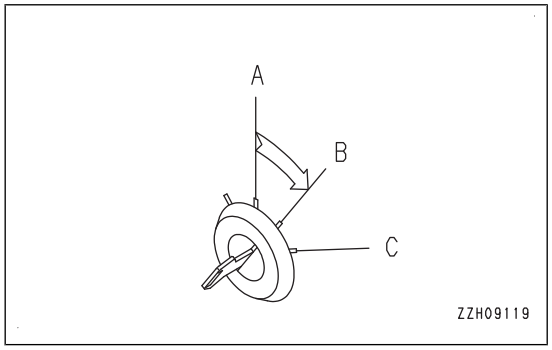
1. Remove the bucket.

   For the removal procedure of the bucket, see “Replace and Invert Bucket”.

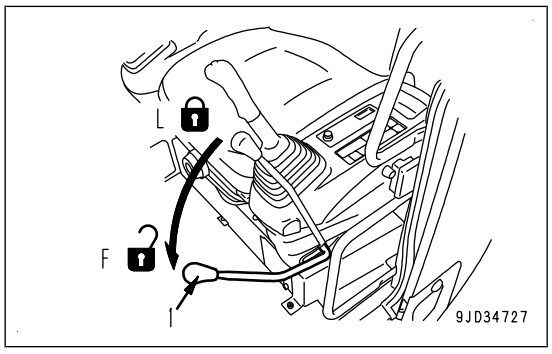
2. Place the attachment on a horizontal place, install the pin (A) and then pin (B) in this order to the arm.
3. Lower the attachment to the ground and stop the engine.



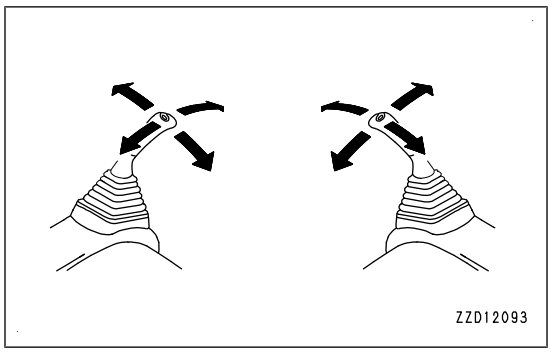
4. Turn the starting switch to ON (B) position.

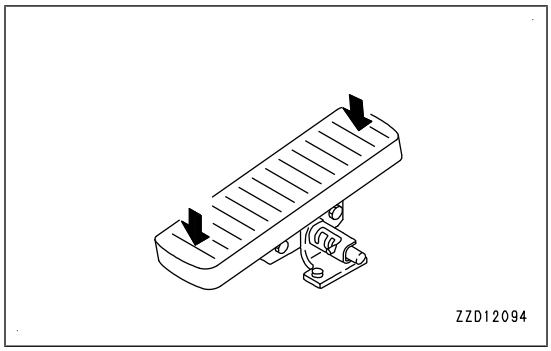


5. Be sure to operate the lock lever (1) by the red portion on the top, then set it to FREE position (F).

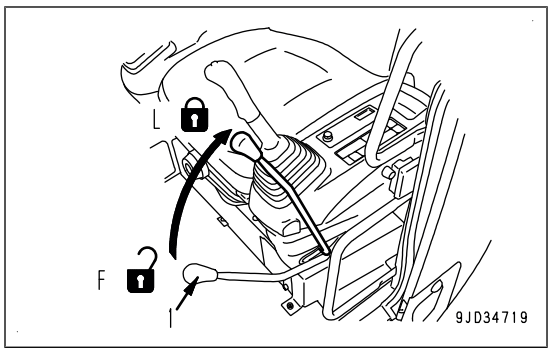


6. Operate each work equipment control lever and attachment control pedal fully to the front, rear, right, and left for 2 to 3 times within 15 seconds to release the internal pressure in the hydraulic circuit.

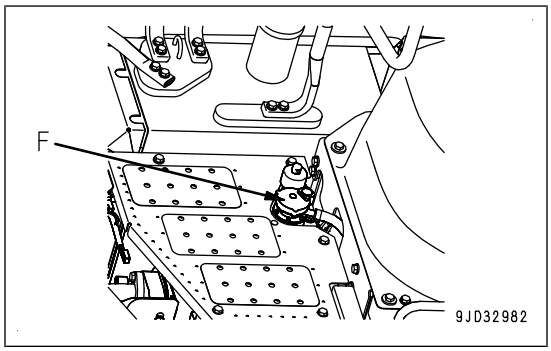




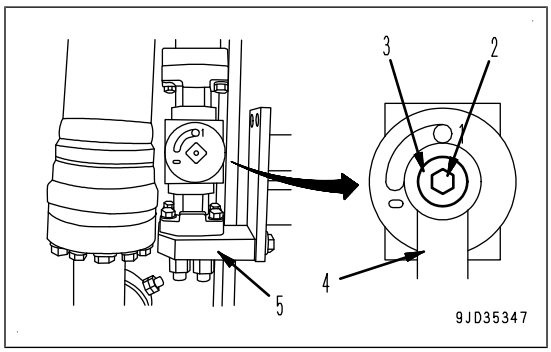
7. Be sure to operate the lock lever (1) by the red portion on the top, then set it to LOCK position (L).



8. Loosen the 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 plates (5) (2 places at the outlet and inlet).
    Be careful not to lose or damage the removed parts.
    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.



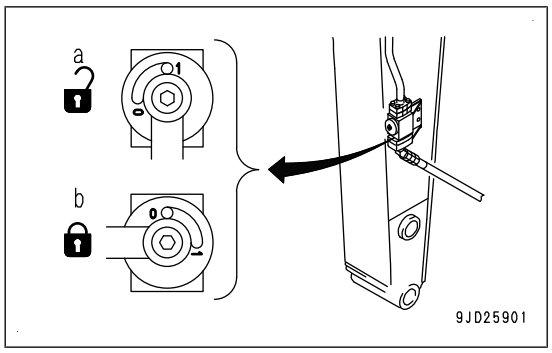
12. Rotate the rotor of the stop valve, which is installed to the piping for the inlet port and the outlet port on the side face of the arm, to FREE position (a).

    (a) FREE

    Hydraulic oil flows. (direction of arrow is parallel to longitudinal direction of arm)

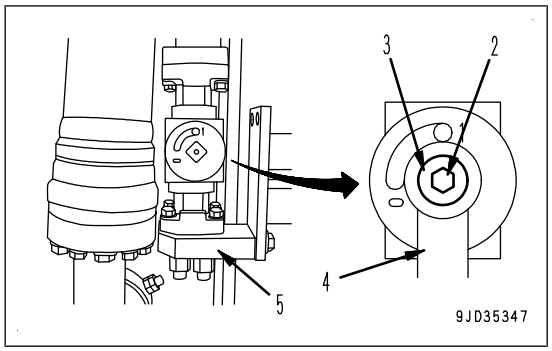
    (b) LOCK

    Hydraulic oil stops. (direction of arrow is perpendicular to longitudinal direction of arm)



    Follow the procedure below for setting the stop valve to FREE position (a).

    1) Remove the bolt (2) and washer (3).
    2) Attach the lever (4).
    3) Turn the lever (4) to rotate the valve to FREE position (a) at the clockwise end or the counterclockwise end.
    4) Remove the lever (4).
    5) Install the bolt (2) and washer (3) again.



13. Check the oil level in hydraulic tank.

How to Operate Attachment

⚠ WARNING

- **If the pedal is operated when the auto-deceleration is being actuated and the engine speed is dropped, the engine speed will suddenly increase, so be careful when operating.**
- **If you perform the 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.**
- **When the attachment is not used, set the lock pin of the pedal to LOCK position to prevent the pedal from being operated.**
- **When you are going to grab something with the attachment, do not release the pedals and proportional switches while holding the object.**

When the attachment operation is performed, the screen on the machine monitor is automatically switched to the bird's eye view display of KomVision.

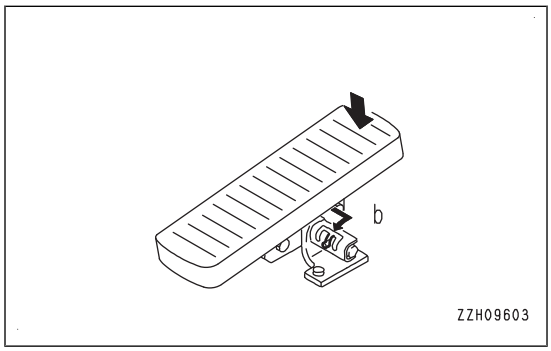
For the change of the flow setting for the breaker mode and attachment mode for the crusher, etc., see “Machine Settings”.

Operate 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.



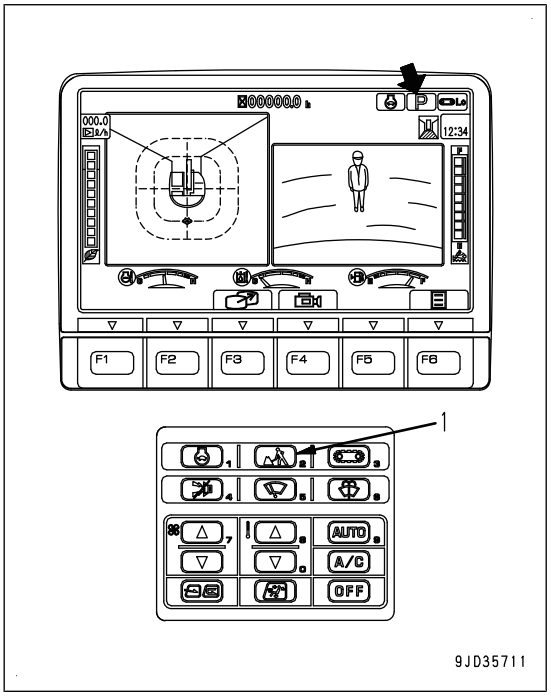
The breaker operates.

How to Operate Machine When Working Mode is Not in Breaker Mode

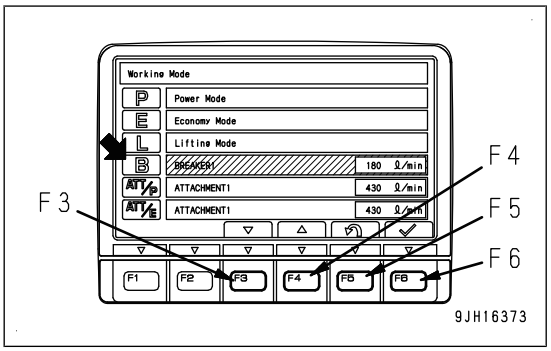
Change the working mode and enter the breaker mode.

1. Press the working mode selector switch (1).

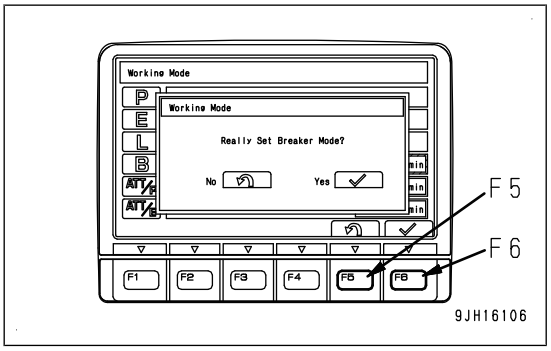
   The screen changes to the working mode selection screen.



2. Press the working mode selector switch (1) or press switches F3 or F4 to select breaker mode B.
3. With breaker mode B highlighted in yellow, do one of the following to enter the selection.
   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.

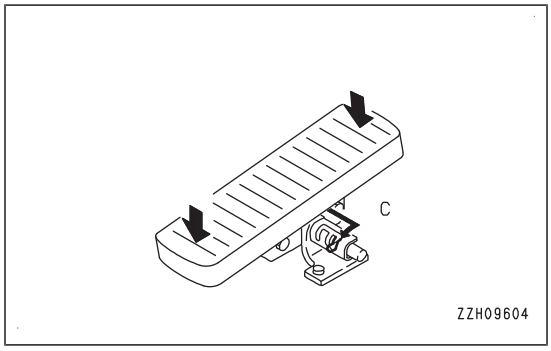
Check Points Before You Use Breaker

- Is the stop valve in FREE position?
- Is the working mode set to B mode?
  For the oil passage route, see “How to Change-over and Connect Hydraulic Circuit for Machine Ready for Installation of Attachment”.
- 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”.
  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.

How to Operate 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.



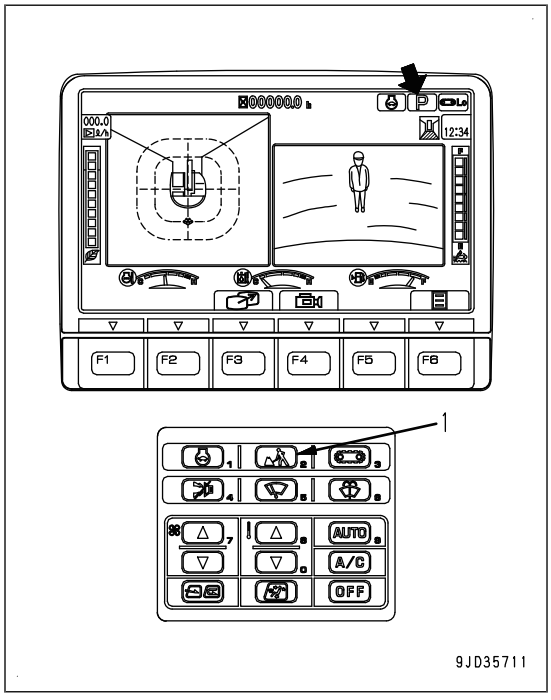
The attachment operates.

How to Operate Machine When Working Mode is Not in ATT/P or ATT/E for Attachment

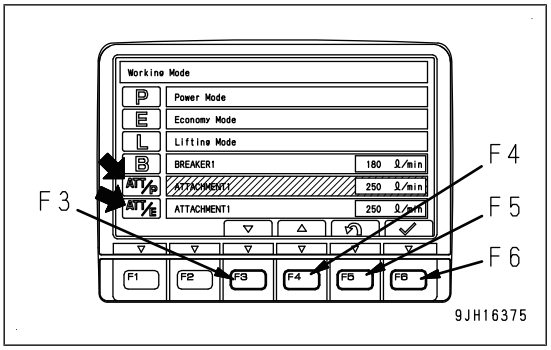
Change the working mode and enter the Attachment Mode.

1. Press the working mode selector switch (1).

   The screen changes to 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) Keep working mode selector switch (1) pressed.
   2) Leave as it is for 5 seconds.
   3) Press switch F6.



REMARK

Even if P, E, or L mode is selected, the attachment is not operated.
When using the Attachment Mode, check that the Attachment Mode is active before starting operations.
On “Attachment Setting” of the user menu, it is possible to make the attachment mode inactive.

Check Points When You Use 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 “How to Change-over and Connect Hydraulic Circuit for Machine Ready for Installation of Attachment”.
  When handling the attachment, follow the instruction manual from the manufacturer and use the attachment correctly.

How to Operate When Tool Control Setting is on

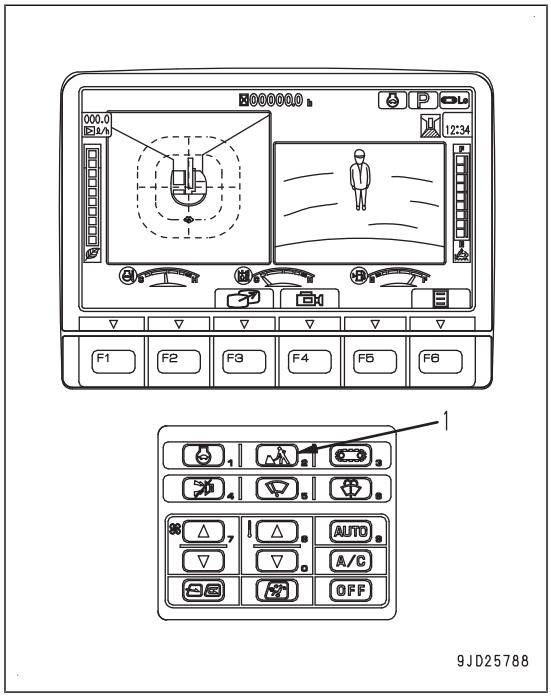
⚠ WARNING

When you are going to grab something with the attachment, do not release the pedals and proportional switches while holding the object.

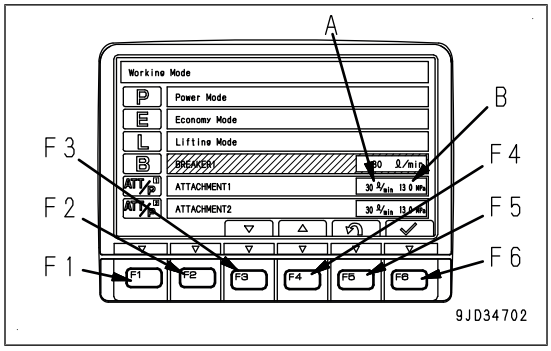
Change the working mode and enter the Attachment Mode.

1. Press the working mode selector switch (1).

   The screen changes to the working mode selection screen.

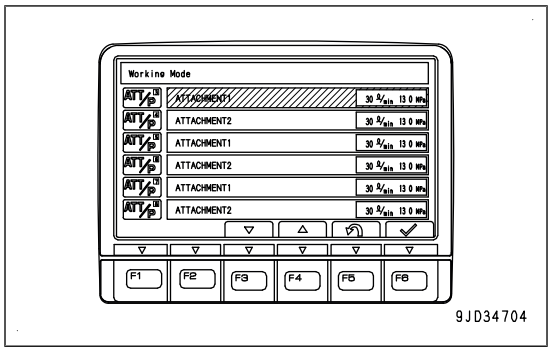


2. Press the working mode selector switch (1) or switch F3 or F4 to select the Attachment Mode ATT/P or ATT/E.
3. With the Attachment Mode ATT/P or ATT/E highlighted in yellow, do one of the following to enter the selection.
   1) Hold down the working mode selector switch (1).
   2) Leave as it is for 10 seconds.
   3) Press the 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 the operations.
- On Attachment Setting of the user menu, it is possible to make the attachment mode inactive.
- Page feeding can be done by pressing the switches F1 and F2.
- (A) shows the flow rate which flows through the attachment and (B) shows the hydraulic oil pressure which flows through the attachment.
  For the hydraulic oil pressure through the attachment, consult your Komatsu distributor.



