WENAM00550_1

Operation & Maintenance Manual

PC138US-11E0

HYDRAULIC EXCAVATOR

SERIAL NUMBERS

PC138US-11E0 F60001 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 whowill 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).

CONTENTS

FOREWORD 1-1
READ THIS MANUAL 1-6
KOMATSU MACHINE OPERATOR PRIVACY POLICY 1-7
SAFETY INFORMATION 1-10
NOISE EMISSION LEVELS 1-11
VIBRATION LEVEL 1-12
INTRODUCTION 1-14
MACHINE INFORMATION 1-17
LOCATION OF PRODUCT IDENTIFICATION NUMBER (PIN) AND MACHINE SERIAL NO. PLATE 1-17
LOCATION OF ENGINE NUMBER PLATE 1-17
FLUORINATED GREENHOUSE GASES 1-18
SERVICE METER LOCATION 1-18
YOUR MACHINE SERIAL NUMBERS AND DISTRIBUTOR 1-18
SERIAL PLATE 1-19
DECLARATION OF CONFORMITY 1-20
ABBREVIATION LIST 1-21
SAFETY 2-1
LOCATION OF SAFETY LABELS 2-2
CONTENTS OF SAFETY LABELS 2-3
OTHER LABELS 2-12
GENERAL PRECAUTIONS COMMON TO OPERATION AND MAINTENANCE 2-20
PRECAUTIONS BEFORE STARTING OPERATION 2-20
PREPARATIONS FOR SAFE OPERATION 2-20
ACTIONS IF FIRE OCCURS 2-21
PRECAUTIONS TO PREVENT FIRE 2-22
PRECAUTIONS WHEN YOU GET ON OR OFF MACHINE 2-23
PRECAUTIONS FOR MACHINE AND JOBSITE 2-25
PRECAUTIONS FOR OPERATION 2-27
PRECAUTIONS FOR JOBSITE 2-27
START ENGINE 2-30
PRECAUTIONS FOR OPERATION 2-33
PRECAUTIONS FOR TRANSPORTATION 2-39
PRECAUTIONS FOR TOWING 2-40
LIFTING OPERATION BY BUCKET WITH HOOK 2-41
LIFTING OPERATION BY BUCKET LINK LIFTING DEVICE (OPTIONAL) 2-41
PRECAUTIONS FOR MAINTENANCE 2-44
PRECAUTIONS BEFORE YOU START INSPECTION AND MAINTENANCE 2-44
PRECAUTIONS FOR CHECK AND MAINTENANCE 2-48
OPERATION 3-1
GENERAL VIEW 3-2
MACHINE EQUIPMENT NAME 3-2
CAB EQUIPMENT NAME 3-4
CONTROLS AND GAUGES NAMES 3-5
MACHINE MONITOR EQUIPMENT NAME 3-6
EXPLANATION OF COMPONENTS 3-8
MACHINE MONITOR EQUIPMENT 3-8
NAMES OF SWITCH PANEL EQUIPMENT 3-89
NAMES OF CONTROL LEVERS AND PEDALS 3-98
OTHER EQUIPMENT 3-103
MACHINE OPERATIONS AND CONTROLS 3-151
CHECKS AND ADJUSTMENT BEFORE YOU START ENGINE 3-151
START ENGINE 3-181
OPERATIONS AND CHECKS AFTER YOU START ENGINE 3-186
STOP ENGINE 3-199
START MACHINE (TRAVEL FORWARD AND REVERSE) AND STOP MACHINE 3-201

STEER MACHINE 3-204
SWING MACHINE 3-206
OPERATE WORK EQUIPMENT 3-207
HANDLE WORKING MODE 3-209
PROHIBITED OPERATIONS 3-211
WORK PRECAUTIONS 3-217
PRECAUTIONS WHEN YOU WORK ON SLOPE 3-220
ESCAPE FROM SOFT GROUND 3-222
RECOMMENDED APPLICATIONS 3-223
LIFT OBJECTS WITH LIFTING DEVICE 3-225
REPLACE AND INVERT BUCKET 3-226
PARK MACHINE 3-229
CHECK AFTER YOU FINISH WORK 3-230
LOCK 3-231
AIR CONDITIONER 3-238
AIR CONDITIONER EQUIPMENT 3-239
OPERATE AIR CONDITIONER 3-244
RADIO 3-252
RADIO EQUIPMENT 3-252
OPERATE RADIO 3-256
RADIO SETTING 3-259
STOW ANTENNA 3-263
KomVision 3-264
PRECAUTIONS WHEN USING KomVision 3-264
MONITOR DISPLAY 3-264
HANDLE ANCHOR POINT FOR TIE-OFF 3-266
HANDLE ROAD LINERS 3-267
RECOMMENDED USE OF ROAD LINERS 3-267
COMPARISON OF ROAD LINERS AND STEEL SHOES 3-267
WARRANTY OF ROAD LINERS 3-267
PRECAUTIONS WHEN USING ROAD LINERS 3-267
TRANSPORTATION 3-269
LOAD AND UNLOAD A TRAILER 3-270
REMOVE AND INSTALL REVOLVING LAMP 3-278
LIFT MACHINE 3-279
COLD WEATHER OPERATION 3-281
COLD WEATHER INFORMATION 3-281
FUEL AND LUBRICANTS 3-281
COOLANT 3-281
DEF 3-281
BATTERY 3-282
PRECAUTIONS AFTER DAILY WORK COMPLETION IN COLD WEATHER 3-282
AFTER COLD WEATHER SEASON 3-283
LONG-TERM STORAGE PRECAUTIONS 3-284
PREPARATION FOR LONG-TERM STORAGE 3-284
MAINTENANCE DURING LONG-TERM STORAGE 3-285
START MACHINE AFTER LONG-TERM STORAGE 3-285
TROUBLES AND ACTIONS 3-286
ACTIONS WHEN YOU RUN OUT OF FUEL 3-286
PHENOMENA THAT ARE NOT FAILURES 3-287
PRECAUTIONS FOR TOWING MACHINE 3-288
PRECAUTIONS FOR SEVERE JOB CONDITION 3-289
ACTIONS WHEN BATTERY IS DISCHARGED 3-290
OTHER TROUBLE 3-296
MAINTENANCE 4-1
PRECAUTIONS FOR MAINTENANCE 4-2
HANDLE ANCHOR POINT FOR TIE-OFF 4-5
MAINTENANCE INFORMATION 4-6

OIL, FUEL, AND COOLANT 4-6
ELECTRICAL COMPONENTS 4-12
STANDARD TORQUE 4-14
MAINTENANCE SCHEDULE 4-16
MAINTENANCE INTERVAL TABLE 4-16
MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER 4-18
MAINTENANCE PROCEDURE 4-19
WHEN REQUIRED 4-19
CHECK BEFORE YOU START OPERATION 4-51
EVERY 100 HOURS MAINTENANCE 4-52
EVERY 250 HOURS MAINTENANCE 4-54
EVERY 500 HOURS MAINTENANCE 4-61
EVERY 1000 HOURS MAINTENANCE 4-72
EVERY 2000 HOURS MAINTENANCE 4-82
EVERY 4000 HOURS MAINTENANCE 4-93
EVERY 4500 HOURS MAINTENANCE 4-96
EVERY 5000 HOURS MAINTENANCE 4-97
EVERY 8000 HOURS MAINTENANCE 4-100
EVERY 9000 HOURS MAINTENANCE 4-101
END OF SERVICE LIFE 4-102
SPECIFICATIONS 5-1
SPECIFICATIONS: PC138US-11E0 5-2
EXPLANATION OF LIFT CAPACITY CHART 5-4
ATTACHMENTS AND OPTIONS 6-1
PRECAUTIONS TO USE ATTACHMENTS AND OPTIONS SAFELY 6-2
HANDLE BUCKET WITH HOOK 6-5
WORK PRECAUTIONS 6-5
HANDLE 2-PIECE BOOM 6-6
2-PIECE BOOM COMPONENTS 6-6
2-PIECE BOOM CONTROL PEDAL 6-7
PREPARATION FOR STORAGE AND LIFTING MACHINE 6-8
MAINTENANCE SCHEDULE 6-9
EVERY 100 HOURS MAINTENANCE 6-9
EVERY 500 HOURS MAINTENANCE 6-11
SPECIFICATIONS 6-13
EXPLANATION OF LIFT CAPACITY CHART 6-15
SUPER LONG FRONT BOOM AND ARM 6-18
GENERAL VIEW OF MACHINE FOR SUPER LONG FRONT BOOM AND ARM 6-18
CHECKS BEFORE STARTING 6-18
WORKING MODES 6-19
METHOD OF WORK 6-20
WHEN TRAVELLING 6-21
TRANSPORT AND STORAGE OF SUPER LONG FRONT MACHINE 6-21
MAINTENANCE 6-21
SPECIFICATIONS 6-23
EXPLANATION OF LIFT CAPACITY CHART 6-25
HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT 6-28
EXPLANATION OF COMPONENTS 6-28
CHANGE OVER AND CONNECT HYDRAULIC CIRCUIT OF ATTACHMENT 6-34
REMOVE AND INSTALL ATTACHMENT 6-36
OPERATE ATTACHMENT 6-42
LONG-TERM STORAGE 6-49
SPECIFICATIONS 6-50
ATTACHMENTS AND OPTIONS 6-51
TRACK SHOES SELECTION 6-51
HANDLE RUBBER PAD SHOES AND ROAD LINERS 6-52
INSTALL ATTACHMENT 6-54
RECOMMENDED ATTACHMENT OPERATIONS 6-55

HYDRAULIC BREAKER 6-55
REPLACEMENT PARTS 7-1
PERIODIC REPLACEMENT OF DEFINED LIFE PARTS 7-2
DEFINED LIFE PARTS LIST 7-2
CONSUMABLE PARTS 7-3
CONSUMABLE PARTS LIST 7-3
RECOMMENDED FUEL, COOLANT, AND LUBRICANT 7-4
LUBRICATION CHART 7-6
USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE 7-8
RECOMMENDED BRANDS AND QUALITIES OTHER THAN KOMATSU GENUINE OILS 7-9
INDEX 8-1

READ THIS MANUAL

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

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

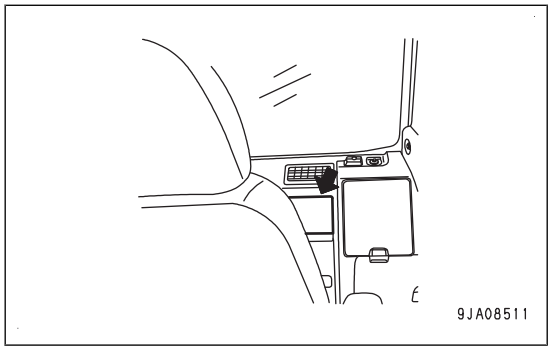
Komatsu cannot predict each circumstance that might involve a possible danger when the machine is used. The precautions and warning indications in the Operation and Maintenance Manual and on the machine cannot include all possible safety precautions.

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

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

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

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



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

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

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

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

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

When you consult your Komatsu distributor for questions or repair, tell them the information in "MACHINE INFORMATION (1-17)".

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

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.

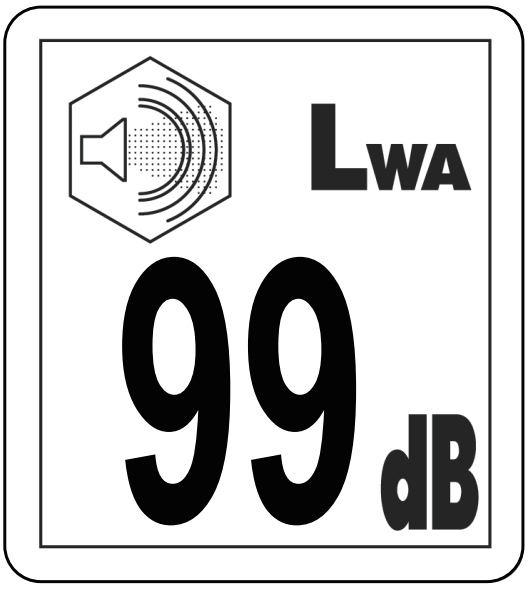
NOTICE	Failure to follow the precautions results in damage to the machine or a personal injury or death.
REMARKS	Shows useful information.

NOISE EMISSION LEVELS

Two signs are attached to the machine that state the noise level produced.

- Sound pressure level at the operator’s station, measured according to ISO 6396 (Dynamic test method, simulated working cycle).
  The maximum value of the standard deviation of the measured time-averaged A-weighted emission sound pressure level at the operator's position is 2.5dB, in accordance with ISO 11201.

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



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.

The actual acceleration value for the hands and arms is less than or equal to 2.5m/s^2, the uncertainty for this value is 0.54m/s^2 according to EN12096:1997.

The actual acceleration value for the body is less than or equal to 0.5m/s^2, the uncertainty for this value is 0.38m/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 traveling 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 traveling path as large as possible
   - Travel at low speed then traveling around sharp curves
7. Minimize vibrations for long work cycle or long distance traveling
   - 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 APPLICATION OF THE MACHINE

This machine is used mainly for the works that follow.

- Digging work
- Ditch work
- Loading work
- Leveling work

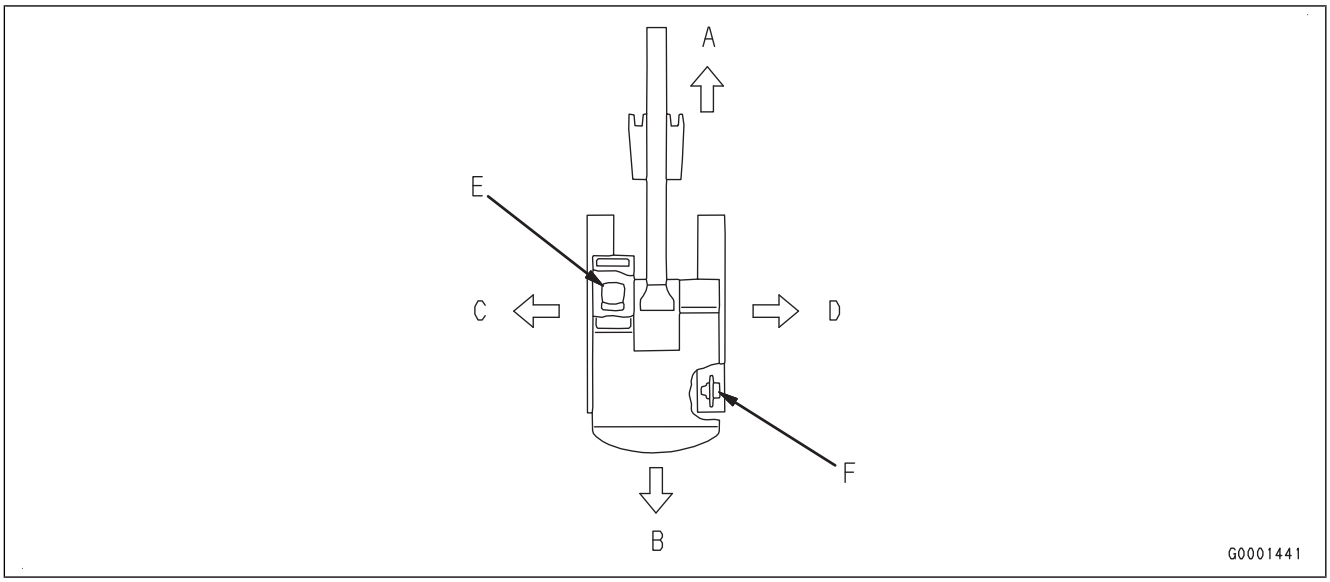
For details of work procedure, see OPERATION, “RECOMMENDED APPLICATIONS (3-223)”.

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 had to demolish, cut, loosen, isolated, pick up, transport and distribute component parts of buildings or civil engineering structures.**
- **This machine is not prepared for use in Demolition.**
- **Using this machine in demolition work gives an increased risk of dangerous injury or death.**
- **All Komatsu machines that are specifically designed, and can be used for demolition work, will display the Komatsu demolition decal.**
- **If the machine does not display this decal and it is necessary to carry out demolition work, contact your distributor for information on demolition machinery compliant with the applicable standards.**

DIRECTIONS OF MACHINE



(A) Front
(B) Rear
(C) Left
(D) Right

(E) Operator's seat (F) Sprocket

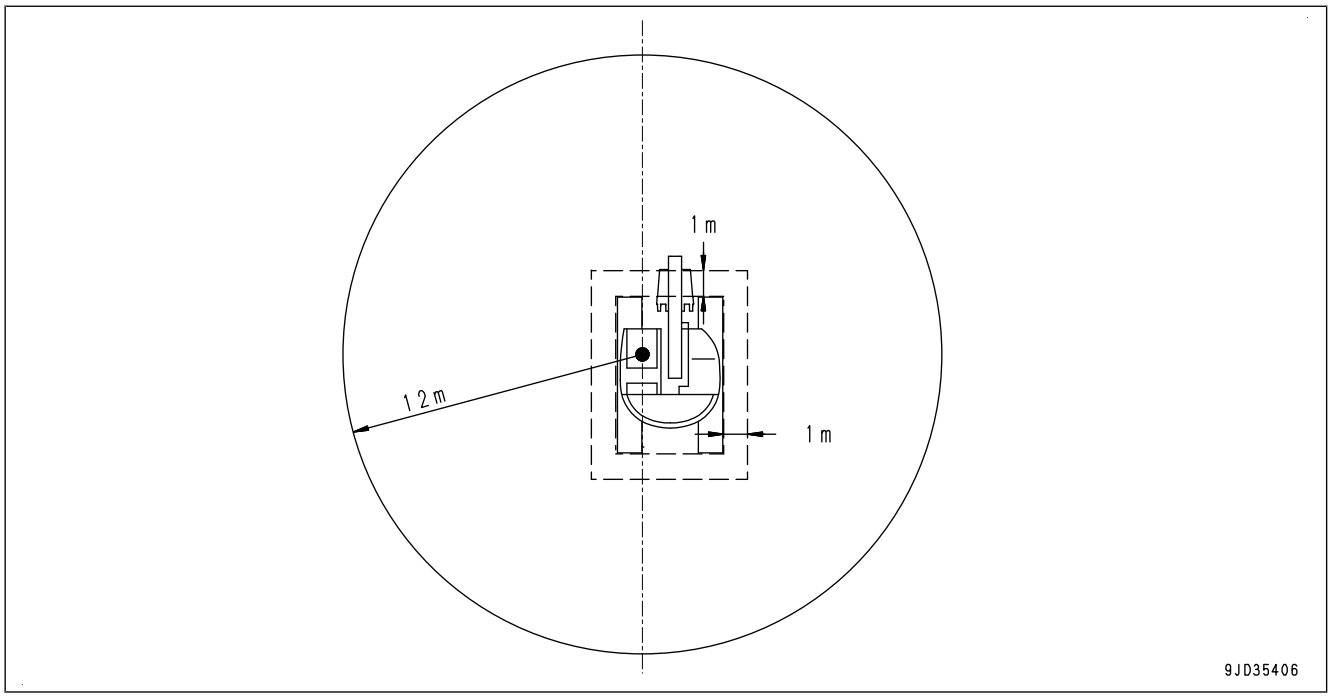
In the Operation and Maintenance Manual, the directions of the machine (front, rear, right, left) are based on the direction when operator in operator's seat views the direction of forward travel while the sprocket is at the rear.

VISIBILITY FROM OPERATOR'S SEAT

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

Proximity visibility

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

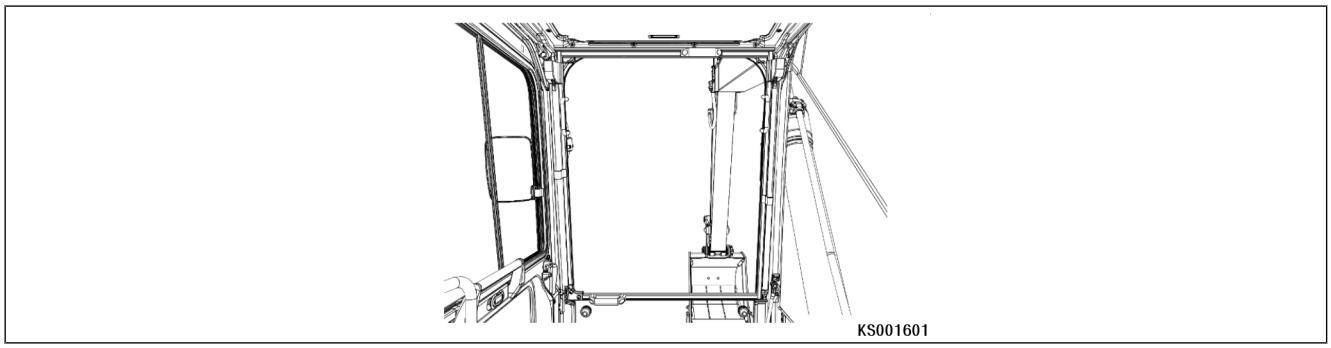


To assist with job site organisation during use of this machine, a visibility map is provided that shows an approximation of any masking to visibility between the 1m rectangular boundary and the 12m test circle.

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

⚠ WARNING

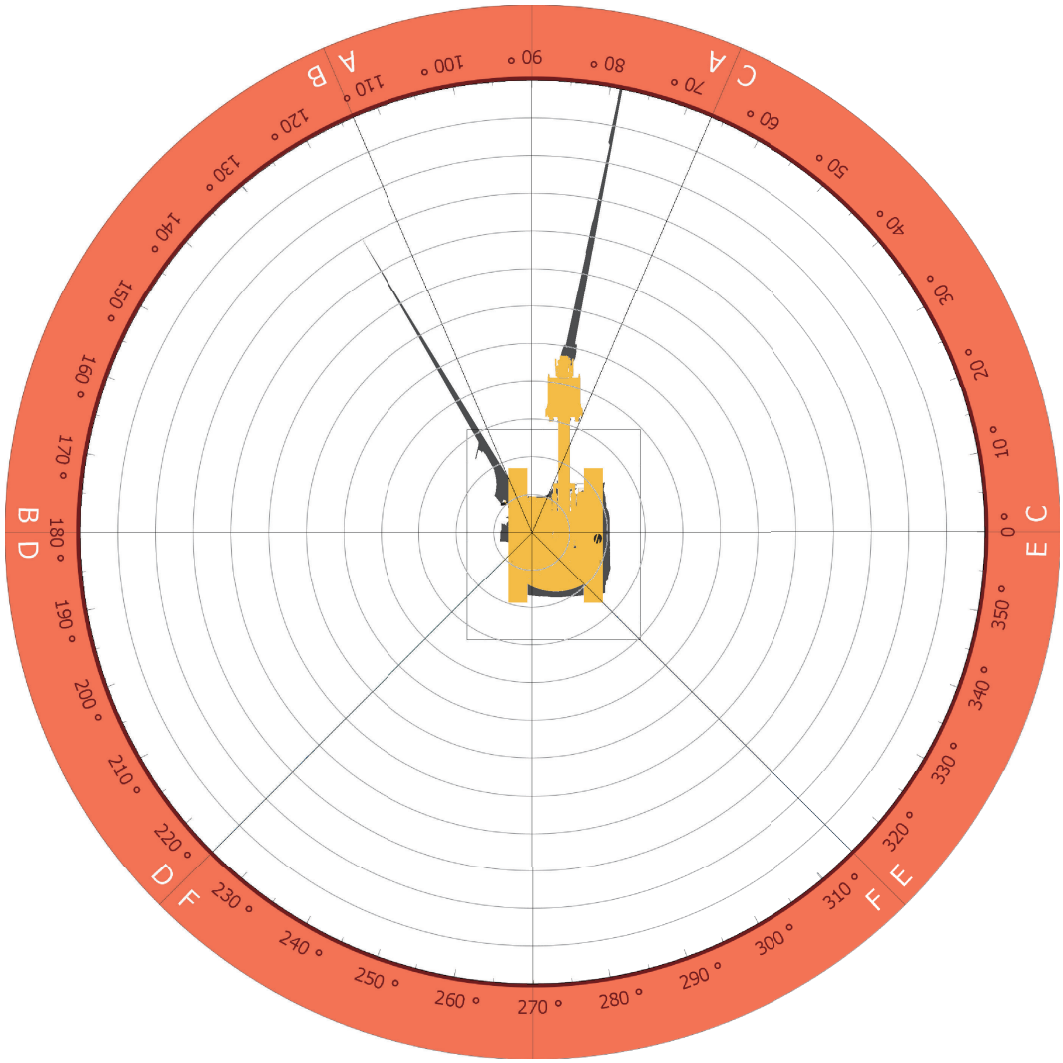
- **During operation the movement of the work equipment (boom/arm) will affect the operator's field of vision. This will be strongly influenced by the type and dimension of any attachment that may be installed.**



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

Specification of visibility map

- Working equipment specification : 4600mm boom - 2500mm arm
- Machine Posture: In accordance with ISO5006
- Evaluation height : 1.2m above the ground
- Scale-interval of the circles is 1m.



Protective structures

This machine has a structure to protect the operator (ROPS) which conforms to ISO12117-2: 2008.

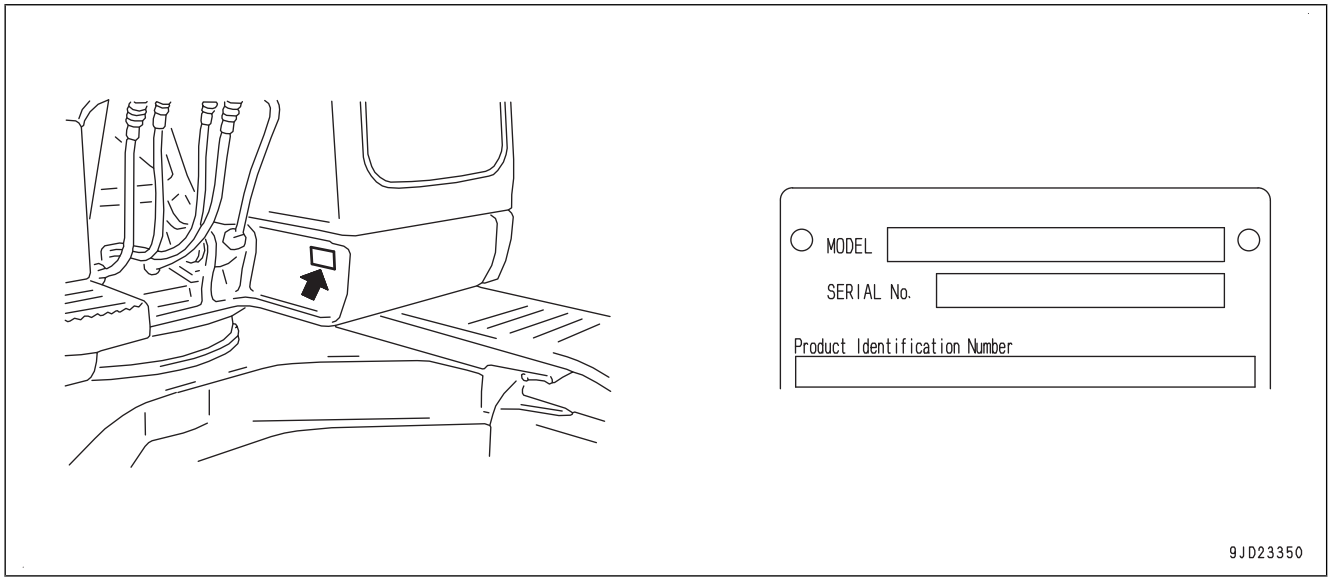
MACHINE INFORMATION

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

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

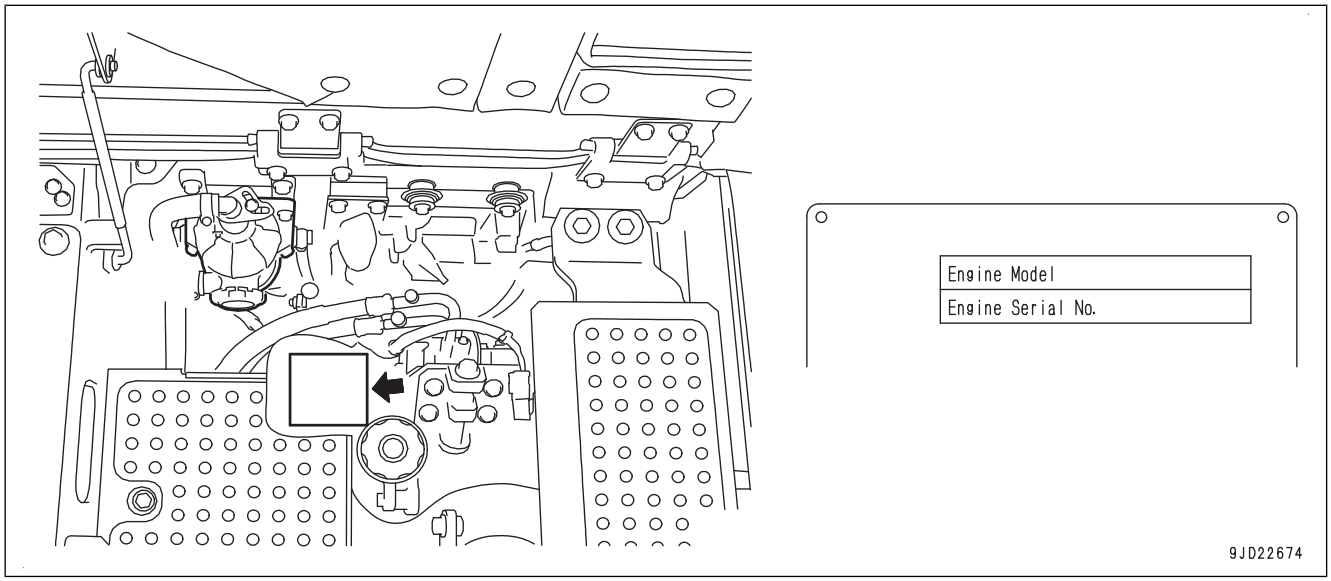
The nameplate is located at the position on the figure.

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



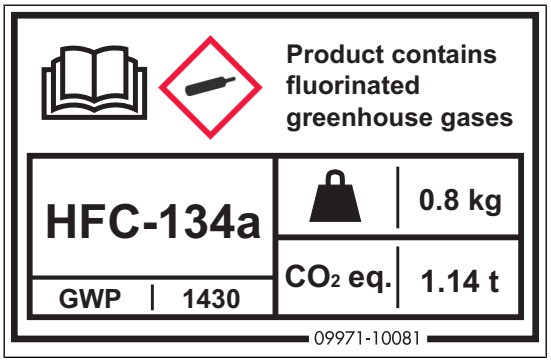
LOCATION OF ENGINE NUMBER PLATE

The nameplate is located at the position on the figure.



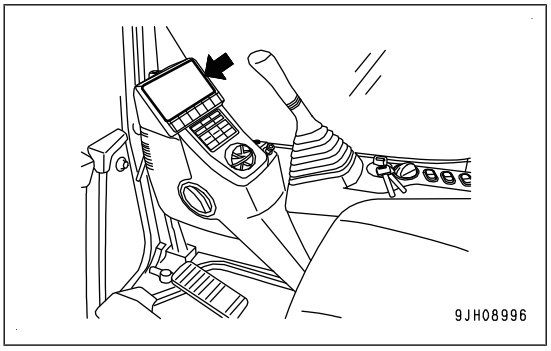
FLUORINATED GREENHOUSE GASES

Product contains fluorinated greenhouse gases.



SERVICE METER LOCATION

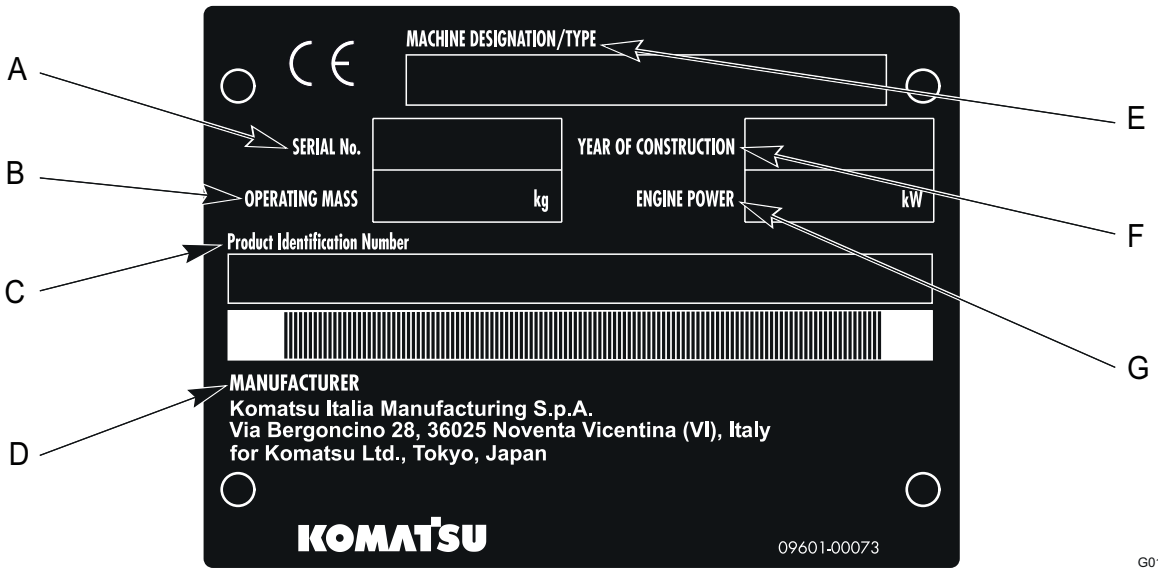
The service meter is shown on the machine monitor.