Operate Machine When Tool Control Setting is on

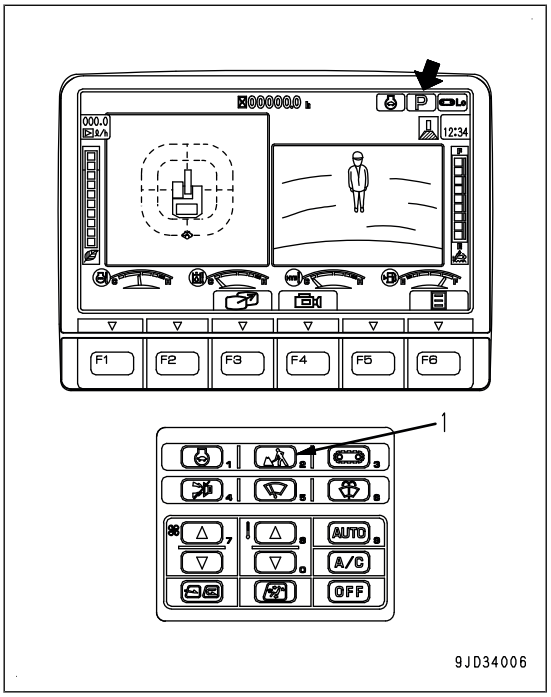
⚠ WARNING

When you are going to hold something with the attachment, do not release the pedals and proportional switches while the attachment holds the object.
If the attachment pressure adjustment system has a failure, stop the operation and move the machine to a safe place, then consult your Komatsu distributor for the inspection and maintenance.

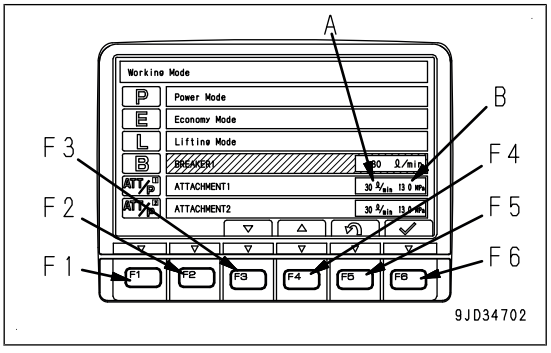
Change the working mode and enter the Attachment Mode.

1. Push the working mode selector switch (1).

   The screen changes to the working mode selection screen.

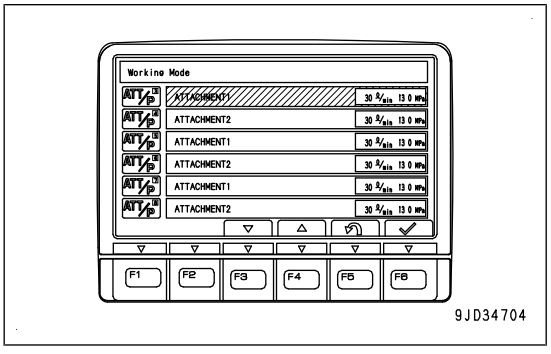


2. Push the working mode selector switch (1) or switch F3 or F4 to select the Attachment Mode ATT/P or ATT/E.
3. With the Attachment Mode ATT/P or ATT/E highlighted in yellow, do one of the operations that follow to enter the selection.
   1) Hold down the working mode selector switch (1).
   2) Keep it as it is for 10 seconds.
   3) Push the switch F6.



REMARK

- Even if the P, E, or L mode is selected, the attachment is not operated.
- When you push the switches F1 and F2, page feeding can be done.
- (A) shows the flow rate which flows through the attachment and (B) shows the hydraulic oil pressure which flows through the attachment.
  For the hydraulic oil pressure through the attachment, consult your Komatsu distributor.



How to Operate Attachment 1 (Crusher Etc.)

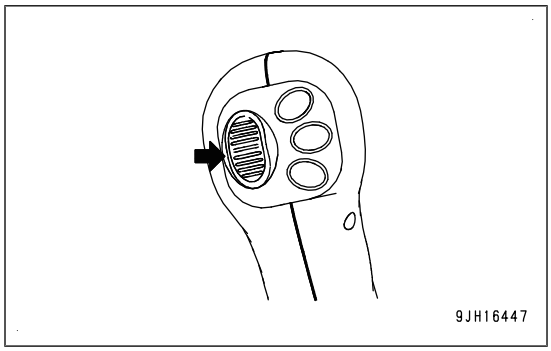
⚠ WARNING

Lock the pedal with the lock pin in order to prevent the attachment from moving incidentally when operating the attachment by using the attachment 1 (crusher etc) proportional switch.

General attachment 1 can be operated by using the proportional switch on R.H lever or the R.H. attachment control pedal.

Operation with the Attachment 1 Proportional Switch

1. Set the working mode to ATT/P or ATT/E mode.
2. Operate the attachment 1 proportional switch.

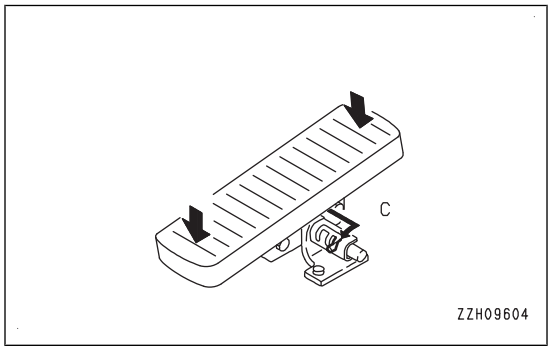


Rolling up the switch makes the attachment move. Rolling down the switch makes the attachment move in an opposite direction.

Operate the roller slightly, and the attachment moves slightly. Operate the roller fully, and the attachment moves quickly.

Operation with the Attachment Control Pedal

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.



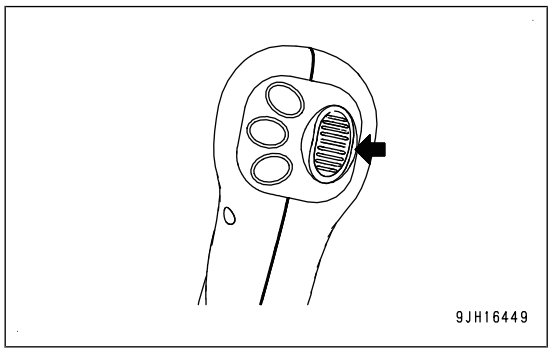
The attachment operates.

How to Operate Attachment 2 (Clamshell Rotation and Crusher Rotation Etc.)

REMARK

Ask your Komatsu distributor to have the monitor setting changed so that two attachments are available if the attachment 2 system is to be equipped as a field kit.

Operate the attachment 2 proportional switch on L.H. lever.



Rolling up the switch generates the attachment movement in one direction. Rolling down the switch generates the attachment movement in an opposite direction.

Operate the roller slightly, and the attachment moves slightly. Operate the roller fully, and the attachment moves quickly.

If the working mode pilot monitor does not show ATT/P or ATT/E for the attachment mode, follow the instructions by referring to “Check Points When You Use General Attachment Such as Crusher Etc.”.

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

- **After the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When using the compressed air, there is a danger that dirt may scatter and cause personal injury. Wear the protective equipment such as the protective eyeglasses and dust mask.**

NOTICE

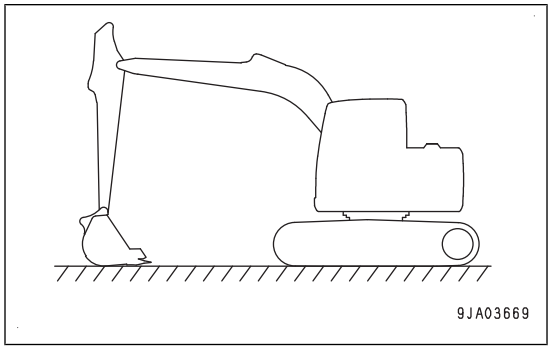
For the element replacement interval, see "Maintenance Interval for Hydraulic Breaker".

Items to be prepared

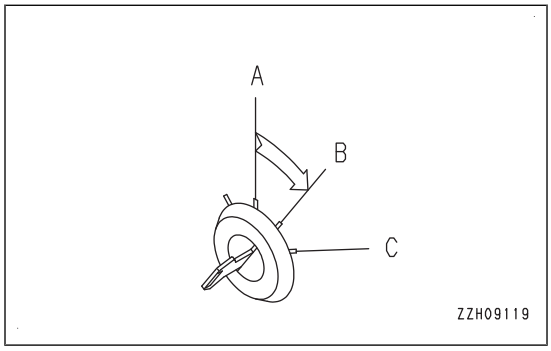
Container to catch drained oil

Prepare for the maintenance so that it can be performed as follows.

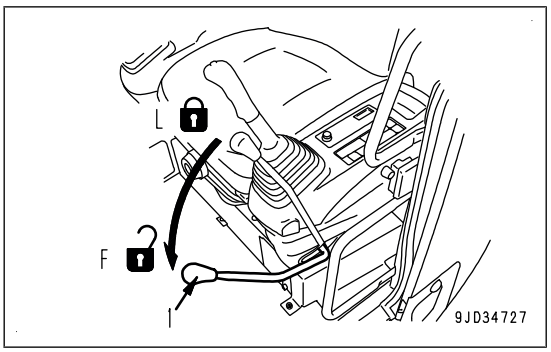
1. Lower the work equipment to the ground and stop the engine.



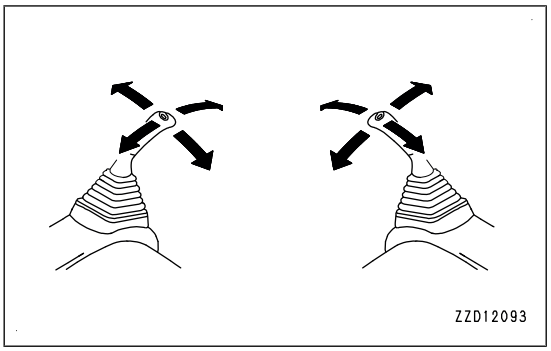
2. Turn the starting switch to ON (B) position.

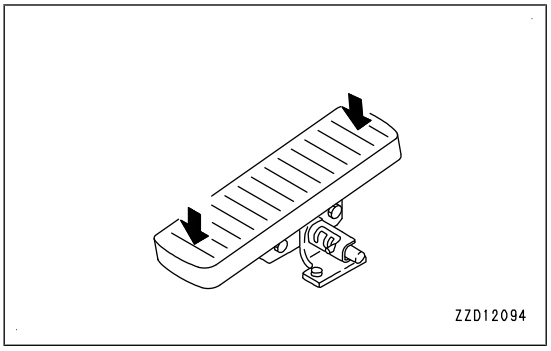


3. Be sure to operate the lock lever (1) by the red portion on the top, then set it to FREE position (F).

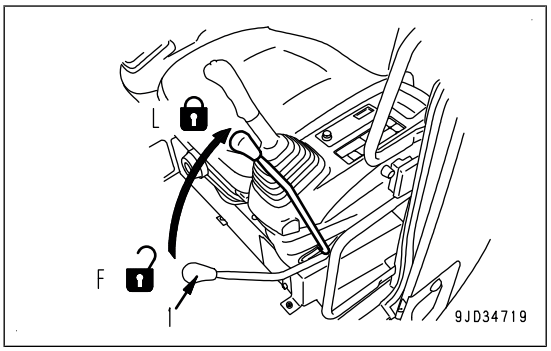


4. Operate each work equipment control lever and attachment control pedal fully to the front, rear, right, and left for 2 to 3 times within 15 seconds to release the internal pressure in the hydraulic circuit.





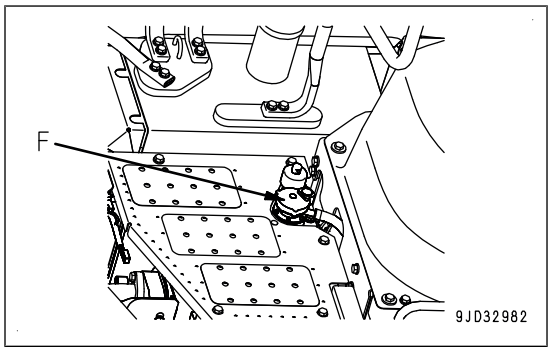
5. Be sure to operate the lock lever (1) by the red portion on the top, then set it to LOCK position (L).



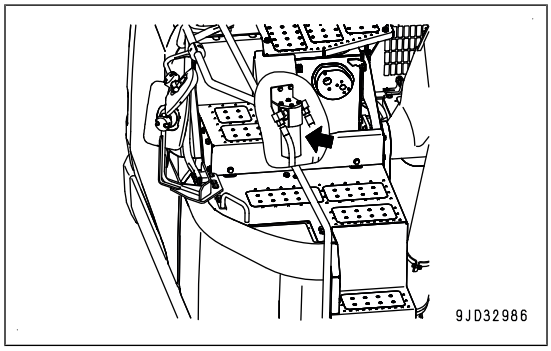
After preparation is completed, replace the additional filter for breaker according to the following procedure.

How to Replace Additional Filter Element for Breaker

1. Loosen the 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 catch the oil under the additional filter at the position pointed with the arrow.

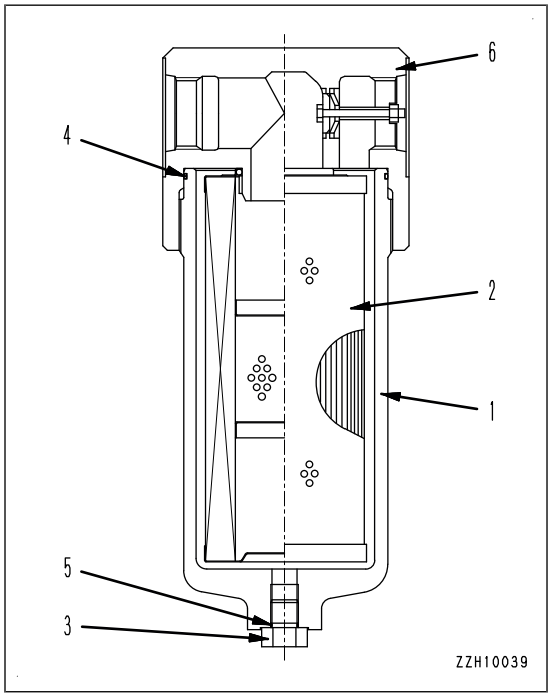


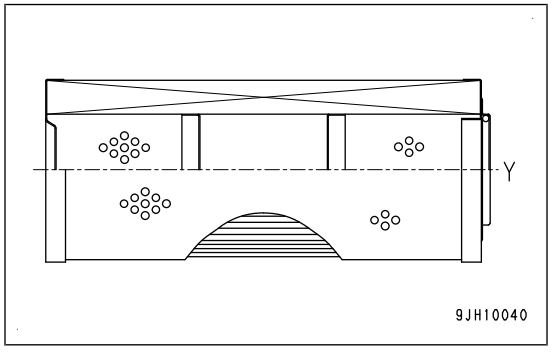
3. Remove the plug (3) and drain the hydraulic oil accumulated in filter case (1) into the prepared oil container.
4. After checking that the hydraulic oil temperature has dropped, turn the filter case (1) counterclockwise, remove it, then remove the element (2).
5. Clean the removed parts, then install the new element (2).

   REMARK

   Element (2) must be installed facing in the correct direction. Set holed Y-side up, and fit the hole in element (2) to the protruding portion inside the filter head (6).
6. Fit the new O-ring (4) to filter case (1) and screw the filter case (1) into filter head (6).
7. After the top of filter case (1) touches the filter head (6), tighten it further at least 1/2 turn.
8. Clean the removed plug (3) and fit the new O-ring (5) to plug (3).
9. Install the plug (3) to filter case (1).

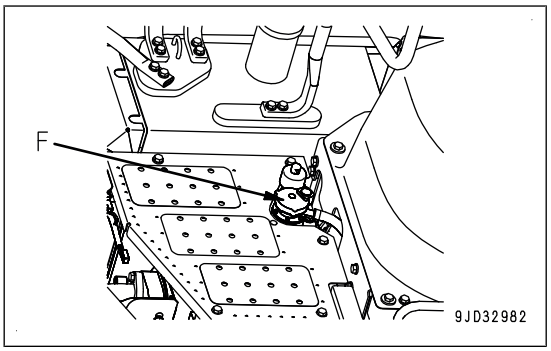
   Tightening torque: 27.4 to 58.8 Nm {2.8 to 6.0 kgfm}



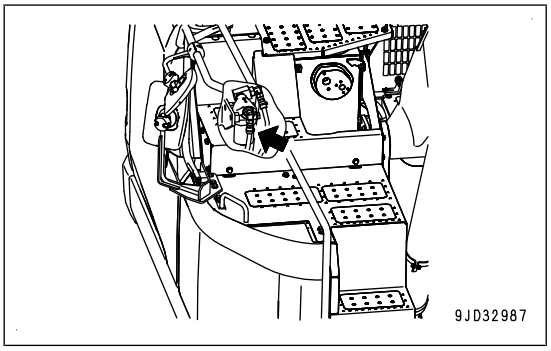


How to Replace Additional Pilot Filter Element for Breaker

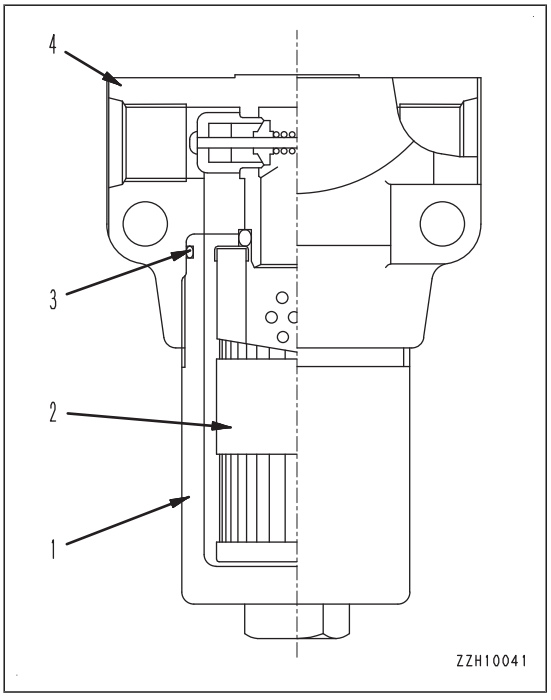
1. Loosen the oil filler cap (F) slowly on the top of the hydraulic tank to release the internal pressure in the hydraulic tank.



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 the filter case (1) counterclockwise, remove it, then remove the element (2).



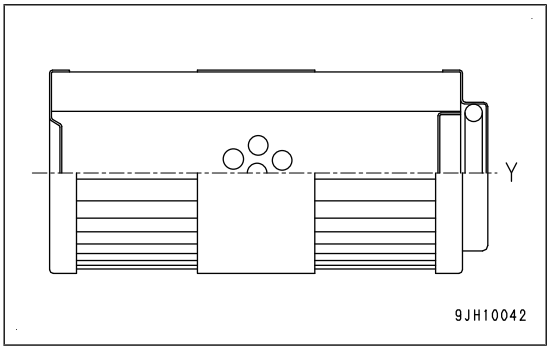
4. Clean the removed parts, then install the new element (2).

   REMARK

   Element (2) must be installed facing in the correct direction. Set holed Y-side up, and fit the hole in element (2) to the protruding portion inside the filter head (4).

5. Install a new O-ring (3) to filter case (1), then tighten filter case (1).

   Tightening torque25 to 35 Nm {2.6 to 3.6 kgfm}
   Tightening torque: 25 to 35 Nm {2.6 to 3.6 kgfm}



Specifications

Hydraulic Specifications

- Max. flow at merge: 214x2 ℓ/min
- Safety valve relief set pressure of service valve
  Port A: 29.9 MPa{305 kgf/cm^2,4340 PSI} (other than B mode)

  Port B: 29.9 MPa{305 kgf/cm^2,4340 PSI} (other than B mode)
- Safety valve cracking pressure of service valve
  Port A: 24.5 MPa{250 kgf/cm^2,3560 PSI} (other than B mode)

  Port B: 24.5 MPa{250 kgf/cm^2,3560 PSI} (other than B mode)
- Safety valve relief set pressure of service valve
  Port A: 29.9 MPa{305 kgf/cm^2,4340 PSI} (B mode)

  Port B: 24.5 MPa{250 kgf/cm^2,3560 PSI} (B mode)
- Safety valve cracking pressure of service valve
  Port A: 24.5 MPa{250 kgf/cm^2,3560 PSI} (B mode)

  Port B: 20.1 MPa{205 kgf/cm^2,2920 PSI} (B mode)

The safety valve relief set pressure: 20.6 MPa{210 kgf/cm^2,2990 PSI} and the safety valve cracking pressure: 15.2 MPa{155 kgf/cm^2,2200 PSI} are provided. Consult your Komatsu distributor.

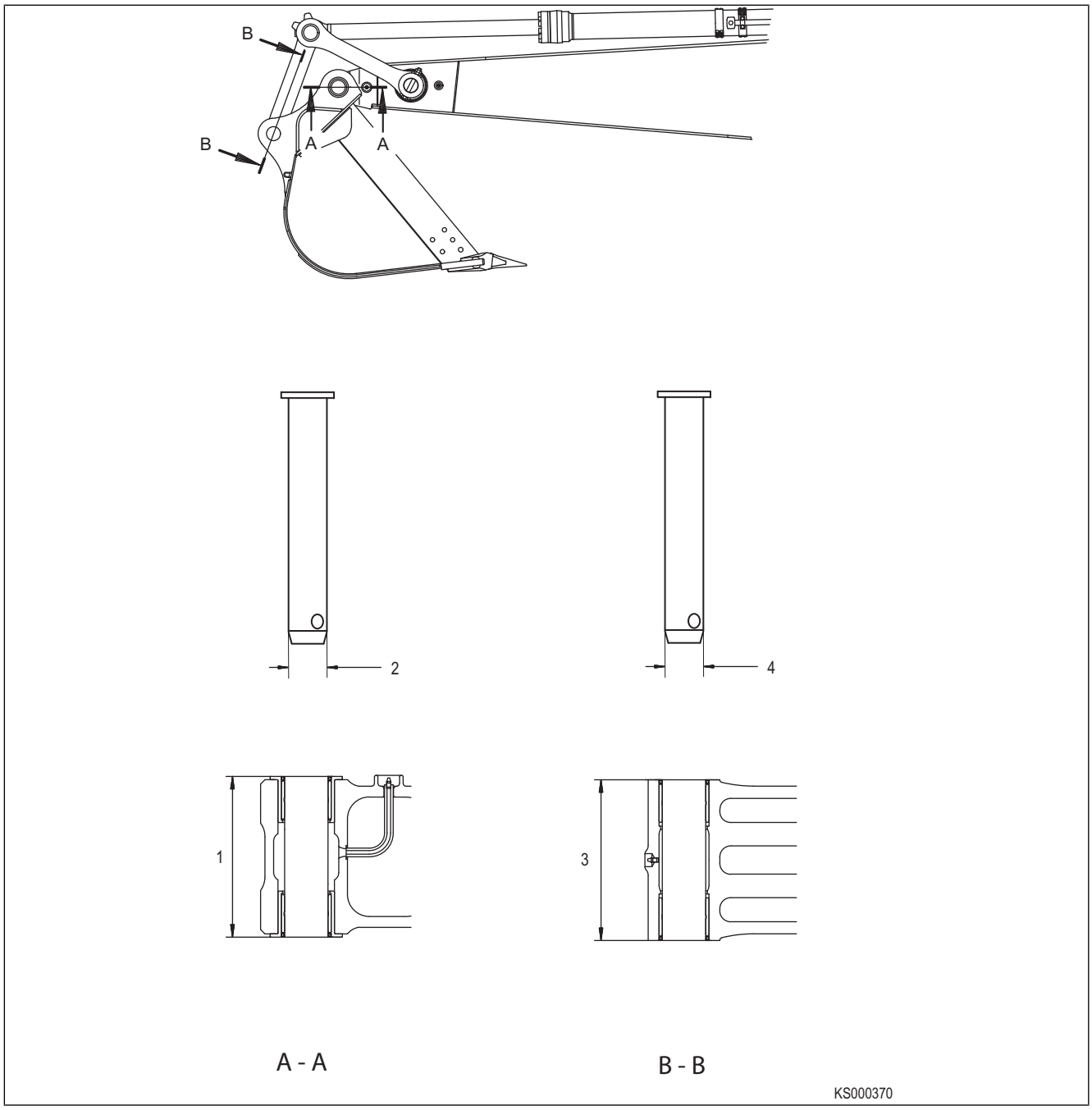
When the attachment control is installed

- Safety valve relief set pressure of service valve
  Port A: 44.3 MPa {452 kgf/cm^2,6430 PSI}

  Port B: 44.3 MPa {452 kgf/cm^2,6430 PSI}
- Safety valve cracking pressure of service valve
  Port A: 38.9 MPa {397 kgf/cm^2,5650 PSI}

  Port B: 38.9 MPa {397 kgf/cm^2,5650 PSI}

Arm/Pin Information



PC228LC-11E0	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.

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

When the long arm is equipped, if the bucket is drawn to the machine body, the arm interferes with the body. Operate the long arm carefully.
When the boom is fully lowered during oblique digging, the boom interferes with the undercarriage. Operate the boom carefully.

This Table Lists the Combination of Attachments Which CAN Be Installed to the Long Arm (Standard) and Short Arm.

○: Can be used, △: Can be used only for light duty work, ×: Cannot be used Mark: Equipped with side cutter

Model	Capacity m^3	Opening width mm	Use	6500mm standard boom			
				Standard Arm 3.2m	Short Arm 2.55m	Ultra short Arm 2.2m	Long Arm 4.0m
* Narrow bucket	0.52	610	Narrow digging	○	○	○	○
* Narrow bucket	1.14	1145	Narrow digging	○	○	○	○
* Standard bucket	1.4	1340	General digging	○	○	○	△
* Light duty bucket	1.6	1515	Loading	△	△	△	×
Light duty bucket	1.8	1700	Loading	△	△	△	×
* Rock bucket	1.4	1458	For digging soft rock	○	○	○	×
Ripper bucket	0.9	950	Digging rocks	○	○	○	×

How to 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.
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Categories of Use

Select a proper attachment for each use.

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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^3) 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.

		PC228USLC-11E0	
	Max Bucket Volume/ Weight ISO	1-Piece Boom	
		2.4 m	2.9 m
Bucket 1.2 t/m^3	m^3 / kg	1.46 / 1000	1.35 / 984
Bucket 1.5 t/m^3	m^3 / kg	1.24 / 933	1.14 / 887
Bucket 1.8 t/m^3	m^3 / kg	1.08 / 855	0.99 / 815

		PC228USLC-11E0	
	Max Bucket Volume/ Weight ISO	2-Piece Boom	
		2.4 m	2.9 m
Bucket 1.2 t/m^3	m^3 / kg	1.29 / 959	1.2 / 913
Bucket 1.5 t/m^3	m^3 / kg	1.1 / 865	1.02 / 827
Bucket 1.8 t/m^3	m^3 / kg	0.95 / 796	0.88 / 763

Values shown are in accordance with EN474

Track Shoes Selection

Select the appropriate track shoe to match the operating conditions.

How to Select the Track Shoes

1. Check the ground to work in Use column of Classification by use table, and then check Classification column.

Categories of Use

Classification	Use	Precautions when using
A	Rocky ground, riverbeds Normal soil	• On rough ground with large obstacles such as boulders or fallen trees, travel at Lo speed.
B	Normal soil Soft ground	• These shoes cannot be used on rough ground where there are large obstacles such as boulders or fallen trees. • Travel at 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.
C	Extremely soft ground (swampy ground)	• Use the shoes only in places where the machine sinks and it is impossible to use A or B shoes. • These shoes cannot be used on rough ground where there are large obstacles such as boulders or fallen trees. • Travel at 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.
D	Paved road	• Flat shoes give low gradeability to the machine, so be careful.
E	Paved road	• To protect the rubber shoes, always follow precautions in “Handling rubber pad shoes and road liner”.

2. Check the Classification column in List of shoe specifications and select a suitable shoe for the use.

	PC228USLC-11E0	
	Specification	Classification
Standard	700 mm {2 ft 4 in} Triple	B
Optional	600 mm {2 ft 0 in} Flat	D
Optional	600 mm {2 ft 0 in} Triple	A
Optional	800 mm {2 ft 7 in} Triple	C
Optional	600 mm {2 ft 0 in} Road liner	E

Precaution for Track Shoe Selection

- Since working conditions “B” and “C” are for wide shoe, their use is limited.
  Check the precautions for use and the using condition, and then use a suitable shoe.
- When selecting the shoe width, choose the narrowest shoes possible to bring the machine within the range where there is no problem regarding the machine flotation and ground contact pressure.
  If wider shoes than necessary are used, the load on the shoe will increase. It may cause problems such as bending of the shoe, cracking of the link, damage of the pin, coming off of the pin, and looseness of the shoe bolts.

Handle Rubber Pad Shoes and Road Liners

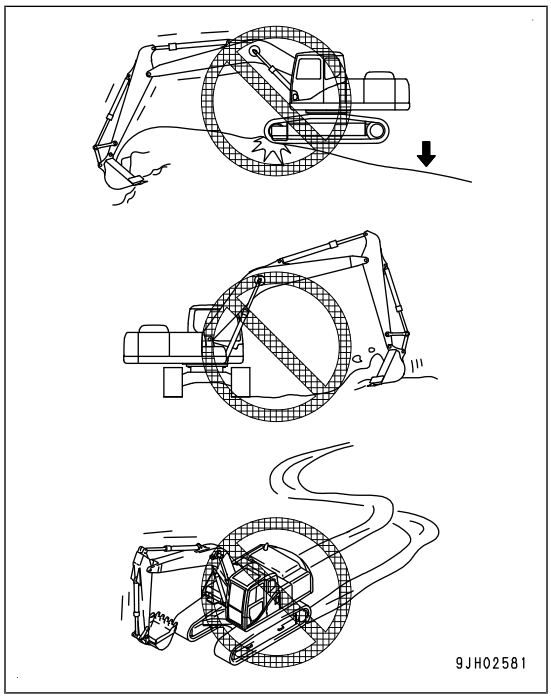
Be sure to observe the following instructions, when using a machine equipped with rubber pad shoes or the road liner.

Work Environment

- Use a machine equipped with rubber pad shoes or the road liner mainly for jobs on the paved roads.
  If it is used otherwise, breakage or chipping will occur on the rubber and the service life will be considerably reduced.
  In particular, following operations must be avoided.
  - Operation on the jobsite with crushed concrete strewed or on sand
  - Operation on the jobsite with protruding edged objects like steel bar, glass and the like (particularly a ride over the sheet piles driven into the ground)
  - Operation on the jobsite on rocky terrain or in a river with many rocks or a ride over a concrete road shoulder
- Be careful of machine skidding on the road covered with water, ice, snow or gravel. Take special care when unloading a machine from a truck.
- Use a machine equipped with rubber pad shoes or the road liner in the ambient temperature range of -25 to 65 °C due to the properties of rubber.

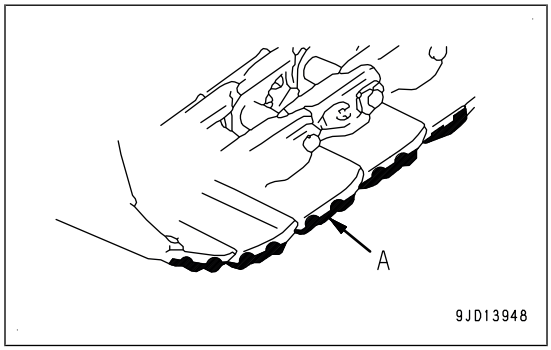
Work Conditions

- Avoid performing the following operations as shown in the figure; the operation using the undercarriage as a fulcrum, side digging work, digging work on a slope, and the work requiring frequent steering. They may damage the rubber due to an excessive load.
- Durability of rubber pad shoes may not be covered with warranty, if a special work equipment is mounted.



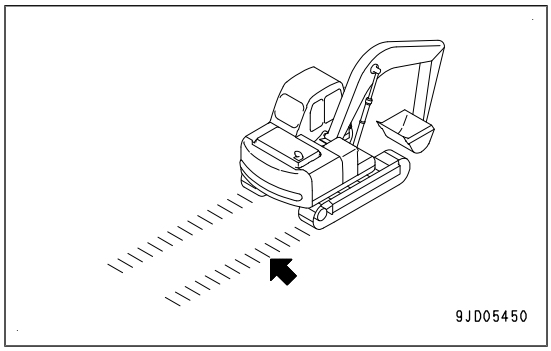
Storage and Maintenance

- Take care that no oil or grease sticks to the rubber. If it does, wipe it off immediately.
- Install rubber pad shoes and road liner (A) corresponding to the number of the links.
  If there is any missing pad or liner, the rubber will be greatly deformed and damaged.
- If rubber pad shoes or the road liner has to be stored for a long period, keep them indoors to avoid direct sunlight and rain.



Degree of Damage to Rubber

- When travelling on a concrete pavement, rubber may stick to the road surface, leaving a dark track behind.
- The rubber is still usable, even if it does not look in good shape with part of the rubber chipped or cuts developed on the surface, so long as damage has not developed all over the shoe or it does not damage a road surface.

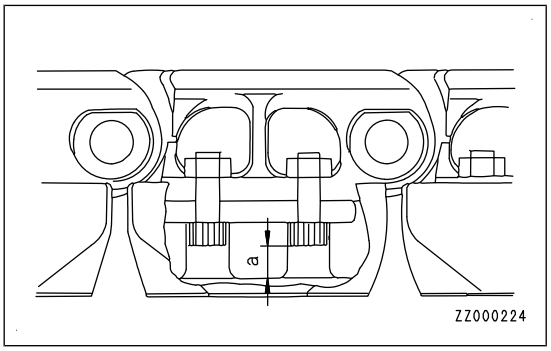


How to Examine Roadliners

If the road liners are in the following condition, they must be replaced. Ask your Komatsu distributor for replacement.

Lug height

- If “a” is less than 5 mm, replace it with a new part.
  If lug height “a” is reduced by wear, the drawbar pull will drop.



For judgment of replacement, repair, and continuation of use of the road liner, consult your Komatsu distributor.

How to Replace Roadliners

- When all the road liners of the machine need to be replaced, ask your Komatsu distributor to replace them.
- When replacing only part of the road liner, use the special road liner removal tool. Order the tool from your Komatsu distributor.

Handle Blade

Components on Machines with Blade

Blade Control Lever

The blade control lever is used to control the blade.

(a) Blade LOWER

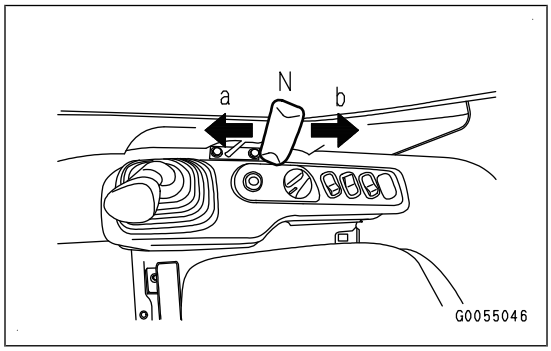
The blade control lever is pushed forward.