YOUR MACHINE SERIAL NUMBERS AND DISTRIBUTOR

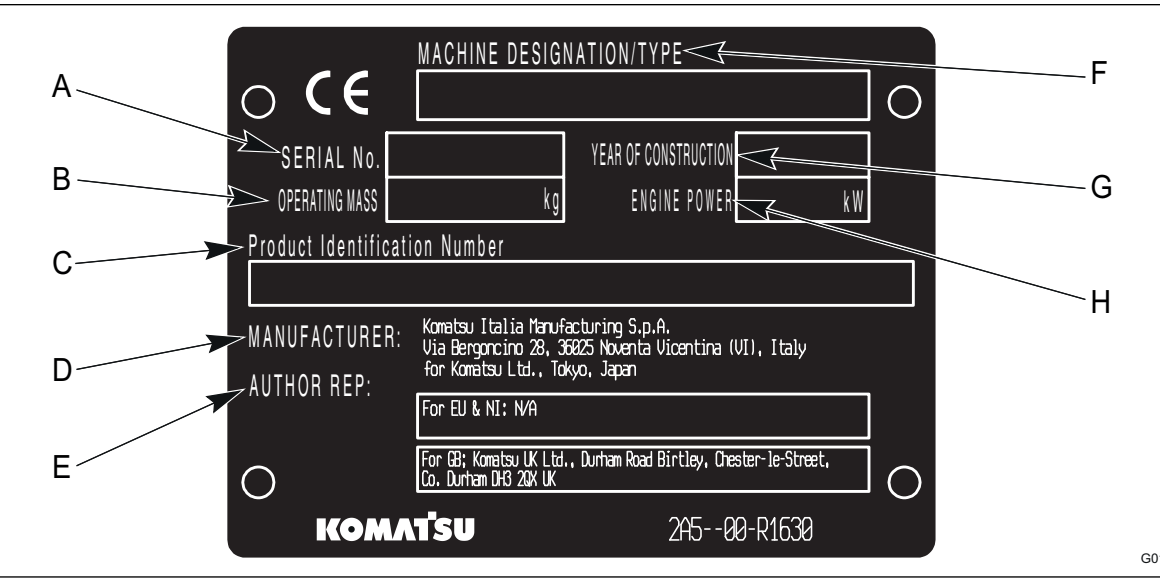
Machine serial No.	
Engine serial No.	
Product identification number (PIN)	
Manufactures name	Komatsu Italia Manufacturing S.p.A. via Bergoncino, 28 36025 Noventa Vicentina (VI) - Italy
Authorised representative for GB	KOMATSU UK Ltd Durham Road Birtley Chester-le-Street County Durham DH3 2QX United Kingdom
Distributor name	
Address	
Phone	
Service personnel	

SERIAL PLATE



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

Alternative serial plate



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

DECLARATION OF CONFORMITY

The Manufacturer:	Authorised representative for GB:
Komatsu Italia Manufacturing S.p.A. via Bergoncino, 28 36025 Noventa Vicentina (VI) - Italy	KOMATSU UK Ltd Durham Road Birtley Chester-le-Street County Durham DH3 2QX United Kingdom

Declares that the machine:

PC138US-11E0

Fulfils all the relevant provisions of following EC Directives:

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

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

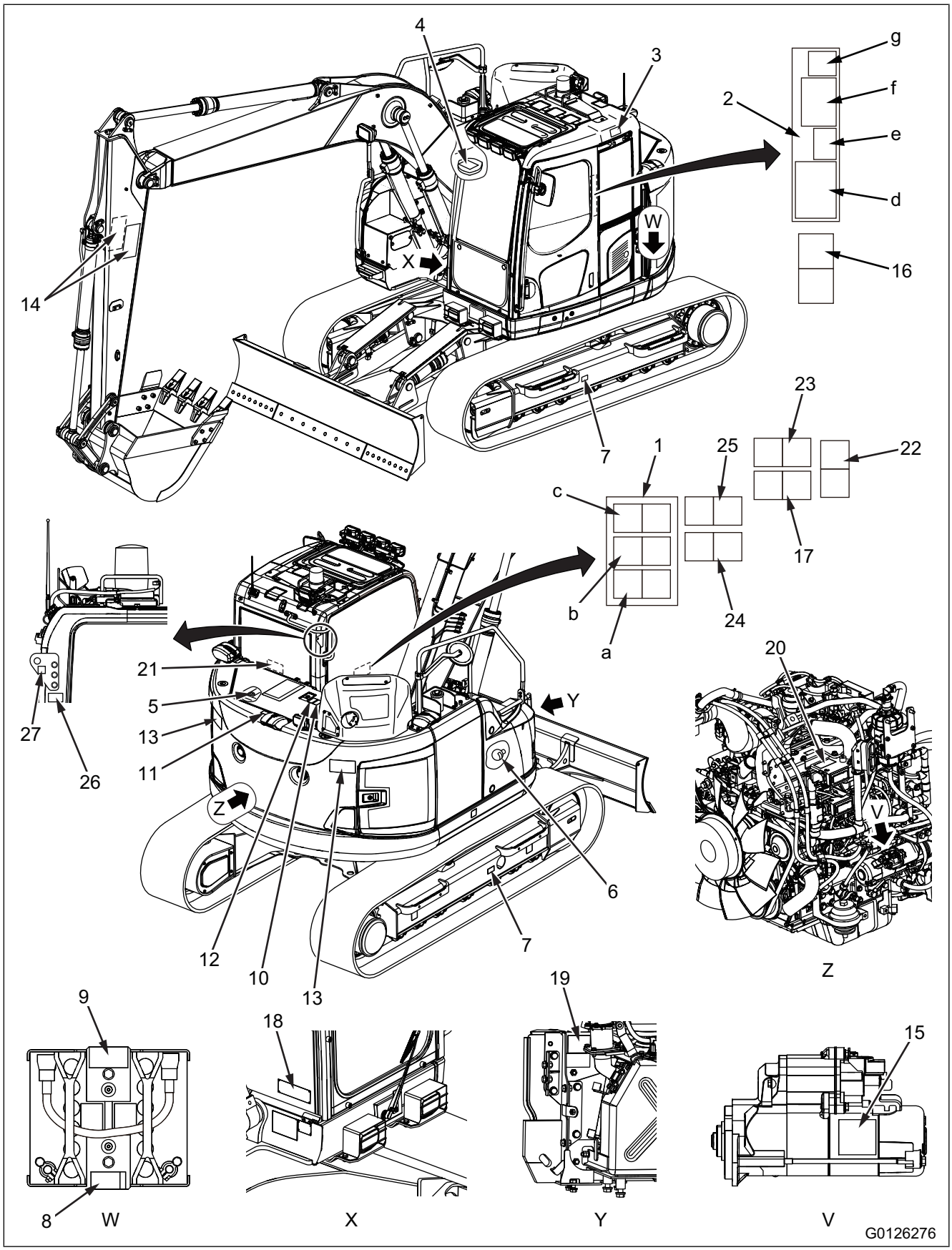
Abbreviation	Actual word spelled out	Explanation
API	American Petroleum Institute	API is the abbreviation for American Petroleum Institute.
BOC	Bolt-On Cutting edge	BOC is a cutting edge that is attached with bolts to the bucket.
CAN	Controller Area Network	CAN is one of networks that communicate between 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.
TOPS	Tip-Over Protectuive Structure	TOPS is a protection structure that protects operators in the event of a machine tip-over.

SAFETY

⚠ WARNING

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

LOCATION OF SAFETY LABELS



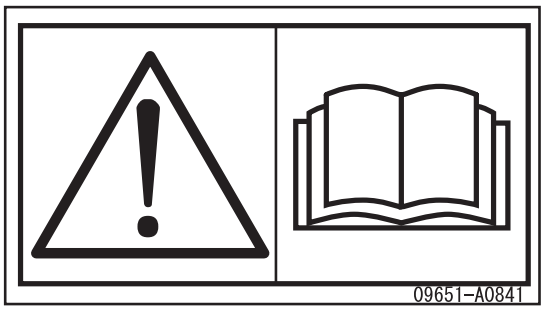
CONTENTS OF SAFETY LABELS

1. Caution for operation, inspection and maintenance, caution when leaving operator's seat, caution for electric cables
   Safety labels that follow are integrated sticker. Make a request with 22B-00-21220 for replacement.

   (A) Caution for operation, inspection and maintenance

   Part number: 09651-A0841

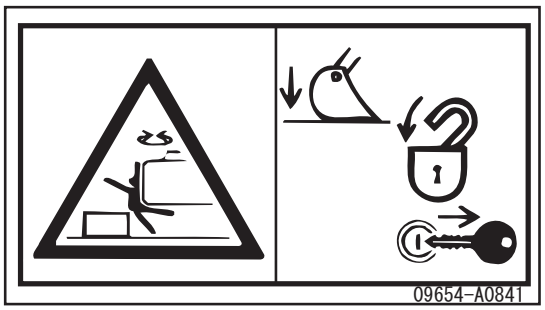
   - Warning!
   - Read manual before operation, maintenance, disassembly, assembly and transportation.



   (B) Caution when leaving operator's seat

   Part number: 09654-A0841

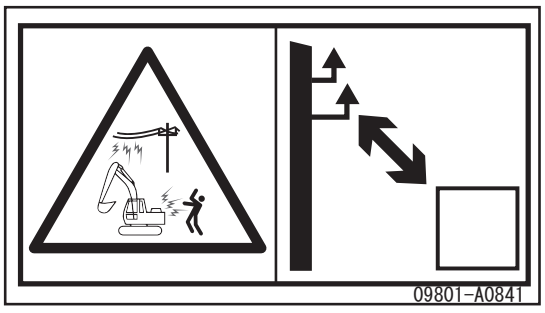
   - Sign indicates a hazard of being caused or run over by unexpected moving of stopped machine.
   - Lower the work equipment to ground, move the lock lever to LOCK position and take key with you before leaving machine.



   (C) Caution for electric cables

   Part number: 09801-A0841

   - Sign indicates an electrocution hazard if machine is brought too near electric power lines.
   - Keep a safe distance from electric power lines.



2. Caution for operation, inspection and maintenance, caution when leaving operator's seat, caution for electric cables
   Safety labels that follow are integrated sticker. Make a request with 22B-00-41710 for replacement.

   (D) Caution before operating

   Part number: 09802-A0880

   - Sign indicates a hazard of swinging and advancing behind. To prevent SEVERE INJURY or DEATH, do the following before moving machine or its attachments:
     - Honk horn to alert people nearby.
     - Be sure no one is on or near machine.
     - Rotate upper structure for full view of travel path if it can be done safely.
     - Use watcher if view is obstructed.

     Follow above even if machine equipped with travel alarm, mirrors and rear view camera.

(E) Caution when opening or closing front window

Part number: 09839-A0481

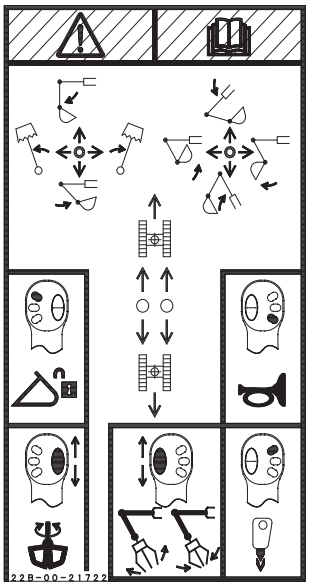
Accidental contact with control levers may cause unintended machine movement resulting in injury or death. Always lower the attachments to ground, set the lock lever to LOCK position and stop engine before:

- Opening or closing front window, ceiling window or door.
- Attaching or detaching lower window.
- Adjusting seat position.
- Standing up from seat.

(F) Control lever operational function

Part number: 22B-00-21722

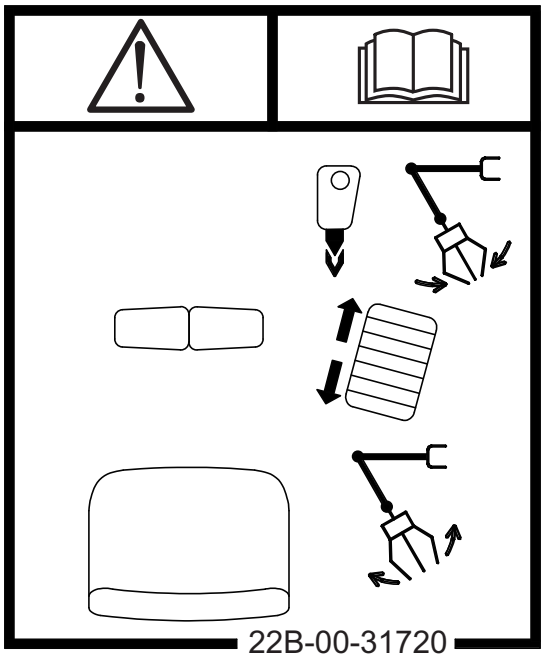
In order to prevent an accident resulting in injury or death caused by error-operation, confirm the machine motion and indicated operating pattern, when operating machines. Pay attention to the circumference and operate slowly when confirming the machine motion.



(G) Attachment control pedal operational function

Part number: 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.



3. Caution when stowing front window

   Part number: 09803-A0481

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

4. Caution for high-temperature oil

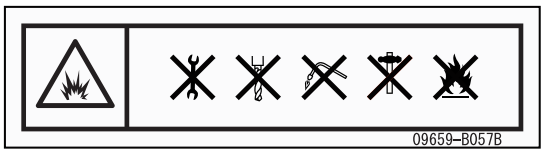
   Part number: 09653-B0481

   - 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.

5. Caution for handling gas spring

   Part number: 09659-B057B

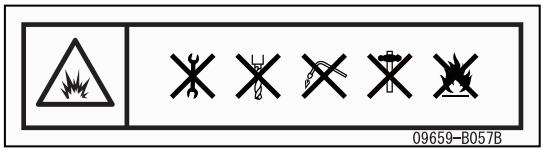
   - There is the hazard of explosion causing injury.
   - Do not disassemble the gas spring, make holes in it, weld it, cut it, hit it, roll it or bring it near flame.



6. Caution for handling accumulator

   Part number: 09659-B057B

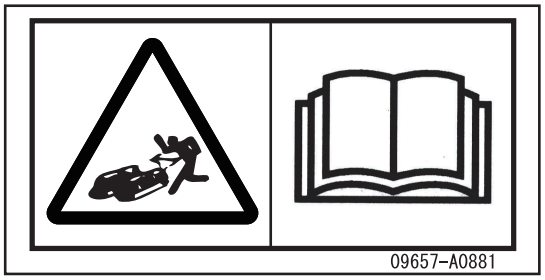
   - There is the hazard of explosion causing injury.
   - Do not disassemble the accumulator, make holes in it, weld it, cut it, hit it, roll it or bring it near flame.



7. Caution for adjusting track tension

   Part number: 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.



8. Caution for handling battery
   Part number: 09664-60001

- Never smoke or use any naked flame near the batteries, no sparks.

- Always wear safety glasses when working with batteries.

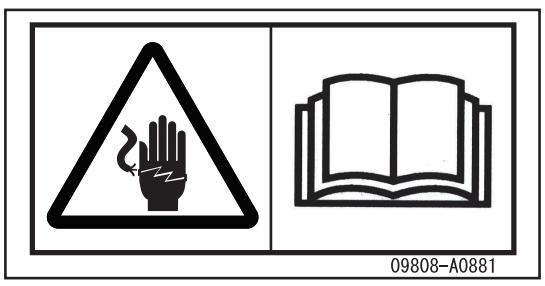
- Keep children away from batteries.

- Caution battery acid.

- Read the operator's manual before working with batteries.

- Caution - explosive gases.

9. Caution for handling cable
   Part number: 09808-A0881
   - Sign indicates an electric shock hazard from handling the cable.
   - Read manual for safe and proper handling.



10. Caution for not getting on engine hood

    Part number: 09805-D0481

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

11. Caution for not getting on counterweight

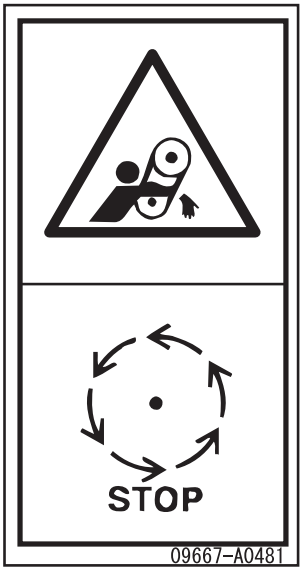
    Part number: 09805-A0481

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

12. Caution for rotating parts when you check and maintenance

    Part number: 09667-A0481

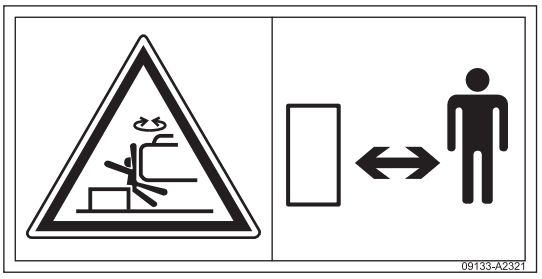
    - Sign indicates a hazard of rotating parts, such as belt.
    - Turn off before inspection and maintenance.



13. Prohibition of entering into swing range

Part number: 09133-A2321

- Sign indicates a crush hazard by rotation of upper structure of the machine.
- Keep away from swinging area of the machine.



14. Caution for nearing machine

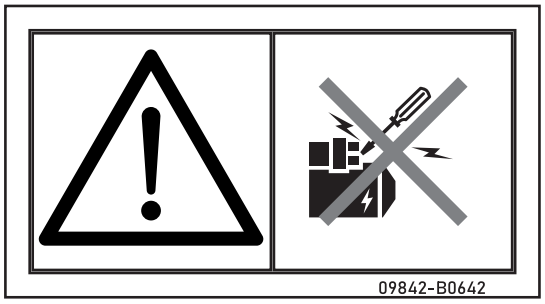
Part number: 09134-A1681

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

15. Prohibition of start by short-circuiting

Part number: 09842-B0642

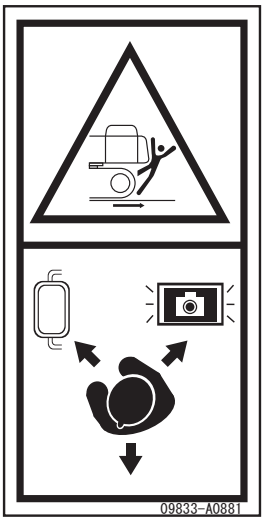
- Start the engine only while sitting on the operator's seat.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious personal injury or fire.



16. Caution when swinging and traveling in reverse

Part number: 09833-A0881

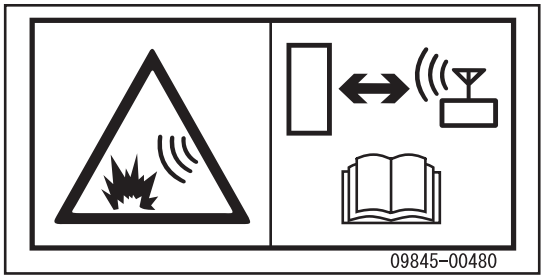
- When swinging or backing up excavator, press button to change display mode on monitor so you can see rear and side of machine.
  Before moving, look around and at mirror and monitor to confirm that no one is around the machine. Failure to do so can result in serious injury or death.



17. Caution for blast site

    Part number: 09845-00480

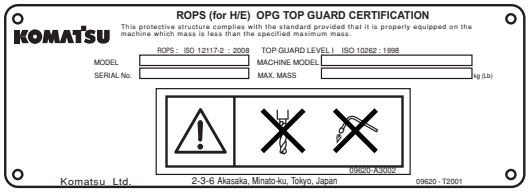
    - Sign indicates an explosion hazard caused by active radio transmitter at a blast site.
    - Keep machine at a safe distance from a blast site and detonator.



18. Caution for handling ROPS

    Part number: 09620-T2001, 09620-A3002

    - If some modification is applied to the ROPS or FOPS, it may affect the strength and may not be comply with the standard. Consult Komatsu Distributor before altering.

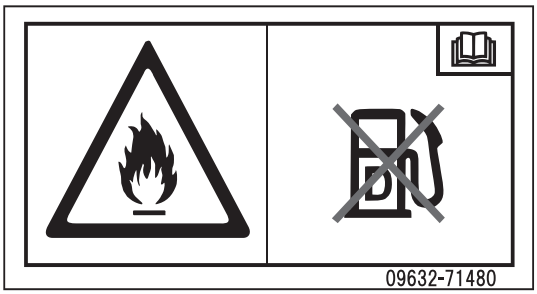


    - ROPS or FOPS may provide less protection if it has been structurally damaged or involved roll-over. Consult Komatsu Distributor in that case.
    - Always wear seat belt when moving.

19. Caution for handling DEF

    Part number: 09632-71480

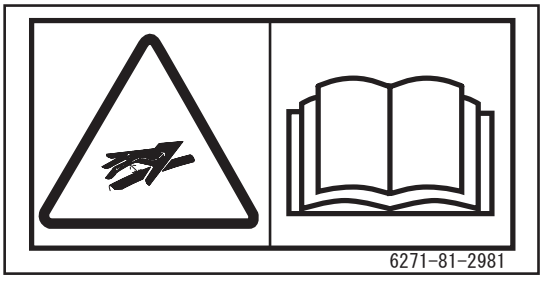
    - DEF only.
      To avoid engine damage or fire, fill with DEF only.
    - Never use diesel fuel.



20. Caution for high-pressure fuel

    Part number: 6271-81-2981

    - Do not open high pressure fuel system with engine running. Engine operation causes high fuel pressure.
    - High pressure fuel spray can cause serious injury or death.



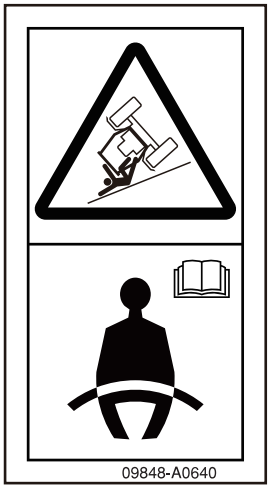
21. Emergency escape

    Part number: 09844-10050

22. Caution for using seat belt

Part number: 09848-A0640

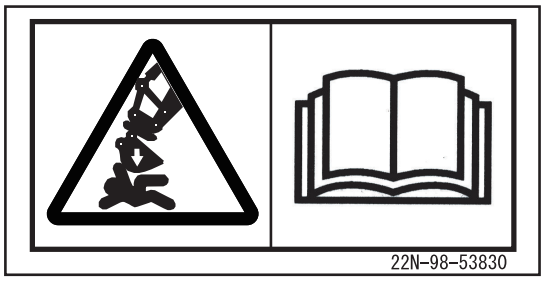
- Always use seat belt when operating the machine to reduce risk of injury or death in case of a roll-over.
- Always check for damage or wear of the seat belt, damage of the connecting brackets, and tightness of bolts.
- Adjust seat position to allow full brake pedal travel with operator's back against 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.



23. Caution for handling quick coupler

Machines with quick coupler
Part number: 22N-98-53830

- Sign indicates a hazard from falling off of working device.
- Read manual for safe and proper handling.

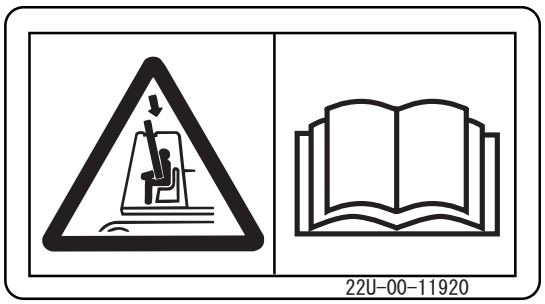


24. Prohibition of getting on or off machine during travel

Part number: 22U-00-11910

25. Caution against falling objects

Part number: 22U-00-11920



26. Anchor point for tie-off

    Part number: 09850-00641
    Anchor point for personal fall-arrest equipment

27. Prohibition of lifting operation

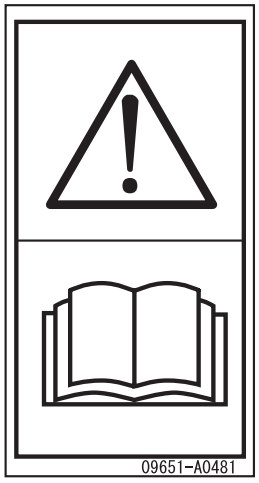
    Part number: 09951-00281

OTHER LABELS

- Caution before operation, inspection and maintenance

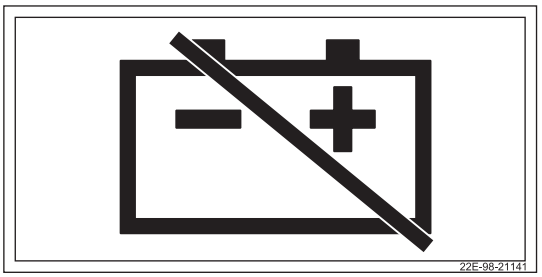
  Part number: 09651-A0481

  - Warning!
  - Read manual before operation, maintenance, disassembly, assembly and transportation.



- Location of battery

  Part number: 22E-98-21141



- Radiator cap

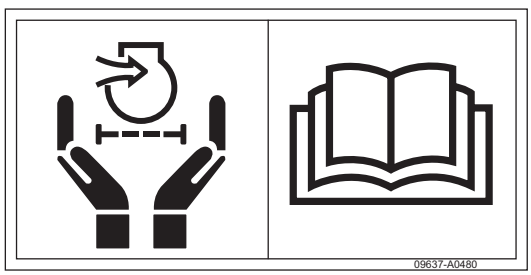
  Part number: 22B-00-41440

  - Sign indicates a burn hazard from spurting hot water or oil if radiator or hydraulic tank is uncapped while hot.
  - Allow radiator or hydraulic tank to cool before removing cap.

G0139578

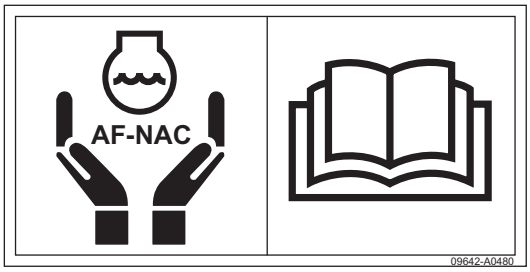
- Air filter

  Part number: 09637-A0480



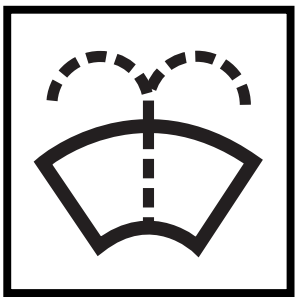
G0120083

- AF-NAC engine coolant
  Part number: 09642-A0480



G0110222

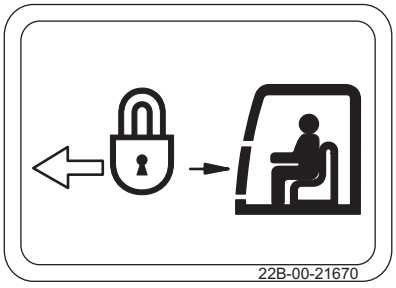
- Washer tank
  Part number: 22B-00-11340



G0120088

- Lock front window
  Part number: 22B-00-21670

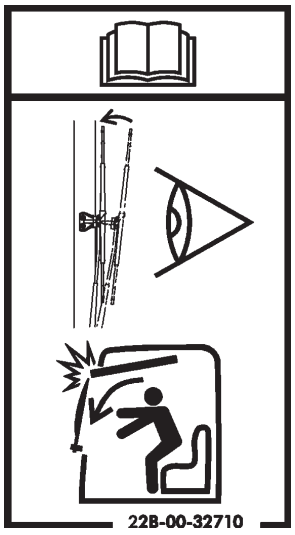
For details, see “OPEN AND CLOSE CAB FRONT WINDOW (3-104)”.



G0139584

- Correct position for wiper blade
  Part number: 22B-00-32710

For details, see “OPEN AND CLOSE CAB FRONT WINDOW (3-104)”.

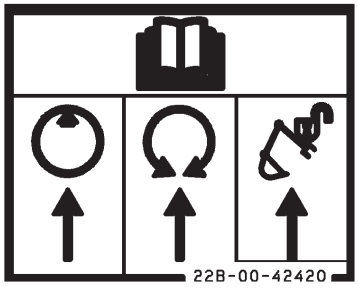


G0120079

- Pump secondary drive switch, swing parking brake cancel switch and lock lever lock cancel switch

  Part number: 22B-00-42420

For details, see “PUMP SECONDARY DRIVE SWITCH (3-94)”, “SWING PARKING BRAKE CANCEL SWITCH (3-94)” and “LOCK LEVER AUTOMATIC LOCK CANCEL SWITCH (3-94)”.

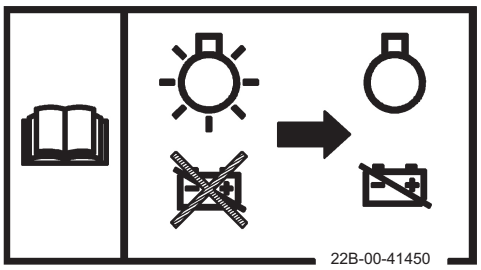


G0120091

- System operating lamp

  Part number: 22B-00-41450

For details, see “BATTERY DISCONNECT SWITCH (3-118)” and SYSTEM OPERATING LAMP (3-120).

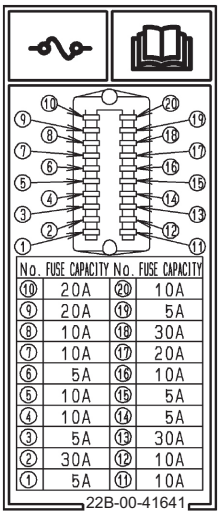


G0139570

- Fuse box label

  Part number: 22B-00-41461

For details, see “FUSE (3-115)”.

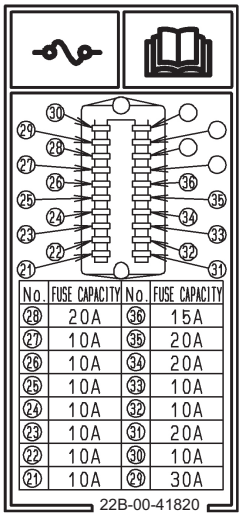


G0139586

- Fuse box label

  Part number: 22B-00-41820

For details, see “FUSE (3-115)”.

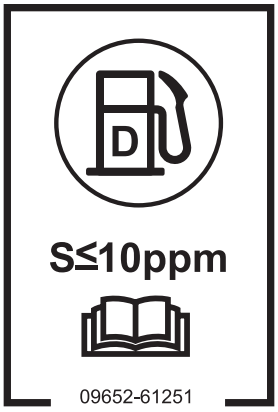


G0139585

- Use ultra low-sulfur diesel fuel

  Part number: 09652-61251

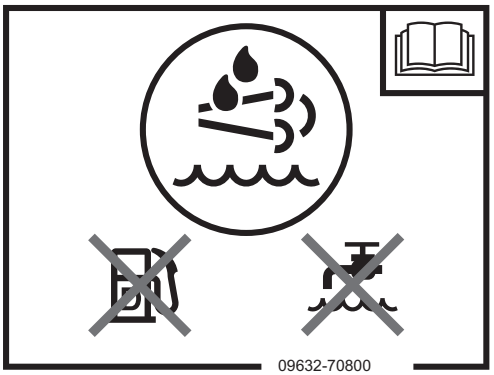
For details, see “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)”.



- Use only DEF. Do not add water or fuel into the DEF tank.

  Part number: 09632-70800

For details, see “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)”.

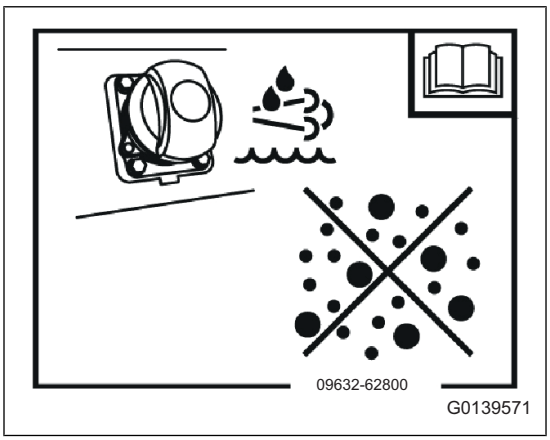


G0139579

- Pay attention not ot enter dust and dirt into DEF tank

  Part number: 09632-62800

For details, see “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)”.



G0139571

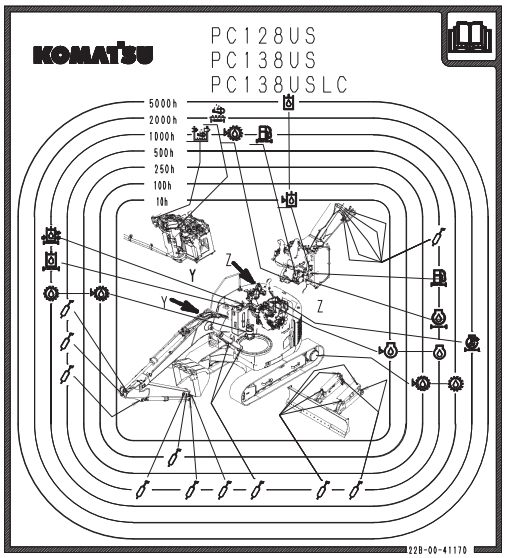
- Do not pour water to the inside air filter

  Part number: 22B-00-41430

G0139582

- Lubrication chart
  Part number: 22B-00-41170

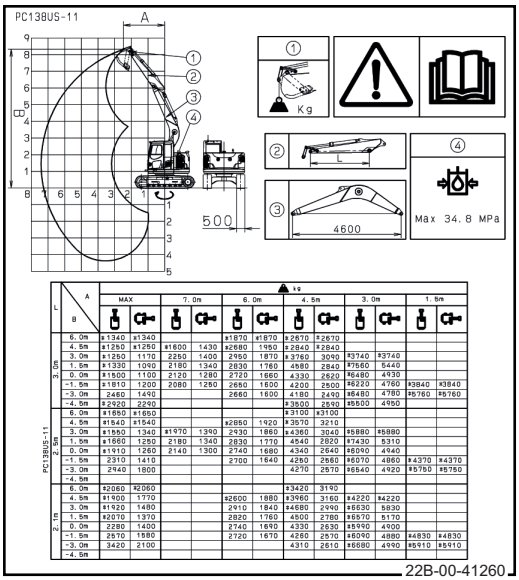
For details, see “LUBRICATION CHART (7-6)”.



G0139583

- Lift capacity chart
  Part number: 22B-00-41260

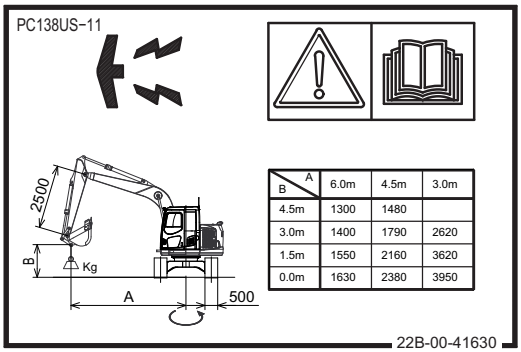
For details, see “”.



G0139580

- Overload capacity chart
  Part number: 22B-00-41630

For details, see “”.

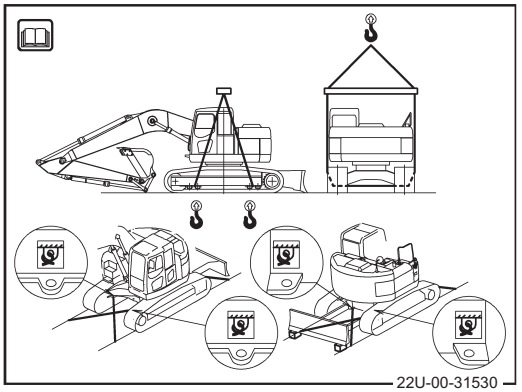


B \ A	6.0m	4.5m	3.0m
4.5m	1300	1480	
3.0m	1400	1790	2620
1.5m	1550	2160	3620
0.0m	1630	2380	3950

G0141272

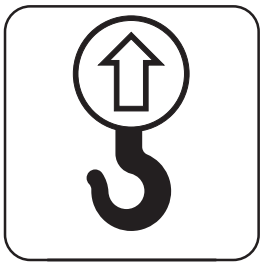
- Lifting and fastening instructions for transport
  Part number: 22U-00-31530

For details, see “TRANSPORTATION (3-269)”.



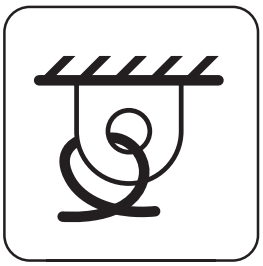
G0139587

- Lifting points
  Part number: 09960-00801



G0110197

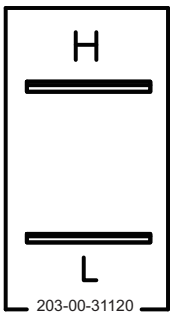
- Fastening points
  Part number: 09960-00802



G0110198

- Oil level
  Part number: 203-00-31120

For details, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (3-155)”.



G0139581

Blade specification

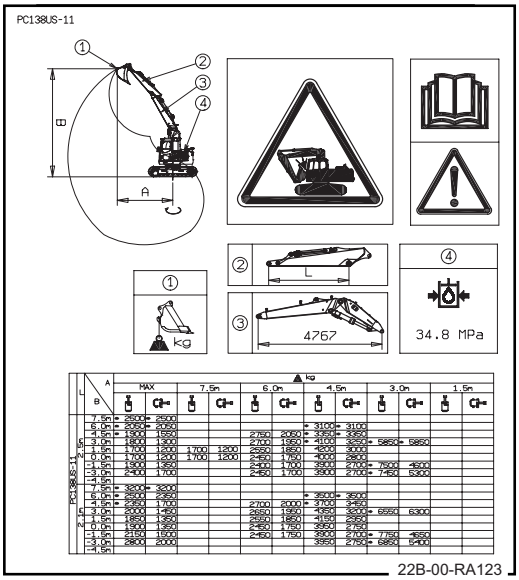
- Blade operation
  Part number: 201-00-61320

G0120082

2-piece boom specification

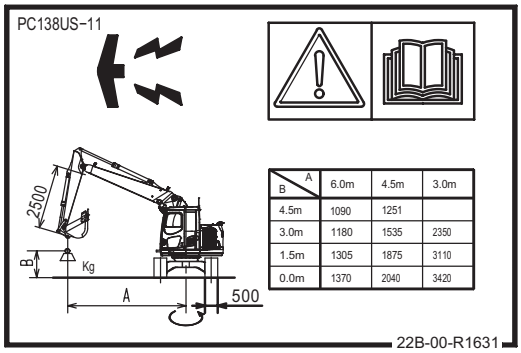
For details, see “HANDLE 2-PIECE BOOM (6-6)”.