(b) Blade RAISE

The blade control lever is pulled back.

(N) NEUTRAL

Blade is held at current position.



How to Operate Blade

⚠ WARNING

If any lever is operated when the auto-deceleration is being actuated, the engine speed will suddenly increase, so be careful for operation.

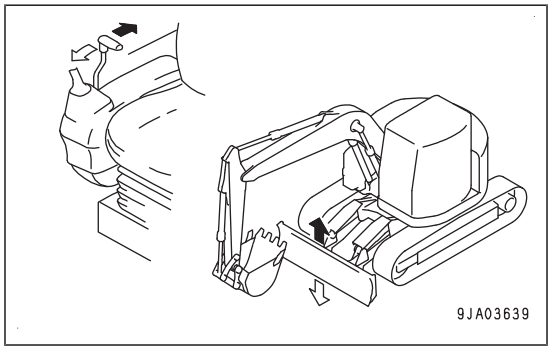
Use the blade control lever to operate the blade.

When the lever is released, it returns to NEUTRAL position and the blade is held in that position.

- Blade operation

Operate the blade control lever back and forth.

You can operate the blade.



If the blade control lever is returned to NEUTRAL position when the machine is stopped, the auto-deceleration mechanism reduces the engine speed to the medium speed even if the fuel control dial is in High idle (MAX) position.

REMARK

The accumulator is installed to the control circuit of this machine. If it is within 15 seconds after the engine is stopped, it is possible to use the lever operation to lower the blade to the ground when the starting switch key is turned to ON position and the lock lever is set to FREE position.
This procedure can also be used to release the remaining pressure in the hydraulic cylinder circuits or to lower the boom after you load the machine onto a trailer.

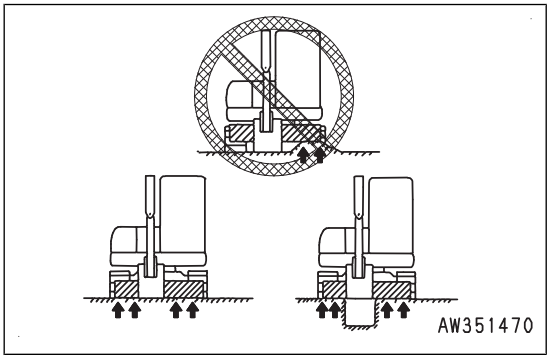
Prohibited Operations

⚠ 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.**

Ground Full of Bottom Side of Blade to Support Machine

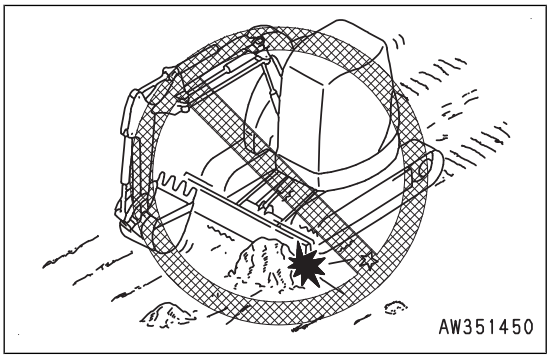
When using the blade as an outrigger, never support the machine with only one end of the blade.



Precautions for Operation

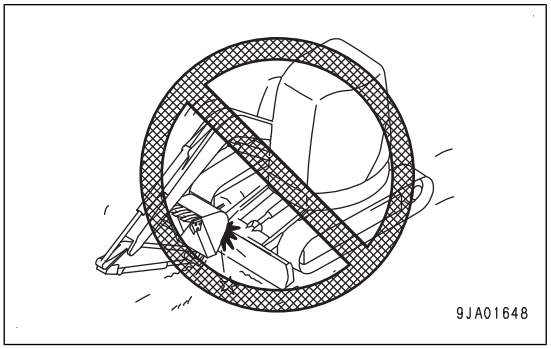
Precautions Not to Hit Blade Against Objects During Blade Operation

Be careful not to hit the blade against rocks or boulders. This will cause premature damage to the blade or cylinders.



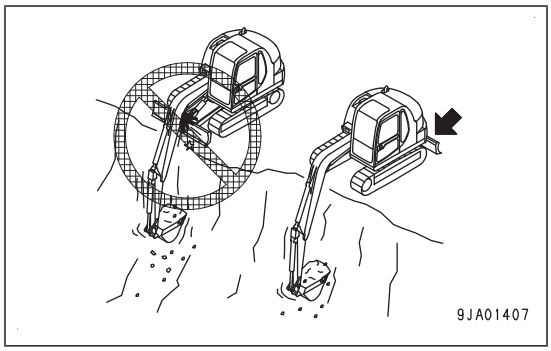
Precautions When You Fold Work Equipment

When folding in the work equipment to the travel or transportation posture, be careful not to let the bucket hit the blade.



Precautions for Blade Position During Backhoe Operation

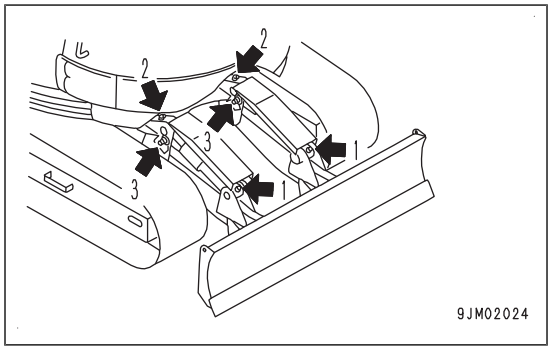
When digging in front of the blade, take care that the boom cylinder does not touch the blade. Dig with the blade at the rear usually, and dig in front of the blade only when required.



Every 100 Hours Maintenance

How to Lubricate

1. Lower the work equipment and blade to the ground, then stop the engine.
2. Use a grease pump to pump-in grease through the grease fitting shown by arrow.
3. After lubrication, wipe off the old grease that is pushed out.
   (1) Blade cylinder foot pin (2 places)
   (2) Blade cylinder rod end pin (2 places)
   (3) Blade foot pin (2 places)



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.

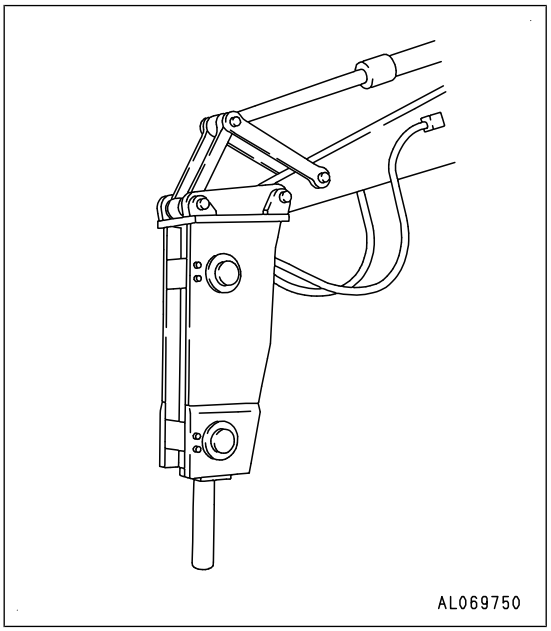
Hydraulic Breaker

Applicable Work

Major works suitable to the hydraulic breaker are as follows.

- Demolition work
- Crushing rock
- Road construction

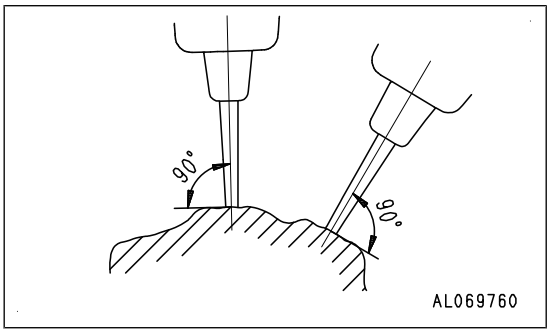
This attachment can be used for a wide range of applications including demolition of buildings, breaking up road surfaces or slag, tunnel work, rock crushing and breaking operations in quarries.



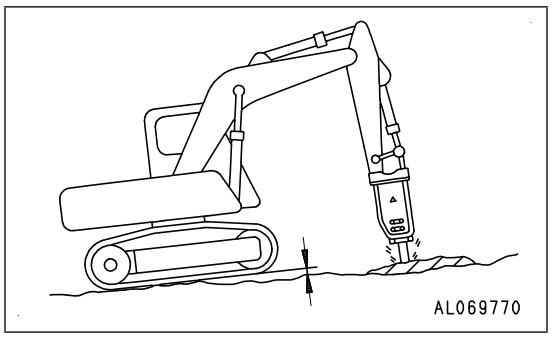
Precautions When You Do Break Operations

Keep the chisel pushed perpendicularly against the impact surface when performing breaking operations.

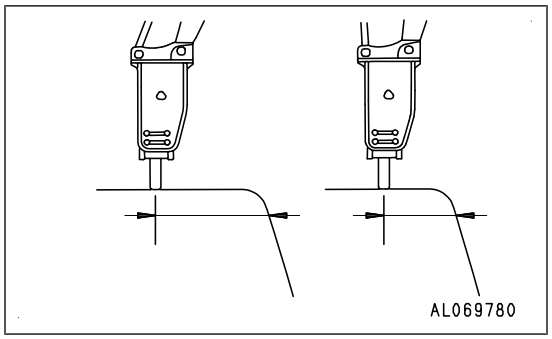
Push the chisel against the impact surface and operate so that the chassis rises approximately 5 cm off the ground.



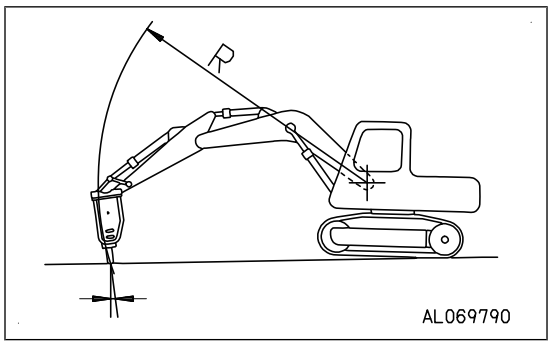
Do not let the machine come further off the ground than this amount.



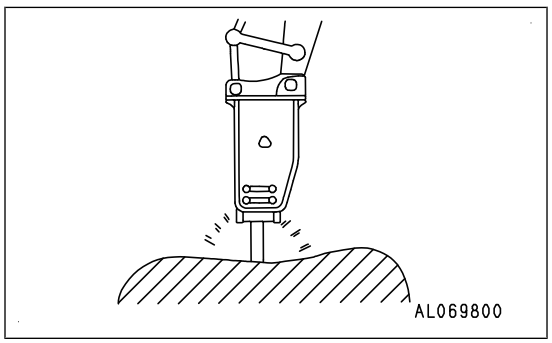
When the chisel does not penetrate or break the surface by continuous impact to the same impact surface for 1 minute, change the point of impact and perform breaking operations by scraping from the edge.



The direction of penetration of the chisel and the direction of the breaker body will gradually move out of line with each other, always adjust the bucket cylinder to keep them aligned.



Always keep the chisel pressed against the impact surface properly not to strike at the air.

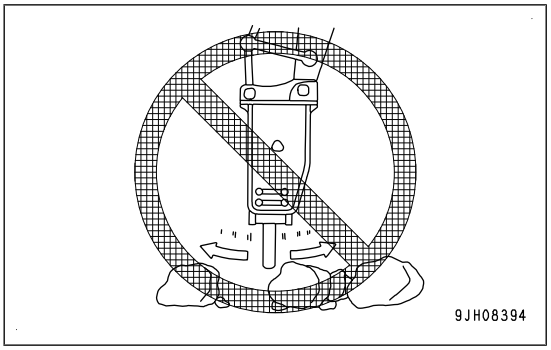


Prohibited Operations

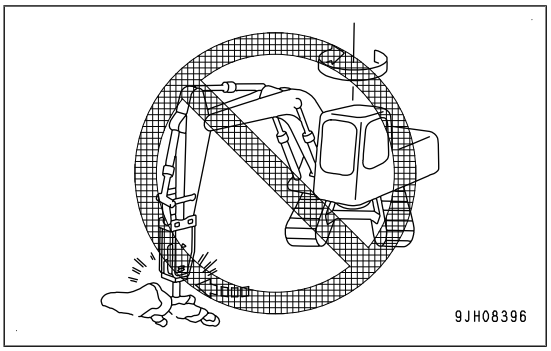
To increase the life of machine, and to ensure that operations are performed in safety, do not operate the machine in any of the following ways.

Do not operate all cylinders to the end of their strokes. Always leave approximately 5 cm to spare.

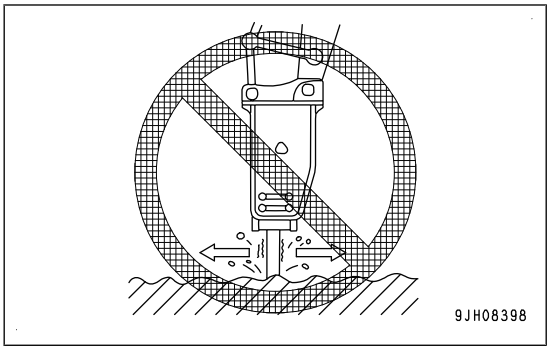
Do not use the mount to gather in pieces of rock.



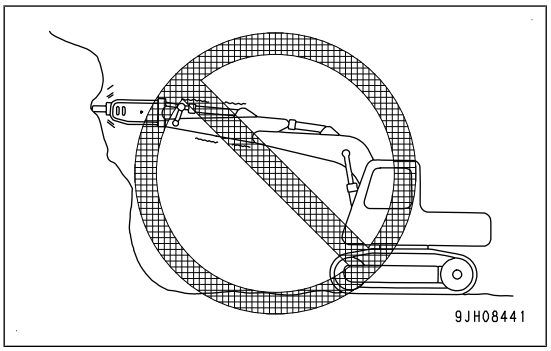
Do not work by using the swing force.



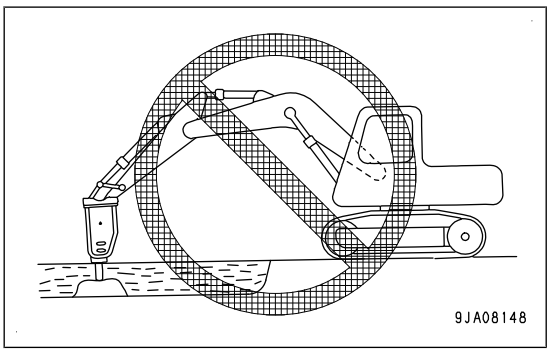
Do not move the chisel while performing breaking operation.



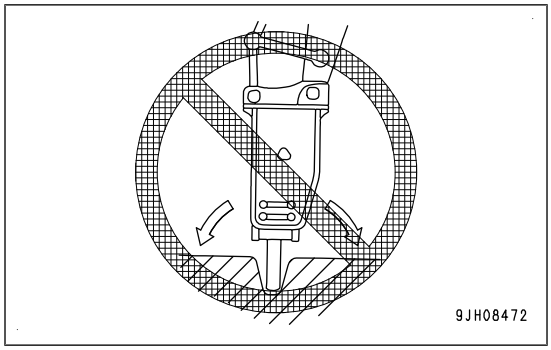
Do not perform breaker operation in horizontal or upward direction.



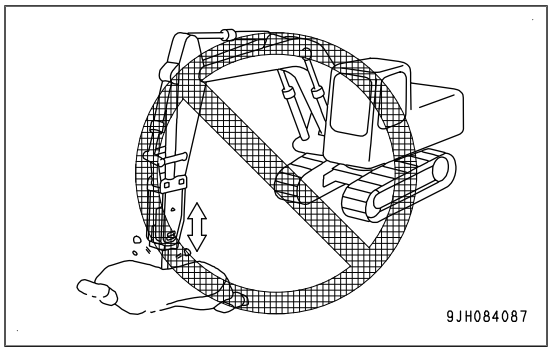
Do not work under water.



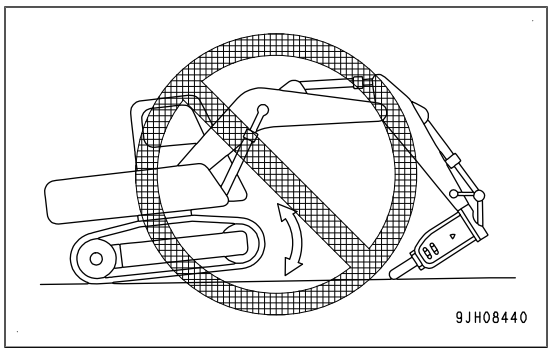
Do not pry the ground or rock with the chisel penetrated.



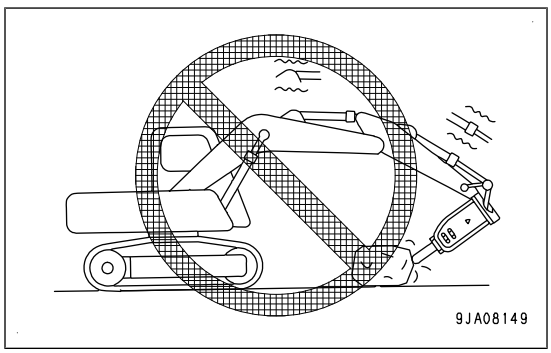
Do not perform pick work.



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.



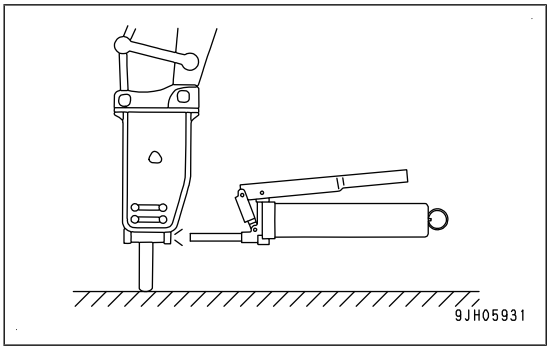
When You Grease the Hydraulic Breaker, Set It in the Specified Posture.

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.

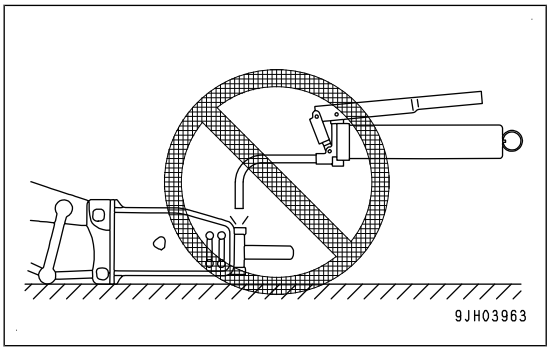
Grease the breaker while holding it in the right posture shown below.

1. Lower the chisel to the ground perpendicularly.
2. Insert the grease pump perpendicularly to the greasing point.

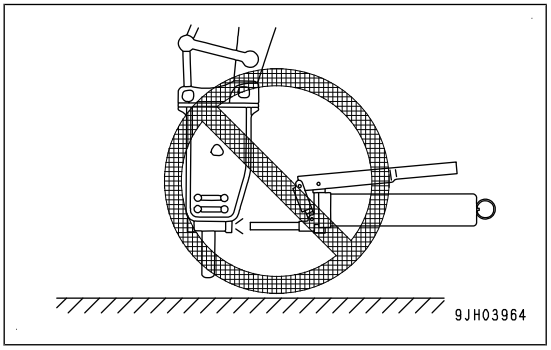


Incorrect Attitude

Do not perform greasing when the hydraulic breaker is lowered to the ground.

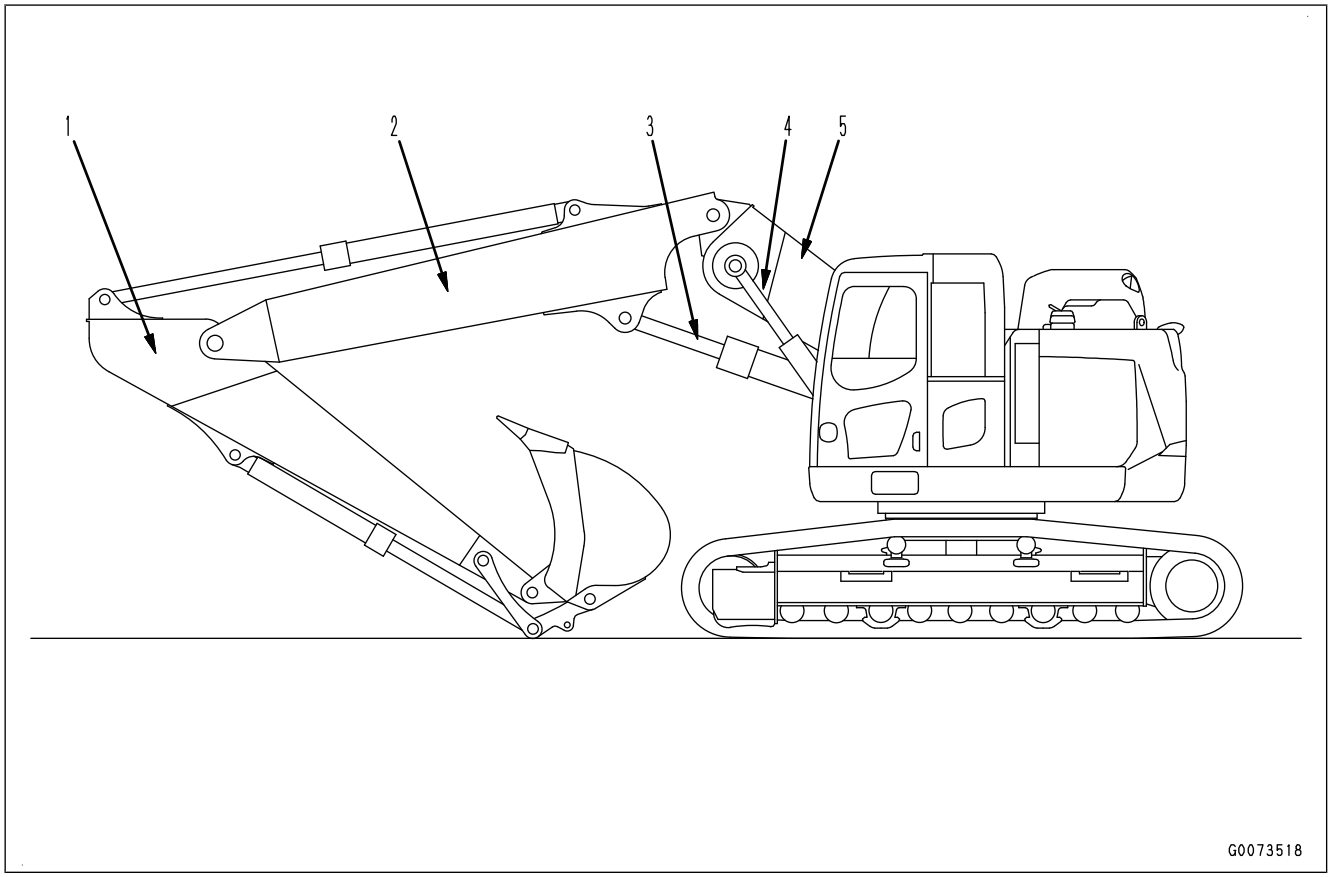


Do not perform greasing when the chisel is not lowered to the ground.



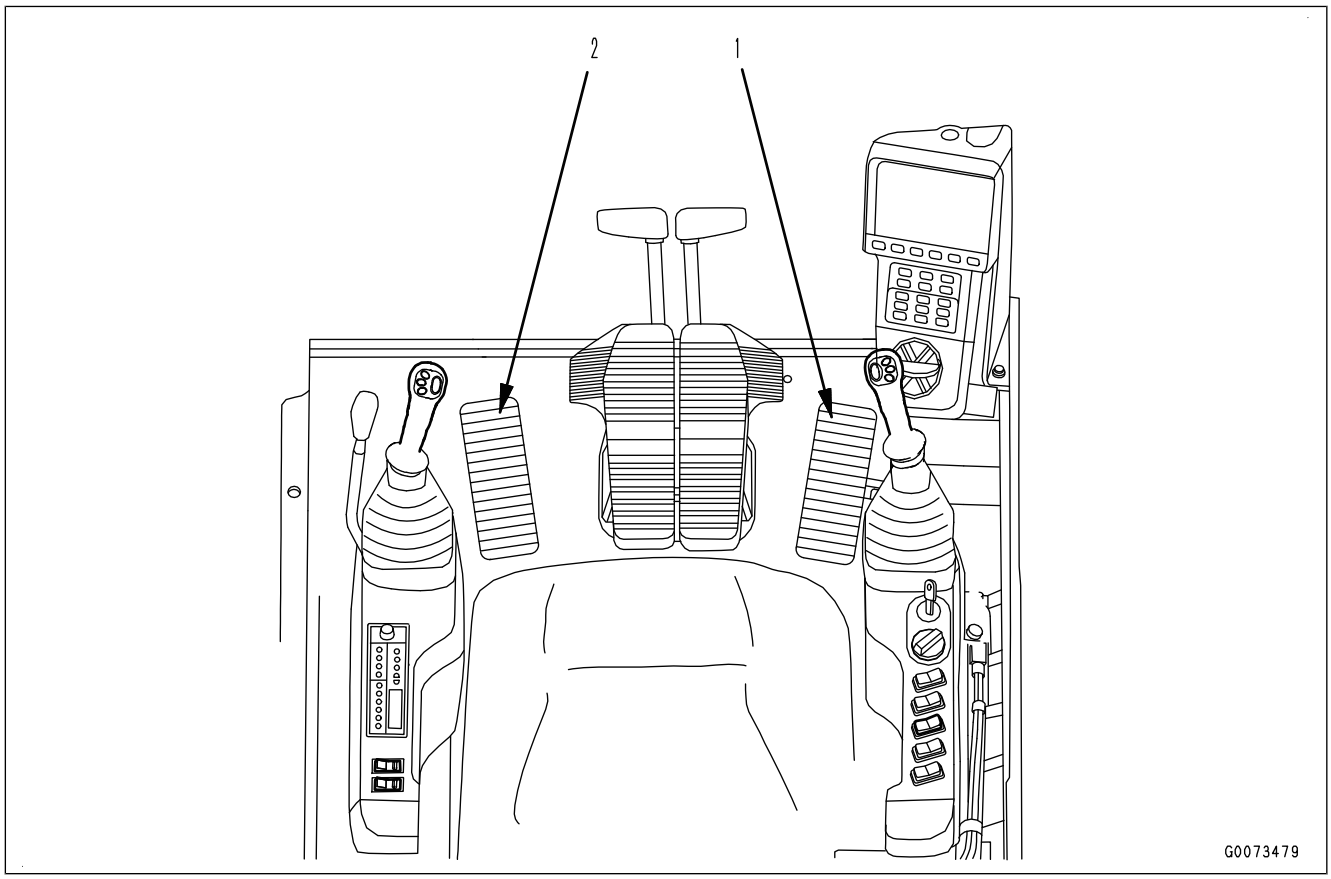
2-Piece Boom

2-Piece Boom Components



(1) Arm
(2) Second boom
(3) Second boom adjust cylinder
(4) First boom raise cylinder
(5) First boom

Detailed Controls



(1) Right attachment control pedal

(2) Left attachment control pedal (for second boom adjust cylinder control)

Attachment Control

⚠ WARNING

Do not carry out operations with your foot on the pedal. If the pedal is depressed by mistake, the attachment may suddenly move and cause a serious accident. Lock the pedal with the lock pin when you are not operating the attachment.

For explanation of attachment circuits see “Explanation of Components on Machines with Attachment (6-10)”.

Left Attachment Control Pedal

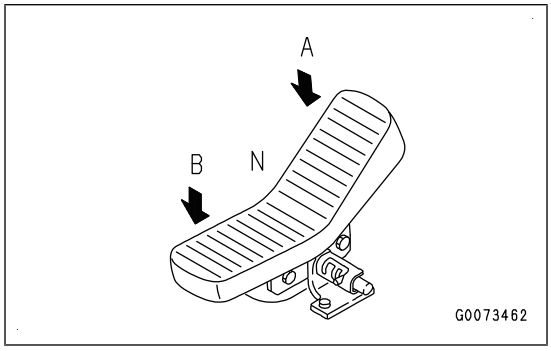
⚠ WARNING

Do not carry out operations with your foot on the pedal. If the pedal is depressed by mistake, the attachment may suddenly move and cause a serious accident. Lock the pedal with the lock pin when you are not operating the attachment.

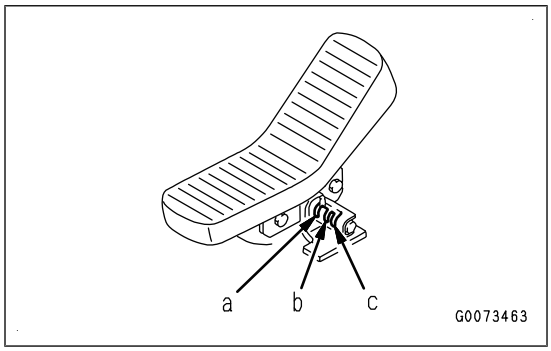
Use this pedal (2) to carry out the RAISE and LOWER operation of the second boom.

(A) Front of pedal: Second boom RAISE

(B) Rear of pedal: Second boom LOWER



- The positions of the lock pin are as follows: (a) lock, (b) pedal half stroke position (c) pedal full stroke position.



Work Equipment Controls and Operations

⚠ WARNING

If the lever is operated when the engine speed has been lowered by the auto-deceleration function, the engine speed will suddenly rise, so operate the levers carefully.

The work equipment is operated by the left and right work equipment control levers and left attachment control pedal. The left work equipment control lever operates the arm and swing, the right work equipment control lever operates the first boom and bucket, and left attachment control pedal operates the second boom.

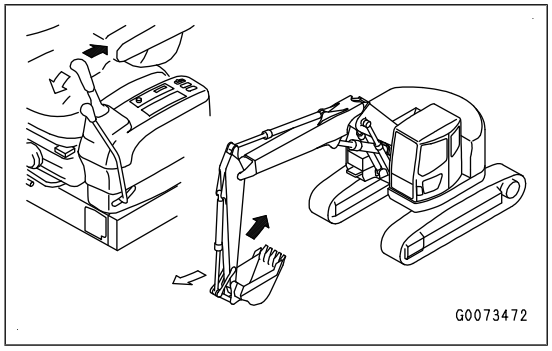
The movements of the lever and pedal and work equipment are as shown in the diagrams below. When the levers and pedal are released, they automatically return to the neutral position and the work equipment is held in place.

- If the work equipment control levers are returned to the neutral position when the machine is stopped, even if the fuel control dial is set to FULL, the auto-deceleration mechanism will act to reduce the engine speed to a mid-range speed.

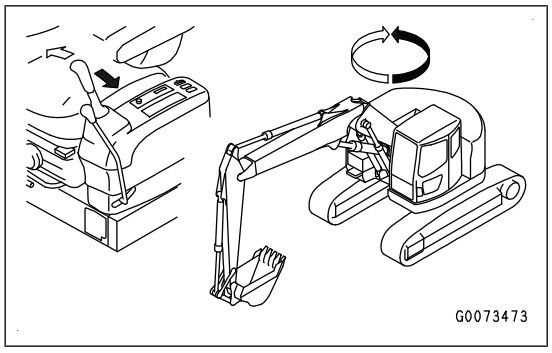
REMARK

With this machine, an accumulator is installed in the operating circuit, so if less than 15 seconds has passed since the engine was stopped, when the starting switch is turned to the ON position even when the engine is stopped, it is possible to operate the levers to lower the work equipment to the ground.
In addition, this operation can also be used to release the remaining pressure in the hydraulic cylinder circuit or to lower the boom after the machine has been loaded onto a trailer.

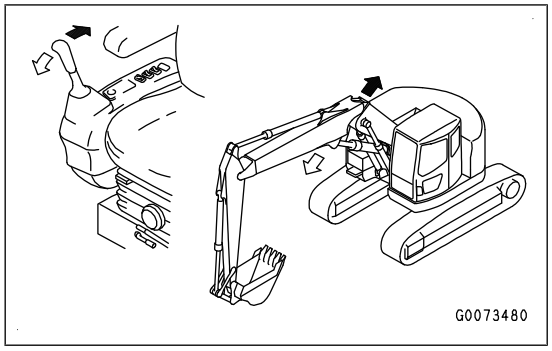
Arm operation



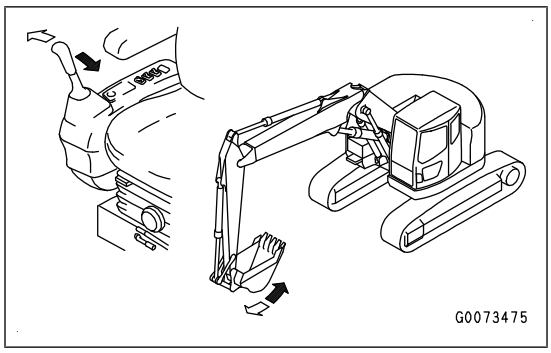
Swing operation



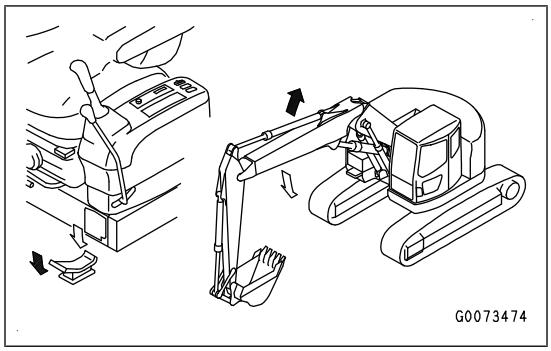
First boom operation



Bucket operation



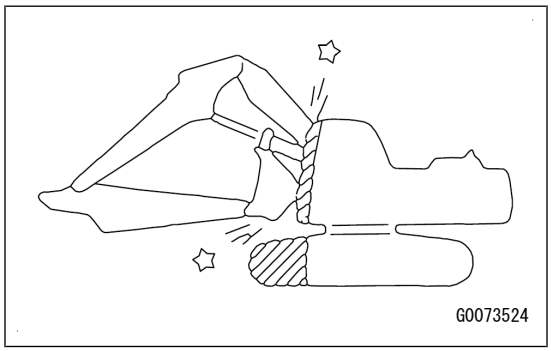
Second boom operation



General Operation Information

Precautions When You Operate

The bucket may hit the machine, so be extremely careful when operating the work equipment.



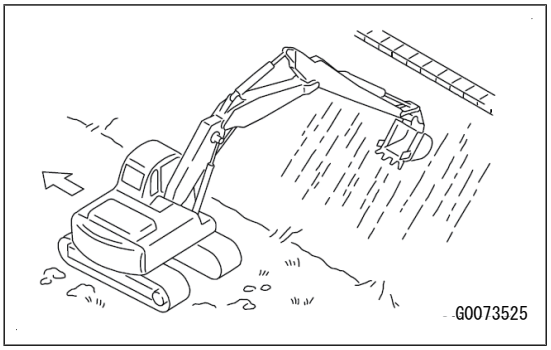
Work Possible with 2-Piece Boom

Independent Operations

The 2-piece boom specification machine can carry out the following independent operations. This is different from the conventional hydraulic excavator.

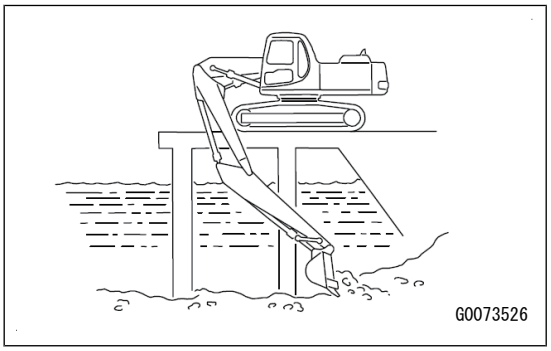
Slope Finishing Work

The boom is retracted, so levelling work can be carried out on long slope faces without moving the machine.