- Lift capacity chart
  Part number: 22B-00-RA123



G0139684

- Overload capacity chart
  Part number: 22B-00-R1631



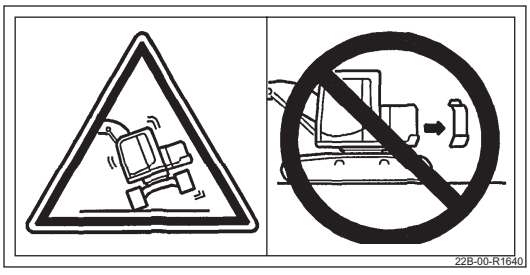
A / B	6.0m	4.5m	3.0m
4.5m	1090	1251	
3.0m	1180	1535	2350
1.5m	1305	1875	3110
0.0m	1370	2040	3420

G0139685

Super Long Front specification

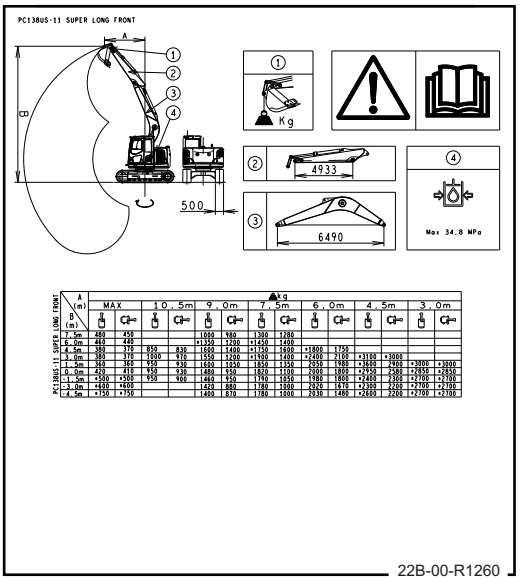
For details, see “SUPER LONG FRONT BOOM AND ARM (6-18)”.

- Prohibition of removing counterweight
  Part number: 22P-00-11350
  - Sign indicates a hazard from tipping.
  - Do not remove the counterweight.



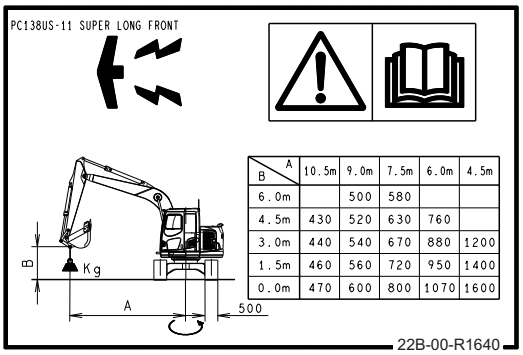
G0139688

- Lift capacity chart
  Part number: 22B-00-RA123



G0139686

- Overload capacity chart
  Part number: 22B-00-R1631



B \ A	10.5m	9.0m	7.5m	6.0m	4.5m
6.0m		500	580		
4.5m	430	520	630	760	
3.0m	440	540	670	880	1200
1.5m	460	560	720	950	1400
0.0m	470	600	800	1070	1600

G0139687

GENERAL PRECAUTIONS COMMON TO OPERATION AND MAINTENANCE

Incorrect operation, inspection and maintenance can cause serious personal injury or death. Read the description of the safety signs in this manual and on the machine before you do operation and maintenance, and obey the precautions.

PRECAUTIONS BEFORE STARTING OPERATION

Ensure safe operation

- Only the trained and authorized persons can operate this machine.
- When an authorized person do operation, inspection, and maintenance of the machine, make sure to follow all safety precautions and procedures described in this manual.
- Do not operate the machine if the operator is unwell, or under the influence of a medicine (which causes drowsiness), or alcohol, or has a mental issue.
- When the work is to be done with multiple workers or when a signalman is provided, make sure to share the details of the work and work under the prescribed signs.

Understand the machine

Before you operate the machine, read this manual fully. If there is a content that you do not understand in this manual, consult the safety personnel.

PREPARATIONS FOR SAFE OPERATION

Precautions for safety-related equipment

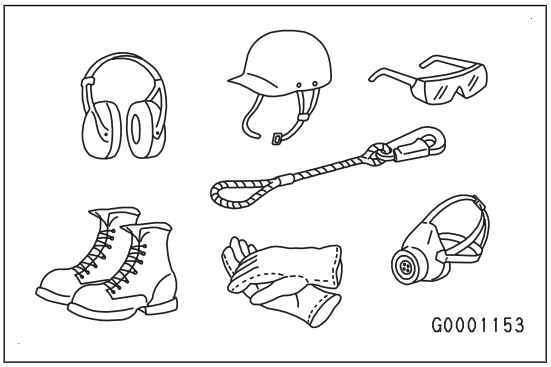
- Make sure that all protective guards, covers, cameras and mirrors are correctly installed. If it is damaged, repair it.
- Fully understand how to use the safety devices.
- Do not remove safety devices, and manage them always to get the correct function.

Inspect machine

Check the machine before you start the machine operation. If a problem is found, do not operate the machine until repairs of the problem is completed.

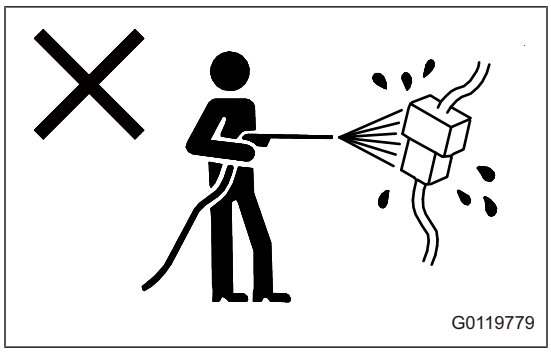
Wear well-fitting clothes and protective equipment

- Do not wear loose clothes and accessories. It can be hooked by the control lever and protrusion part, and there is a danger that the machine moves unexpectedly.
- Be sure to wear a hard hat and safety shoes. Wear the protective equipment like protective eyeglasses, masks, gloves, ear plugs, and safety belt by the content of work.
- There is a danger that long hair sticks out of your helmet and get caught in the machine. Tie it up not to get caught.
- Check the function of each protective equipment before use.



Keep machine clean

- If sand, soil, oil or grease is attached to the machine, your foot slips when you get on or off the machine and when you do inspection or maintenance of the machine. Wipe off sand, soil, oil, or grease attached to the machine always to keep the machine clean.
- If water directly gets on the engine, the engine can have failure. When you clean the machine with water or steam, be careful not to spray water directly onto the engine.



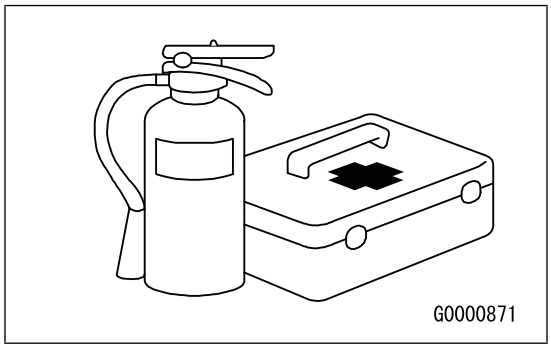
- If water gets in the electrical system, electric devices can have a malfunction and it can cause a failure of machine. There is a danger that causes serious personal injury or death if the machine moves unexpectedly by a malfunction. When you clean the machine with water or steam, be careful not to spray water directly onto the electric devices.
- There is a danger that splashed high pressurized water damages the camera. Be careful that high pressurized water is not splashed on it directly. When you clean the camera, wipe off dirt with soft cloth.
- If you stand on an unbalanced footing or you are in an unbalanced posture when you clean the camera, you can fall and be injured. Put a stepladder or step on the level and firm ground, and adjust the camera in a stable balance.

Precautions for inside operator's compartment

- Before you go in the operator's compartment, remove the mud or oil or grease from your shoes.
  If you operate pedals with mud or oil or grease attached to your shoes, your foot slips and that can cause an accident.
- Do not let the parts and tools remain in the operator's compartment. If the parts and tools enter the operation devices, it prevents the operation and the machine moves unexpectedly, and there is a danger that causes serious personal injury or death.
- Do not install a suction cup on the window glasses. Suction cup can work as a lens, and it can cause fire.
- Do not use a mobile phone when you drive the machine or you operate the machine. This can lead to mistakes in operation, and cause serious personal injury or death.
- Do not get the dangerous objects such as flammable or explosive materials into the operator's compartment.

Provide fire extinguisher and first aid kit

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



- To prepare for the possibility of fires, check the location of the fire extinguisher and get full knowledge of its use.
- Regularly do inspection and maintenance of the fire extinguisher.
- Decide where to store the first aid kit. Check it regularly and add items if necessary.

Report immediately if a problem is found

If you notice abnormality (sound, vibration, smell, instrument malfunction, smoke, oil leakage, and warning device or error display on the monitor) in the machine while you do operation, inspection, or maintenance of the machine, immediately report the responsible person, and take appropriate measures. Do not operate the machine until the problem is corrected.

ACTIONS IF FIRE OCCURS

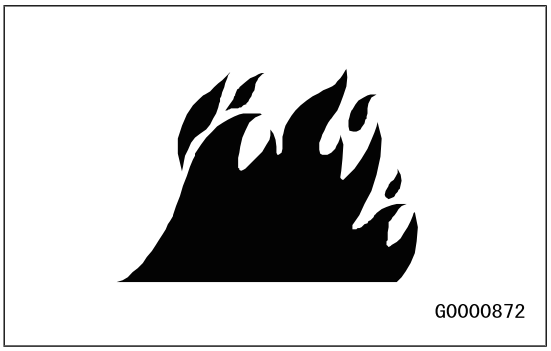
- Turn the starting switch to the OFF position to stop the engine.
- Use the handrails and steps to escape from the machine.
- Do not jump down from the machine. There is a danger that causes serious personal injury by fall.
- The combustion gas during a fire contains harmful materials which have a bad influence on your body.
  Do not breathe or inhale the combustion gas.
- In the unburned remaining left after a fire is extinguished, harmful compounds generated by the fire remains in some cases, and direct contact with skin has a bad effect to the human body.

Wear rubber gloves always when you handle unburned remaining.
Chloroprene rubber (neoprene rubber) or polyvinyl chloride (when the temperature is sufficiently low) is recommended for the material of the gloves.
If you use the cotton gloves, wear the rubber gloves below them.

PRECAUTIONS TO PREVENT FIRE

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

Do not let an open flame be near flammable substances such as fuel, oil, coolant, or window washer fluid. There is a danger that they catch fire. Obey the items that follow.



- Do not smoke or use flame near fuel or other flammable substances.
- Shut down the engine before you add fuel.
- While fuel or oil is added to the machine, stay near the machine.
- 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 you add fuel or oil, wipe up the spilled fuel or oil.
- Put the greasy rags and other flammable materials into a safe container and store it.
- When you wash the parts with oil, use a non-flammable oil. Do not use the diesel fuel or gasoline. There is danger that they catch fire.
- Do not weld or use a cutting torch to cut the pipes or tubes that contain flammable liquids.
- Keep the oil and fuel in the well-ventilated and the specified area and keep unauthorized persons away from there.
- Before you do the machine grinding or welding work, move the flammable materials to a safe area.

Fire caused by accumulated flammable objects

- Remove dry leaves, chips, pieces of paper, coal dust, or other flammable materials accumulated or stuck around the engine exhaust manifold, exhaust pipe, or battery, or on the inside of the undercovers.
- To prevent fires caused by sparks or burned particles from other fires, remove flammable materials such as dry leaves, chips, coal dust, or other flammable materials accumulated or stuck around the cooling system (radiator, oil cooler) or inside of the undercover.

Fire caused by electric wiring

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

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

Fire from pipings

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

If they are loose, they can vibrate during operation and rub against other parts. This could lead to damage to the hoses and the high-pressure oil could spurt out. It can cause a fire and personal injury.

Explosion caused by light

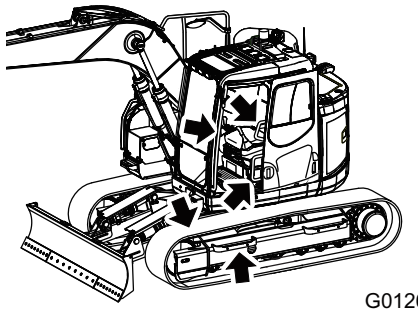
When you check the level of fuel, oil, battery electrolyte, or coolant, use the lighting which does not cause an explosion by vapor.

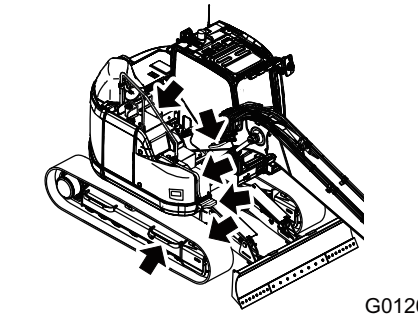
PRECAUTIONS WHEN YOU GET ON OR OFF MACHINE

Use handrails and steps when you get on or off machine

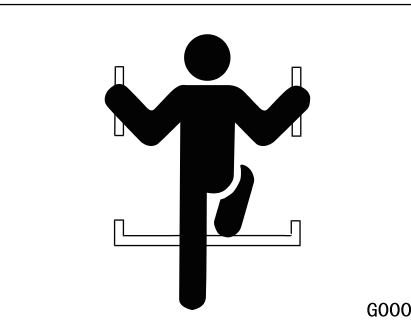
To prevent personal injury caused by slipping or falling off the machine, obey the items that follow.

- Use the handrails and steps marked by arrows in the figure when you get on or off the machine.


G0126282


G0126283

- Always face to the machine, and keep 3 points or more contact by your hands and feet (two feet and one hand, or two hands and one foot) with the handrails and the steps, to support yourself.
- Before you get on and off the machine, check the handrails and steps if there is no oil, grease, or mud on them. If it is found, wipe it off immediately not to slip. If there is a loose bolt on the handrail and step, tighten it.
  If the handrails and steps are damaged or deformed, they need to be repaired immediately. Consult your Komatsu distributor.


G0000874

- Do not hold the control levers or lock levers when you get on or off the machine. When you get on or off the machine, be careful that your body or clothes do not touch the levers.
- Do not climb on the engine hood or covers where there are no non-slip pads.
- Do not get on or off the machine with tools in your hand.

No jumping on or off machine

There is a danger that causes serious personal injury or death if you get on or off the moving machine. Obey the items that follow.

- Do not jump onto the machine or jump down from it. Do not get on the machine or get off from it while it is moving.
- Even if the machine starts moving while nobody is on board, avoid jumping onto the machine to stop it.

Lifting of personnel prohibited

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

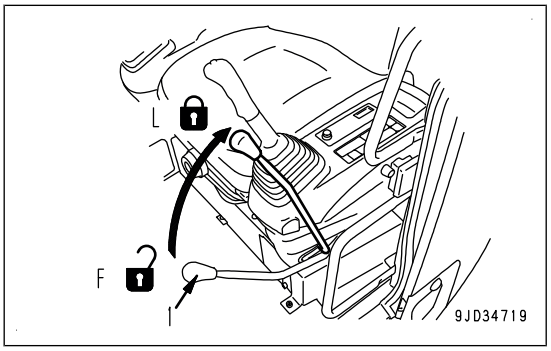
No people on work equipment or attachments

Do not let a person stand on the work equipment or attachment. There is a danger of serious personal injury or death caused by such as falling down.

Precautions when you stand up from operator's seat

Before you stand up from the operator's seat, such as when you open or close the front window or ceiling window, or when you remove or install the lower window, or when you adjust the position of the seat, always lower the work equipment to the ground, hold the red part on the top of the lock lever (1) to set it to the LOCK position (L), and stop the engine.

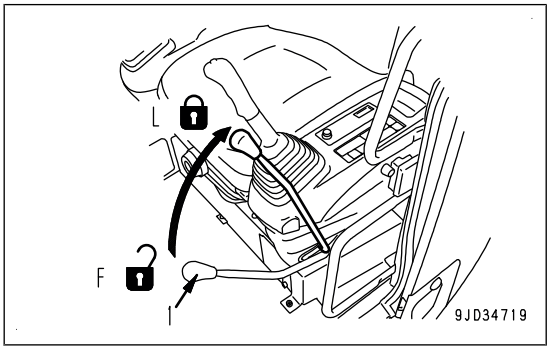
If you touch the control levers by mistake, there is a possibility that the machine suddenly moves and it could cause serious personal injury or death.

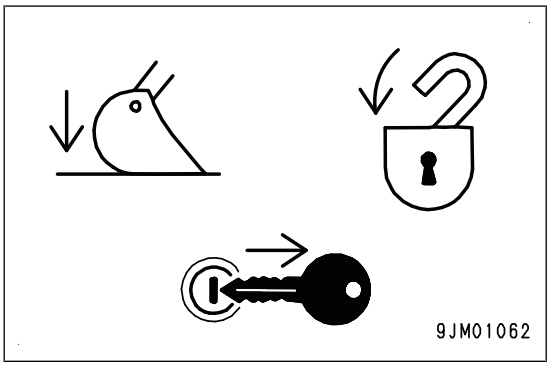


Precautions when you leave operator's seat

If the correct procedures are not done when you park the machine, the machine suddenly moves off by itself, and this can lead to serious personal injury or death. Obey the items that follow.

- When you go away from the machine, be sure to make the direction of undercarriage and upper structure the same, and lower the work equipment to the ground. Hold the red part on the top of the lock lever (1), securely operate it to the LOCK position (L), and stop the engine. Apply all the locks and be sure to take the key with you and keep it in the specified location.
- If the operator's seat and console are positioned at the front, your body or clothes will easily touch the levers. Move them rearward to keep a sufficient space, and then get off the machine.
- Apply all the locks and be sure to take the key with you and keep it in the specified location.





Emergency exit from operator's cab

- If you cannot open the door of the cab, use the hammer for emergency to break the window glass, and escape.
- When you escape, remove all the pieces of glass from the window frame. Be careful not to cut yourself on the glass. Not to slip on the broken pieces of glass, be careful of your footing.

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.

PRECAUTIONS FOR MACHINE AND JOBSITE

Do not get caught

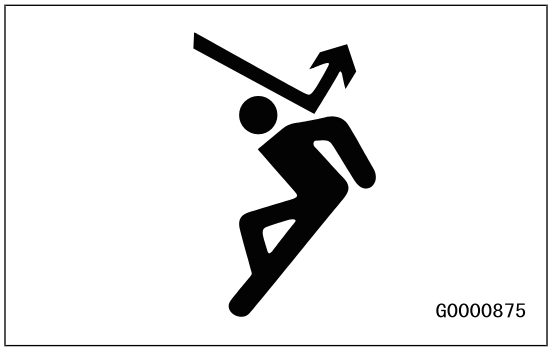
The clearance in the area around the work equipment changes by the movement of the link. There is a danger that causes serious personal injury or death if you get caught in it.

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

Precautions related to protective structures

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

ROPS function cannot be guaranteed when the guaranteed load (listed on the nameplate) of ROPS is exceeded. Do not modify the machine or install attachments that increase the weight which exceeds the guaranteed load.

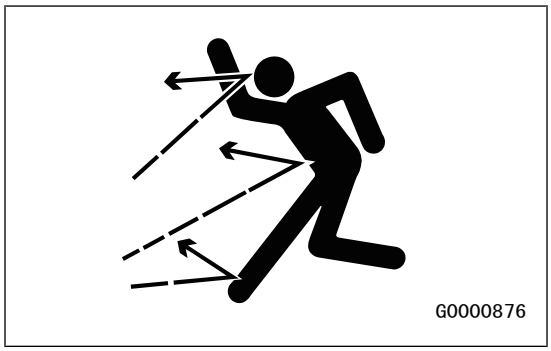


If the function of the structure to protect the operator is prevented, the operator is not protected and may be injured. Obey the items that follow.

- If the protective structure is fitted, do not operate the machine without the protective structure.
- If the protective structure is welded, or holes are drilled in it, or it is modified, its strength could be lowered. Do not do the modification.
- If the protective structures for operators are deformed by falling objects or due to tipping over of machine, the strength is reduced and the original performance cannot be maintained. In such case, be sure to consult your Komatsu distributor.
- Even if the protective structure is installed, it cannot be effective unless the seat belt is fastened correctly. Be sure to use the seat belt during the operation.

Protection against objects which fall, fly, or enter

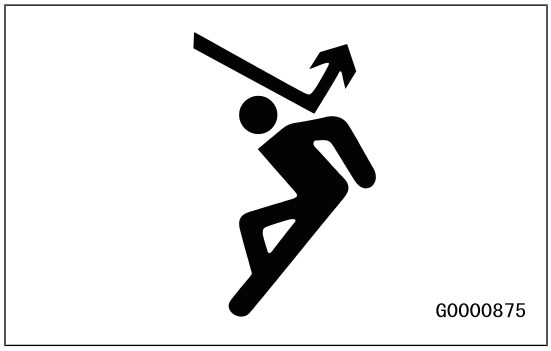
On the jobsite where the objects can fall or fly or come in to the operator's compartment, install the necessary equipment to protect the operator in response to the working conditions.



- When you work in an area where rocks can fall, such as in a mine or a quarry, be sure to install falling object protective structure (FOPS) and a front guard, and make sure to do operation with all windows and doors closed. Also, make sure that there is no person except the operator in the area where the objects which fall or fly can reach.
- When you do a demolition work or breaker work, make sure to install a front guard and do operation with all windows and doors closed. Also, make sure that there is no person except the operator in the area where the objects which fall or fly can reach.

The above is intended for standard work, and additional protective guard is required for situation of each site.

Do not operate the machine without the necessary protective guards. Make sure to consult your Komatsu distributor about the necessary protective guards before you start the work.



Unauthorized modification

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

- Consult your Komatsu distributor in advance because modification can cause a safety issue.

Precautions related to attachments and options

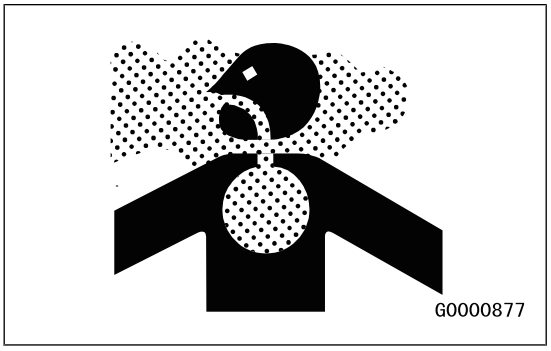
- We take no responsibility for personal injury, failure, or property damage caused from the use of attachments or options not authorized by us.
- Installation of an attachment or option can cause a safety and legal issue. Consult your Komatsu distributor in advance.
- Installation of an attachment shown in the install attachment combination table of this document does not exceed the guaranteed load of ROPS. If you attach an attachment other than the one described in this manual, there is a danger that the load can exceed the guaranteed load. Consult your Komatsu distributor.
- By the type or combination of attachment, the work equipment possibly hits the cab or other parts of the machine. If an interference with the machine occurs during operations, it can cause a serious personal injury or death. Before you use the attachment, check that it does not interfere with the machine. Use the attachment in the range it does not interfere.
- Make sure that you read the Operation Manual of the attachment and description related to the attachment and options shown in this Operation and Maintenance Manual.

Precautions for cab glass

- If the cab glass is broken, stop the work and repair it immediately.
- If the cab glass on the work equipment side is broken, there is a danger that the operator can be directly hit or caught in the work equipment. Immediately stop the work and replace the glass.
- The ceiling window is made of resin, so if it gets scratched, the visibility will be deteriorated and the risk to get cracked will increase. Replace the damaged ceiling windows with new ones as soon as possible. If you do not repair the scratch, there is a danger that causes injury when the soil and sand fall onto the ceiling window and break the ceiling window.

Precautions when you operate engine inside building

Exhaust gas from engine contains ingredients that can cause injury in your health or cause death. Start the engine and operate the machine in a well-ventilated area. If it is unavoidable to operate the engine or the machine indoors or in a poor-ventilated area, make sure to exhaust the engine exhaust gas and take in sufficient clean air.



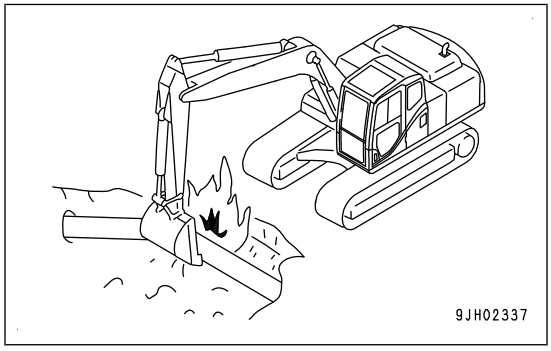
PRECAUTIONS FOR OPERATION

PRECAUTIONS FOR JOBSITE

Jobsite conditions - Investigate/Confirm

In the jobsite, there are many dangers that could cause serious personal injury or death. Before you start the work, check the items that follow to make sure that there is no danger on the jobsite.

- When you do the work near thatched roofs, dead leaves, dead grass, etc., be careful because they easily can cause a fire.
- Find out the terrain and ground condition at the jobsite, and decide the safe way of work. Do not do the work on the jobsite where there is a danger of landslides or falling rocks.
- If there seemed to be buried objects such as water pipes, gas pipes, high-voltage pipes, consult the management company, check the location, and make sure not to destroy these buried objects.
- Take measures to keep the unauthorized persons away from the jobsite.
- Especially when you do the work on a road, allocate a signalman or install the fences around the jobsite to protect the pedestrian and vehicles.
- When you drive the machine or do the work in shallow water or soft ground, inspect the depth of water, the speed of water flow, the ground and topographical conditions in advance to avoid areas where the travel can be impeded.



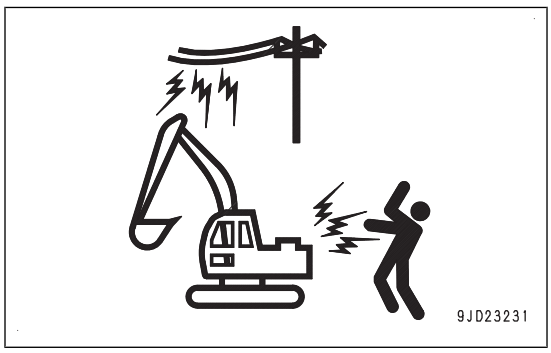
Precautions when you work on loose ground

- Do not travel or work on the cliffs, road shoulders or near deep trenches. There is a danger that the ground is loose. There is a danger that the ground collapses because of weight and vibration of the machine and the machine tips over or fall. In particular after rain, earthquake, or blasting, be careful because the ground collapses easily.
- There is a danger that the ground collapses on the embankment or near the excavated trench because of weight and vibration of the machine. Before you start work, take measures to keep the ground safe and to prevent the machine not to tip over or fall.

Do not go close to high-voltage cables

Do not move the machine or do the work near electric cables. There is a danger of serious personal injury or death by an electric shock. In the jobsite where the machine can come into contact with the electric cables, obey the items that follow.

- Tell the electric power company that the construction work will be done near the electric cables and consult the necessary measures.
- If the electric cable is a high-voltage cable, be aware that you can get an electric shock when you just go closer to it. Make sure to keep the safe distance shown in the Table when you do the work. Consult the electric power company about the voltage.



Line voltage	Safe distance
100V, 200V	2m or more
6600V	2m or more
22000V	3m or more
66000V	4m or more

Line voltage	Safe distance
154000V	5m or more
187000V	6m or more
275000V	7m or more
500000V	11m or more

Safe distance for Italian market

Line voltage	Safe distance
<=1000V	Min. 3m
1001 to 30000V	Min. 3.5m
30001 to 132000	Min. 5m
> 132001V	Min. 7m

- In case of emergency, wear rubber-soled shoes and rubber gloves, and lay a rubber sheet on the operator's seat, and make sure that your body parts not protected by rubber etc. do not touch the machine body.
- Allocate a signalman to keep the machine away from the electric cables.
- To prevent electric shock, do not allow unauthorized person to approach the machine when you work near high voltage wires.
- If the machine came near or touched the electric cables, to protect the operator from electric shocks, keep the operator seated until the electricity is shut off. Keep other persons away from the machine.

Ensure good visibility

Although this machine has the equipment that assists your visibility such as a mirror or camera, there are some parts that cannot be seen from the operator's seat, so be very careful when you operate.

There is a danger that causes serious personal injury or death if you drive the machine or do operation in a place where visibility is bad, because you cannot check an obstacle around the machine or state of the work site. When you drive or operate the machine in the site where the visibility is bad, obey the items that follow.

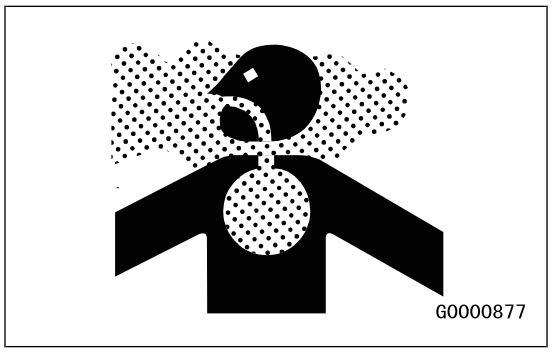
- If the visibility is not sufficient, allocate a signalman as needed.
- The signalman who gives signals must be one person.
- In dark area, turn on the working lamp and headlamp installed to the machine, and add lighting facilities to make the site brighter if necessary.
- If the visibility is bad because of mist, snow, rain, or dust, stop the work.
- Clean the mirror which is installed to the machine when you do the check before starting, and adjust the range of view to secure the visibility.
- When you clean the camera, wipe off dirt with soft cloth. Make sure that the image is clear on the monitor.
  If you stand on an unbalanced footing or you are in an unbalanced posture when you clean the camera, you can fall and be injured. Put a stepladder or step on the level and firm ground, and adjust the camera in a stable balance.

Check signs and signalman's signals

If signals and signs are not clear, there is a danger of serious personal injury or death caused by the machine that slips, tips over, and contacts with the obstacle or persons around the machine. Obey the items that follow.

- Provide the signs to let the operator recognize the soft road shoulder or ground. If the visibility is not sufficient, assign a signalman as needed. The operator must pay attention to the sign and follow the instructions of the signalman.
- The signalman who gives signals must be one person.
- All workers must understand the meaning of all signals and signs.

Beware of asbestos dust



There is a danger of lung cancer if you breathe air which contains asbestos dust. There is a danger that you breathe the asbestos particles on the jobsites where demolition work is done or the industrial wastes are handled. Obey the items that follow.

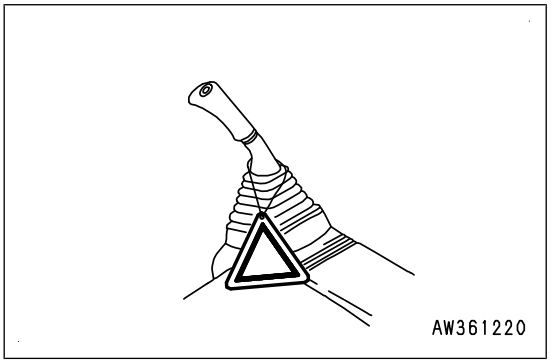
- Sprinkle water over the ground not to let the asbestos scatter in the air.
- Do not use the compressed air.
- Workers must do the work on the windward if the machine is operated at the jobsite where there is a danger of asbestos dust.
- Workers must wear the dust masks.
- Outsiders must be away during the work.
- Obey the rules related to the jobsite and environmental standard.

This machine does not use asbestos, but there is a danger that non-genuine parts contains asbestos in some cases. Use our genuine parts.

START ENGINE

Use warning tags

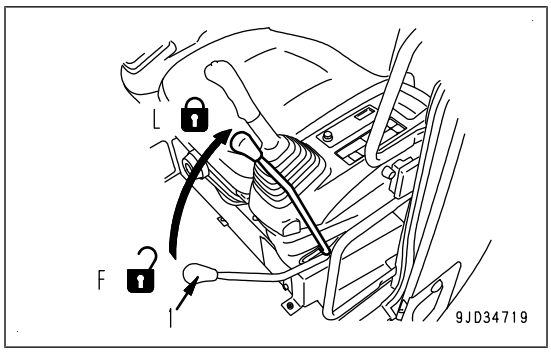
If “DANGER! Do NOT operate!” warning tag is shown, the machine is under inspection and maintenance. There is a danger that causes serious personal injury or death if you get caught in rotation part or movable part of the machine when you ignore the warning tag and operate the machine. Do not start the engine. Do not touch levers.



CHECKS AND ADJUSTMENT BEFORE YOU START ENGINE

Before you start the engine, check the items that follow and make sure that there is no problem to operate the machine. If these checks are not done, a bad influence is given to machine operation. There is a danger that serious personal injury or death is caused.

- Remove all dirt from the surface of the window glass to keep a good view.
  When you clean the right window, use a tool such as a mop.
- Do the walk-around check securely by “WALK-AROUND CHECK (3-151)”.
- Remove all dirt from the surface of the lens of the headlamps and working lamps, and make sure that they light up correctly.
- Check the coolant level, fuel level, oil level in the engine oil pan, the clogging of the air cleaner, damage of the electric wiring, etc.
- Make sure that there is no mud or dirt accumulated around the movable parts of pedals, and that the pedals work correctly.
- Adjust the operator's seat to a position where it is easy to do the operations, and make sure that there is no damage or wear to the seat belt or mounting hardware.
- 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 you start the engine, make sure that the lock lever (1) is in the 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 “ADJUST MIRRORS (3-173)”.
- Adjust the cameras to have a good rear view and a good view of surrounding area from the operator's seat.
  For the adjustment, consult Komatsu distributor.
- Adjust the armrest to a position for easier operation, and then fix it securely. If you operate the machine in an unstable posture, mistake in operation can occur, and it can cause serious personal injury or death.
  For the adjustment, see “ADJUST OPERATOR SEAT (3-167)”.
- Make sure that there is no person or obstacle above, below, or around the machine.

Precautions when you start engine

There is a possibility that the machine starts suddenly, and it can cause serious personal injury or death. Obey the items that follow.

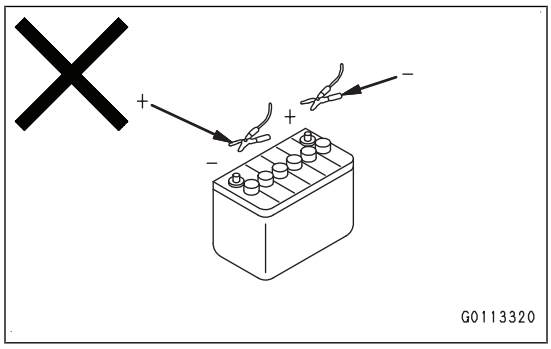
- When you start the engine, be sure to sit on the operator's seat.
- Before you start the engine, make a horn sound to give a warning.
- Do not allow anyone other than the operator to ride on the machine.
- Do not start the engine by short circuit of the engine starting circuit. Serious personal injury or death or fire can be caused.

In cold weather

- If the work equipment is operated without sufficient warming-up operation of the machine, there is a possibility that the response of the work equipment to the movement of the control lever and the control pedal becomes slow, and that the work equipment cannot respond to the operator's desires. So be sure to do the warm-up operation. Especially in cold weather, be sure to do the warm-up operation sufficiently.
- When battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a danger that the battery will catch fire and explode.
  Before you charge the battery or start with another power supply, thaw the battery electrolyte and make sure that there is no leak of battery electrolyte.

Start engine with jumper cables

If a mistake is made in the method to connect the jumper cables, it can cause the battery explosion, so be sure to obey the items that follow.



- Be sure to wear the protective eyeglasses and rubber gloves when you start the engine with the jumper cables.
- When you connect a normal machine to a failed machine with the jumper cables, be sure to use the normal machine with the same battery voltage as the failed machine.
- When you start the engine with the jumper cables, do the startup operation with 2 workers (one worker sits on the operator's seat and the other handles the battery).
- When you use other machine for the start-up operation, be careful that the normal machine does not touch the failed machine.
- When you connect the jumper cables, turn the starting switches of the failed machine and the normal machine to the OFF position. If the failed machine has a battery disconnect switch, set it to the OFF position, and then set it to the ON position again after the cables are connected.
  For details of operation of the battery disconnect switch, see “BATTERY DISCONNECT SWITCH (3-118)”.
  It is dangerous that the machine possibly moves when the power is connected.

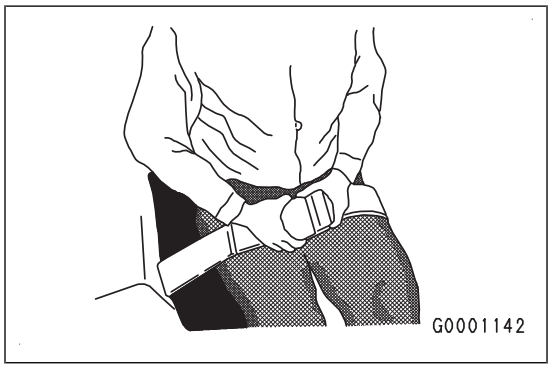
- Be sure to connect the positive (+) terminal first when you connect the jumper cables. Disconnect the negative (-) terminal (ground side) first when you disconnect them.
- Do not let the clips touch other clips or the machine when you disconnect the jumper cables.
- For the procedure to start the machine by the jumper cables, see OPERATION, “START ENGINE WITH JUMPER CABLES (3-294)”.

PRECAUTIONS FOR OPERATION

Checks before operation

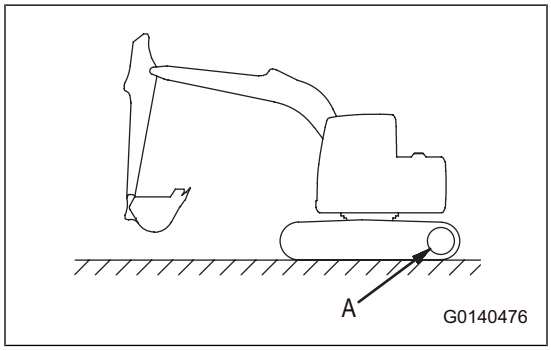
If the check before starting is not done, the machine performance will not be fully used, and there is a danger that causes serious personal injury or death.

Do the inspection in a large area where has no obstacle, and be very careful around the machine. Keep persons away from near the machine.



- Be sure to fasten the seat belt. There is a danger that operator is thrown out from the operator's seat and gets personal injury when brake is applied suddenly.
- Check that the movement of the machine agrees with the display on the control pattern card. If it does not match, immediately replace the control pattern card with a correct one.
- Check that the machine, work equipment, travel, and swing are operated correctly.
- Check that sound, vibration, heat, smell is normal, and there is no abnormality in instrument, oil leakage, fuel leakage.
- Repair the failed part always when an abnormality is found.

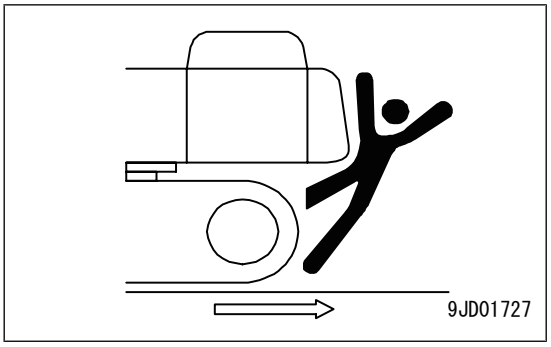
Precautions when machine travels forward and reverse, or swings

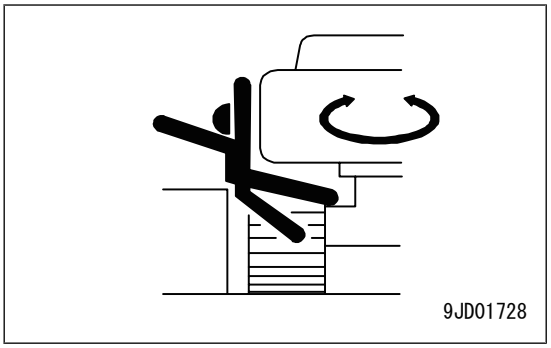


- Make the sprocket (A) be on the rear side before the machine travels. If the sprocket (A) is on the front side, the actual travel direction becomes opposite to travel lever operation. It is very dangerous and can cause serious personal injury or death because the machine will travel in the incorrect direction unexpectedly.
- All the windows and doors at the cab must be fixed securely whether they are opened or closed.
  In the jobsite where there is a danger of objects that fly on or go in the operator's cab, close all the windows and doors.
- Do not allow anyone other than the operator to ride on the machine.

- If persons are in the area around the machine while it travels or swings, there is danger that they will be hit or caught by the machine, and this can lead to serious personal injury or death. Before you drive the machine or do the swing operation, obey the items below.
  - When you operate the machine, be sure to sit on the operator's seat.
  - Before you move the machine, check again that there is no person or obstacle around the machine.
  - Before you operate the machine, make a horn sound to give a warning to persons around the machine.
  - Make sure that the travel alarm operates normally.
  - If there is an area in the rear of the machine which cannot be seen, allocate a signalman. Drive or swing the machine carefully and slowly not to have the accidental contact.

Obey the above precautions even for the machines with mirrors and cameras.

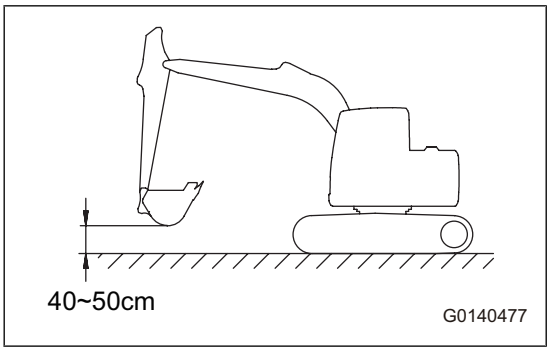


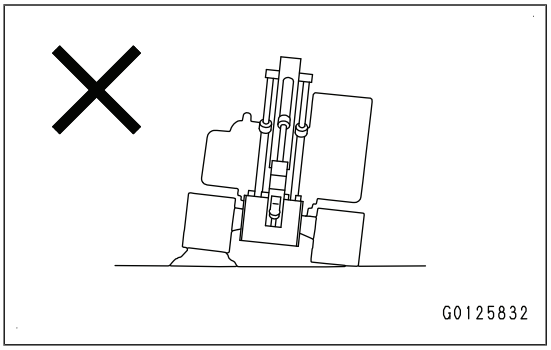


Precautions when you travel

There is a danger of serious personal injury or death caused by that the machine falls over while it travels, or a person gets in contact with the machine. Obey the items that follow.

- To prevent accident, keep a sufficient distance from persons, constructions, and other machines while you operate the machine.
- When the machine travels on a level ground, keep the work equipment at 40 to 50cm above the ground. If that height is not kept between the work equipment and the ground, there is a danger that the work equipment touches the ground and the machine falls over.
- If you have bad visibility on the right side, raise the boom to make sure that you have good visibility.
- When you drive the machine on rough terrain or on steep slopes, make sure to turn the auto decelerator switch off (release). If it is in the ON (operation) state, the engine speed can increase and the speed can suddenly increase.
- Do not ride over the obstacles. If the machine needs to ride over an obstacle, keep the work equipment near the ground and drive the machine at low speed. The machine falls over easily in the lateral direction. Do not drive it over obstacles which make the machine tilt largely in the lateral direction.
- When the machine travels on rough ground, drive the machine at low speed not to let the machine fall over, and avoid sudden direction change. If the work equipment touches the ground, the machine could lose the balance, and there is a danger that the machine and the structure around it are damaged.





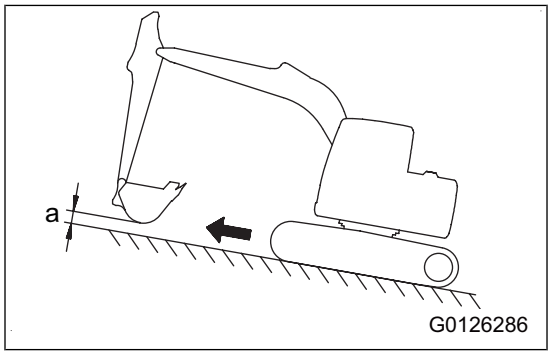
- When you use this machine, to prevent the machine tipping over by overload, and accident by damage of the work equipment, do not use the machine to the level that exceeds the allowable performance such as the maximum allowable load specified by structural reason.
- Before the machine goes over the bridges or the constructions, check that they are sufficiently strong to support the weight of the machine.

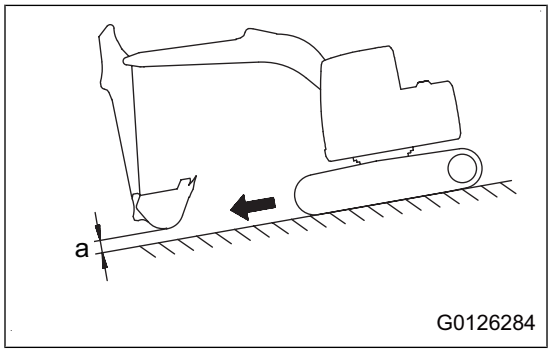
- When you operate the machine in such areas where height is limited as in tunnels or buildings or below bridges or below electric wires, operate it slowly and be very careful not to let the machine and work equipment touch anything.
- For the machine with blade, raise the blade before the travel when you do not do the leveling work.

Precautions when you travel on slopes

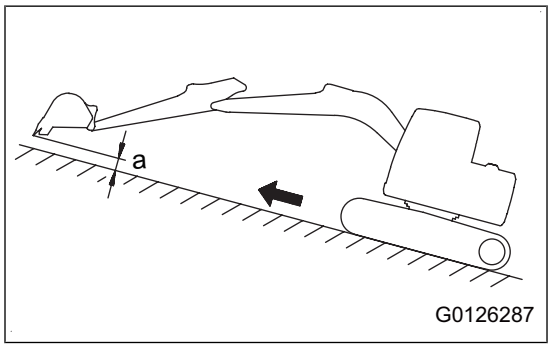
To prevent unexpected falling over and sideways slip, obey the items that follow.

- Hold the work equipment at the height (a) of 20 to 30cm above the ground to be able to lower the work equipment to the ground and stop the machine immediately in case of an emergency.
- When you drive the machine uphill, let the operator's seat point toward the mountain side, and when downhill, toward the root side. Be careful of the ground below the undercarriage and drive the machine.

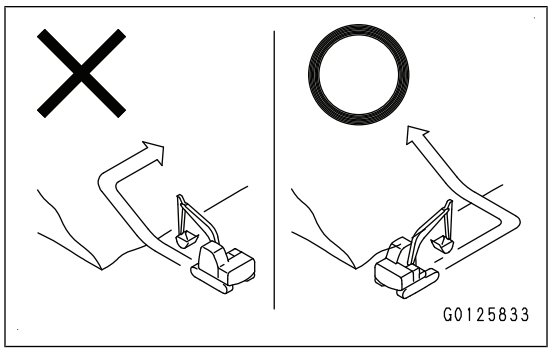




- When the machine travels up on a steep slope, extend the work equipment forward to improve the balance, keep it at the height (a) of 20 to 30cm above the ground, and travel at low speed.



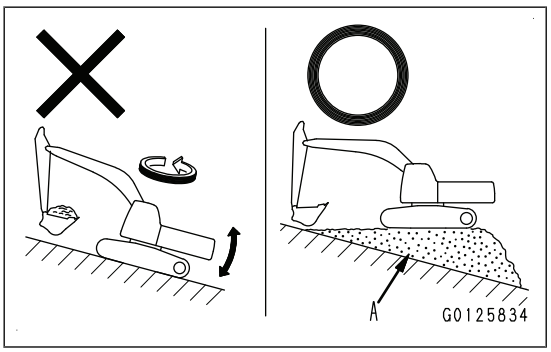
- When you drive the machine on downhill, lower the engine speed, move the travel lever to near the NEUTRAL position, and drive it with low speed.
- Move the machine straight to the slope. Do not move the machine diagonally across the slope, or travel in a horizontal direction. It is very dangerous.
- On a slope, do not steer the machine or do not go across the slope. If you need to change the direction, move the machine to the level ground and find other path.



- Do not travel on the slope covered with the iron plates. Even a slight slope is slippery and it is very dangerous.
- Set the travel speed as low as possible on the grasses and fallen leaves. Even a small-angle slope is slippery and dangerous.
- If the engine stops, move all control levers to the NEUTRAL position immediately, set the lock lever to the LOCK position, and start the engine.

Precautions when you operate machine on slopes

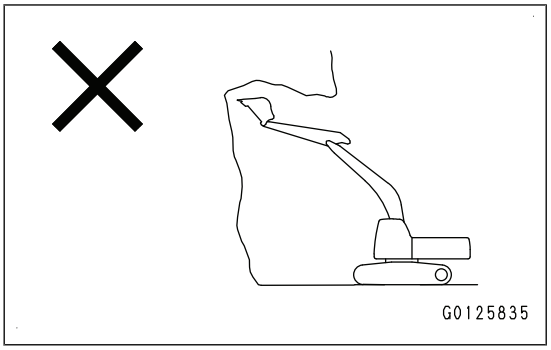
- If you do swing operation or the work equipment operation on a slope, there is a danger of a serious personal injury or death when the machine loses its balance and tips over. Keep a stable area for operations, and do the work very carefully.
- Do not swing toward the root side when the bucket is loaded with soil because there is a danger that the machine tips over.
- If you cannot avoid the work on a slope, make embankment (A), etc. before you start the work, to create a level and solid scaffold for the machine not to tip over.
- Do not do the work at the slope covered with the steel plates. Even a slight slope is slippery and it is very dangerous.



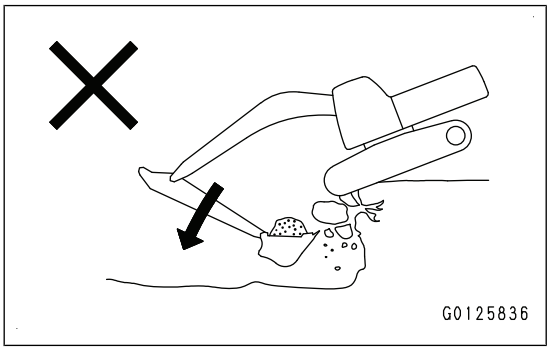
Prohibited operations

There is a danger of serious personal injury or death if the machine tips over or fall, or the ground at the jobsite breaks or object of demolition work collapses. Obey the items that follow.

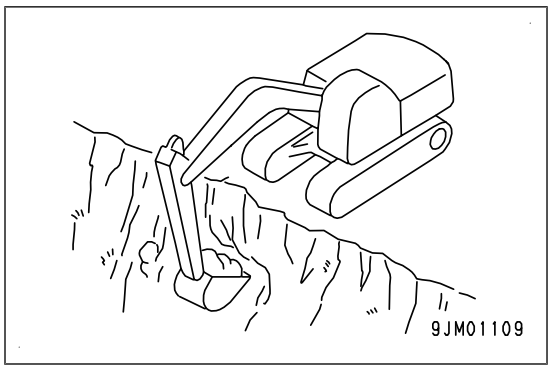
- If the work is done at the bottom of a cliff, there is a danger of landslide or falling rocks. Do not excavate at the bottom of a cliff.



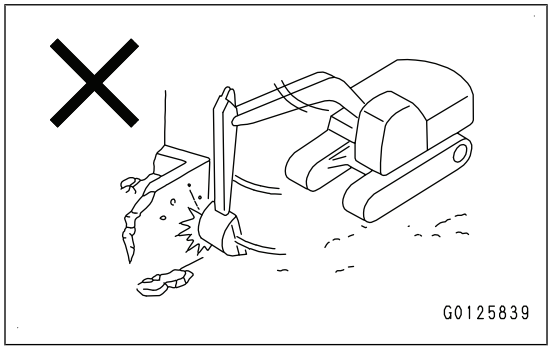
- Do not excavate too deeply below the front of the machine. The ground below the machine can break and cause the machine to fall.



- When you operate the machine near the cliff or road shoulder, do the work with the tracks at a right angle to the cliffs and shoulders and the sprocket at the back for quick evacuation in case of emergency.

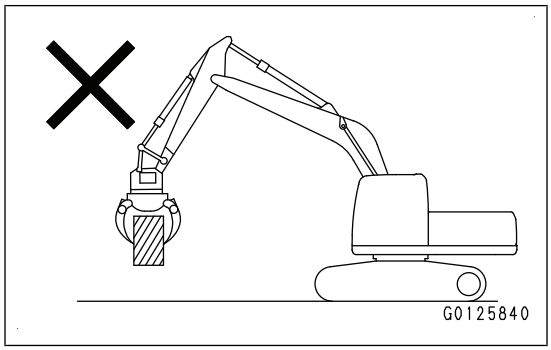


- Do not crush the object with the work equipment because there is a danger that causes serious personal injury or death by scattered crushed material, damaged work equipment, or falling of the machine by reaction of the hit.



- Do not let the bucket go over above the operator's head or operator's seat of the transportation machine such as a dump truck. There is a possibility that soil drops and bucket hits the machine. These can cause the serious injury or death in some cases.
- When the work is done on top of the structure such as a building or from above, check the strength and the structure before you start the operations. Serious injury or death can be caused by the broken building or structure.
- In general, the machine is more likely to tip over when the work equipment is in the lateral direction than it is in the longitudinal direction against the forward and reverse direction of tracks.
  Be very careful when the machine swings sideways from the longitudinal position while a load is applied to the work equipment. There is a danger that the machine falls over.
- There is a danger that the machine becomes unbalanced and tips over when heavy attachment (such as crusher) is used. Obey the items that follow not only on a slope but also on a level ground.
  - Do not swing suddenly. Do not lower the work equipment suddenly. Do not stop the work equipment suddenly.
  - Do not suddenly extend or retract the boom cylinder. The shocks can cause the machine to fall over.
- Do not do the work such as pinching with the tip when do the work with fork or grapple.

  Object is easy to slip and fall, and there is a danger that it damages the machine or causes serious personal injury or death.



Precautions when you operate on snow or frozen surfaces

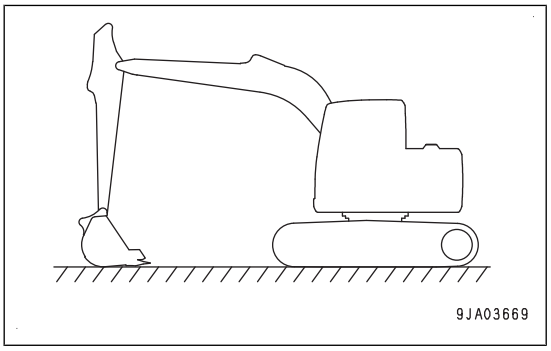
- Snow-covered or frozen surfaces are slippery, so be careful when you drive or operate the machine, and avoid sudden lever operations. Machine can slip even on a slight slope. Be especially careful when you do the work on slopes.
- Frozen road becomes soft when the temperature increases. Be careful because there is a possibility that the machine can fall over or you cannot escape from the machine.

- It is dangerous that the machine goes into deep snow. The machine can fall over or become buried in the snow. Be careful not to go off the road or to get trapped in a drift of snow.
- In the snow removal work, the road shoulder and objects along the road are buried in the snow and cannot be seen. Be careful because there is a risk of a fall or a collision.

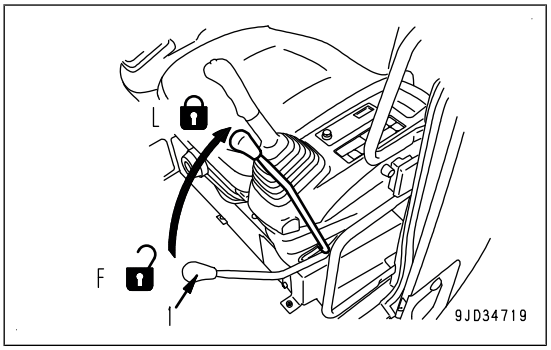
Precautions when you park machine

Unexpected movement of the parked machine can cause serious personal injury or death. Obey the items that follow.

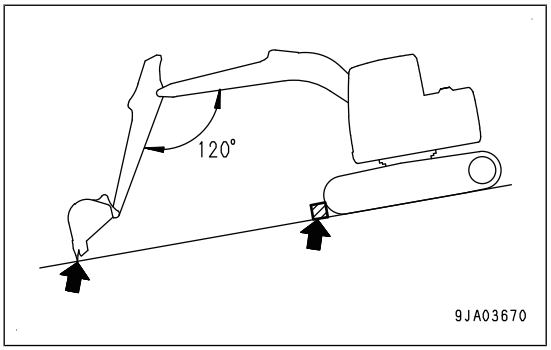
- Park the machine on a firm and level ground.
- Select an area where there is no risk of landslides, falling rocks, or flooding.
- Lower the work equipment to the ground.



- When you go away from the machine, be sure to make the direction of undercarriage and upper structure the same, and lower the work equipment to the ground. Hold the red part on the top of the lock lever (1), securely operate it to the LOCK position (L), and stop the engine.
- If the operator's seat and console are positioned at the front, your body or clothes will easily touch the levers. Move them rearward to keep a sufficient space, and then get off the machine.
- Be sure to close the operator's cab door, and apply all the locks. Remove the key not to let an unauthorized person move the machine, and keep it in the specified area.



- If you need to park the machine on a slope, obey the items that follow.
  - Make the work equipment on the downhill side and dig it into the ground.
  - Block the tracks not to move.



PRECAUTIONS FOR TRANSPORTATION

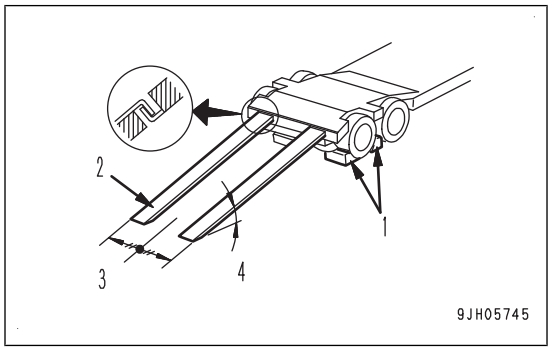
When you transport the machine, there is a risk of serious personal injury or death because of accident during the transportation. Obey the items that follow.

- The machine weight, transportation height, and overall length are different by the work equipment and option that is installed to the machine. Check it carefully.
- Before you determine the transportation route, check that the bridges or the constructions the machine goes over can bear the weight of the transporting vehicle and the machine.
- The disassembly of this machine can be necessary for the transportation by each related law and regulation. When you transport the machine, consult your Komatsu distributor.

Precautions when you load and unload

If you handle the machine incorrectly when you load or unload the machine, it is dangerous that the machine can turn over or fall. It requires special attention. Obey the items that follow.

- Load or unload the machine on a firm and level ground only. Avoid road edge or area near the cliff.
- Do not use the work equipment to load or unload the machine. There is danger that the machine can turn over or fall.
- Be sure to use the ramps that have sufficient length, width, and strength. Set the ramps not to be moved or dropped.
  (1) Chock
  (2) Ramp
  (3) Center of ramp
  (4) Angle of ramp: Max. 15°



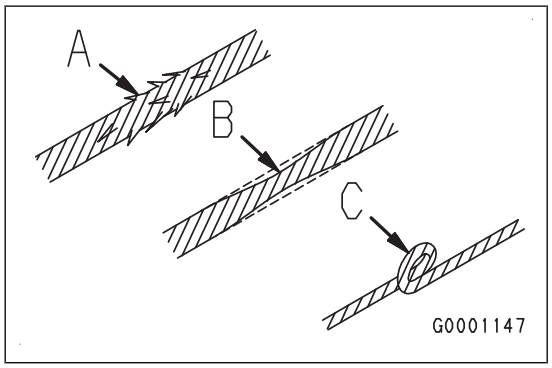
- To prevent the machine slip, be sure the surfaces of ground, ramps, and loading platform are free of grease, oil, ice, and water, etc. If any, remove them. Remove mud off from the undercarriage of the machine. Especially on a rainy day, be very careful as they are slippery.
- Be sure to turn off (cancel) the auto-deceleration switch. If you operate the machine while the auto-deceleration switch is turned on (activated), there is danger that the engine speed suddenly increases, the machine suddenly moves off, or the machine travel speed becomes faster.
- Set the engine speed to low idle, and drive the machine slowly.
- When the machine is on the ramps, do not operate the lever other than travel levers (travel forward and reverse).
- Do not correct your steering on the ramps. If necessary, drive off the ramps onto the ground, correct the direction, and then go onto the ramps again.
- The center of gravity of the machine will change suddenly at the joint between the ramps and the loading platform, and there is a danger that the machine loses its balance. Drive the machine slowly over this point.
- When you load or unload the machine on an embankment or platform, make sure that it has sufficient width, strength, and grade.
- When you swing the upper structure on the loading platform, lower the work equipment, retract it, and do the operation slowly since the footing is not stable.
- Be sure to fold the mirrors and stow the radio antenna.
  For the machines with cab, be sure to lock the door after the machine is loaded. The door can be open during transportation.
- When it is necessary to remove the handrails and steps, be careful not to lose the removed handrails and steps.
  Install the removed handrails and steps securely.

PRECAUTIONS FOR TOWING

Precautions for towing and being towed

In the towing and being towed operation, a mistake in the selection of the wire rope or towing bar or towing procedure can cause personal injury or death.

- Make sure that the wire rope or towing bar used for towing operation has a sufficient strength for the weight of the towed machine.
- Do not use a wire rope which has breaks in the strands (A), the reduced diameter (B), or the kinks (C). There is a danger that the rope can break during the towing operation.
- Wear the leather gloves always when you handle the wire ropes.
- Do not do the towing operation on a slope.
- During the towing operation, do not stand between the towing machine and the towed machine.

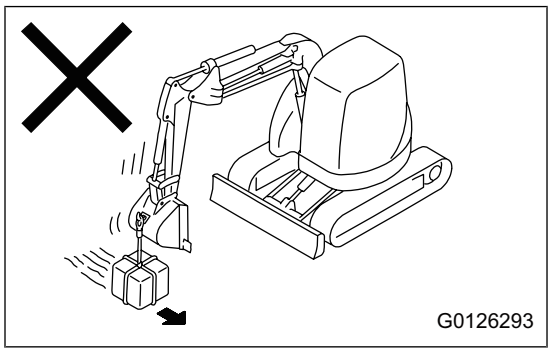


LIFTING OPERATION BY BUCKET WITH HOOK

Precautions for lifting operations

There is danger that a lifted load falls down or the machine falls over. It can cause serious personal injury or death. Obey the items that follow.

- Do not do the lifting work on slopes, soft ground, or other areas where the machine is not stable.
- Use wire rope that agrees with the specified standard.
- Make the signals to be used and give a signalman in the location.
- Do not let a worker go in the area where there is danger of contact with a lifted load or the danger from a falling load.
- It is dangerous if a lifted load hits the person or structure. When you do the swing operation or the work equipment operation, make sure that the area around the machine is safe.
- Do not start, swing, or stop the machine suddenly. The lifted load possibly swings, and it is dangerous.
- Do not use the work equipment or swing to pull the load. There is danger that the hook can be damaged and the load can come off. The reaction at this time can cause personal injury.
- Do not go away from the operator's seat while the load is lifted.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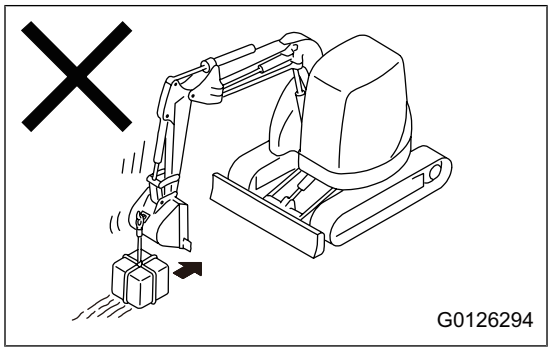
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LIFTING OPERATION BY BUCKET LINK LIFTING DEVICE (OPTIONAL)

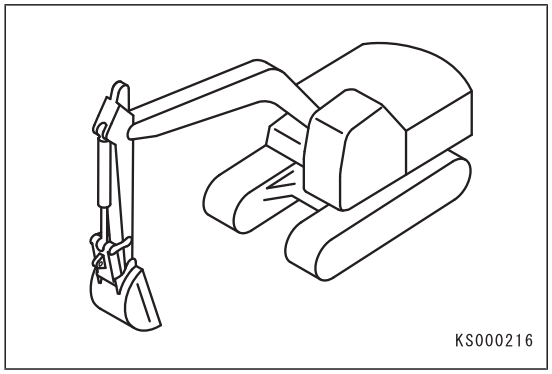
PRECAUTIONS FOR LIFTING OPERATIONS

- 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.

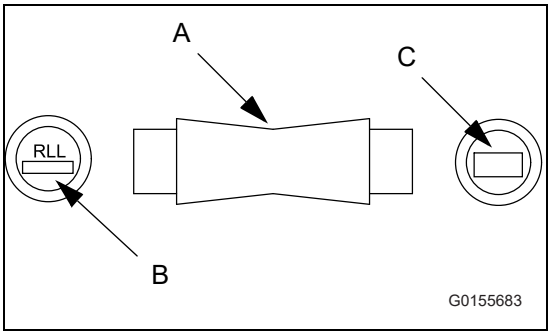


- Do not leave the operator seat when there is a raised load.
- If the load approaches the lifting limit of the machine, a warning is shown on the monitor panel and an audible alarm sounds. In this case, lower the load to the ground.

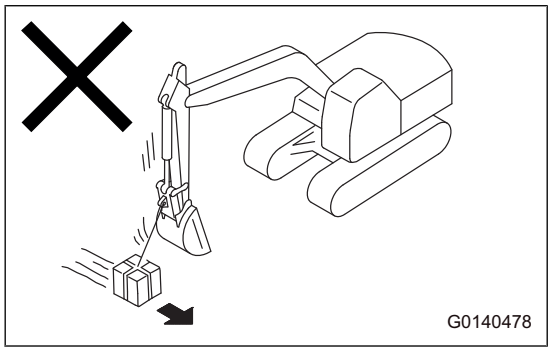
(A) Lifting bar

(B) RLL (Rated Lifting Load) number.

(C) Part number.



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



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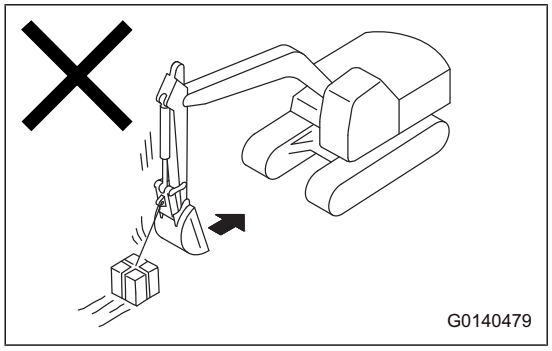
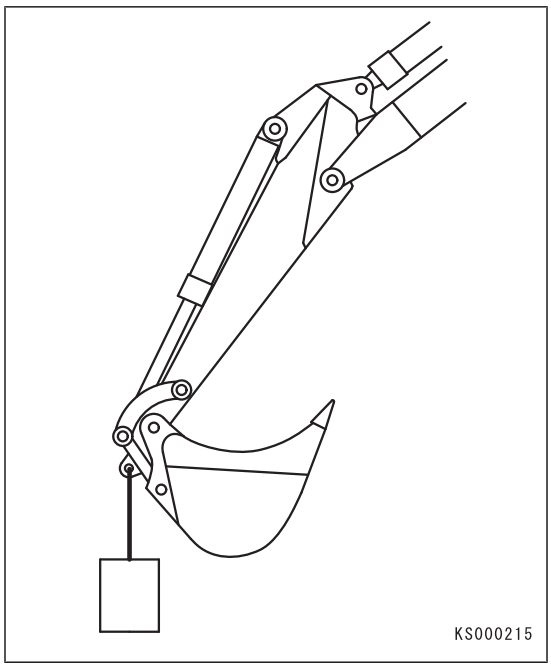
There is a danger that the lifting eye may be damaged due to abnormal loading making it unsafe to lift.

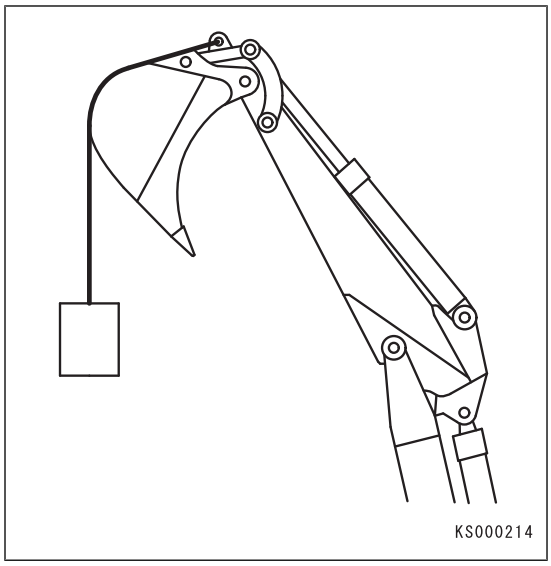


- The operator or person attaching the sling should inspect the bucket link lifting device and all the components in the load line (e.g. chains, shackles etc.) visually for damage or deformation before use to ensure that they are not damaged or worn.

  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 YOU START INSPECTION AND MAINTENANCE

Show warning tag during inspection and maintenance

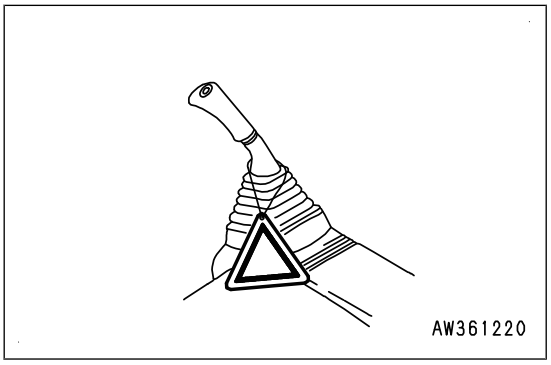
During the inspection and maintenance, “DANGER! Do NOT operate!” warning tag must be shown.

If “DANGER! Do NOT operate!” warning tag is shown, the machine is under inspection and maintenance. There is a danger that causes serious personal injury or death if you get caught in rotation part or movable part of the machine when you ignore the warning tag and operate the machine. Do not start the engine. Do not touch levers.

Show the warning tags around the machine where it is necessary.

Warning tag part number 09963-A1640

Store this warning tag in the tool box when it is not used. If there is no tool box, store it in the pocket for Operation and Maintenance Manual.



Keep work place clean and tidy

- Put away tools, and hammers which can be obstacle for work, wipe off slippery objects such as grease and oil, and clean and organize the work place for workers to work safely. If the workplace is not organized, there is a danger of personal injury if you tip over or slip with cluttered tool.
- Use water only to clean ceiling windows that use organic glass (polycarbonate), not organic solvents. The use of organic solvents such as benzene, toluene and methanol causes chemical reactions such as dissolution or decomposition, which deteriorates the polycarbonate.

Select suitable place for inspection and maintenance

- Stop the machine on a firm and level ground.
- Select an area where there is no risk of landslides, falling rocks, or flooding.

Only authorized personnel

When you do maintenance, there is a danger that serious personal injury or death occurs if unauthorized persons touch the machine. Do not let unauthorized persons come close other than necessary workers. Allocate a personnel as needed.

Appoint leader when you work with others

When you repair the machine or remove or install a work equipment, assign a person who will direct the work and follow its instructions to prevent personal injury because of being caught.

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.

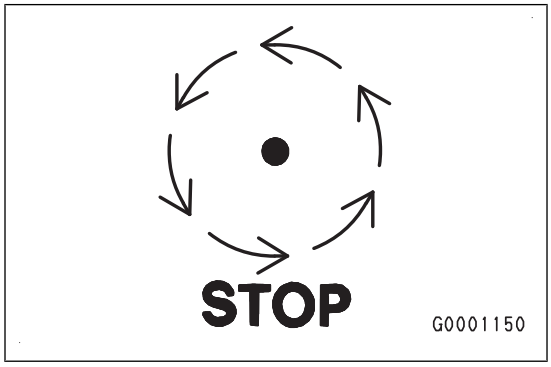
END OF SERVICE LIFE

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

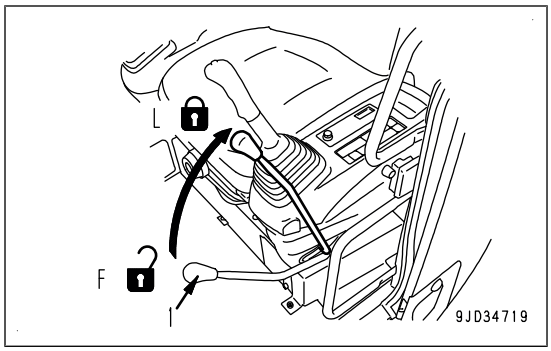
Stop engine before you inspect or do maintenance

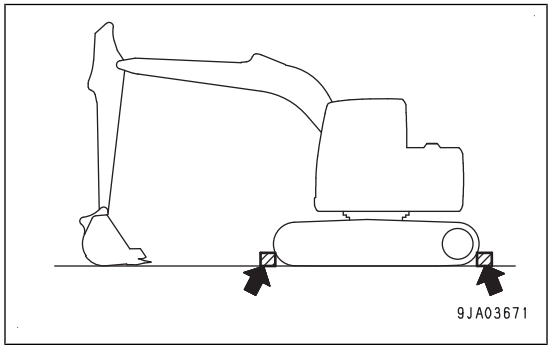
If you are caught or pinched between the work equipment during operation, or exposed to high-temperature or high-pressure liquids, it is dangerous and can cause serious personal injury or death. Obey the items that follow.