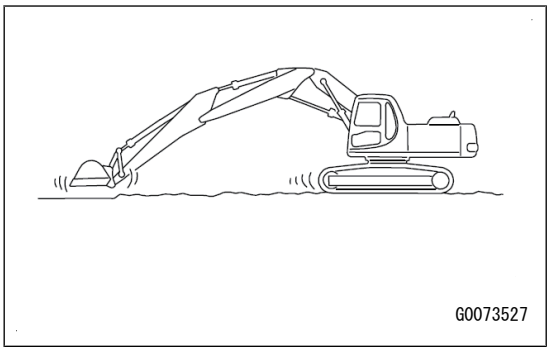
Excavate Under Front of Machine

Using the 2-piece boom, it is possible to carry out excavation work under the front of the machine.



Levelling Work

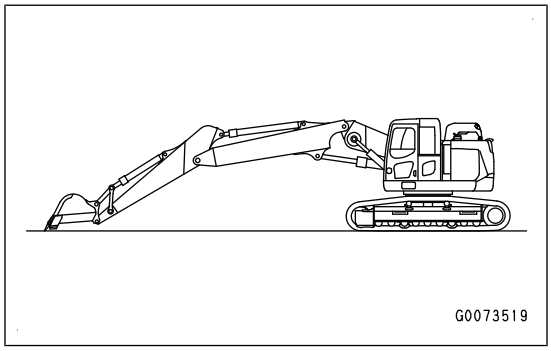
Long finishing work can be carried out at one time.



Storage Posture When You Move Away from Machine

NOTICE

When leaving the operator's compartment, set the machine in the posture shown in the figure for reasons of safety.



1. When leaving the machine for a long time see “LONG TERM STORAGE”for instructions on correct preparation of machine for long term storage.

   If the work quipment is not in the condition shown in the figure on the right, set it according to the following procedure.

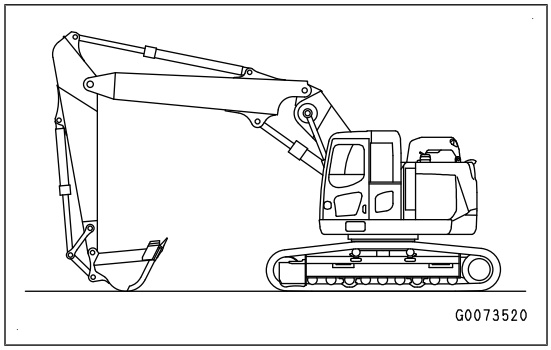
   1) Start the engine, and run in at low speed.
   2) Retract the arm and bucket cylinder rods fully.
   3) Extend the second boom adjust cylinder rods fully.
   4) Lower the first boom and lower the bucket teeth to the ground.
   5) Stop the engine.

   REMARK

   Going up and down cannot be done in this condition.
   Please change the work equpment condition to “WHEN LEAVINGTHE MACHINE FOR A SHORT TIME” condition before going up and down.

2. When leaving the machine for a short time.

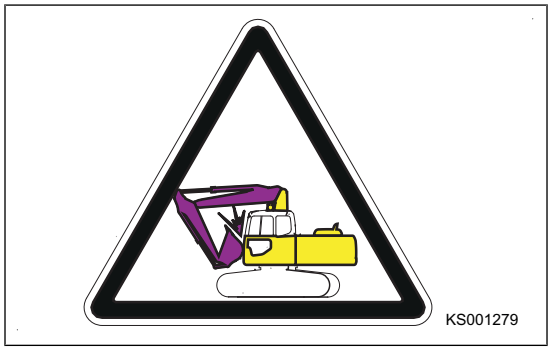
   If the work quipment is not in the condition shown in the figure on the right , set it according to the following procedure.



   1) Start the engine, and run in at low speed.
   2) Raise the first boom then retract the arm, bucket, and second boom adjust cylinder fully.
   3) Lower the first boom and lower the bucket teeth to the ground.
   4) Raise the second boom only and set the angle between the arm and the ground to 90°.
   5) Lower the bucket to the ground by lowering the second boom only.
   6) Stop the engine.

How to Lift

Recommended posture during lifting operations is with adjust cylinder fully extended.



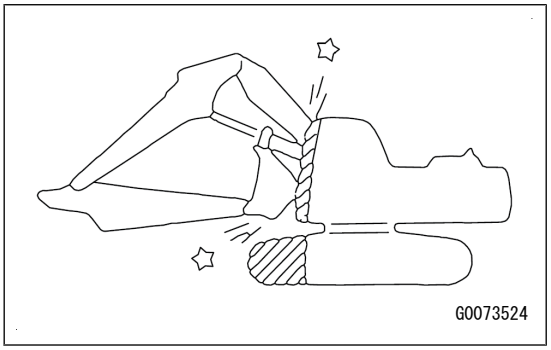
⚠ WARNING

- **Do not operate the adjust cylinder during lift operations as work equipment may move suddenly and cause serious damage.**
- **When the second boom adjust cylinder is retracted, the bucket or attachment can hit the operator cab or chassis.**
- **Operate work equipment slowly and carefully to avoid any injury and damage.**

General Operation Information

Precautions When You Operate

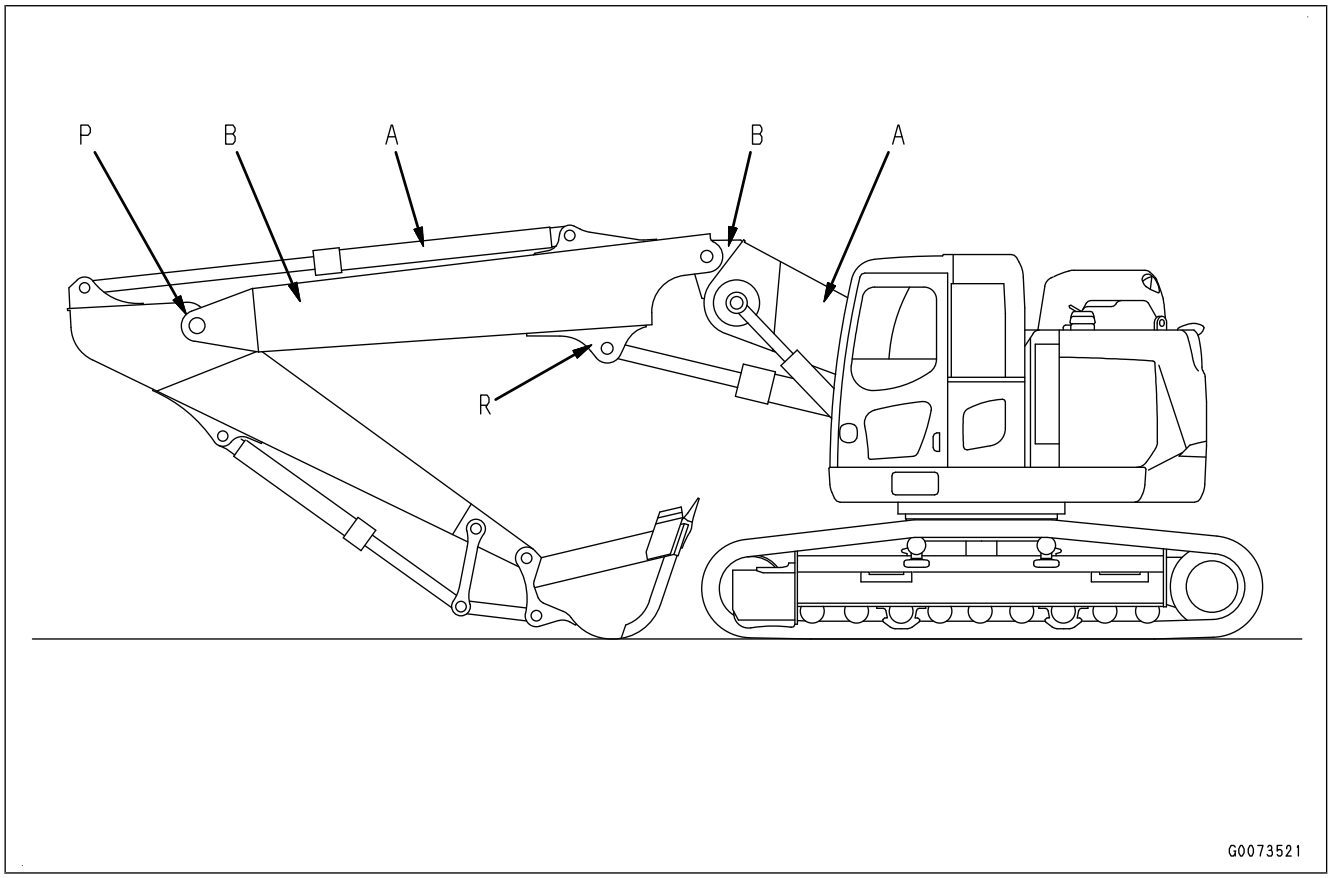
The bucket may hit the machine, so be extremely careful when operating the work equipment.



Inspection and Maintenance

To use the machine safely, and to prevent failures before they occur, always carry out checks before starting and periodic maintenance.

The locations for periodic inspection are as shown in the diagram below.



A	Cracks at end of weld (checks before starting).
P, R	Play, wear of pins (every 1000 hours).
C	Furrows in base metal (checks before starting).

NOTICE

If any abnormality is found during inspection, please contact your Komatsu distributor.
For details of inspection and maintenance items for the chassis other than those listed above, see "Maintenance".

Maintenance Schedule

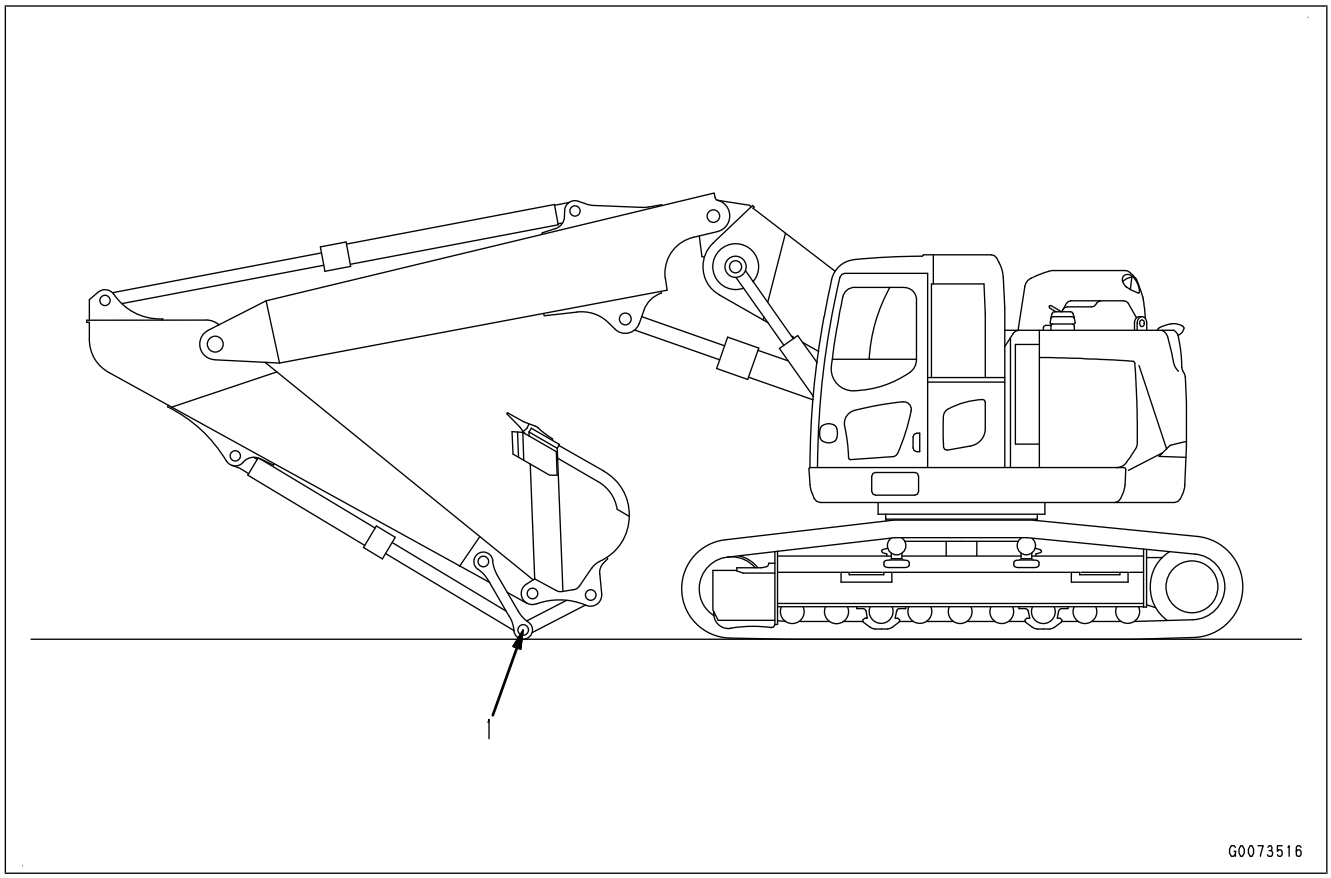
Every 100 Hours Maintenance

Lubrication

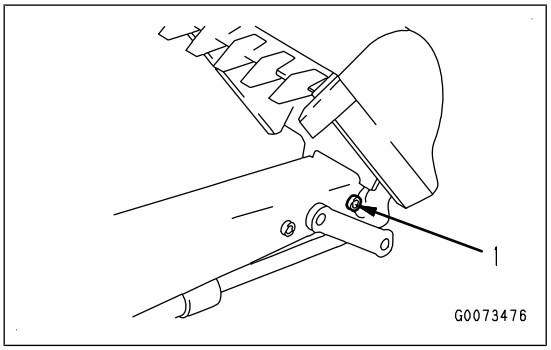
NOTICE

- **If any abnormal noise is generated from any greasing point, carry out greasing regardless of the greasing interval.**
- **Carry out greasing every 10 hours for the first 50 hours on a new machine.**
- **After the machine has been subjected to jobs in water, be sure to grease the wet pins.**

1. Set the work equipment in the greasing posture according to the following procedure.
   1) Start the engine, and run it at low speed.
   2) Raise the first boom then extend the arm, bucket, and second boom adjust cylinder fully.
   3) Lower the bucket bobhe ground by lowering the first boom.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any old grease that was pushed out.



(1) Arm-Bucket coupling pin (1 point)



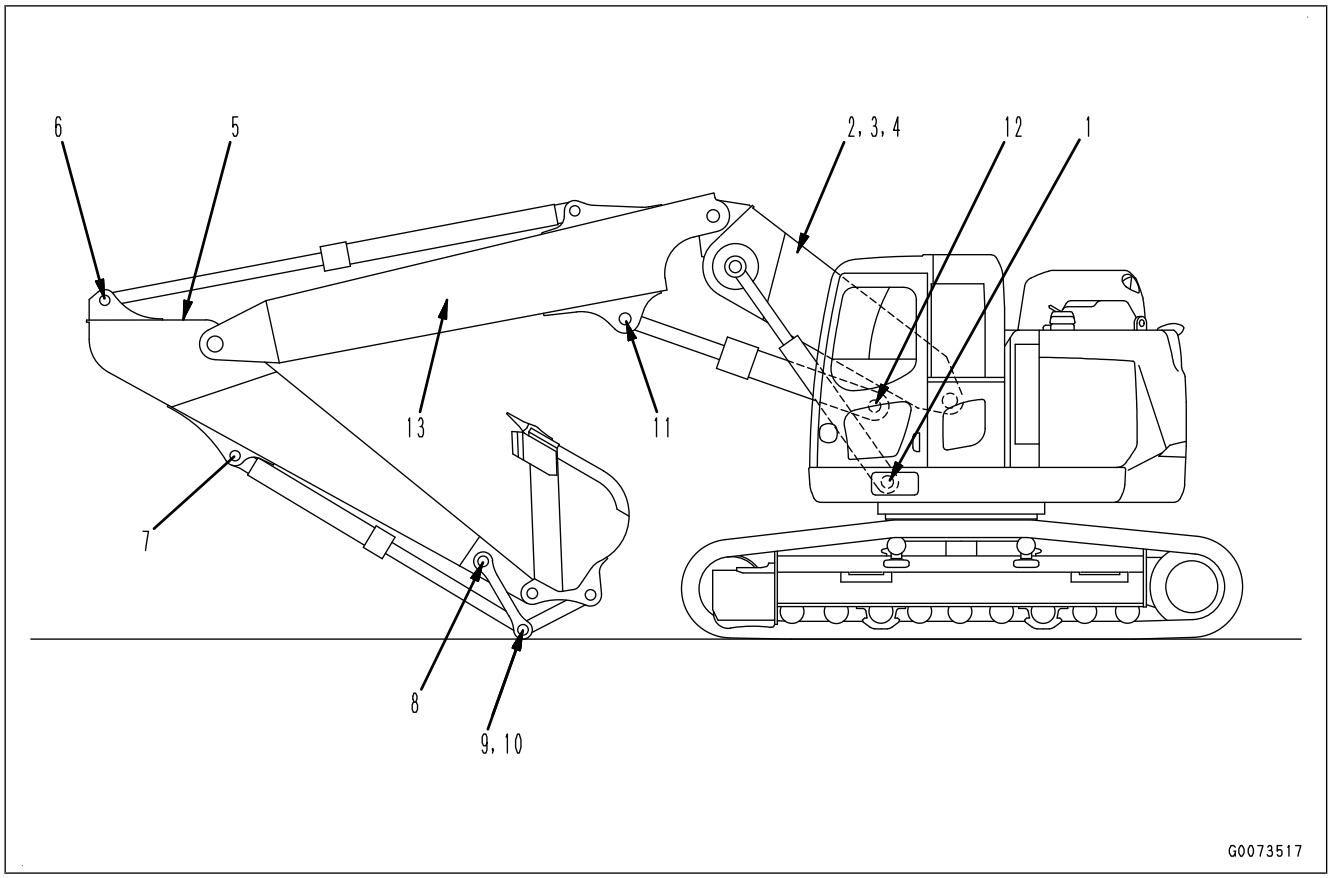
Every 500 Hours Maintenance

Lubrication

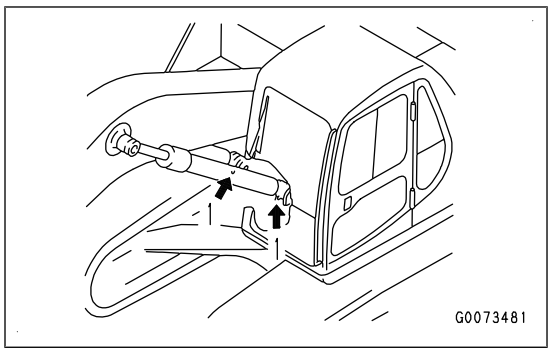
NOTICE

- **If any abnormal noise is generated from any greasing point, carry out greasing regardless of the greasing interval.**
- **Carry out greasing every 10 hours for the first 50 hours on a new machine.**
- **After the machine has been subjected to jobs in water, be sure to grease the wet pins.**

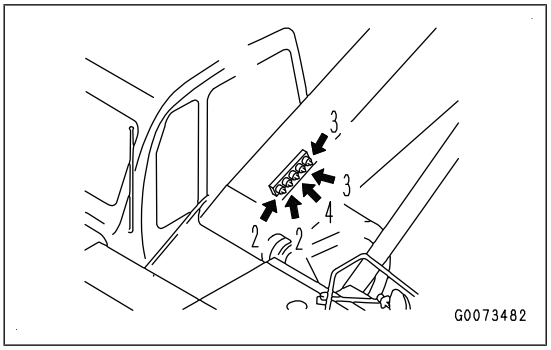
1. Set the work equipment in the greasing posture according to the following procedure.
   1) Start the engine, and run it at low speed.
   2) Raise the first boom then extend the arm, bucket, and second boom adjust cylinder fully.
   3) Lower the bucket bobhe ground by lowering the first boom.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any old grease that was pushed out.
4. After greasing, move the boom up and down several times and then grease the lower boom foot pin (2) again.



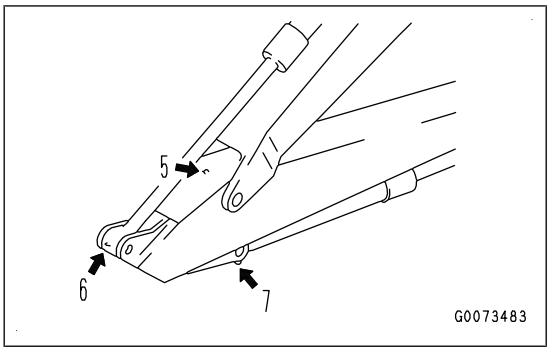
(1) Lower boom cylinder foot pin (2 places)



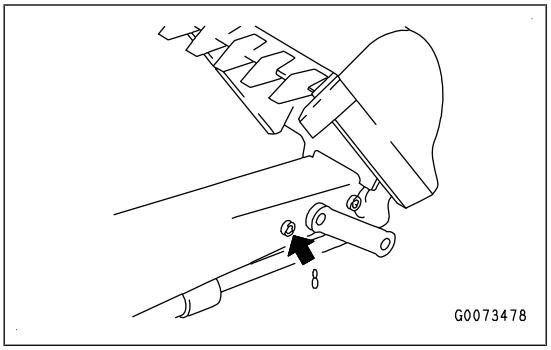
(2) Lower boom foot pin (2 places)
(3) Lower boom cylinder end (2 places)
(4) Lower boom-Upper boom coupling pin (1 place)



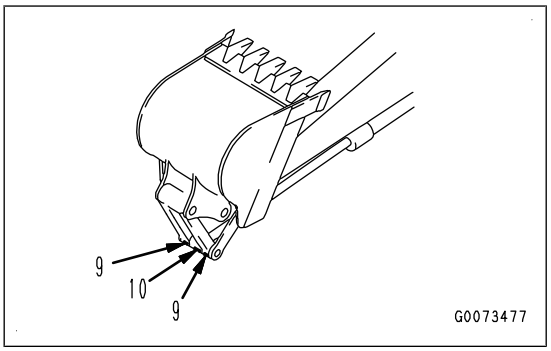
(5) Upper boom-Arm coupling pin (1 place)
(6) Arm cylinder rod end (1 place)
(7) Bucket cylinder foot pin (1 place)



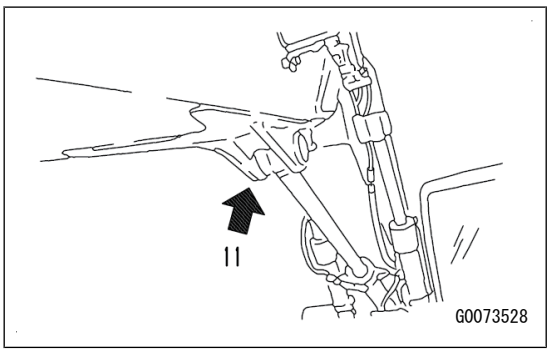
(8) Arm-Link coupling pin (1 place)



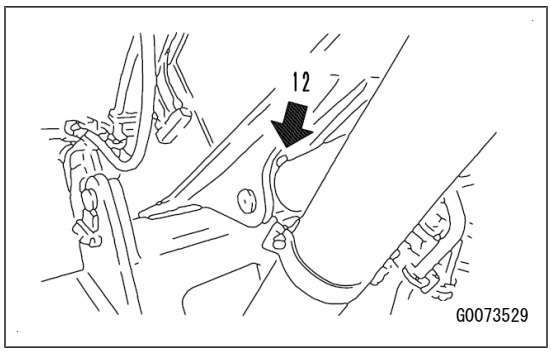
(9) Link coupling pin (2 places)
(10) Bucket cylinder rod end (1 place)



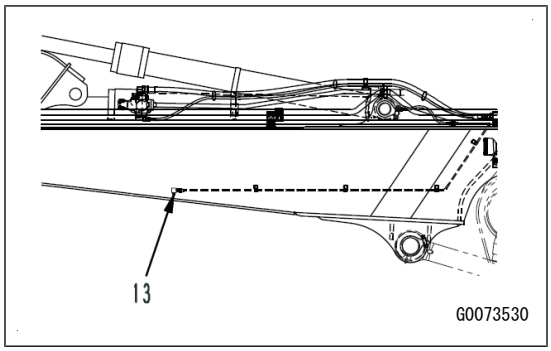
(11) Upper boom cylinder rod end (1 place)



(12) Upper boom cylinder foot pin (1 place)



(13) Arm cylinder foot pin (1 place)



Bucket Combinations

⚠ WARNING

- **Depending on the type and combination of work equipment, the work equipment may hit the cab or the machine. When using work equipment for which you have no experience of use, check before starting if there is any danger of contact, then operate carefully.**
- **If a bucket is used which is marked as impossible to use on the combination chart, there is a danger that the work equipment may break. Do not use such buckets.**

○: Can be used

△: Can be used only for light duty work

×: Cannot be used

NOTICE

- **When the boom is fully lowered during oblique digging, the boom interferes with the undercarriage. Operate the boom carefully.**
- **When the 2-piece boom equipped, if the bucket is pulled in to the machine body, the boom interferes with the body. Operate the boom carefully.**

Categories of Use

For general digging: Digging or loading sand, gravel, clay etc.

For light duty digging: Digging or loading dry, uncaked earth and sand, mud etc.

For loading work: Loading dry, loose earth and sand.

*** Equipped with Side Cutter.**

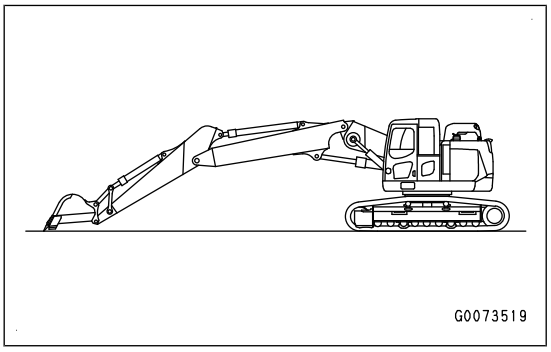
Name of bucket	Capacity (m^3)	Outside width (mm)	Use	2-piece boom
*Narrow bucket	0.50	750	Narrow digging	○
*Narrow bucket	0.60	970	Narrow digging	○
*Standard bucket	0.80	1,150	General digging	○
*Light duty bucket	0.90	1,200	Light digging	△
Light duty bucket	1.00	1,330	Loading	△
Slope finishing bucket	0.40	—	For trimming of a slope and rolling compaction	○

Periodic Maintenance

- Changing the hydraulic oil

When changing the hydraulic oil, set the work equipment in the posture as shown on the right qccarding to the following procedure.

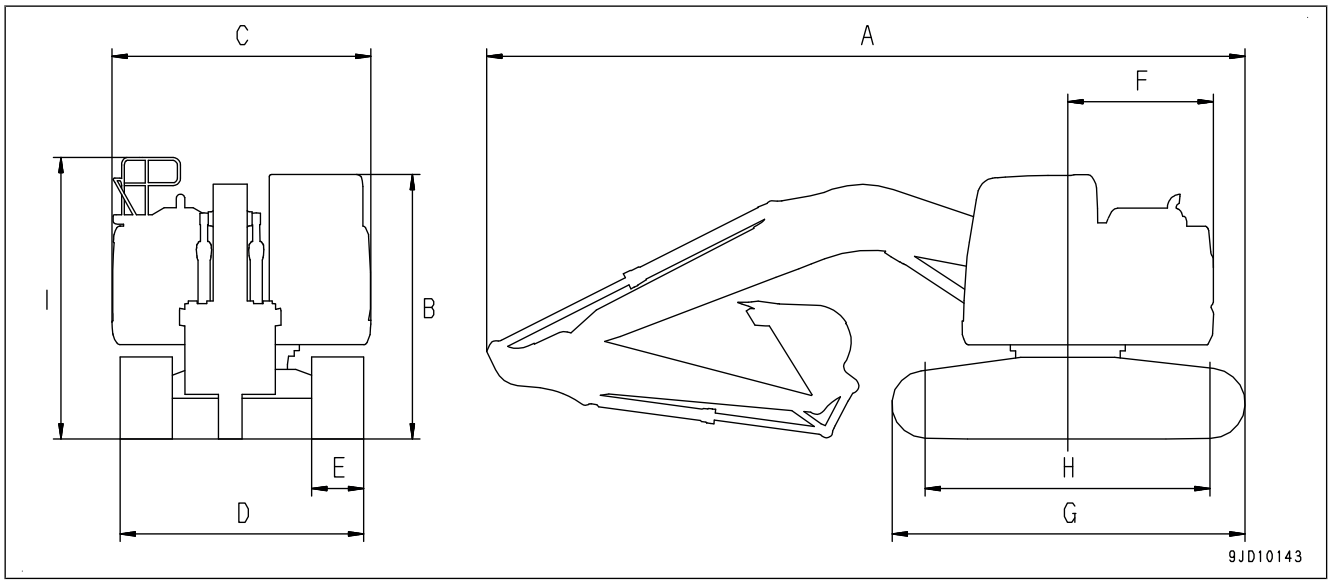
1. Start the engine,and run it at low speed.
2. Raise the first boom then retract the arm,bucket,and second boom adjust cylinder fully.
3. Lower the first boom and lower the bucket teeth to the ground.



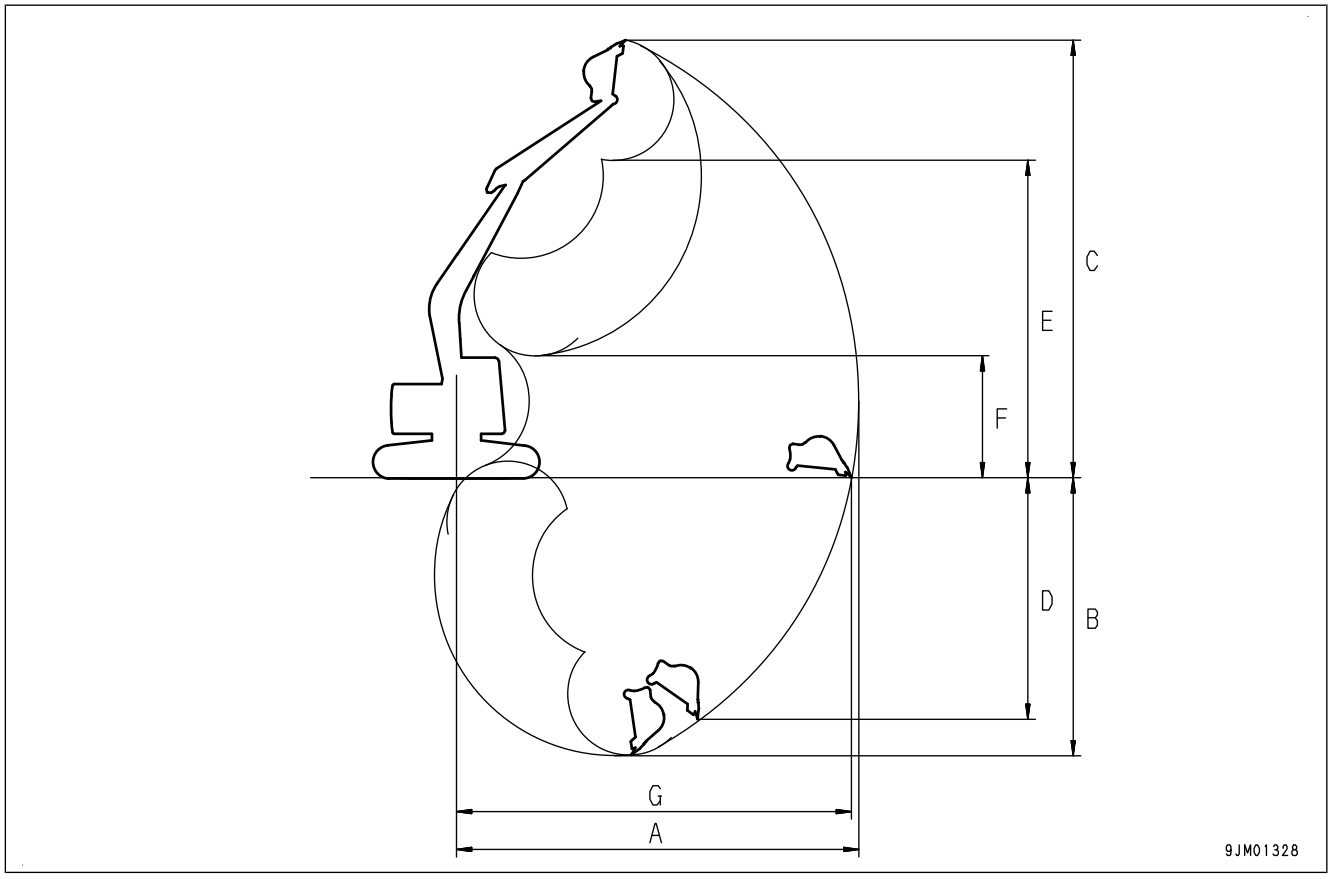
- Refill capaciby :126 litres
- Periodic maintenance required is the same as mono-boom machine.