- Be sure to lower the work equipment to the ground and stop the engine before inspection and maintenance.



- Turn the starting switch to the ON position. Operate the work equipment control lever back and forth, right and left 2 to 3 times fully to release the remaining pressure in the hydraulic circuit. Hold the red part on the top of the lock lever (1) to operate it to the LOCK position (L), and turn the starting switch to the OFF position.
- Make sure that the battery relay is turned off and the main power is not supplied. (Turn the starting switch to the OFF position, wait for approximately 1 minute, and push the horn switch. If the horn does not operate, the power is not supplied.)
- Chock the tracks to prevent movement.



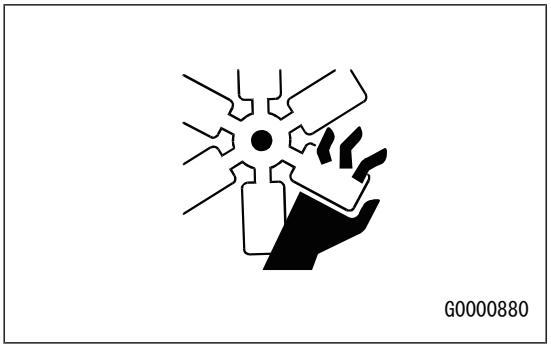


Precautions for maintenance when engine is in operation

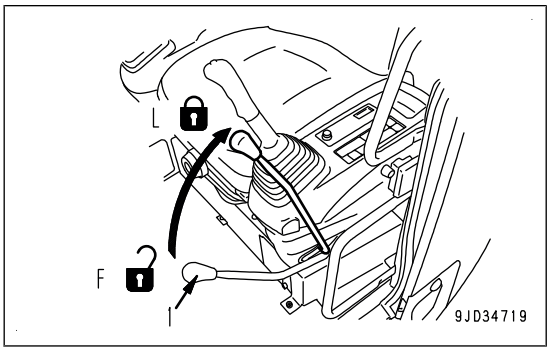
To prevent an accident, do not do the maintenance while the engine is in operation. If maintenance is necessary while the engine is in operation, do the work with 2 or more workers, and obey the items that follow.

- One worker must sit on the operator's seat and be ready to stop the engine always. All workers must keep contact with the other workers.

- Rotating parts such as the fans or belts are dangerous that they can easily catch your body part or a thing. When you work, be careful not to let them come near the rotating parts.
- Do not drop or insert tools or other objects into the fan, belt, or other rotating parts. They possibly touch the rotating parts and fly. It is dangerous.

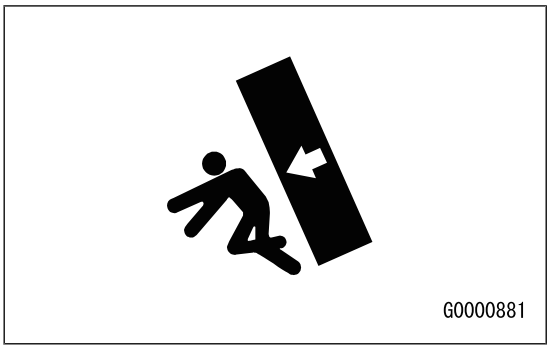


- Release the remaining pressure in the hydraulic circuit, and hold the red part on the top of the lock lever (1) to operate it to the LOCK position (L). For the procedure to release the remaining pressure, see “RELEASE INTERNAL PRESSURE IN HYDRAULIC CIRCUIT (4-85)”.
- Do not touch the control levers (and pedals). When it is necessary to operate the control levers (and pedals), always give a signal to your fellow workers to evacuate them to a safe area.



Precautions when you install, remove, or store attachments

- For removal or installation of the attachments, allocate a leader.
- When you store attachments that can fall over, store them in a stable condition to let them not fall over. Also, keep the unauthorized persons away from the storage area.



Precautions when you work at high places

When you work in high places, prepare a workbench with stairs, etc. to make the work area available. Then, start the work.

There is a danger of serious personal injury or death caused by fall or such.

Precautions when you work on machine

- When you do the maintenance on the machine, obey the items that follow not to fall down from the machine.
  - Do not spill oil or grease.
  - Organize the tools.
  - When you walk, be careful of the footing.
  - Remove the mud and grease on your shoes.
- Do not jump from the machine.
  Keep an eye on the machine. Support yourself at three-point contact with handrails and steps.
  Three-point contact means to support yourself with both feet and one hand, or both hands and one foot.
- Do not stand on the areas where there are no non-slip pads.

Precautions when you work below machine or work equipment

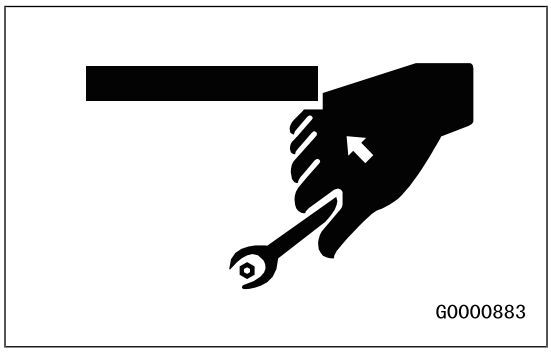
If the machine or work equipment falls down, it can lead to serious personal injury or death. Obey the items that follow.

- Use the hoists or hydraulic jacks which are in good condition and sufficiently strong to handle the weight of the component. Do not use the hydraulic jacks at the parts where the machine is damaged or bent or twisted. If the strand of wire rope is frayed, or the wire rope is twisted, or the diameter of wire rope is decreased, do not use it. Do not use a hook which is bent or damaged.
- It is extremely dangerous to work below the machine if the track shoes are lifted off the ground and the machine is supported only with the work equipment. If one of the control levers is touched by accident, or if the hydraulic piping is damaged, the work equipment or the machine will suddenly fall. Do not go below the work equipment or machine.

- If it is necessary to raise the work equipment or the machine and then go below it to do the 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 they are not supported, there is a possibility that the machine or work equipment falls down, and it leads to serious personal injury or death.
- Do not use concrete blocks for supports. There is a possibility that the concrete blocks break even with a light load.

Use proper tools

Handle the proper tools correctly. There is a danger that causes serious personal injury or death if you use a damaged or deformed tool or use a tool in purpose other than that it is intended.



PRECAUTIONS FOR CHECK AND MAINTENANCE

Turn battery disconnect switch to OFF position

In the cases that follow, after you turn the starting switch to the OFF position, check that the system operating lamp is not lit. Then turn the battery disconnect switch to the OFF position and remove the switch key.

There is a danger that causes serious personal injury or death by electric shock if you do inspection and handling of the battery when you do not turn the battery disconnect switch to the OFF position.

- When you store the machine for a long time (more than a month)
- When you repair the electrical system
- When you do the electric welding
- When you handle the battery
- When you replace the fuse or such

Precautions for welding

Welding can be done only by qualified personnel and it can be done in a place there are correct facilities. Unqualified personnel must not do welding because there is a danger of gas generation, fire, electric shock, etc. in welding.

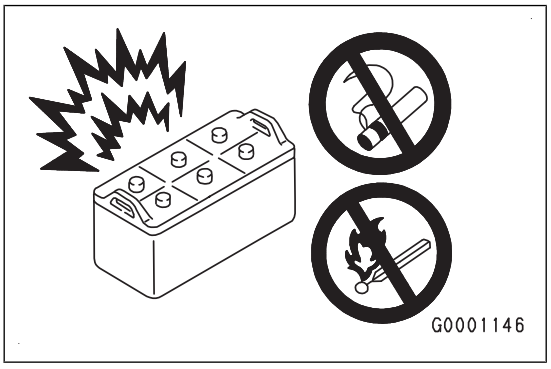
Battery

To check and handle the battery, turn the starting switch to the OFF position, make sure that the system operating lamp is not lit. Set the battery disconnect switch to the OFF position, and remove the switch key.

Risk for battery explosion

Battery emits flammable hydrogen gas and it can explode. The battery electrolyte contains dilute sulfuric acid. If there is a mistake when you handle the battery, it can cause serious personal injury, explosion, or fire, so always obey the items that follow.

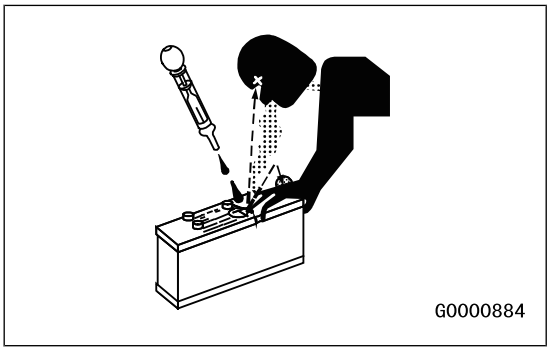
- Do not use or charge the battery if the battery electrolyte level is below LOWER LEVEL line. It can cause explosion. Check the battery electrolyte level in the specified intervals, and add purified water (such as a commercial battery fluid) to UPPER LEVEL line.
- Do not use a dry cloth to clean the battery. Use a wet cloth to prevent fire or explosion from static electricity.
- Do not smoke or use flame near the battery.
- Do not remove the battery cap when you charge the battery. The battery cap is explosion-proof, so it prevents the acid splash when you charge the battery.
- Hydrogen gas occurs when the battery is being charged, so remove the battery from the machine, take it to a well-ventilated area, then charge the battery there.



Risk caused by dilute sulfate

Battery emits flammable hydrogen gas and it can explode. The battery electrolyte contains dilute sulfuric acid. If you handle it in not correct way, it can cause serious personal injury and death, explosion, or fire. Obey the items that follow.

- When you handle the battery, be sure to use the protective eyeglasses and rubber gloves.
- If the battery electrolyte got in contact with your eyes, immediately wash your eyes with water and consult a doctor.
- If you got the battery electrolyte on your clothes or skin, immediately flush it off fully with a lot of water.



Risk for spark

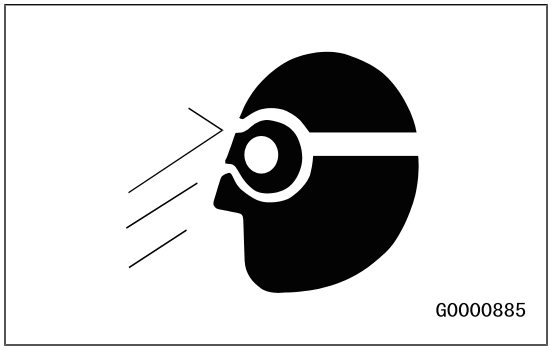
Sparks are made and can cause fire. Obey the items that follow.

- Do not allow metal object like a tool to contact between the terminals of the battery. Do not leave the tools.
- When you remove the battery terminals, after you turn the starting switch to the OFF position, check that the system operating lamp is not lit. Then turn the battery disconnect switch key to the OFF position and remove the key.
  Be sure to remove the ground side (negative (-) terminal side) of battery terminal first. Install the positive (+) terminal first, and install ground side last.
- Install the battery terminals securely.
- Install securely the battery to the specified position.

Precautions when you use hammer

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

- When you hit pins and tooth with a hammer, there is a danger that persons nearby get injury by scattered pieces and others. Check that there is no person around the machine.
- When you hit hard metal parts such as pin, tooth, cutting edge, bearing and such with a hammer, there is a danger of serious personal injury or death caused by scattered objects. Wear the protective equipment such as protective eyeglasses and gloves.
- If the pins are hit with a strong force, they can fly out and cause injury to people around it. Keep persons away from around the machine.

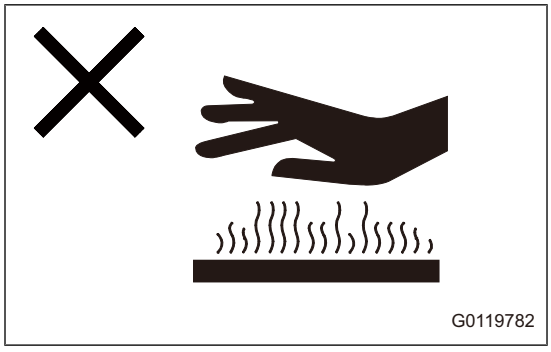


Precautions for high-temperature coolant

To prevent burn injury caused by hot water or steam spouting, when you inspect or drain the cooling water, make sure that the radiator cap is cool enough to be touched with bare hands, loosen the cap slowly to release pressure from the radiator, and then remove the cap.

Precaution for high-temperature oil

To prevent burn injury caused by spouting hot oil or touching the high temperature part, make sure that the cap and plug are cool enough to be touched with bare hands when you inspect or drain oil. Then, loosen the cap and plug slowly to release internal pressure, and remove the cap and plug.



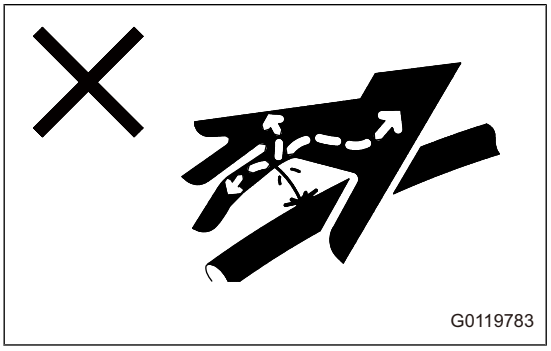
Precautions for high-temperature parts

To prevent burns caused by contact with hot parts, make sure it is cold enough to be touched with bare hands before you do inspection or service of the machine after you stop the engine.

Precautions for high-pressure oil

Internal pressure is constantly applied to the hydraulic system. Internal pressure is applied to the fuel pipes when engine is running and immediately after it is stopped. When you do inspection and replacement of pipes and hoses, if you do not make sure that the pressure of the circuit has been released, there is a danger that serious personal injury or death occurs. Obey the items that follow.

- Do not do inspection or replacement work when pressure is applied.
  Release pressure. See “RELEASE INTERNAL PRESSURE IN HYDRAULIC CIRCUIT (4-85)”.
- If there is oil leakage from the pipes or hoses, the pipes, hoses and around them are wet. Check the pipes for cracks, check the hoses for cracks and swelling.
  Wear the protective equipment such as protective eyeglasses and gloves at the time of measuring.
- If high-pressurized oil which is leaked through a small hole can pierce the skin or cause blindness if it hits the skin or eyes directly. If high-pressurized oil causes serious skin or eye injury, wash it off with clean water and get medical treatment as soon as possible.



Precautions for high-pressure fuel

While the engine is in operation, a high-pressure occurs in the engine fuel piping system. If disassembly is done before the pressure is released, there is a danger that causes serious personal injury or death. When you do inspection and maintenance of fuel piping system, wait for 30 seconds or more after the engine is stopped to let the internal pressure go down.

High-pressure hoses and piping

There is a danger of serious personal injury or death by fire or malfunction if the oil or fuel leaks from the high-pressure hoses or pipes.

If you find looseness in the mounting parts of the hoses or the piping, or if oil or fuel leaks from the mounting parts, stop the work and retighten them to the specified torque.

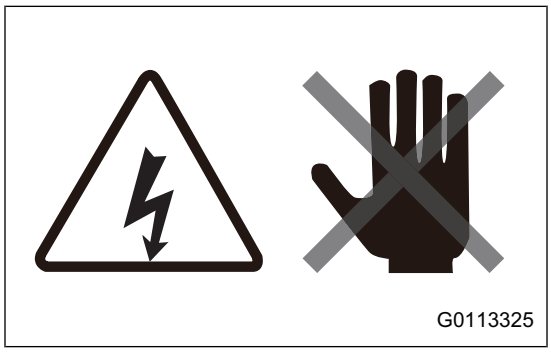
If you find damage or deformation in the hoses or piping, consult your Komatsu distributor.

Replace the hose if you find one of the conditions that follow.

- Hose damage, deformation of fitting
- Scratch of coating, cutting, exposure of reinforcing layer of wire
- A part of coating is expanded
- Movable part of hoses has signs of “distortion” and “crushing”.
- Foreign material is in the coating.

Precautions for high voltage

When the engine is in operation or immediately after it is stopped, there is a danger of electric shock because voltage in the engine controller or engine injector is very high. Do not touch the inside of engine controller or the injector part of engine. If it is necessary to touch the inside of engine controller or the injector part of engine, consult your Komatsu distributor.



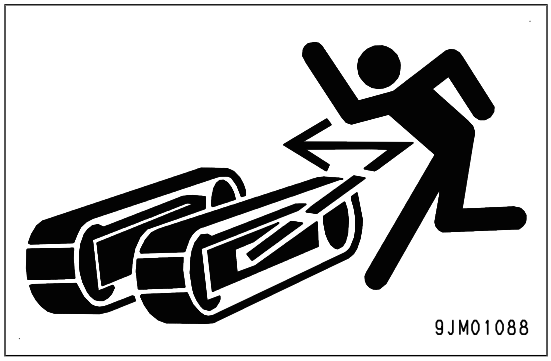
Precautions for noise

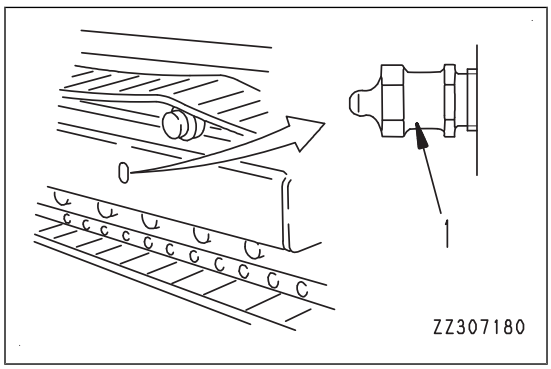
Wear the ear covers or ear plugs if you do the work exposed in noise for a long time such as adjustment work of engine.

Large ambient noise around you can cause auditory disturbance or hearing loss.

Precautions for high-pressure grease during track tension adjustment

- Grease is pumped into the track tension adjustment system, and high pressure is applied on it. If the adjustment is not done with the specified procedure for maintenance, the grease drain plug (1) can fly out and cause serious injury or death.
- When you loosen the grease drain plug (1) to loosen the track tension, do not loosen it by 1 turn or more. Loosen the grease drain plug slowly.
- Keep your face, hands, feet, or other part of your body away from the grease drain plug (1).

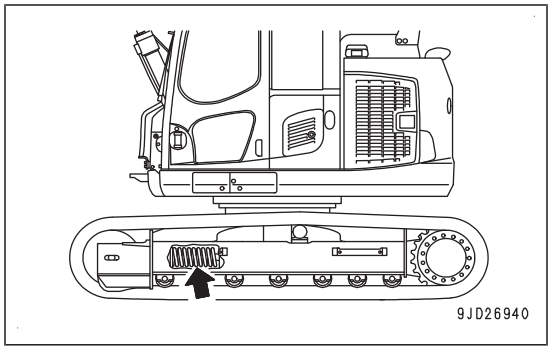




Do not disassemble idler cushion

Do not disassemble the idler cushion.

A powerful spring (recoil spring) is set in the idler cushion that acts to reduce the impact on the idler. If it is disassembled by mistake, the spring can shoot out and it can cause serious personal injury or death. If it is necessary to disassemble it, consult your Komatsu distributor.



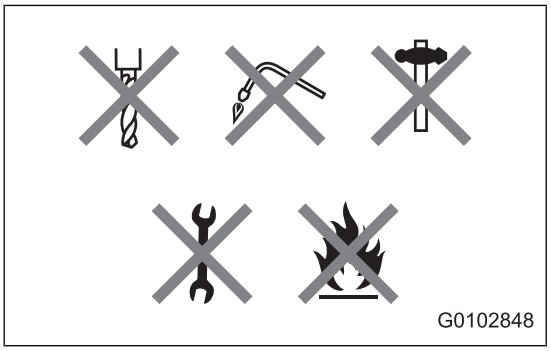
Accumulator and gas spring

Accumulator is installed to this machine. The work equipment goes down by its weight for a while after engine is stopped if the work equipment control lever is operated to LOWER direction.

After you stop the engine, set the lock lever to the LOCK position.

The accumulator and the gas spring are charged with high-pressure nitrogen gas, and if a mistake is made in the operation, it can cause an explosion and serious personal injury or death. Obey the items that follow.

- Do not disassemble.
- Do not let it come near an open flame, or do not dispose of it in fire.
- Do not do the drilling, welding or flame-cutting.
- Do not hit it or roll it or give shocks to it.
- When you dispose of it, the gas must be released. Consult your Komatsu distributor.



Precautions for compressed air

- If the compressed air is used for cleaning, dirt in the air could scatter and cause serious personal injury or death.
- When using the compressed air to clean the element or radiator, wear protective equipment such as protective eyeglasses, dust mask, and gloves.

Maintenance of air conditioner

If the refrigerant of air conditioner gets into your eyes, you can lose your eyesight. Also, if it touches your skin, it can cause frostbite. Do not loosen the 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.

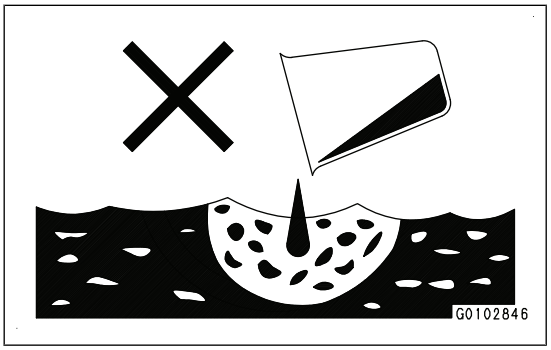
If any doubt exists, contact your Komatsu distributor.

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

Precautions when you dispose of waste materials

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

- Be sure to put the waste fluid into cans or tanks. Do not drain it directly onto the ground or pour it into the sewage system, rivers, seas, or lakes.
- When you dispose of the harmful objects such as oil, fuel, coolant, solvent, filters, and batteries, obey the applicable laws and regulations.



Some rubbers and plastics generate harmful gasses that have a bad effect to the human body when burned.

- Outsource to a contractor the disposal of rubber, plastics, and parts that contains them (hoses, cables, harnesses, etc.) in accordance to applicable laws and regulations.

If you have a question about waste disposal, consult Komatsu distributor.

Window washer fluid - Select

Use the ethyl alcohol washer fluid.

Do not use the methyl alcohol washer fluid because it can cause injury to your eyes.

PERIODIC INSPECTION OF DEFINED LIFE PARTS

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

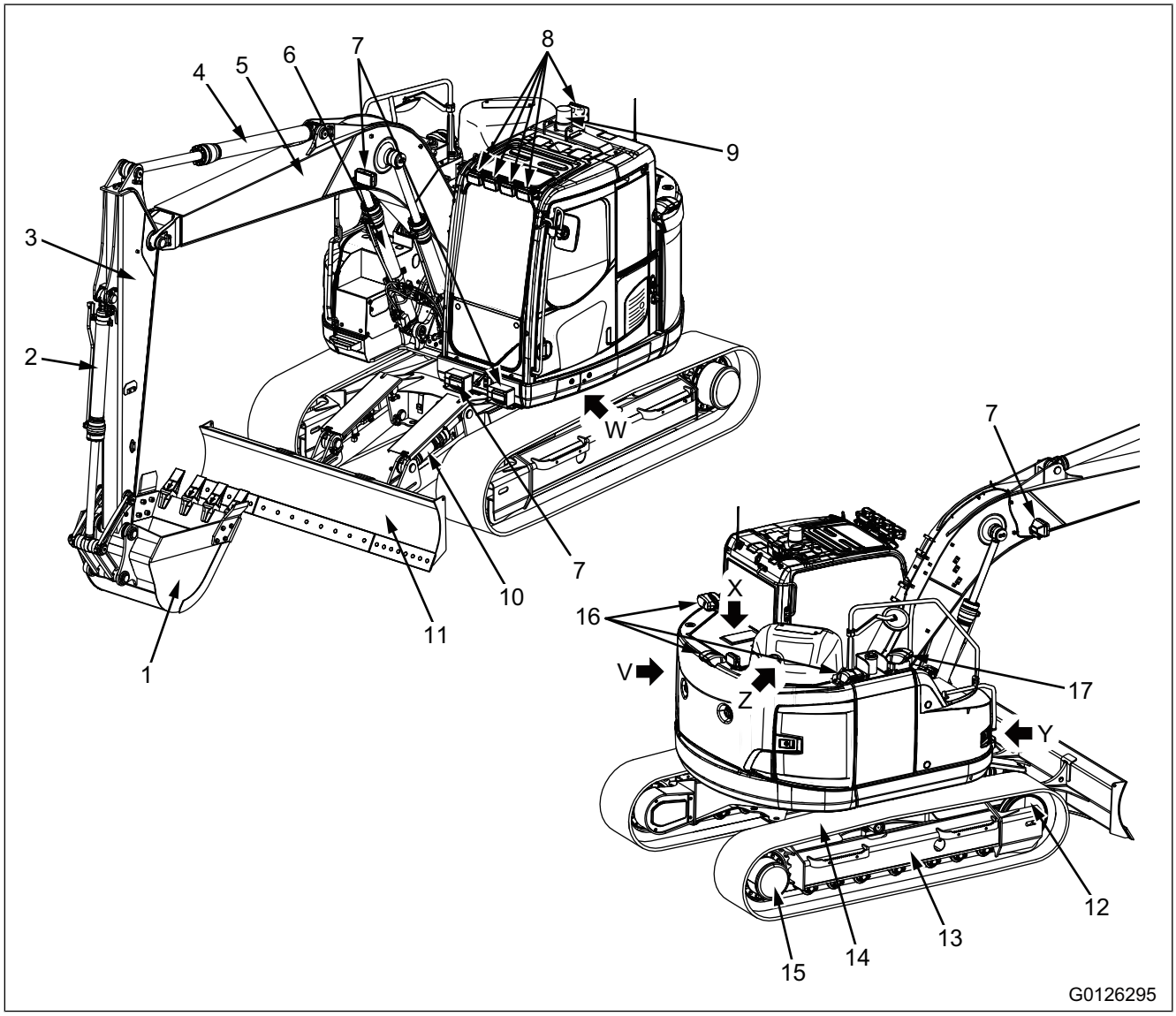
OPERATION

⚠ WARNING

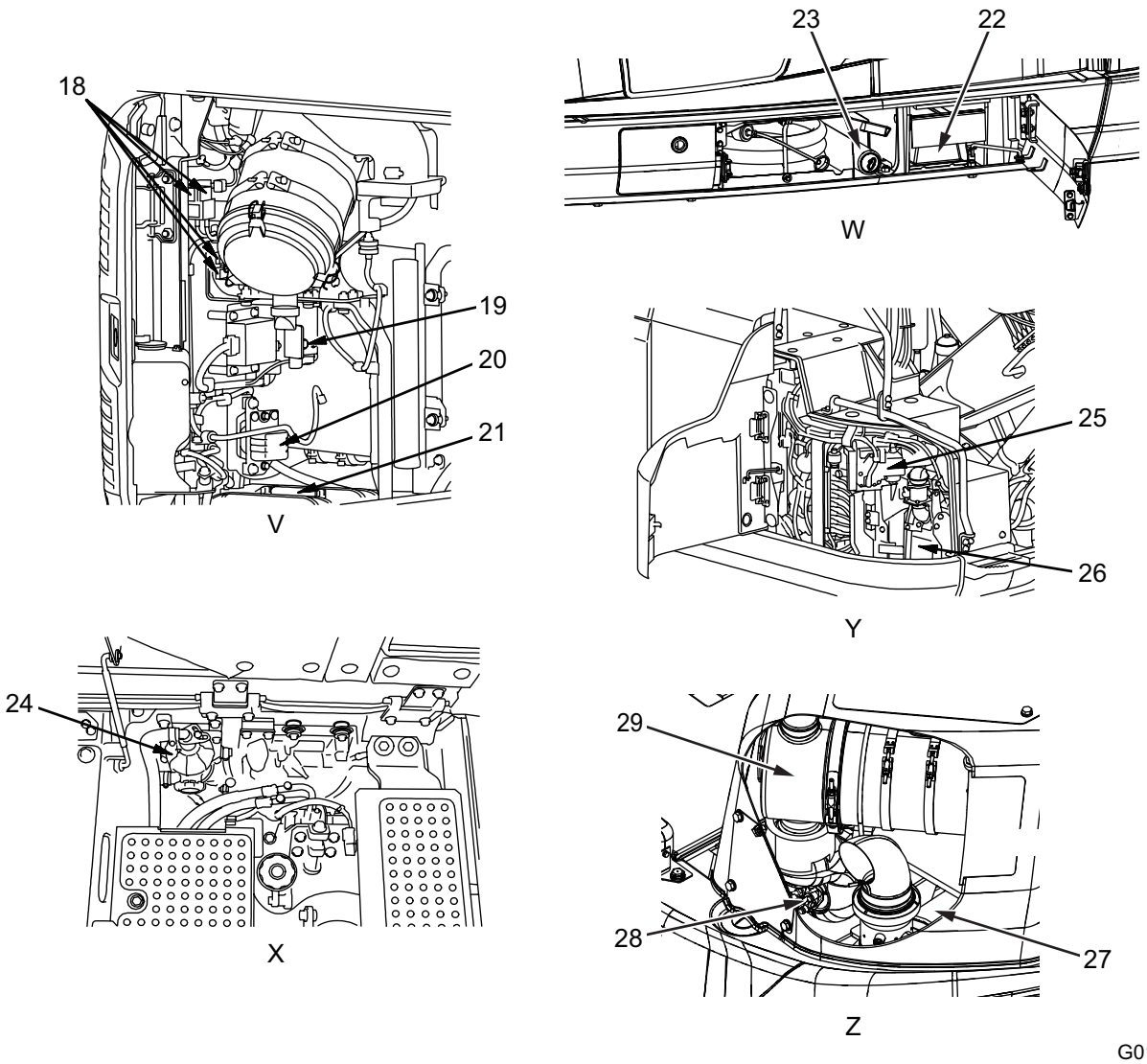
Before you read the OPERATION, read and understand the SAFETY.

GENERAL VIEW

MACHINE EQUIPMENT NAME

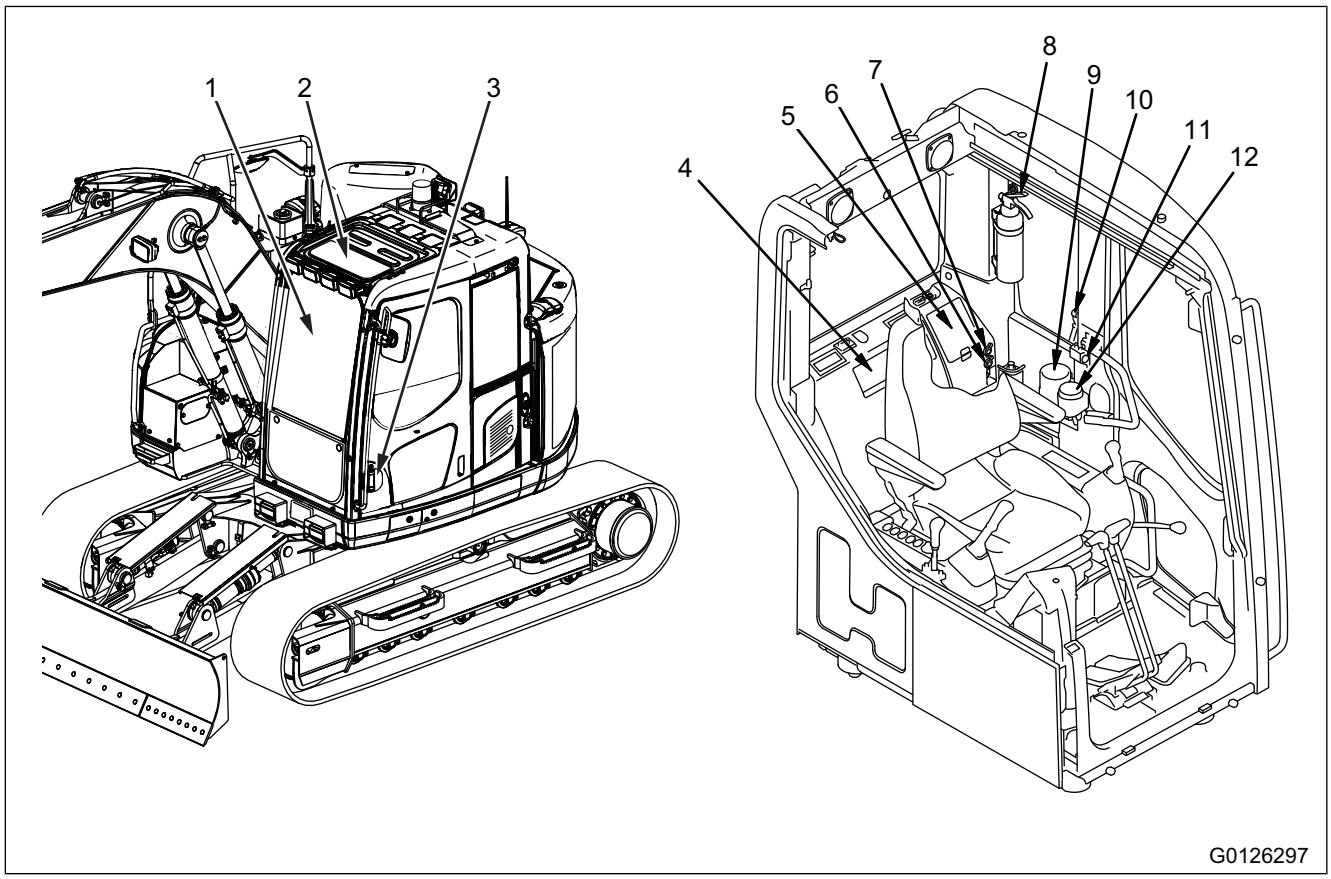


(1) Bucket
(2) Bucket cylinder
(3) Arm
(4) Arm cylinder
(5) Boom
(6) Boom cylinder
(7) Working lamp
(8) Cab light
(9) Revolving lamp
(10) Blade cylinder (blade specification)
(11) Blade (blade specification)
(12) Idler
(13) Track frame
(14) Track
(15) Sprocket
(16) KomVision camera
(17) KomVision camera (if equipped)



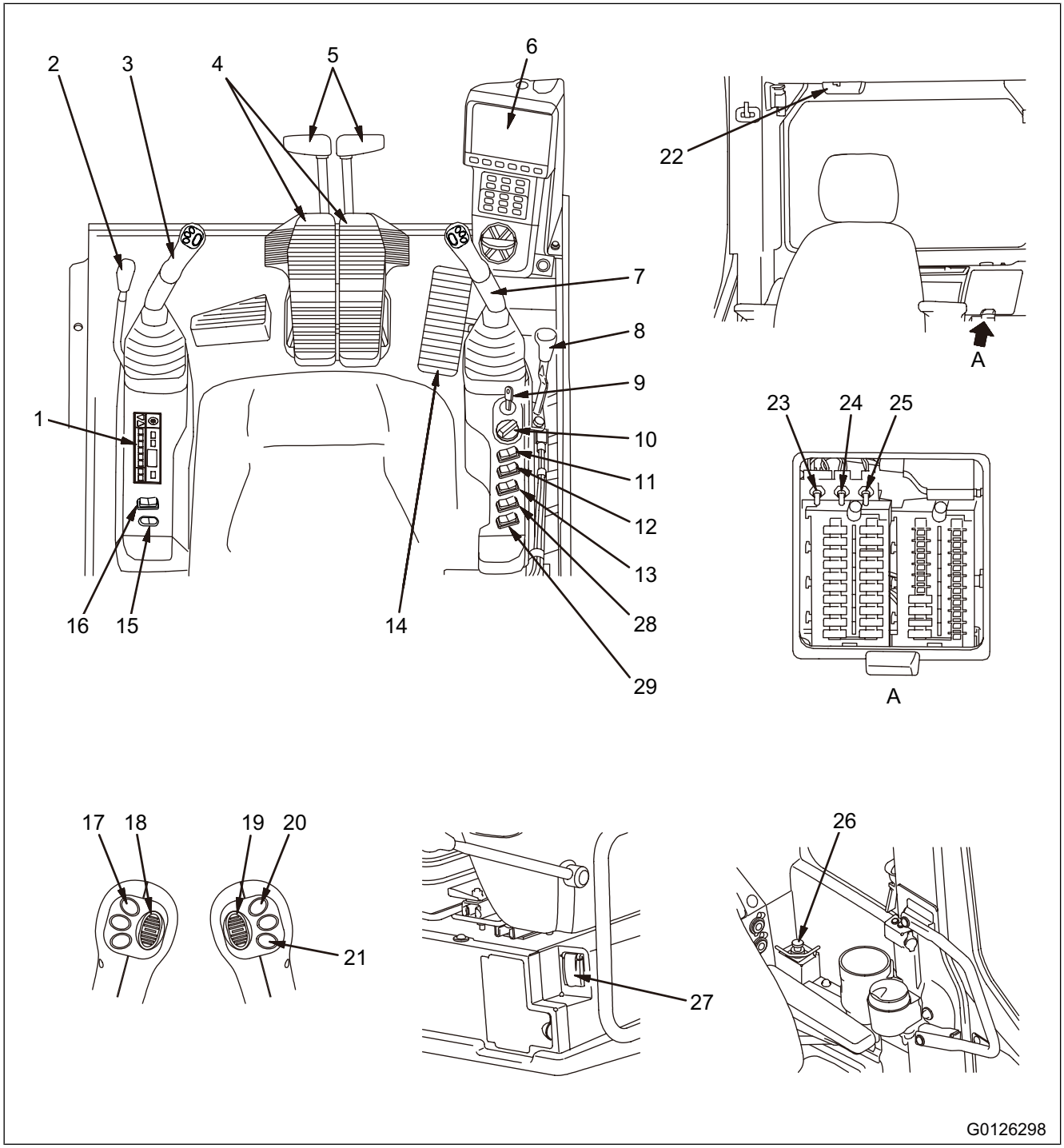
(18) Fusible link
(19) System operating lamp
(20) Battery disconnect switch
(21) Battery
(22) Toolbox
(23) Grease pump holder
(24) Komatsu Closed Crankcase Ventilation (hereafter KCCV) ventilator
(25) DEF pump
(26) DEF tank
(27) SCR
(28) DEF injector
(29) KDPF

CAB EQUIPMENT NAME



(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) USB
(12) Ashtray

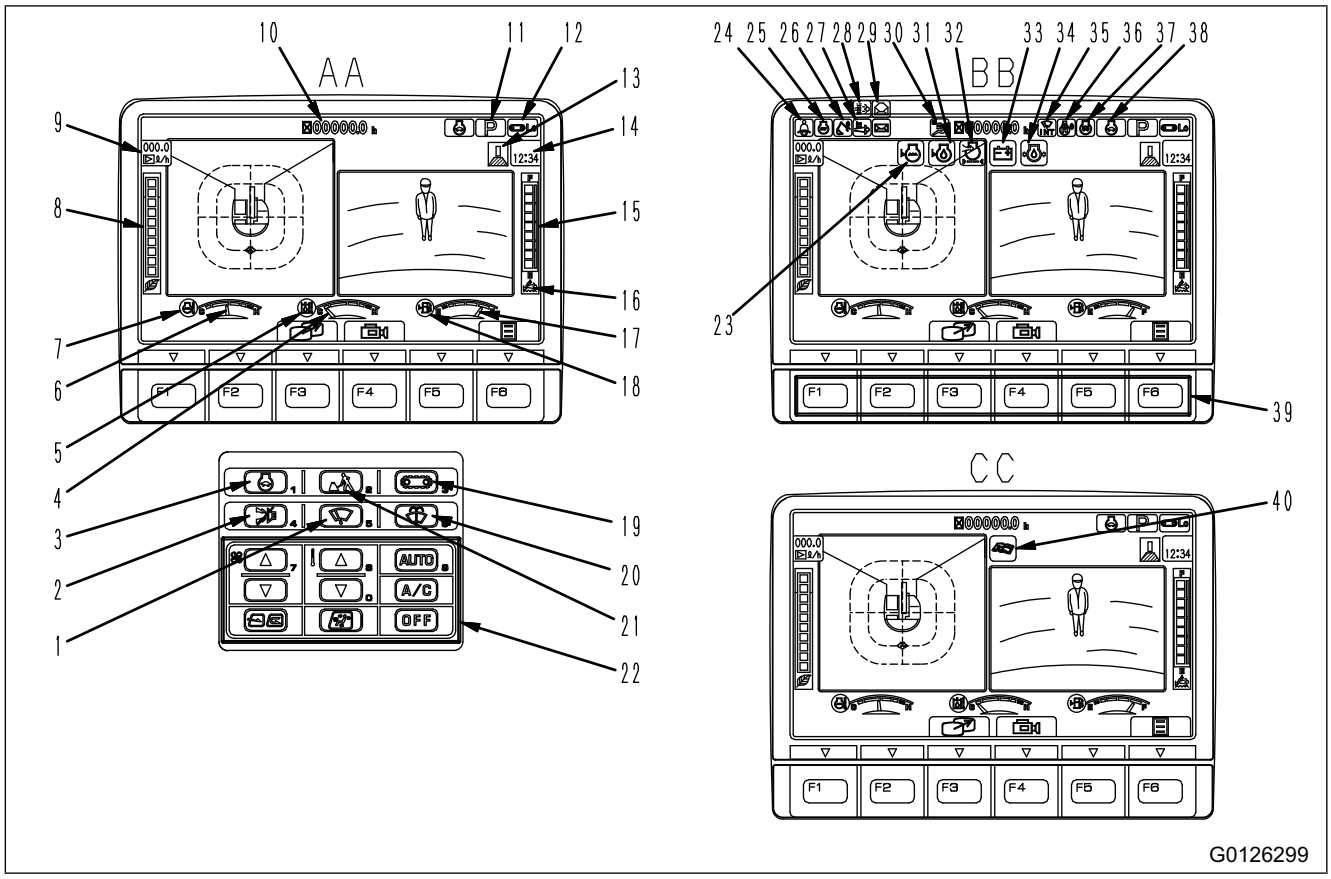
CONTROLS AND GAUGES NAMES



(1) Radio
(2) Lock lever
(3) L.H. work equipment control lever
(4) Travel pedal
(5) Travel lever
(6) Machine monitor
(7) R.H. work equipment control lever
(8) Blade control lever (blade specification)
(9) Starting switch
(10) Fuel control dial
(11) Lamp switch
(12) Swing lock switch
(13) Revolving lamp switch
(14) Attachment control pedal
(15) Seat heater switch
(16) Quick coupler main switch
(17) Quick coupler operation switch
(18) 2nd-line attachment proportional switch

(19) 1st-line attachment proportional switch
(20) Breaker operation switch
(21) Horn switch
(22) Room lamp switch
(23) Pump secondary drive switch
(24) Swing parking brake cancel switch
(25) Lock lever automatic lock cancel switch
(26) Cigarette lighter
(27) Engine shutdown secondary switch
(28) Additional lamp switch
(29) Lower wiper switch (if equipped)

MACHINE MONITOR EQUIPMENT NAME



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

(1) Wiper switch
(2) Buzzer cancel switch
(3) Auto-deceleration switch
(4) 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
(38) Auto-deceleration pilot lamp
(39) Function switches (F1 to F6)
(40) Maintenance time caution lamp

REMARK

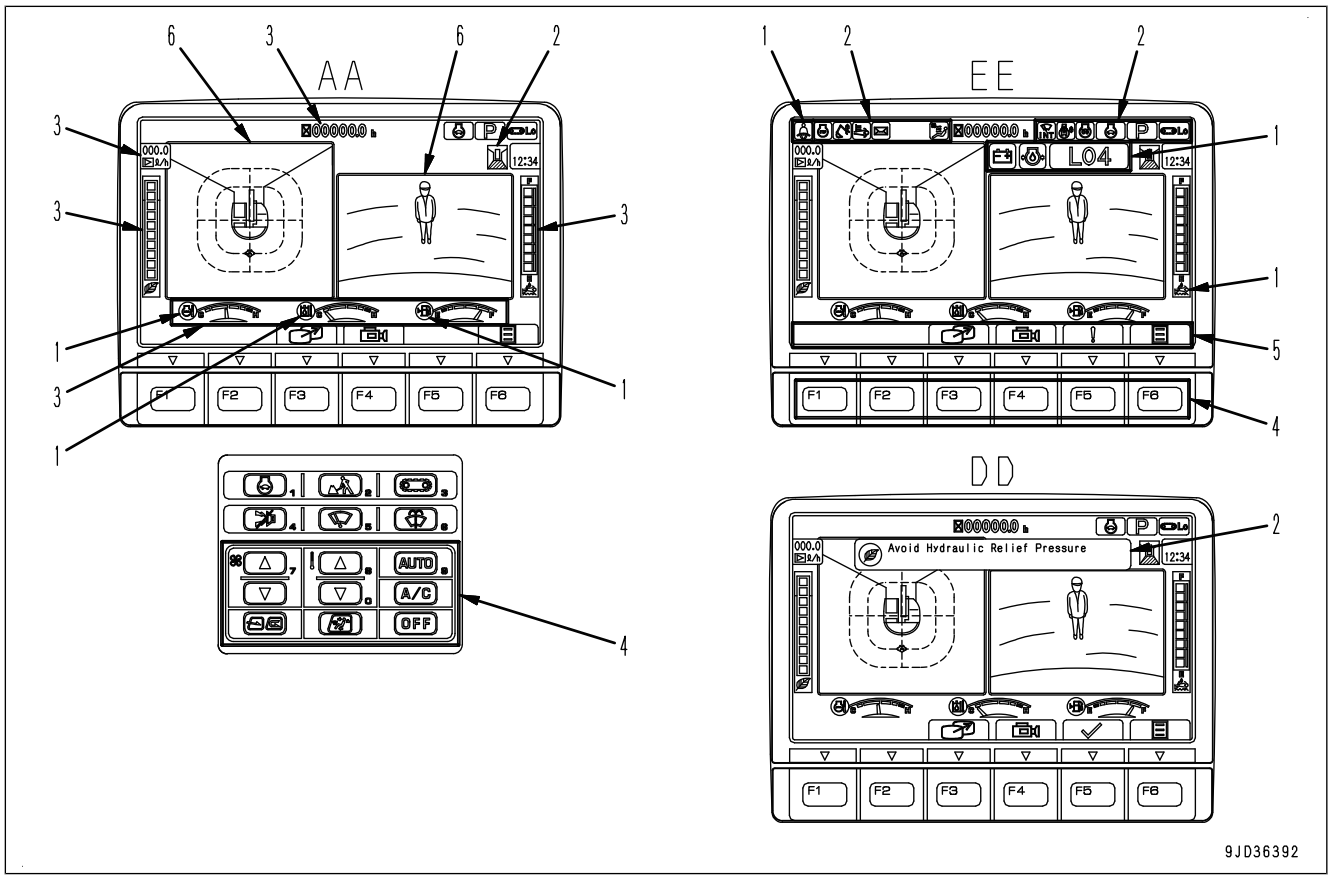
This figure shows only the symbols for primary caution lamps.
For caution lamps which are not shown, see “CAUTION LAMP LIST (3-20)”.

EXPLANATION OF COMPONENTS

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

For the correct, safe, and comfortable operations, understand the methods to operate the equipment, and the contents of the displays correctly.

MACHINE MONITOR EQUIPMENT



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

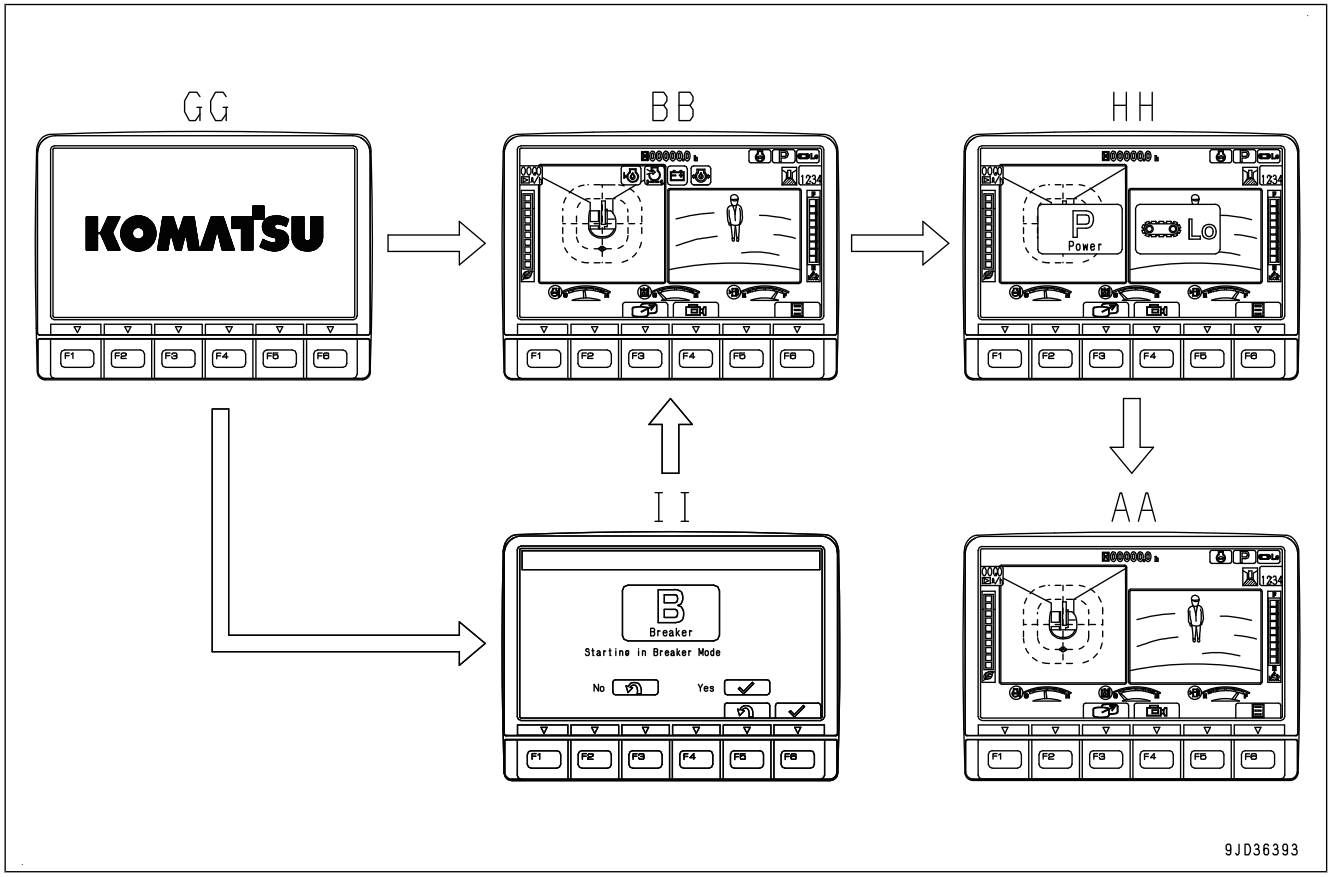
(1) Warning display
(2) Pilot display
(3) Meter display
(4) Monitor switch part
(5) Guidance icon display
(6) Camera image display

REMARK

- If environmental temperature of the machine monitor is high, the brightness can be automatically reduced to protect the liquid crystal.
- The brightness or color of the objects shown on the screen changes in some cases because of the automatic adjustment function of the camera.

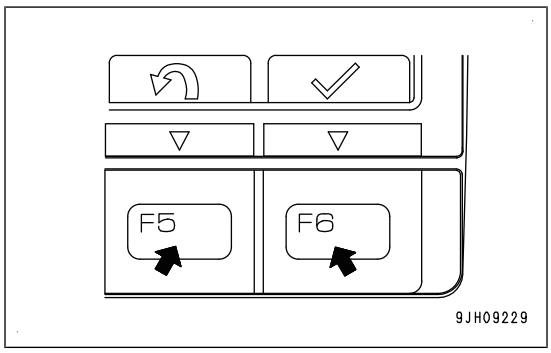
BASIC OPERATION OF MACHINE MONITOR

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



- When you turn the starting switch to the ON position, the start screen GG is shown.
- 2 seconds after the start screen GG is shown, the screen changes to the check before starting screen BB.
- 2 seconds after the check before starting screen BB is shown, the screen changes to the working mode/ travel mode display screen HH.
- 2 seconds after the working mode/travel mode display screen HH is shown, the screen changes to the standard screen AA.
- When you turn the starting switch to the ON position, if the working mode is B mode, 2 seconds after the start screen GG is shown, the screen changes to the breaker mode confirmation screen II.

When you start 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.



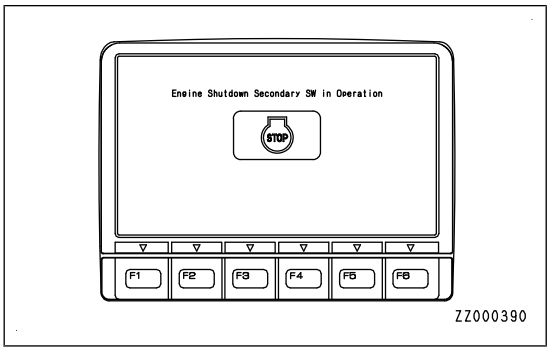
REMARK

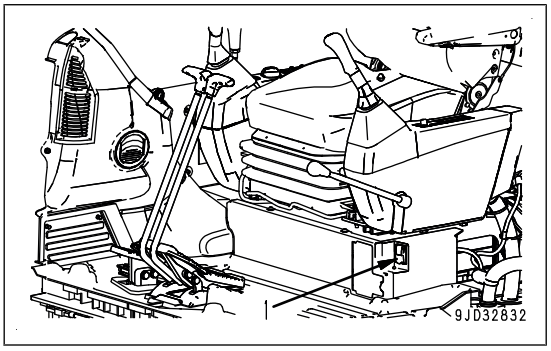
When the engine is started, the battery voltage can decrease suddenly by the temperature and the battery condition. In such case, the machine monitor will start again in some cases. It is not a problem.

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

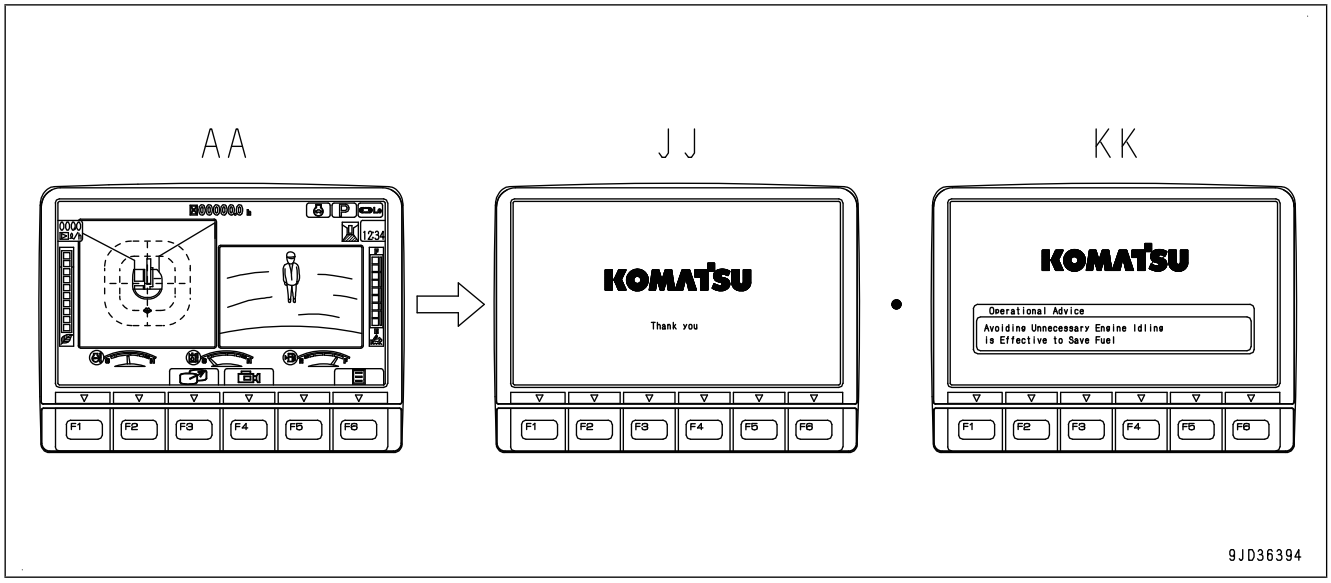
If the starting switch key is turned to the ON position while the engine shutdown secondary switch (1) is set to the ON position (engine is stopped), the screen in the figure is shown and the engine cannot be started.

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





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

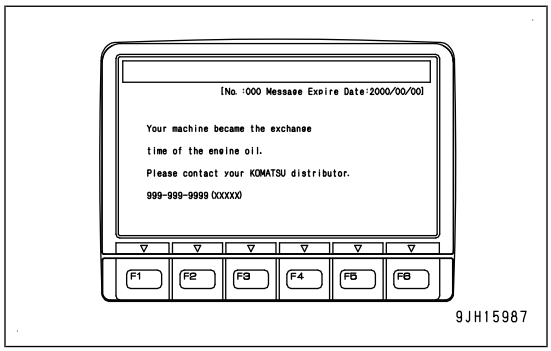


When the starting switch is turned to the OFF position, the end screen JJ or KK is shown for 5 seconds, and the screen goes off.

End screen when there is a message

When there is a message from Komatsu distributor, the message is shown on the end screen.

In such case, turn the starting switch to the ON position to check the message again, and make a reply if it is required.



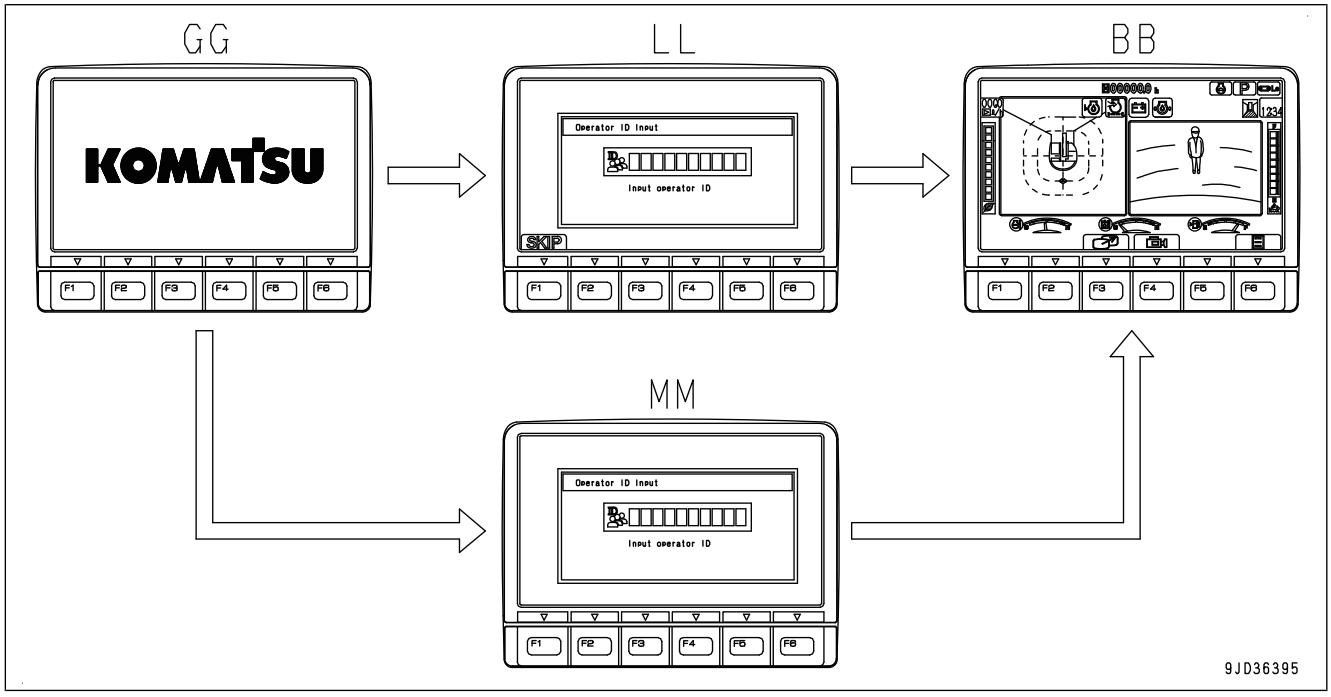
BASIC OPERATION OF MACHINE MONITOR WHEN ID NUMBER OF OPERATOR IDENTIFICATION IS SET WHILE STARTING SWITCH IS ON

NOTICE

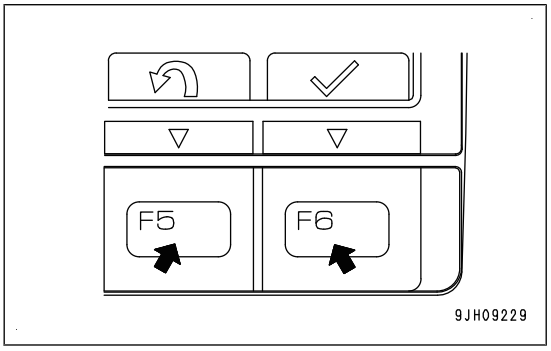
Do not use the operator identification function to enhance the security. The operator identification function has no effect of security enhancement or theft prevention.
We will not be responsible for theft or damage of the machine caused by the actions that follow.

- **Misuse of ID**
- **Unauthorized use of ID by unauthorized person**

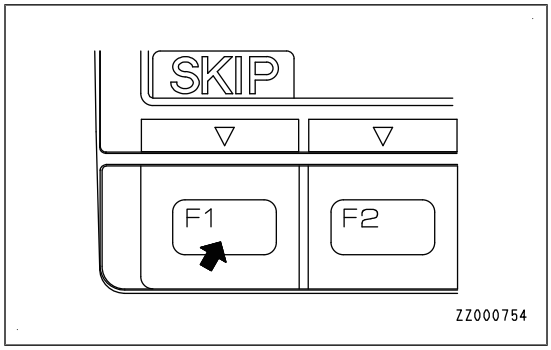
Consult your Komatsu distributor for setting, change, or cancel of the operator identification function.



- If the “ID Number Input (with SKIP)” of “Operator ID Setting” is set, start screen GG changes to “Operator ID Input”(with SKIP) screen LL when you turn the starting switch key to the ON position.
- If the “ID Number Input (without SKIP)” of “Operator ID Setting” is set, start screen GG changes to “Operator ID Input”(without SKIP) screen MM when you turn the starting switch key to the ON position.
- Input the registered ID number on “Operator ID Input” (with SKIP) screen LL or “Operator ID Input” (without SKIP) screen MM, and push the switch F6. The screen changes to the check before starting screen BB. If you input an incorrect ID number, push the switch F5, and delete it one character at a time.



When the switch F1 is pushed on “Operator ID Input” (with SKIP) screen LL, the screen changes to the check before starting screen BB without ID number input.



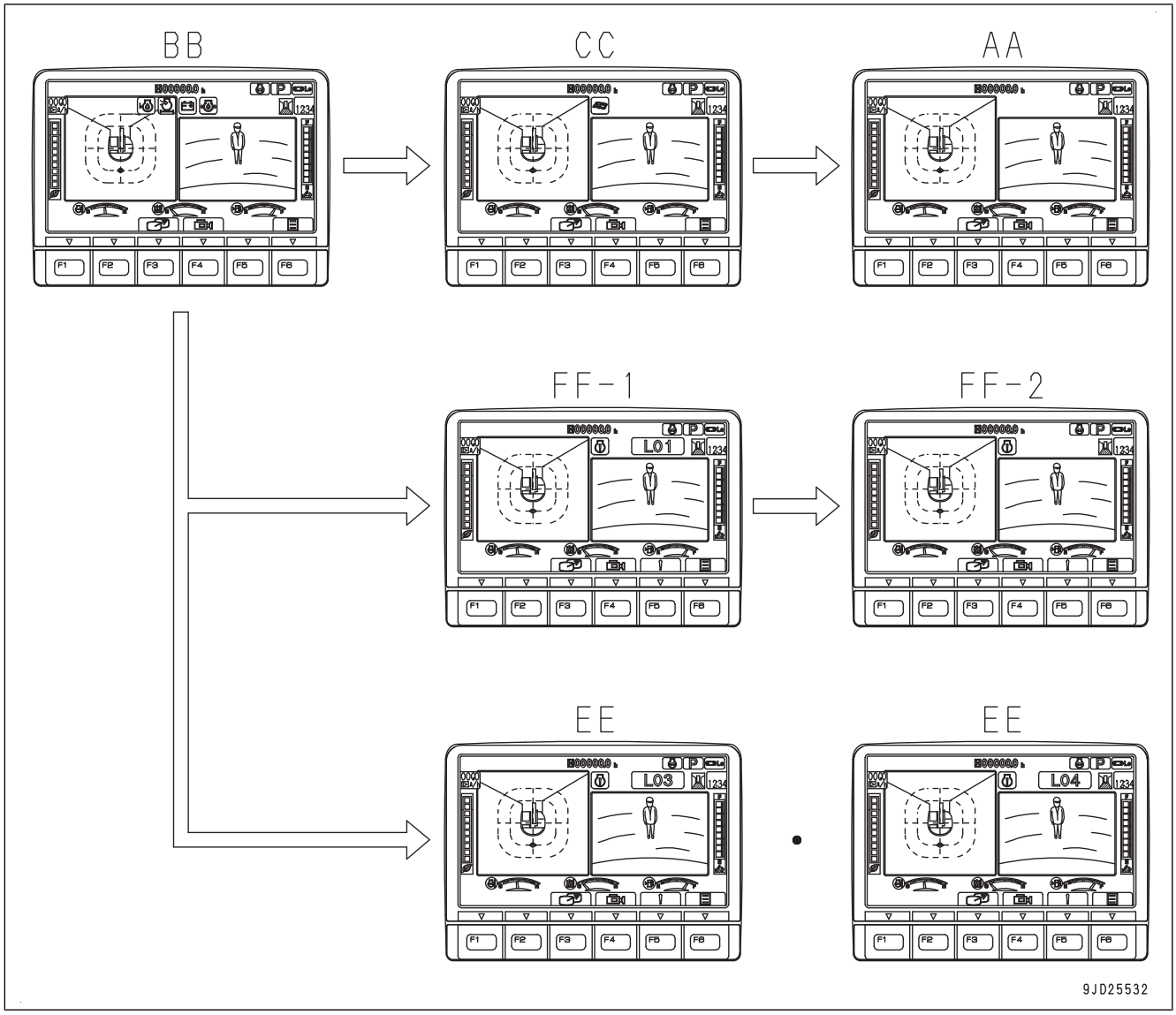
If you input an incorrect ID number for 3 times, you cannot input the ID number in the next 5 minutes. Wait for 5 minutes or more, and enter the ID number again.

As long as “Operator ID Input” screen is shown, the engine cannot be started. If you forget the ID number and cannot start the engine, check the ID number with the administrator of the vehicle.

REMARK

Even if the ID number input is set for “Operator ID Setting”, “Operator ID Input” (with SKIP) screen LL or “Operator ID Input” (without SKIP) screen MM is not shown in some setting values of “Operator ID Holding Time with Key OFF” in setting items in operator identification function.

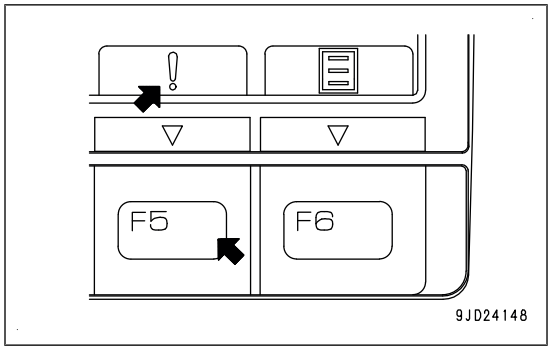
BASIC OPERATION OF MACHINE MONITOR WHEN YOU START ENGINE IN ABNORMAL SITUATION

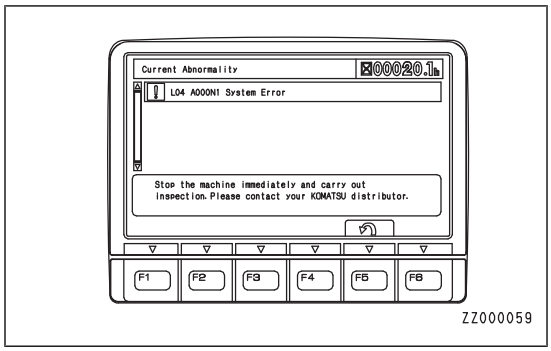


- If there is a problem when you start the engine, the check before starting screen BB changes to the maintenance time warning screen CC, warning screen FF, or error screen EE.
- After the check before starting screen BB is shown for 2 seconds, the screen changes to the maintenance time warning screen CC.
- After the maintenance time warning screen CC is shown for 30 seconds, the screen changes to the standard screen AA.
- 2 seconds after the check before starting screen BB is shown, the screen changes to the warning screen FF or error screen EE.

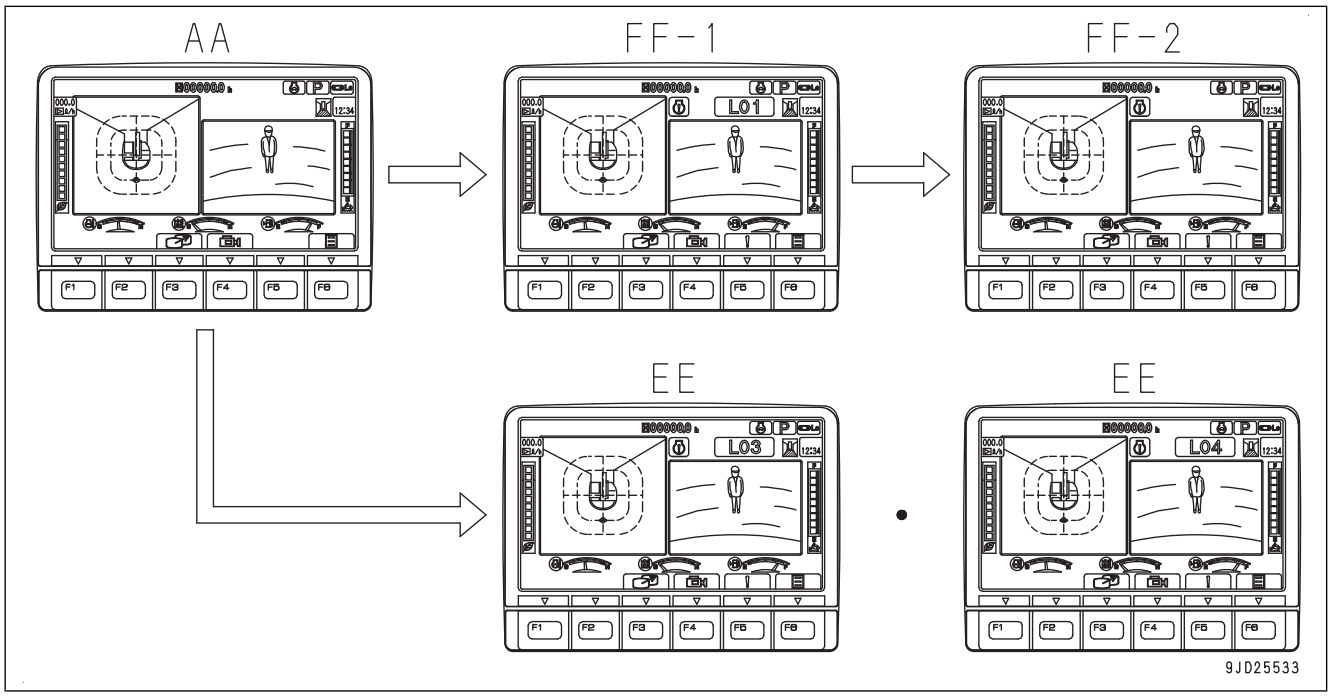
If there is any error existing, “ ! ” is shown on top of switch F5. switch F5.

Press switch F5 to check the detail of the current abnormality. “Current Abnormality” screen is shown.





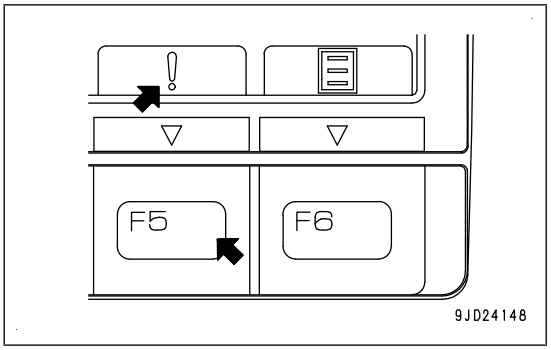
BASIC OPERATION OF MACHINE MONITOR WHEN TROUBLE OCCURS WHILE OPERATE MACHINE

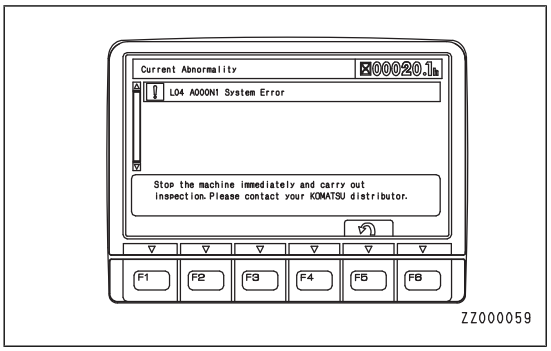


- If a problem occurs during the work, the standard screen AA changes to the warning screen FF-(1) or the error screen EE.
- After the warning screen FF-(1) is shown for 2 seconds, the screen changes automatically to the warning screen FF-(2).