Specifications: PC228USLC-11E0 - 2-Piece Boom

	Item		Unit	Arm length 2400 mm	Arm length 2900mm
	Operating weight		kg	25355	25475
	Bucket capacity		m^3	0.8	
	Engine model		-	Komatsu SAA6D107E-3 diesel engine	
	Rated horsepower	SAE J1995 (gross)	kW / min^{-1}	123.2 / 2000	
		ISO14396		123 / 2000	
		ISO 9249/SAE J1349 *(net)		123 / 2000	
A	Overall length		mm	9190	9285
B	Cab height		mm	3050	
	Overall width		mm	2980	
C	Upper structure width		mm	2980	
D	Overall width of track		mm	2980	
E	Shoe width		mm	600	
F	Tail swing radius		mm	1785	
G	Overall length of track		mm	4450	
H	Distance between tumbler centres		mm	3655	
I	Height of handrail		mm	3240	
	Minimum ground clearance		mm	440	
	Travel speed (Lo/Mi/Hi)		km/h	3.0/4.1/5.5	
	Swing speed		rpm	11.0	



	Working ranges	Unit	Arm length 2400 mm	Arm length 2900 mm
A	Maximum digging reach	mm	9752	10273
B	Maximum digging depth	mm	5669	6190
C	Maximum digging height	mm	11124	11598
D	Maximum vertical wall digging depth	mm	4750	5350
E	Maximum dumping height	mm	8164	8624
F	Minimum dumping height (when adjust cylinder is at maximum)	mm	4134	5326
	Minimum dumping height (when adjust cylinder is at minimum)	mm	1368	849
G	Maximum reach at ground level	mm	9570	10100



Explanation of Lift Capacity Chart (2-Piece Boom Specification)

2-Piece Boom - PC228USLC-11E0

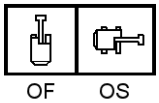
LEGEND

A: Reach from swing centre

B: Bucket hook height

OF: Lifting capacity (rating overfront)

OS: Lifting capacity (rating overside)



LEGEND

(1) Position of lifting point

(2) Arm length

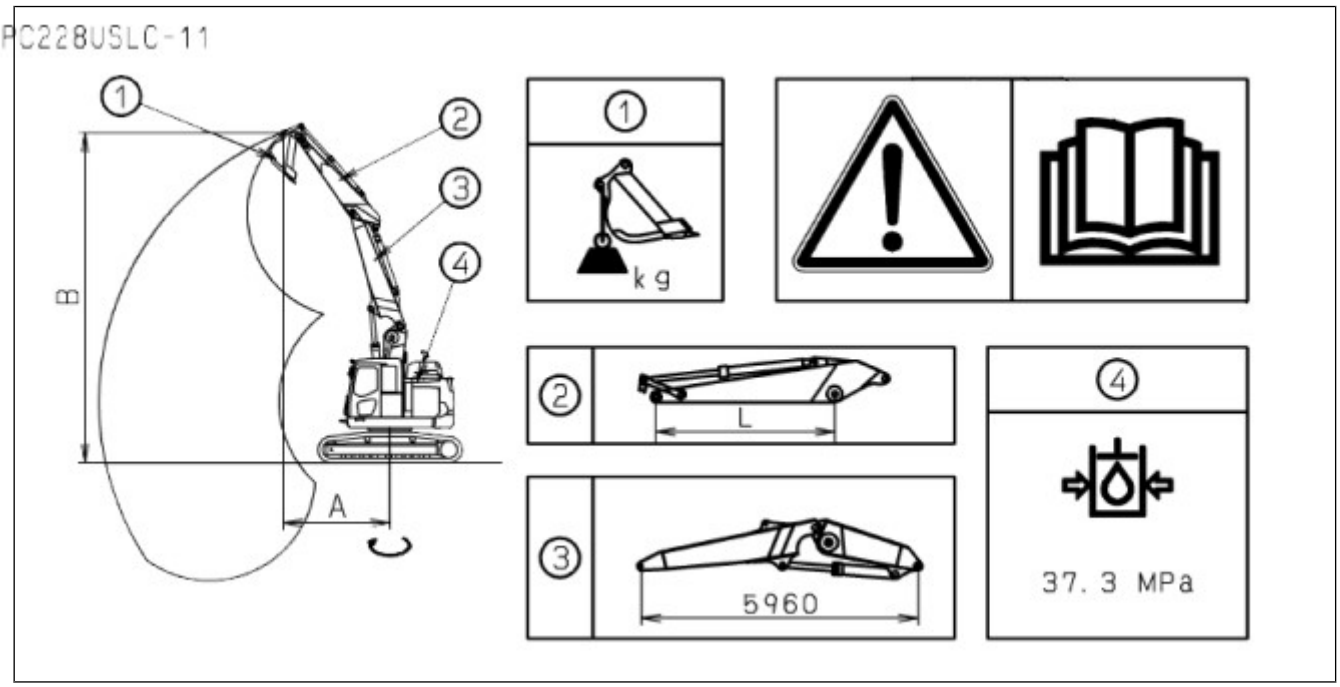
(3) Boom length

(4) Hydraulic pressure

WORKING CONDITIONS:

- WITH BUCKET 650 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

Loads do not exceed 87% of hydraulic capacity or 75% of tipping capacity (* load limited by hydraulic capacity rather than tipping).



PC228USLC-11E0

L	A / B	kg MAX		7.5m		6.0m		4.5m		3.0m	
2.9m	6.0m	*2510	2430	*4450	2860	*5400	4490				
	4.5m	*2480	2010	4760	2770	*6240	4230	*7480	*7030		
	3.0m	*2560	1790	4570	2600	6760	3900	*9860	6320		
	1.5m	*2740	1700	4390	2430	6400	3680	10460	5640		
	0.0m	*3070	1720	4250	2300	6130	3350	10000	5250	*5350	*5350
	-1.5m	3540	1880	4190	2240	6010	3230	9860	5140	*8880	*8880
	-3.0m					6020	3250				
2.4m	6.0m	*4010	2760			*6000	4340				
	4.5m	3990	2240	4650	2670	*6680	4080	*8290	6770		
	3.0m	3610	1970	4480	2510	6610	3760	*10120	6040		
	1.5m	3480	1860	4310	2360	6270	3470	10190	5410		
	0.0m	3570	1900	4200	2250	6050	3270	9850	5130		
	-1.5m	3930	2110	4180	2240	5970	3200	9840	5120		

Replacement Parts

Periodic Replacement of Defined Life Parts

For using the machine safely for an extended period of time, Komatsu highly recommends the periodic replacement of the defined life and fire prevention-related parts listed in the table of the defined life parts.

Material quality of these parts can change as time passes and they are likely to wear out or deteriorate. However, it is difficult to determine the extent of wear or deterioration at the time of periodic maintenance. Hence, it is required to replace them with new ones regardless of their condition after a certain period of usage. This is important to ensure that these parts maintain their full performance at all times.

Furthermore, should anything abnormal be found on any of these parts, replace it with a new one even if the periodic replacement time for the part has not yet arrived.

If any of the hose clamps show deterioration like deformation or cracking, replace the clamps at the same time as the hoses.

Also perform the following checks with hydraulic hoses which need not to be replaced periodically. 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.	Target Parts		Inspection /Replacement interval
1	Fuel system	Fuel hose	Every 2 years or every 4000 hours, whichever comes sooner.
2	Engine lubrication system	Turbocharger lubrication hose Engine oil filter hose	Replace if any of the damages were found when the daily check or periodical maintenance.
3	Work equipment hydraulic system	Main pump delivery hose Pump delivery hose	
		Pump branch hose Main pump LS hose	
		External work equipment hose • Boom foot joint hose • Boom cylinder hose • Arm connection hose • Arm cylinder hose • Line hose for additional attachment	
4	Others	PPC accumulator Attachment additional accumulator	
		Seat belt	Every 3 years from start of usage or 5 years after manufacturing of seat belt, whichever comes sooner.

Consumable Parts

Replace consumable parts such as the filter element or air cleaner element at the time of periodic maintenance or before they reach the wear limit. The consumable parts should be replaced correctly in order to ensure more economic use of the machine. When replacing parts, Komatsu recommends using Komatsu genuine parts.

As a result of our continuous efforts to improve product quality, the part number may change. Inform your Komatsu distributor of the machine serial number and check the latest part number when ordering parts.

Consumable Parts List

The parts in parentheses are to be replaced at the same time.

Item	Part No.	Part Name	Q'ty	Replacement interval
Engine oil filter	6736-51-5142	Cartridge	1	Every 500 hours
Fuel prefilter	600-319-3610	Cartridge	1	
Hydraulic oil filter	207-60-71183 (07000-15195)	Element (O-ring)	1 (1)	Every 1000 hours
Fuel main filter	600-319-3750	Cartridge	1	
Hydraulic tank breather	421-60-35170	Element	1	
DEF tank breather	421-60-35170	Element	1	
DEF filter	6540-71-2320	Element	1	Every 2000 hours
KCCV filter	600-331-2900	Element	1	
Radiator cap	208-03-61460	Cap	1	Every 4000 hours
Air conditioner RECIRC air filter	22B-979-2860	Filter	1	Every 1 year
Air conditioner FRESH air filter	17M-911-3530	Element	1	
Air cleaner	600-185-3100	Element assembly	1	-
Electric heater	6754-11-4120	Gasket	2	-
Additional filter for breaker (if equipped)	20Y-970-1820 (07000-12115) (07000-12014)	Element (O-ring) (O-ring)	1 (1) (1)	-
Additional pilot filter for breaker (if equipped)	20Y-62-51691 (706-76-71390)	Element (O-ring)	1 (1)	-

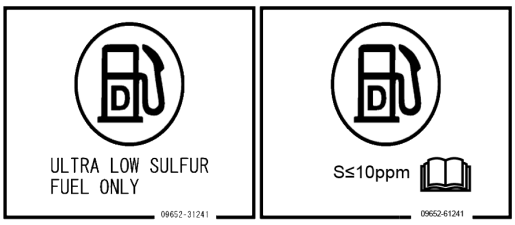
Recommended Fuel, Coolant, and Lubricant

NOTICE

- **Komatsu genuine oils are adjusted to keep the reliability and durability of Komatsu construction equipment and components.**
  To keep your machine in the best condition for long period of time, follow the instructions in this Operation and Maintenance Manual.
- **Failure to follow these recommendations can cause shortened life or excessive wear of the engine, power train, cooling system, and other components.**
- **Commercially available lubricant additives can be good or bad for the machine. Komatsu does not recommend the commercially available lubricant additive.**
- **Komatsu recommends the use of Komatsu genuine engine oil for KDPF. The use of oil other than Komatsu genuine engine oil for KDPF will have bad effects to the engine components such as reduced KDPF filter cleaning interval or reduced lubrication function by deterioration of the engine oil. This can cause failure, decrease of the service life, degradation in performance, or increase of fuel consumption of the machine.**
- **Use the fuels, oils, and lubricants which are recommended in response to the ambient temperature.**
- **If the machine is operated at a temperature of -20 °C or below, separate devices are needed, so consult your Komatsu distributor.**

NOTICE

Be sure to use the ultra-low sulfur diesel fuel.(≤10 ppm)
To get good fuel consumption characteristics and exhaust gas characteristics, an electronically controlled high-pressure fuel injection device and emission gas control system (KDPF) are used for this machine. The high-pressure fuel injection device requires high precision parts and lubrication. If low viscosity fuel with low lubrication quality is used, its durability can decrease significantly. Also, if fuel with high sulfur content is used, it can deteriorate the engine parts and KDPF catalyzer, and can cause failures, decrease of the service life, and degradation in performance.
For the fuel, do not use additive agents that contain metal component.
Metal component in the additives will not be burned during the KDPF regeneration, and can cause abnormal conditions in the exhaust gas aftertreatment devices.



The ASTM D975 diesel fuel can contain 5 % or less of biofuel.

The EN590 diesel fuel can contain 7 % or less of biofuel.

NOTICE

When you use biofuel other than the preceding diesel fuel and its mixing ratio is up to 20 %, obey the precautions that follow.

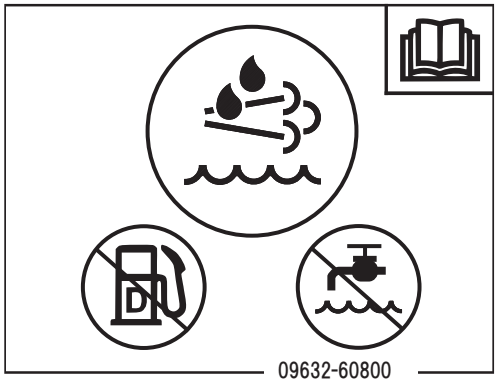
- **It is necessary to consult with the local regulatory authorities of engine exhaust gas regulation whether the biofuel can be used or not.**
- **The fuel can possibly leak because of the deterioration of rubber material of the fuel hose. Replace it with the fuel hose applicable for biofuel. Consult your Komatsu distributor for replacement of the fuel hose.**
- **Biofuel cannot be stored for a long time because it is easy to deteriorate and change in quality. Use the fuel in the storage tank or the fuel tank of the machine within 6 months. If the deteriorated and altered biofuel is used, it can cause bad effects on the engine parts. When you store the machine which uses the diesel fuel mixed with the biofuel for more than 3 months, do the procedure that follows.**
  - **Replace it with pure diesel fuel or the new diesel fuel mixed with the biofuel at the lowest possible mixing ratio.**
  - **After you change the fuel, run the engine for a minimum of 30 minutes before you store the machine.**
- **Because the biofuel dissolves the materials stuck to the fuel tank and fuel line, the fuel filter can be clogged with them. When you change the diesel fuel to the biofuel, replace the fuel main filter cartridge and fuel prefilter cartridge with new ones. When you replace the fuel main filter cartridge and fuel prefilter cartridge, make the replacement interval half the normal time until the second replacement after you change the diesel fuel to the biofuel.**
- **Because the biofuel absorbs moisture easily, it can possibly cause a growth of microorganism. When the microorganism grows in the biofuel, it can cause corrosion of the fuel system and the clogging of the fuel filter. Drain the water from the fuel tank before you start the operation. When you complete the operation, fill the fuel tank to reduce the air layer.**
- **If the biofuel is used in the conditions of the specific operation, the fuel can possibly get mixed into the engine oil. The fuel level in the engine oil must not exceed 5 %. Deteriorated engine oil can cause adverse effects on the engine parts such as a reduction of lubricating function. It is recommended to take a sample of the oil on a periodic basis.**
- **The characteristics of the biofuel change when outside air temperature is low. The fuel filter can be clogged and the fuel inside the fuel tank can solidify. Store the biofuel in the warm building or in the storage tank.**

NOTICE

Use the paraffin-based fuel which agrees with EN15940:2016 and ASTM D975.
As long as the fuel agrees with EN15940:2016 and ASTM D975, its mixing ratio can be up to 100 %.

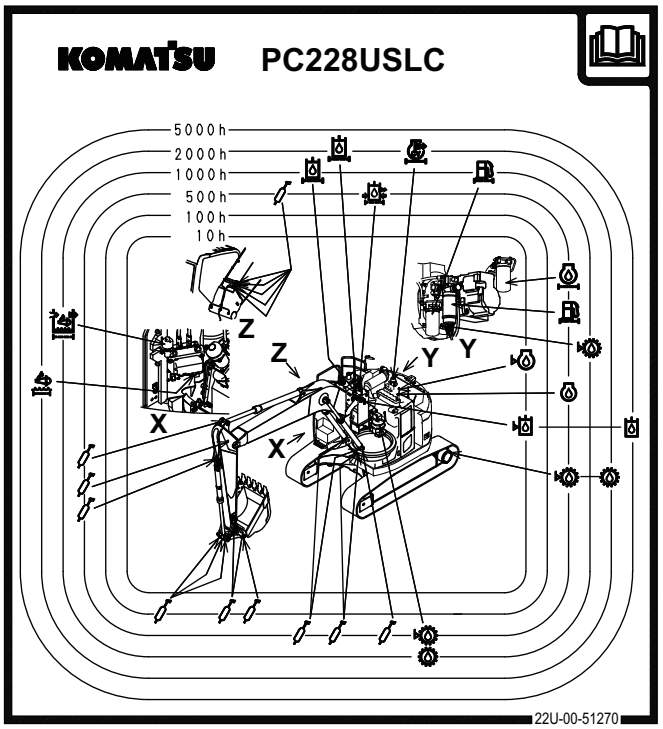
NOTICE

Use DEF as the aqueous urea solution for urea SCR system.
DEF is a colorless transparent 32.5 % aqueous urea solution.
The quality of DEF is provided in ISO22241-1. Always use DEF that agrees with this quality standard.



Lubrication Chart

- The lubrication chart uses symbols to show the lubrication points and types of lubricant by each lubrication interval.
  Keep this chart in the magazine box inside the cab so that the people concerned can refer it any time during lubrication.
- Even if the same symbol is used in the lubrication chart, the recommended genuine oil may differ according to the lubrication points and the ambient temperature.



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
	Repalce hydraulic tank breather element		Replace fuel filter
	Replace KCCV filter		Replace DEF tank breather element
	Replace DEF filter		

How to Use Fuel, Coolant and Lubricants by Ambient Temperature

Reservoir	Fluid type	Recommended Komatsu Fluids	Ambient temperature, degrees Celsius(°C)	
			Min	Max
Engine oil pan	Engine oil for KDPF used in cold terrain (Oil Change interval 250 hours) (Note.1)	EOS0W40-LA (KES)	-30	40
	Engine oil for KDPF (Oil Change interval 500 hours)	EO10W30-LA (KES)	-20	40
		EO15W40-LA (KES)	-15	50
Swing machinery Case Final drive case Damper case	Power train oil (Note.2)	TO30 (KES)	-30	50
Hydraulic System	Power train oil	TO10 (KES) (Note.5)	-20	50
	Hydraulic oil	HO56-HE (KES)	-30	50
		HO46-HM (KES) (Note.5)	-20	50
Grease fitting	Hyper grease (Note.3)	G2-TE (KES)	-20	50
	Lithium EP grease	G2-LI (KES)	-20	50
Cooling system	Non-Amine Engine Coolant AF-NAC (Note.4)	AF-NAC (KES)	-40	50
Fuel tank	Diesel fuel	EN 590 Class2	-30	20
		EN 590 Grade D	-10	50
DEF tank	DEF (Note.6)	DEF	-40	50

KES: Komatsu Engineering Standard

Reservoir	Specified capacity		Refill capacity	
	Liter	US gal	Liter	US gal
Engine oil pan	25.4	6.71	23.1	6.1
Swing machinery case	7.1	1.88	6.5	1.72
Final drive case (each of right and left)	5.4	1.43	5.0	1.32
Damper case	0.65	0.17	0.65	0.17
Hydraulic system	225	59.4	126	33.3
Cooling system	28.3	7.48	28.3	7.48
Fuel tank	290	77.6	-	-
AdBlue® tank	21.1	5.57	-	-

REMARK

Specified capacity means the total amount of oil including the oil in the tank and the piping. Refill capacity means the amount of oil needed to refill the system during inspection and maintenance.

Note 1: KDPF engine oil for cold district is deteriorated easily than that for normal area (replace every 500 hours), so replace oil and filter cartridge every 250 hours. For changing the maintenance time of machine monitor, ask your Komatsu distributor to perform the work.

Note 2: 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: Non-Amine Engine Coolant (AF-NAC)

1) 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.

Non-Amine Engine Coolant (AF-NAC) is strongly recommended wherever available.

2) For the concentration of Non-Amine Engine Coolant (AF-NAC), see the Coolant density table.

Non-Amine Engine Coolant (AF-NAC) is supplied in diluted state, so always fill up with it. (Never dilute it with ordinary water.)

Coolant Density Table

Min. atmospheric temperature	°C	-10 or more	-15	-20	-25	-30	-35	-40	-45	-50
	°F	14 or more	5	-4	-13	-22	-31	-40	-49	-58
Density(%)		30	36	41	46	50	54	58	61	64

Note 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 {12.2 °F} . If thawing is necessary, the DEF system is automatically heated to thaw DEF after the engine is started.

Recommended Brands and Qualities Other Than Komatsu Genuine Oils

When using commercially available oils other than Komatsu genuine oil, consult your Komatsu distributor.

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