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

Press switch F5 to check the detail of the error. “Current Abnormality” screen is shown.

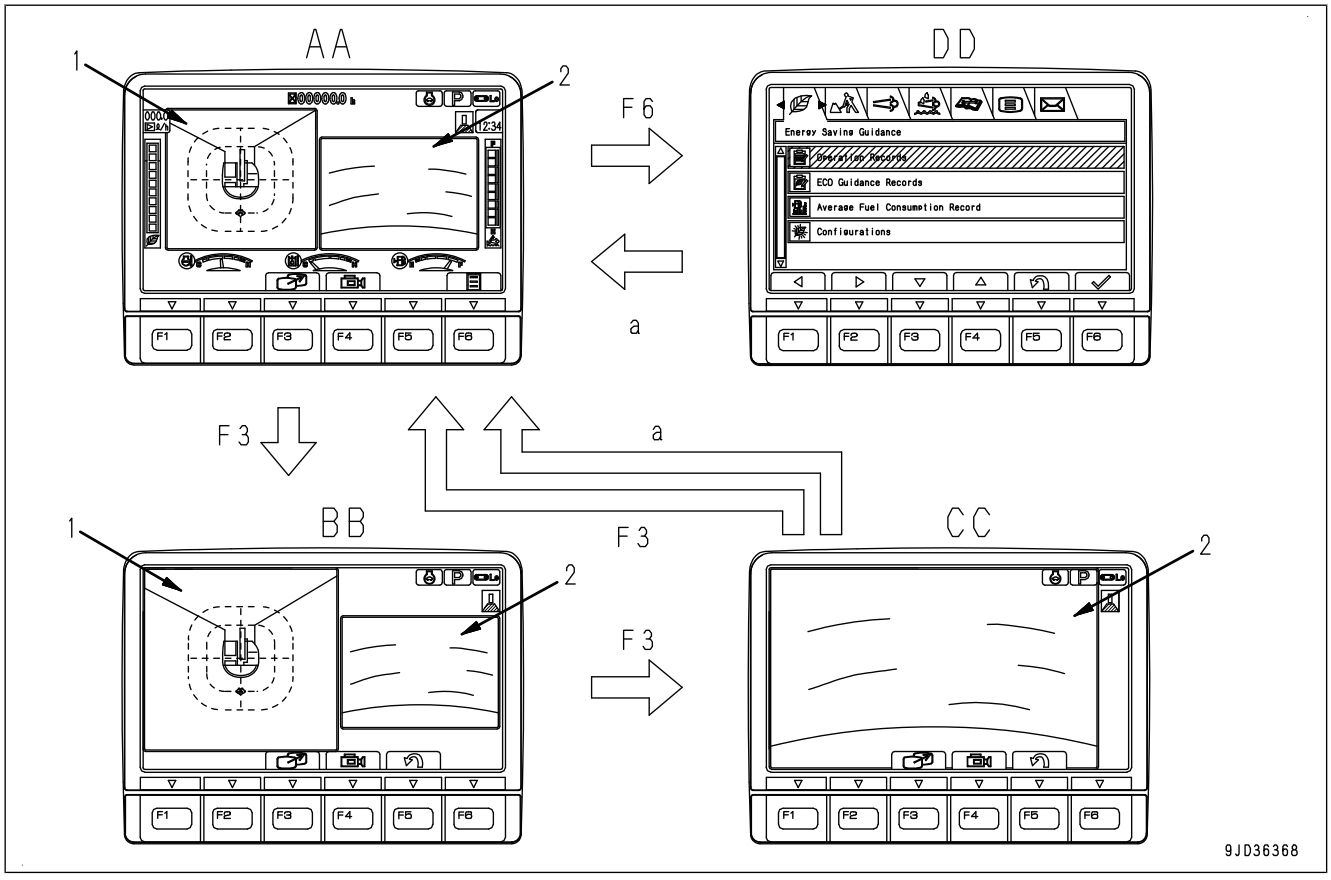




BASIC OPERATION OF MACHINE MONITOR WHEN YOU OPERATE WORK EQUIPMENT, SWING, TRAVEL, AND ATTACHMENTS

When you do the operations that follow, the screen changes to the screen which shows images of bird's eye view display of KomVision and camera.

- Work equipment operation
- Swing operation
- Travel operation
- Attachment operation



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) Image of bird's eye camera (2) Image of camera

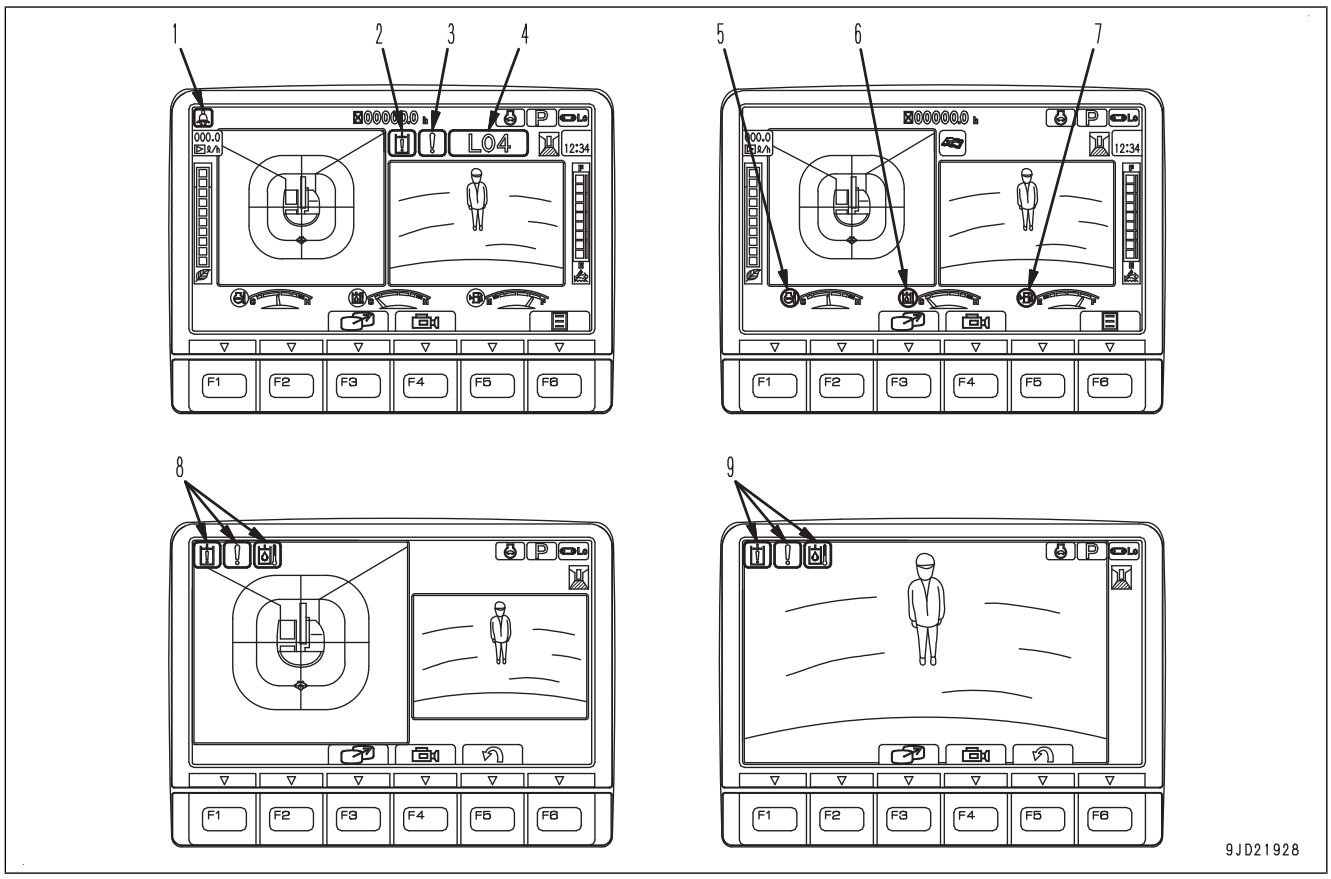
(a) Starting operation of work equipment, swing, travel and attachment

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

WARNING DISPLAY

NOTICE

If one of action levels “L01” to “L04” is shown on the machine monitor, there is a problem on the machine. Do the applicable action instructed on the “List of action level displays and required actions”.
The caution lamp lights up in red when an action level is shown, and it gives a warning to stop the machine immediately, or to stop the current operation temporarily. Do the action immediately. If no action is taken, it can have serious effects on the machine.



(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)

When 1 warning occurs, it is shown on the caution lamp (2).

When 2 warnings occur, they are shown on the caution lamps (2) and (3).

When 3 or more of warnings occur, they are shown on the caution lamps (2) and (3) alternately at intervals of 2 seconds.

Full-screen camera image display

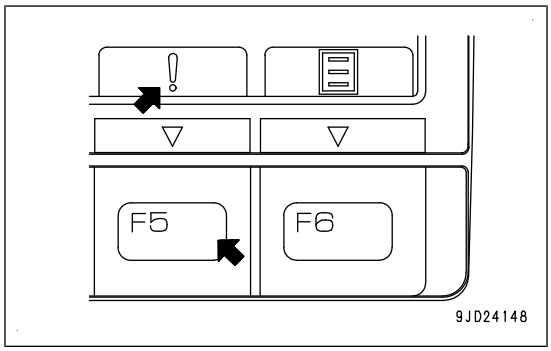
The occurred warning is shown by flashing of the caution lamp (9).

If 2 or more warnings occur, they are shown in the order from the left end of the screen.

ACTION LEVEL DISPLAY

The action level shows the degree of urgency of the problem currently found on the machine by “L01” to “L04”. The larger the number in the table is, the more dangerous effects the problem can have on the machine if it is left with no action.

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



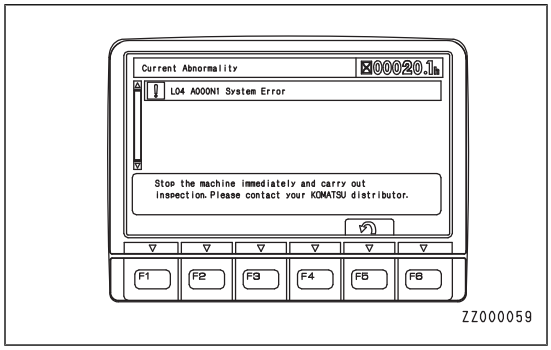
List of action level displays and required actions

Degree of urgency	Action level	Buzzer	Color of caution lamp	Action
High ↑ ↓ Low	L04	Operates continuously	Lights up in red	Stop the machine immediately and consult your Komatsu distributor for inspection and maintenance.
	L03	Operates intermittently	Lights up in red	Stop the operation, move the machine to a safe area, and consult your Komatsu distributor for inspection and maintenance.
	L02	Operates intermittently	Lights up in red	Stop the operation, and then run the engine at medium speed with no load or stop the engine. If the condition does not become better, consult your Komatsu distributor for inspection and maintenance.
	L01	Does not operate	Lights up in yellow	Some functions can be restricted, but the machine can be operated. When you complete the operation, be sure to do the inspection and maintenance. Consult your Komatsu distributor for inspection and maintenance as needed.

If an action level is shown on the machine monitor, check the message shown on the monitor.

When you push the switch F5 while the action level is shown on the machine monitor, “Current Abnormality” screen is shown.

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



CAUTION LAMP LIST

NOTICE

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

Caution lamp and color

Symbol	Type of caution lamp	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)	-	-	-
 9JD20486	Fan control system caution lamp	Abnormal (L03)	Abnormal (L01)	-	-
 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)	-	-

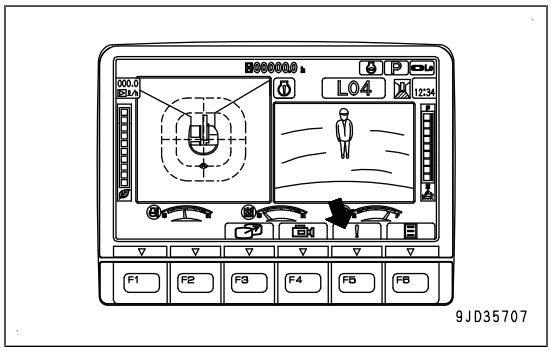
For the explanation of caution lamps and required actions, see the section of the caution lamps.

CURRENT ABNORMALITY DISPLAY SWITCH

When there is an error, “!” is shown above the switch F5.

If you push the switch F5 when “!” is shown, you can change the screen on the monitor display to the “Current Abnormality” screen.

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



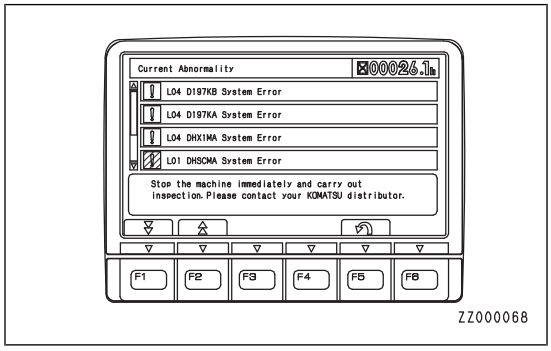
Operation on the “Current Abnormality” screen

On the “Current Abnormality” screen, you can do the operations that follow with the switches F1, F2, and F5.

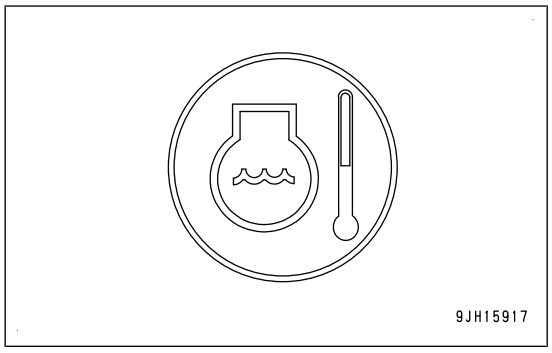
F1: Shows the next page. When on the last page, it shows the first page.

F2: Shows the previous page. When on the first page, it shows the last page.

F5: The screen goes back to the standard screen.



ENGINE COOLANT TEMPERATURE CAUTION LAMP



The engine coolant temperature caution lamp gives a warning about states caused by engine coolant temperature.

When abnormal

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

The engine coolant temperature is abnormally high.

While it is lit, the overheat prevention system is automatically activated, and the engine speed decreases.

Stop the operation, and keep the engine at low idle state until the caution lamp shows display color at correct temperature (blue light).

When temperature is low

The caution lamp lights up in white.

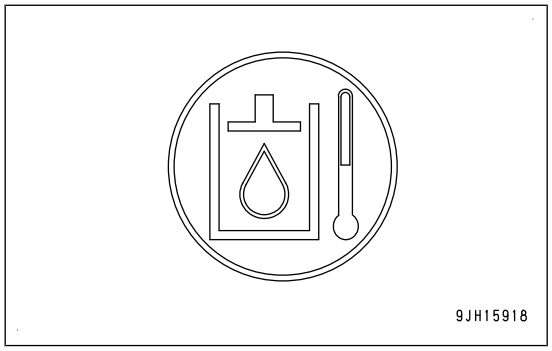
The engine coolant temperature is low.

The engine needs the warm-up operation. Do the warm-up operation for the engine until the caution lamp shows the display color (blue light) at the correct temperature. For details, see “ENGINE WARM-UP OPERATION (3-188)”.

When temperature is correct

The caution lamp lights up in blue.

HYDRAULIC OIL TEMPERATURE CAUTION LAMP



The hydraulic oil temperature caution lamp gives a warning about states caused by hydraulic oil temperature.

When abnormal

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

The hydraulic oil temperature is abnormally high.

Stop the operation, and run the engine at low idle or stop it until the caution lamp changes to the display color (blue) at the correct temperature.

When temperature is low

The caution lamp lights up in white.

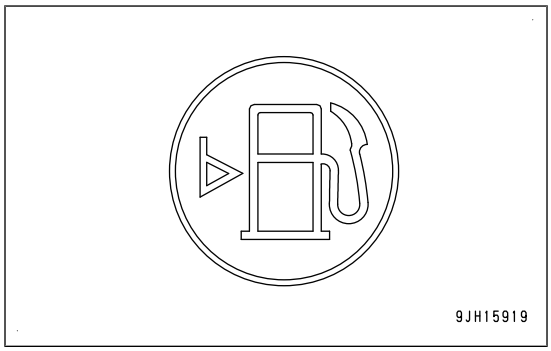
The hydraulic oil temperature is low.

It is necessary to warm up the hydraulic component. Do the warm-up operation for the hydraulic component until the caution lamp changes to the display color (blue) at the correct temperature. For details, see “HYDRAULIC SYSTEM WARM-UP OPERATION (3-190)”.

When temperature is correct

The caution lamp lights up in blue.

FUEL LEVEL CAUTION LAMP



The fuel level caution lamp gives a warning about low level of remaining fuel.

When fuel level is low

The caution lamp lights up in red.

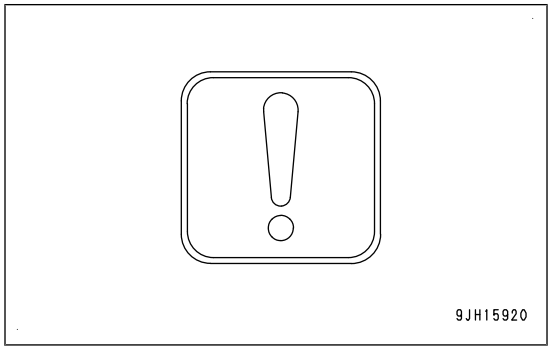
The remaining fuel quantity has been reduced to approximately 32ℓ or below.

Add fuel shortly.

When normal

The caution lamp lights up in blue.

SYSTEM CAUTION LAMP



The system caution lamp gives a warning about a problem in the machine system such as sensors.

When the action level “L04” is shown

The caution lamp lights up in red, and the alarm buzzer operates continuously.

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

When the action level “L03” is shown

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

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

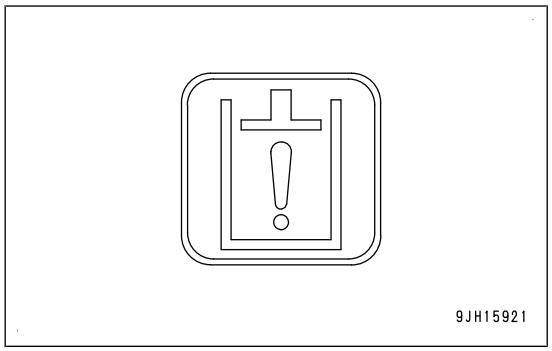
When the action level “L01” is shown

The caution lamp lights up in yellow.

Some functions can be restricted, but the machine can be operated.

When you complete the operation, be sure to do the inspection and maintenance. Consult your Komatsu distributor for inspection and maintenance as needed.

HYDRAULIC SYSTEM CAUTION LAMP



The hydraulic system caution lamp gives a warning about an abnormality in the hydraulic system.

When the action level “L04” is shown

The caution lamp lights up in red, and the alarm buzzer operates continuously.

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

When the action level “L03” is shown

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

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

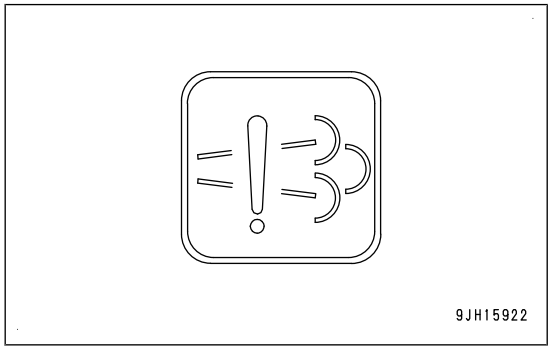
When the action level “L01” is shown

The caution lamp lights up in yellow.

Some functions can be restricted, but the machine can be operated.

When you complete the operation, be sure to do the inspection and maintenance. Consult your Komatsu distributor for inspection and maintenance as needed.

KDPF SYSTEM CAUTION LAMP



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

When the action level “L04” is shown

The caution lamp lights up in red, and the alarm buzzer operates continuously.

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

When the action level “L03” is shown

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

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

When the action level “L01” is shown

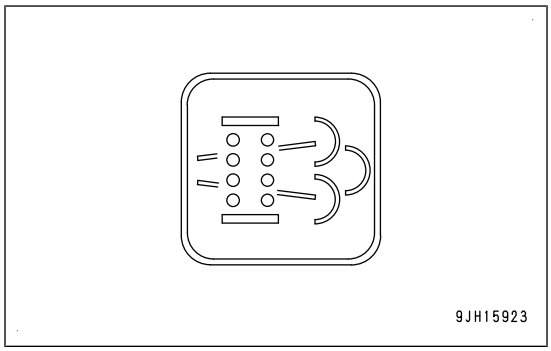
The caution lamp lights up in yellow.

Some functions can be restricted, but the machine can be operated.

When you complete the operation, be sure to do the inspection and maintenance. Consult your Komatsu distributor for the inspection and maintenance as needed.

KDPF SOOT ACCUMULATION CAUTION LAMP

The KDPF soot accumulation caution lamp gives a warning that the soot is accumulated in KDPF or the filtering function of KDPF lowered abnormally.



When abnormal

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

System failure occurs as excessive quantity of soot is accumulated or filter function is reduced.

Stop the operation, move the machine to a safe area, and do the manual stationary regeneration.

The regeneration can start automatically to protect the KDPF system.

When soot is accumulated

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

Much soot is accumulated in KDPF, but the operation is possible.

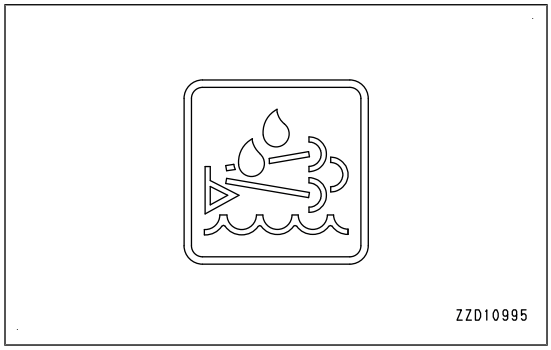
When you complete the operation, move the machine to a safe area and do the manual stationary regeneration.

DEF LEVEL CAUTION LAMP

The DEF level caution lamp gives a warning about low level of remaining DEF.

Add DEF shortly.

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



When caution lamp lights up in red

When the action level “L04” is shown

The caution lamp lights up in red, DEF tank level is too low.

The warning state is “Severe Inducement”.

The engine output is lowered largely.

When the action level “L03” is shown

DEF tank level is too low.

The warning state is “Low level Inducement”.

The engine output is lowered.

No action level is shown

- The warning state is “Continuous Warning”.
  DEF tank level is too low.
  Add DEF shortly not to let the warning step go further.
- The warning state is “Warning”.
  DEF tank level is too low.
  Add DEF shortly.

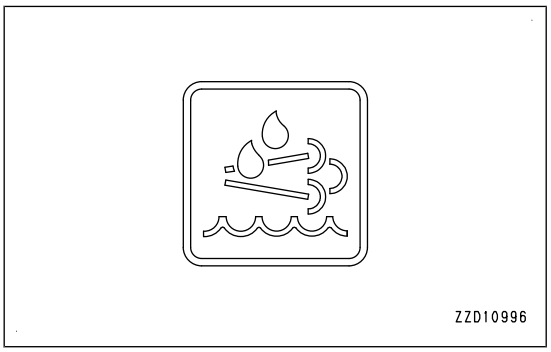
When lamp lights up in white

The tank level sensing is not done correctly.

- When DEF is frozen.

- When the fluctuation of DEF tank level is large.
- When DEF is added after the engine starting switch is turned to the OFF position.
- When DEF tank level sensor is defective.

DEF SYSTEM CAUTION LAMP



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

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

When the action level “L04” is shown

The caution lamp lights up in red.

The warning state is “Severe Inducement”. The engine output is lowered largely.

When the action level “L03” is shown

The caution lamp lights up in red.

The warning state is “Low level Inducement”. The engine output is lowered.

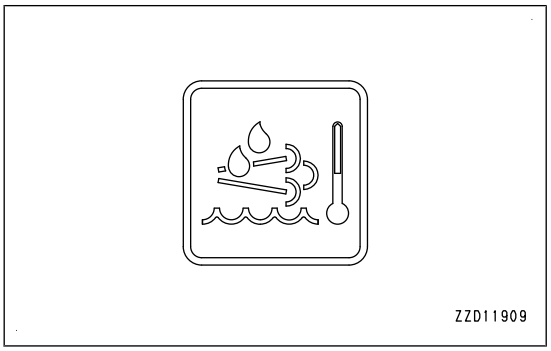
When the action level “L01” is shown

The caution lamp lights up in yellow.

The warning state is “Warning” or “Continuous Warning”.

If no maintenance is done in “Continuous Warning”, the machine goes to the next Inducement status. The engine output is lowered.

DEF SYSTEM HIGH TEMPERATURE STOP CAUTION LAMP



The DEF system high-temperature stop caution lamp gives a warning when the times of engine stop in the condition of high temperature of DEF system exceeds the specified number of times.

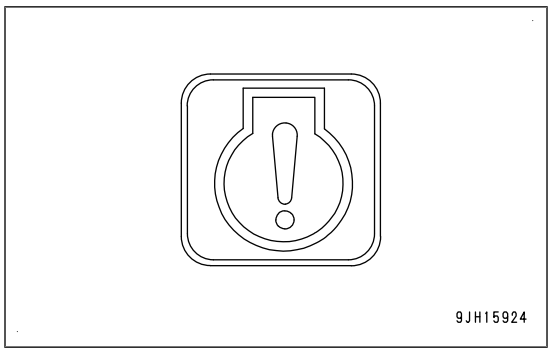
When the caution lamp lights up in yellow, consult Komatsu distributor for inspection and maintenance as needed.

To stop the engine, after you run it at low idle for approximately 5 minutes.

ENGINE SYSTEM CAUTION LAMP

⚠ CAUTION

There is a danger that the machine will have an unwanted serious effect if you continue operation with the red caution lamp lit. Stop the engine immediately.



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

When the action level “L04” is shown

The caution lamp lights up in red, and the alarm buzzer operates continuously.

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

When the action level “L03” is shown

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

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

When the action level “L01” is shown

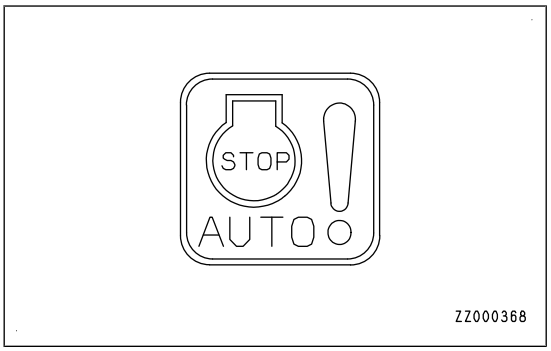
The caution lamp lights up in yellow.

Some functions can be restricted, but the machine can be operated.

When you complete the operation, be sure to do the inspection and maintenance. Consult your Komatsu distributor for inspection and maintenance as needed.

CAUTION LAMP FOR ENGINE SUDDEN STOP BY AUTO IDLE STOP

Caution lamp for engine sudden stop by auto idle stop gives caution for abnormality when engine stops suddenly by auto idle stop more than specific number of times.



When the action level “L03” is shown

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

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

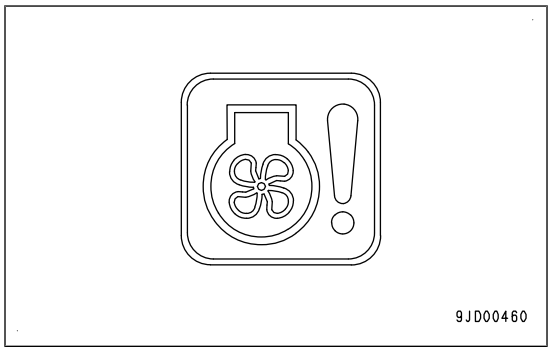
When the action level “L01” is shown

The caution lamp lights up in yellow.

There is a possibility that the engine durability is decreased, but the work can be done.

When you complete the operation, be sure to do the inspection and maintenance. Consult your Komatsu distributor for inspection and maintenance as needed.

FAN CONTROL SYSTEM CAUTION LAMP



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

When action level “L03” is displayed

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

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

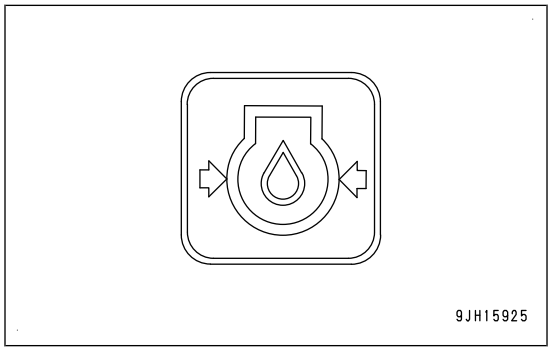
When action level “L01” is displayed

The caution lamp lights up in yellow.

Some functions can be restricted, but the machine can be operated.

When you complete the operation, be sure to do the inspection and maintenance. Consult your Komatsu distributor for inspection and maintenance as needed.

ENGINE OIL PRESSURE CAUTION LAMP



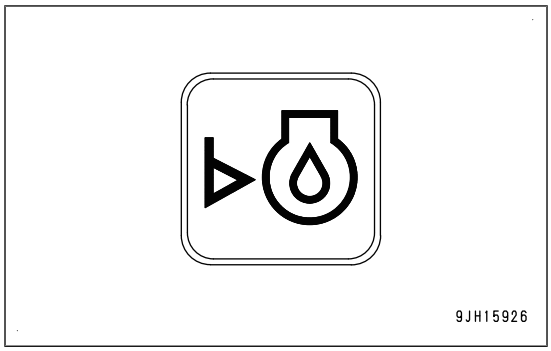
The engine oil pressure caution lamp gives a warning about a problem of the engine lubricating oil pressure.

When oil pressure is low

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

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

ENGINE OIL LEVEL CAUTION LAMP



The engine oil level caution lamp gives a warning about decrease of engine oil level.

It is shown only while the engine is stopped.

When engine oil level is low

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

The engine oil level in oil pan is low.

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

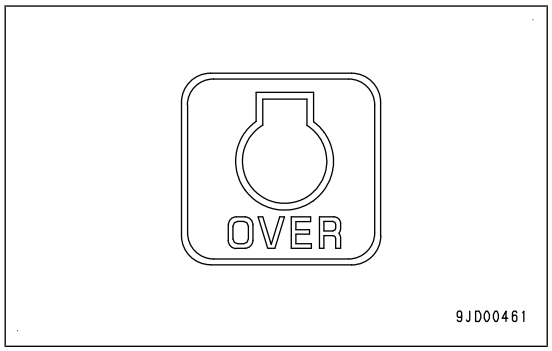
For detail, see “CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (3-158)”.

If it occurs againg in a short time, the engine oil possibly leaks from engine.

Consult your Komatsu distributor for the inspection and maintenance.

ENGINE OVERRUN CAUTION LAMP

The engine overrun caution lamp gives a warning about the overspeed of the engine.



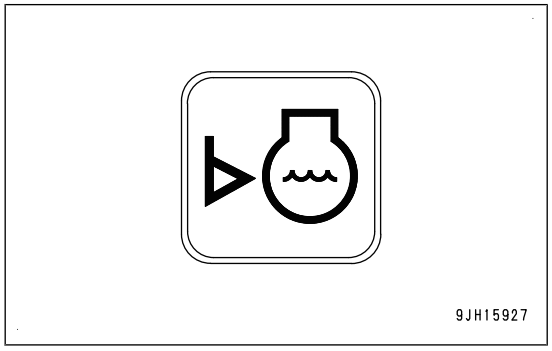
When engine overspeeds

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

Stop the work immediately, and operate the machine with moderate travel speed until the engine overrun caution lamp goes off. If you continue to do the work, there is a danger that it can damage the engine and hydraulic devices.

RADIATOR COOLANT LEVEL CAUTION LAMP

The radiator coolant level caution lamp gives a warning about the decrease of the radiator coolant level.



When the coolant level is continuously low

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

Stop the operation, move the machine to a safe area, and check the coolant level in the radiator and add coolant. For details, see “CHECK COOLANT LEVEL, ADD COOLANT (3-157)”.

When the coolant level is low

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

The radiator coolant level is low.

Check the coolant level in the reservoir tank of the radiator and add coolant. For details, see “CHECK COOLANT LEVEL, ADD COOLANT (3-157)”.

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

CHARGE LEVEL CAUTION LAMP

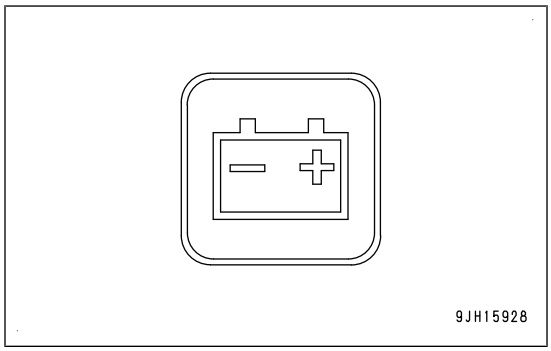
The charge level caution lamp gives a warning about a problem in the charge system while the engine is in operation.

When abnormal

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

The battery is not charged correctly while the engine is in operation.

Stop the engine and check the fan belt for damage. Then consult your Komatsu distributor for inspection and maintenance.



AIR CLEANER CLOGGING CAUTION LAMP

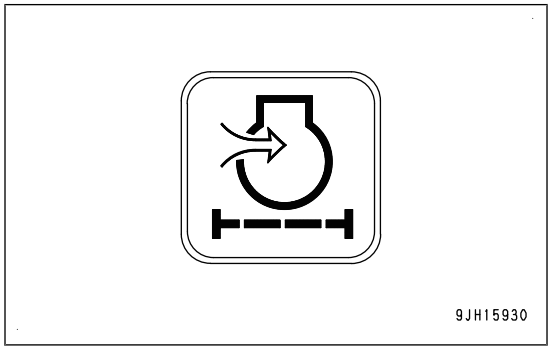
The air cleaner clogging caution lamp gives a warning that the air cleaner is clogged.

When clogged

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

The air cleaner is clogged.

Stop the engine. Then, check and clean the air cleaner. For details, see “CHECK, CLEAN AND REPLACE AIR CLEANER (4-19)”.



AIR CONDITIONER SYSTEM CAUTION LAMP

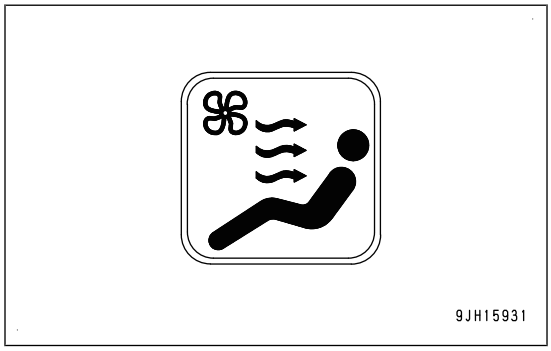
The air conditioner system caution lamp shows an abnormality in the air conditioner system.

When abnormal

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

A problem is found in the air conditioner system.

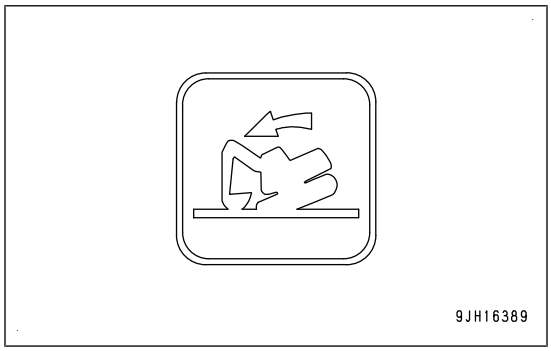
Consult your Komatsu distributor for the inspection and maintenance as fast as possible.



OVERLOAD CAUTION LAMP

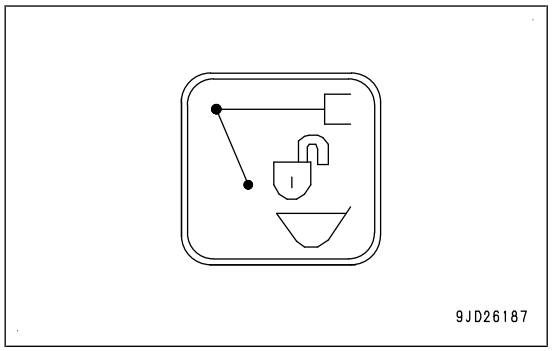
The overload caution lamp warns that the machine is close to tipping due to the load (an audible warning is also given), if the warning is given lower the load.

Refer to the lifting capacity chart for safe load.



HYDRAULIC QUICK COUPLER SYSTEM CAUTION LAMP

This indicator signals that there are faults in the hydraulic quick coupling system.



When there is an abnormality:

The caution lamp lights up in red and the alarm buzzer sounds intermittently and indicates action level “L03”.

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

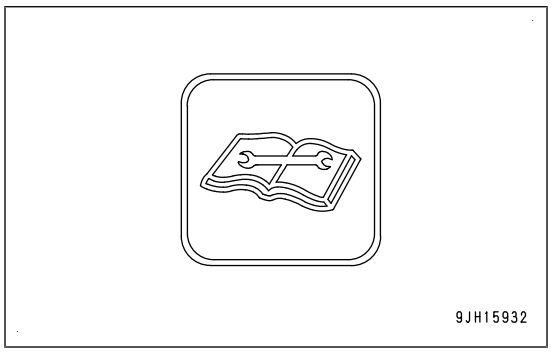
REMARK

This indicator comes on with a red light also when the quick coupler locking/unlocking operations are carried out. In this case the warning indicator emits a continuous sound and the intervention level is not displayed on the monitor. This is therefore not an alarm for an anomaly or fault.

MAINTENANCE TIME CAUTION LAMP

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

It lights up when you turn the starting switch to “ON” position, goes off after 30 seconds, and the screen changes to the standard screen.



When due time is over

The caution lamp lights up in red.

The maintenance due time is over.

If no remedies are taken, the machine performance will deteriorate and the machine life will decrease. Do the necessary maintenance as fast as possible.

When notice is given

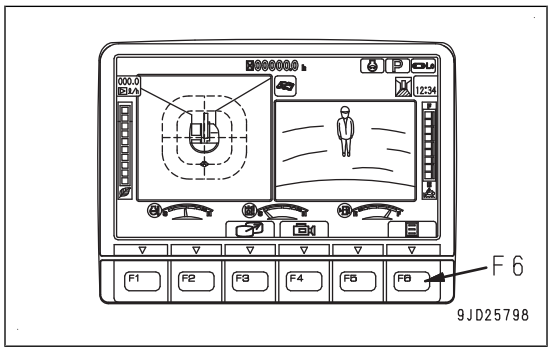
The caution lamp lights up in yellow.

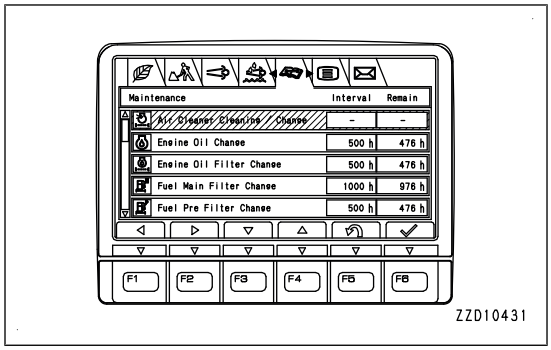
The maintenance time is near.

Prepare the necessary parts for maintenance.

REMARK

- Push the switch F6 on the maintenance time caution screen shown in the right figure or on the standard screen, and check the necessary maintenance item on “Maintenance” tab screen. For the operations on “Maintenance” tab screen, see “MAINTENANCE (3-77)”.
- By default, the maintenance time caution lamp (yellow) is set to light up when the remaining time becomes 30 hours or below. You can change this setting.
  Consult your Komatsu distributor to change it.

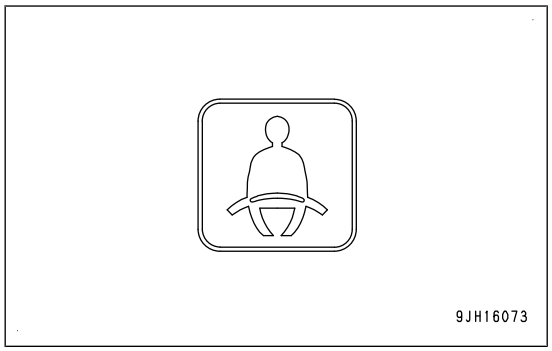




SEATBELT CAUTION LAMP

The seat belt caution lamp is shown when the seat belt is not fastened. It goes off when the seat belt is fastened.

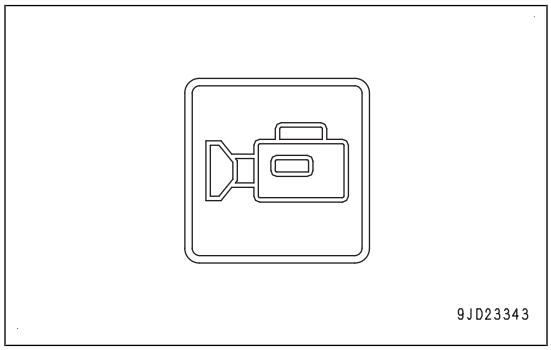
To fasten the seat belt, see “FASTEN AND UNFASTEN SEAT BELT (3-177)”.



CAMERA SYSTEM CAUTION LAMP

⚠ WARNING

Do not move the machine unless the camera image is shown on the machine monitor.
Make sure to have a signalman present when you move the machine to a safe area. If there is a sign, the operator must pay attention to the sign and obey the instructions of the signalman.



The camera system caution lamp gives a warning about the trouble in camera signal caused by breakage in cables, loose and disconnected connectors.

When the action level “L03” is shown

A problem is found in the camera signal.

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

Camera image is not shown on the machine monitor when the caution lamp lights up.

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

When the action level “L01” is shown

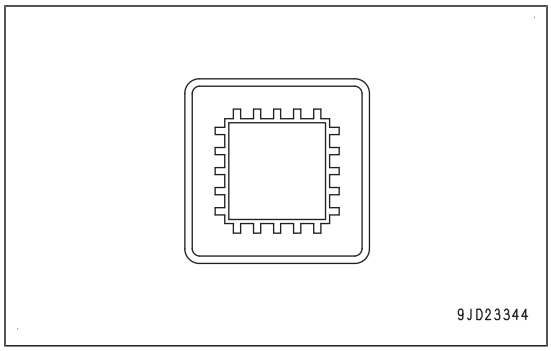
The caution lamp lights up in yellow.

Camera image is not shown on the machine monitor when the caution lamp lights up.

When you operate the machine, visually check the safety around the machine.

When you complete the operation, be sure to do the inspection and maintenance. Consult your Komatsu distributor for inspection and maintenance as needed.

CAMERA CONTROLLER CAUTION LAMP



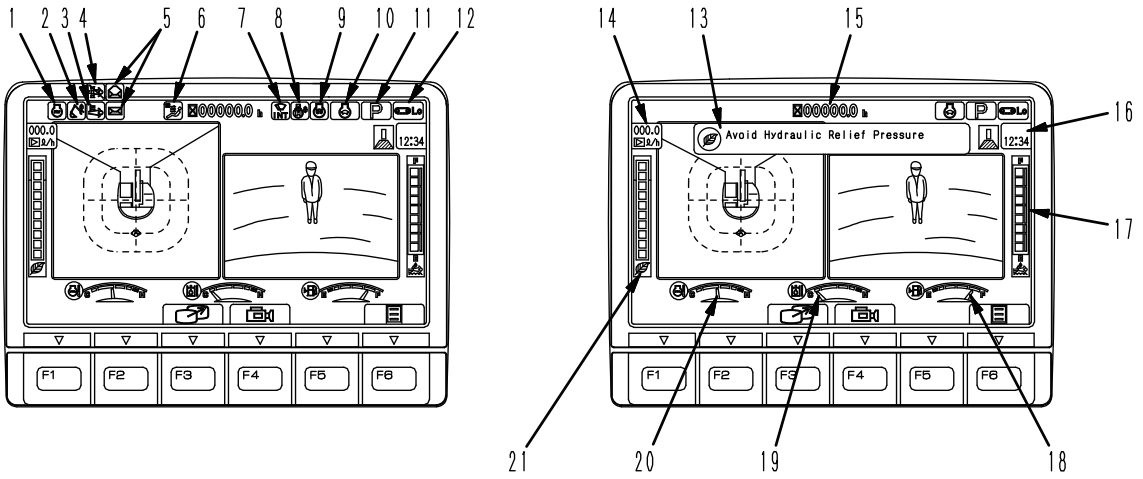
When an abnormality occurs in KomVision system controller, the caution lamp lights up in yellow, and the action level “L01” is displayed.

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) Preheating pilot lamp
(10) Auto-deceleration pilot lamp
(11) Working mode display
(12) Travel speed display
(13) ECO guidance

Meter display

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

PILOT DISPLAY

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

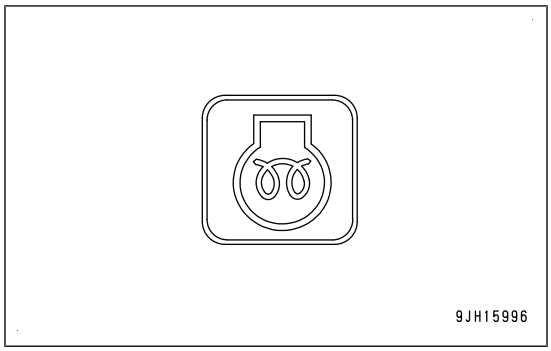
The pilot lamp lights up when each function is in operation while the starting switch is at ON position.

PREHEATING PILOT LAMP

The preheating pilot lamp is shown while the engine at 0℃ or below is preheated before you start it.

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

The maximum automatic preheating time is approximately 30 seconds.



WIPER PILOT LAMP

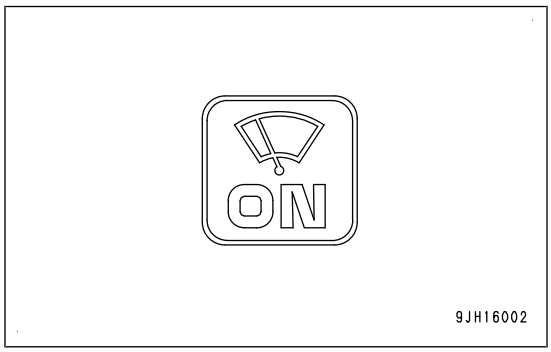
The wiper pilot lamp shows the operation state of the wiper.

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

When ON lights up: Wiper operates continuously

When INT lights up: Wiper operates intermittently

When nothing lights up: Wiper stops



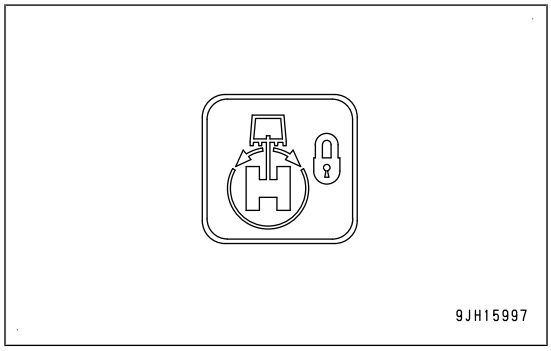
SWING LOCK PILOT LAMP

The swing lock pilot lamp shows the state of the swing parking brake cancel switch.

The pilot lamp display by the swing parking brake cancel switch operation is as follows.

Pilot lamp flashes: Swing parking brake cancel switch ON

Pilot lamp is not lit: Swing parking brake cancel switch OFF



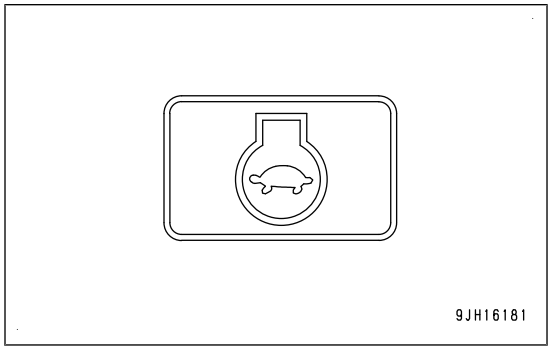
AUTO-DECELERATION PILOT LAMP

The auto-deceleration pilot lamp shows which one of ON or OFF the auto-deceleration function is set.

The pilot lamp display by the auto-deceleration switch operation is as follows.

Pilot lamp is lit: Auto-deceleration is ON

Pilot lamp is not lit: Auto-deceleration is OFF



WORKING MODE DISPLAY

Working mode display shows the working mode which is set for the work.

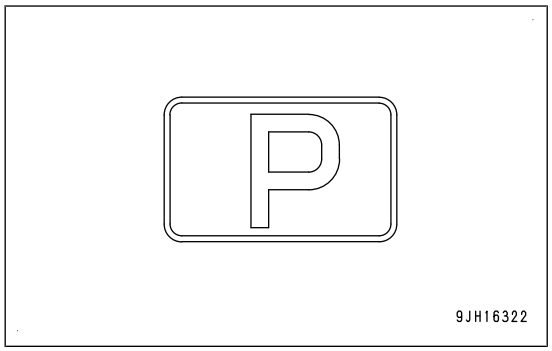
The working mode display with the working mode switch operation is shown as follows.

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

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

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

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



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

“ATT/E”: ATT/E mode (for operations of 2-way attachment like crusher, etc. with emphasis on fuel consumption)

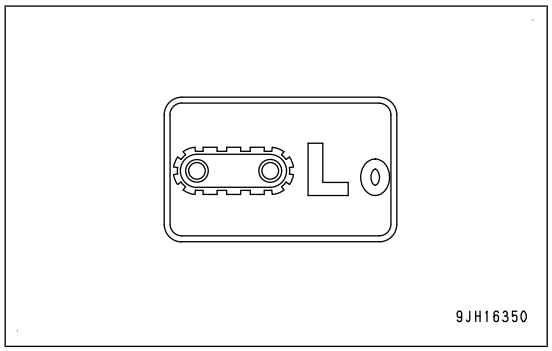
TRAVEL SPEED DISPLAY

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

The travel speed set with the travel speed selector switch operation is shown as follows.

“Lo”: Low-speed travel

“Hi”: High-speed travel

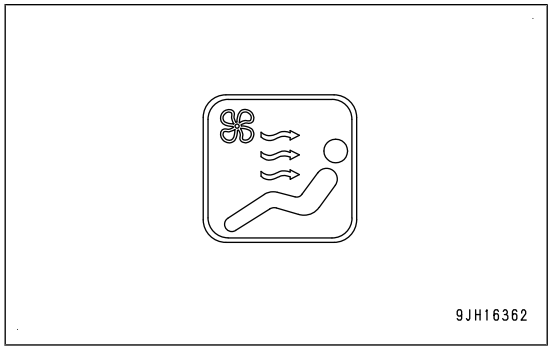


AIR CONDITIONER PILOT LAMP

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

Pilot lamp is lit: Air conditioner ON

Pilot lamp is not lit: Air conditioner OFF



MESSAGE DISPLAY

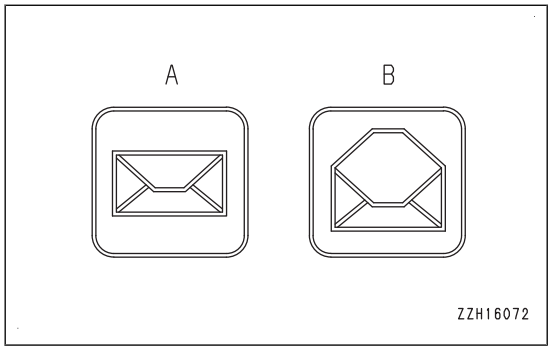
The message display lights up when there is a message from Komatsu.

To read the message, see “MESSAGE DISPLAY (3-87)”.

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

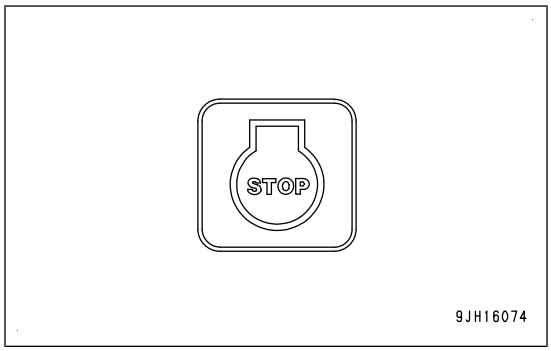
Lights up in blue (B): There is a message to which no reply is made.

OFF: No message



ENGINE STOP PILOT LAMP

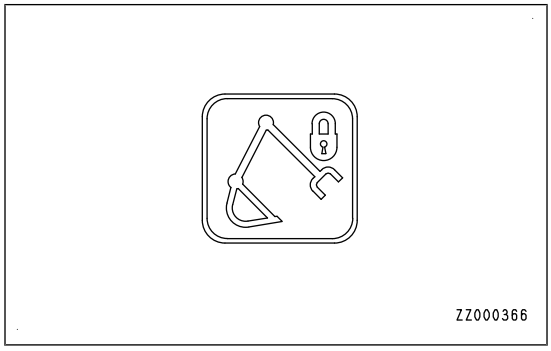
The engine stop pilot lamp is shown while the engine is stopped. It goes off when the engine is started.



WORK EQUIPMENT LOCK PILOT LAMP

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

It lights up when the work equipment lock state changes from release to lock.



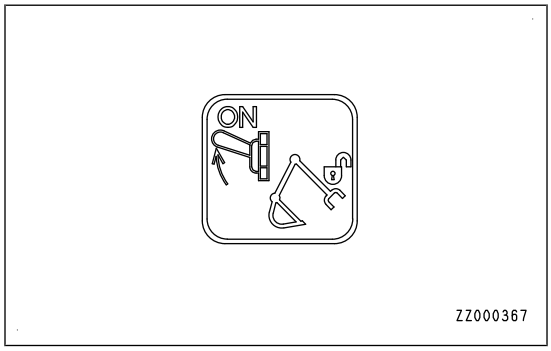
LOCK LEVER AUTOMATIC LOCK CANCEL PILOT LAMP

Lock lever automatic lock cancel pilot lamp shows the state of lock lever automatic lock cancel switch.

The pilot lamp display by the lock lever automatic lock cancel switch operation is as follows.

Pilot lamp flashes: The lock lever automatic lock cancel switch is ON

Pilot lamp is not lit: The lock lever automatic lock cancel switch is OFF

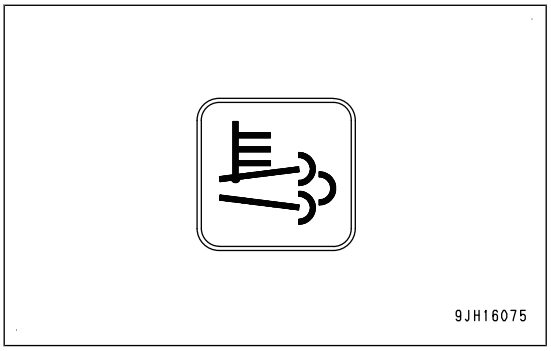


AFTERTREATMENT DEVICES REGENERATION PILOT LAMP

⚠ CAUTION

- **During the aftertreatment devices regeneration, the exhaust gas temperature can become higher than the conventional models. Keep away from the exhaust pipe outlet to prevent burn injury. Do not let the flammable materials come near the exhaust pipe outlet to prevent a fire.**
- **When there are thatched houses, dry leaves or pieces of paper near the job site, set the system to the regeneration disable. It is because to prevent the fire hazards due to exhaust gas caused during the aftertreatment devices regeneration.**

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

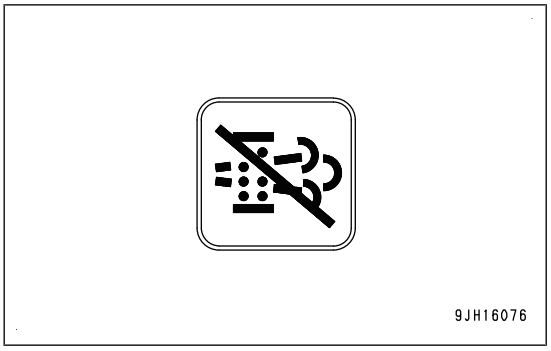


AFTERTREATMENT DEVICES REGENERATION DISABLE PILOT LAMP

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

REMARK

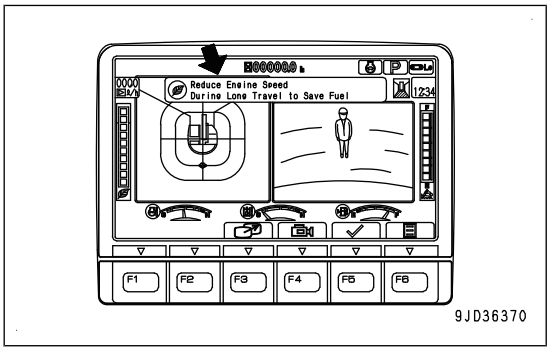
Even if the aftertreatment devices regeneration is disabled, when the manual stationary regeneration is necessary, the KDPF soot accumulation caution lamp lights up. If the KDPF soot accumulation caution lamp lights up, cancel the regeneration disable and do the manual stationary regeneration.



ECO GUIDANCE

Guidance to recommend energy saving operation to decrease the fuel consumption can be shown during operation.

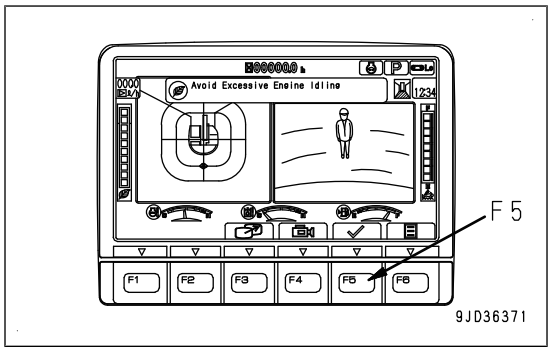
The details of the guidance are as follows.



IDLING STOP GUIDANCE

If no operation is done for 5 minutes or longer, and when the engine runs at idle, “Avoid long time idling.” is shown on the monitor. When you wait for the work or stop operation for a short period, stop the engine to decrease fuel consumption.

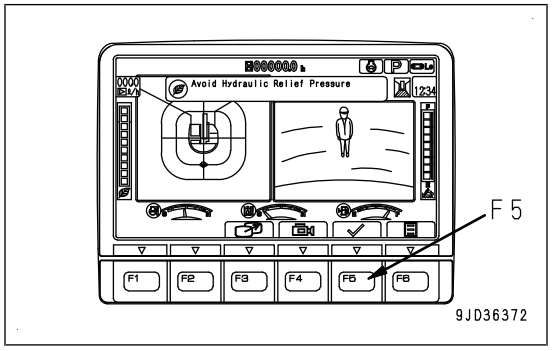
“Idling stop guidance” goes off when you operate the lever again, or push the switch F5.



GUIDANCE TO AVOID HYDRAULIC RELIEF

If relief of the hydraulic oil is kept for 3 seconds or longer during operation, “Avoid hydraulic pressure relief.” is shown on the monitor.

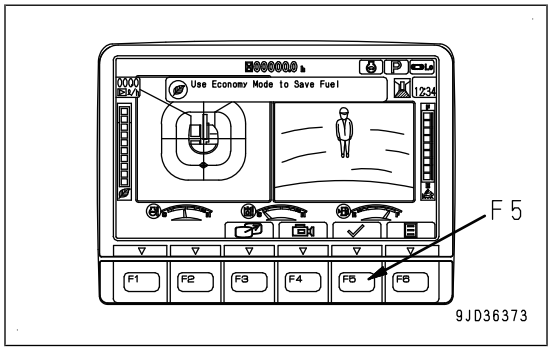
“Guidance to avoid hydraulic relief” goes off after it is shown for 10 seconds or longer, or when the switch F5 is pushed.



ECONOMY MODE RECOMMENDED GUIDANCE

If you do the work with light load 10 minutes or more in P mode or ATT/P mode, “E mode is recommended to save fuel.” will be shown. During the work with light load, set the working mode to the Economy mode to decrease fuel consumption.

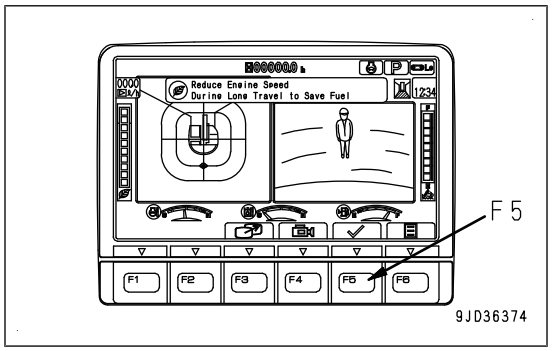
“Economy mode recommended guidance” goes off after it is shown for 10 seconds or longer, or when the switch F5 is pushed.



TRAVEL PARTIAL MODE RECOMMENDATION GUIDANCE

When the travel mode is “Hi”, the fuel control dial is at the MAX position, and travel state is kept for 2 minutes or more, “Reduce engine speed during long travel to save fuel.” is shown. When you drive the machine for a long time, turn down the fuel control dial to reduce the fuel consumption.

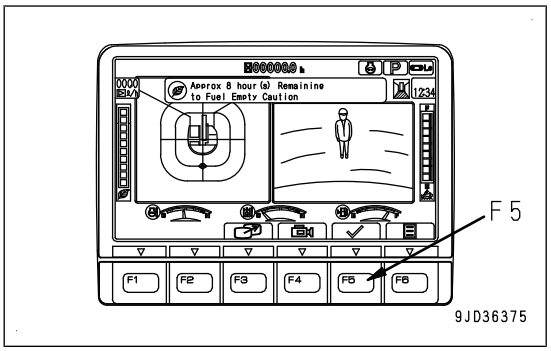
“Travel partial recommendation guidance” goes off after it is shown for 10 seconds, or when the switch F5 is pushed.



FUEL LOW LEVEL GUIDANCE

If the starting switch key is set to the ON position when the available operating hours estimated from the remaining fuel level and the latest average fuel consumption is less than 8 hours, “FUEL LOW LEVEL GUIDANCE” is shown.

“Fuel low level guidance” goes off after it is shown for 10 seconds or longer, or when the switch F5 is pushed.

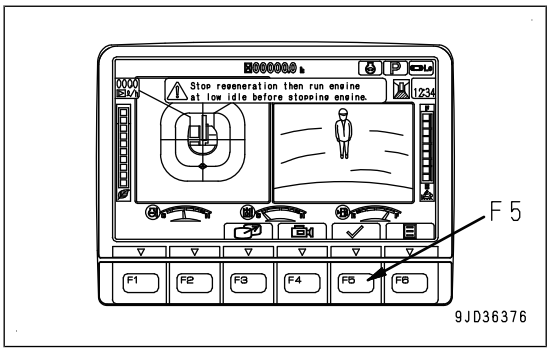


GUIDANCE OF ENGINE STOP OPERATION DURING AFTERTREATMENT DEVICES REGENERATION

Immediately after you start the aftertreatment devices regeneration, “Stop regen before you stop the eng. Run at low idle, then stop engine.” is shown on the monitor.

When you stop the engine during regeneration of the aftertreatment devices, stop the aftertreatment devices regeneration first, and then stop the engine after you run it at low idle for approximately 5 minutes.

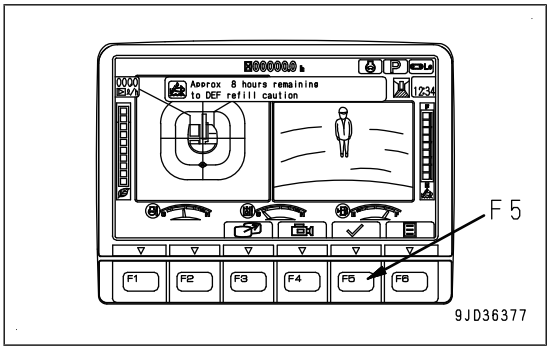
“The guidance of engine stop operation during aftertreatment devices regeneration” goes off after it is shown for 10 seconds or longer, or when the switch F5 is pushed.



DEF LOW LEVEL GUIDANCE

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

“Approx 8 hours remaining to DEF refill caution” goes off after it is shown for 10 seconds or longer, or when the switch F5 is pushed.



METER DISPLAY

ENGINE COOLANT TEMPERATURE GAUGE

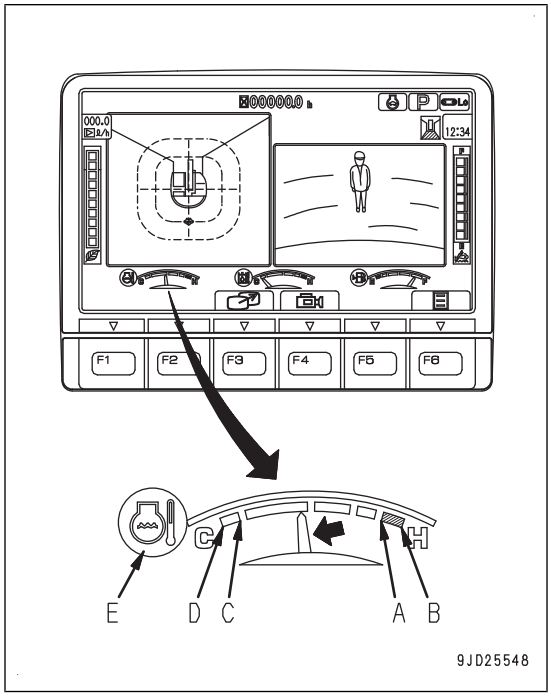
The engine coolant temperature gauge shows the engine coolant temperature.

During operations, it is correct if the pointer is in the green range. If the pointer exceeds the red range (A) position during operations, the overheat prevention system activates.

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

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

(C) to (D): Shows the white range.



The overheat prevention system operates as follows.

Red range (A) position: The engine coolant temperature caution lamp (E) becomes a display at abnormal temperature.

Red range (B) position: The engine speed changes to the low idle, and the engine coolant temperature caution lamp (E) becomes a display at abnormal temperature. At the same time, the alarm buzzer operates.

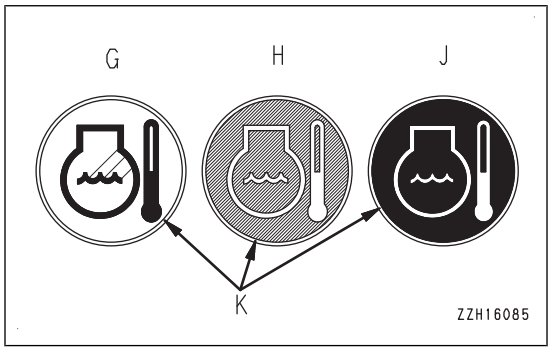
The overheat prevention system continues its operation until the pointer gets in the green range.

Engine coolant temperature caution lamp (E) shows low temperature display when the pointer is in the (D) position at the engine start. In this case, do the engine warm-up operation.

Display (G) when temperature is low: The caution lamp background (K) is white

Display (H) when temperature is correct: The caution lamp background (K) is blue

Display (J) when temperature is abnormal: The caution lamp background (K) is red



HYDRAULIC OIL TEMPERATURE GAUGE

The hydraulic oil temperature gauge shows the hydraulic oil temperature.

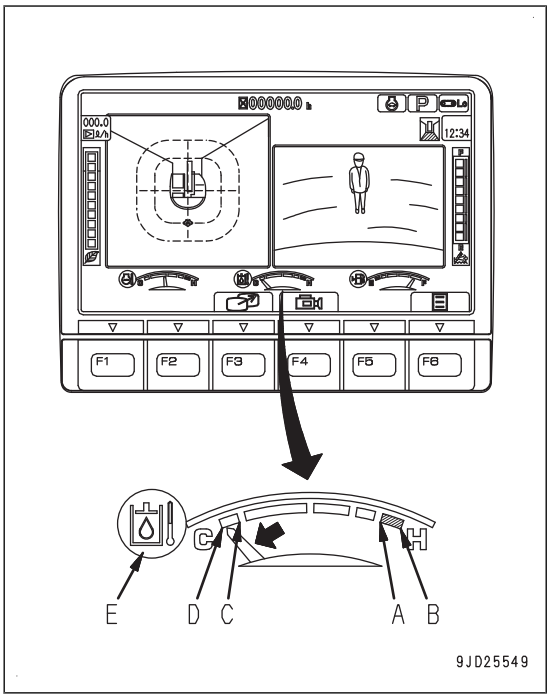
During operations, it is correct if the pointer is in the green range.

When you do operations, if the pointer is near the red range (A), hydraulic oil temperature is 102℃ or more. Set the engine at low idle or stop the engine, and wait until the hydraulic oil temperature goes down.

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

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

(C) to (D): Shows the white range.



REMARK

Hydraulic oil temperature when the pointer is near the red range (A) is as follows.

Red range (A) position:102℃ or more

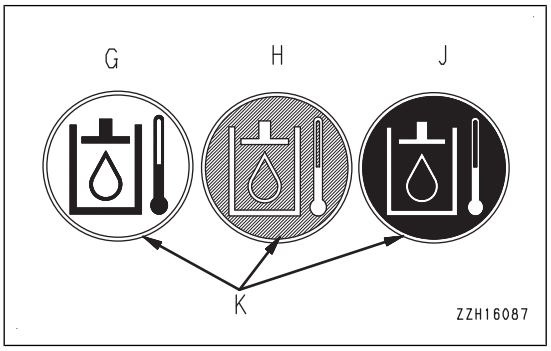
Red range (B) position:105℃ or more

When the pointer is in the red range of (A) to (B), the hydraulic oil temperature caution lamp (E) becomes a display of abnormal temperature.
When the pointer is in the range of (C) at the engine start, the hydraulic oil temperature is 20℃ or below. Hydraulic oil temperature caution lamp (E) becomes a display of low temperature. In this case, do the engine warm-up operation. See “HYDRAULIC SYSTEM WARM-UP OPERATION (3-190)”.

Display (G) when temperature is low: The caution lamp background (K) is white

Display (H) when temperature is correct: The caution lamp background (K) is blue

Display (J) when temperature is abnormal: The caution lamp background (K) is red



FUEL GAUGE

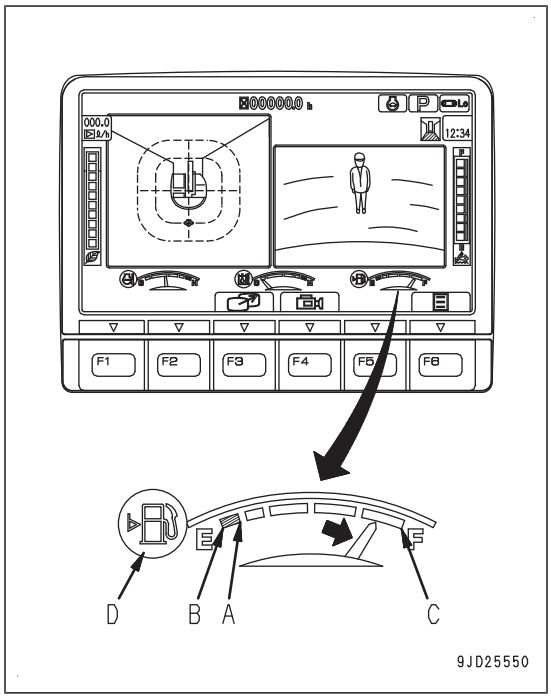
The fuel gauge shows the quantity of fuel in the fuel tank.

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

During operations, if the pointer is near the red range (A), the fuel quantity is 52ℓ or below. Check and add fuel.

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

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



REMARK

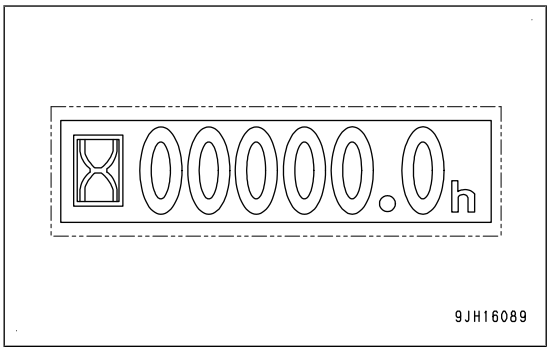
If the pointer reaches the red range (B), the fuel quantity is 32ℓ or below.
If the pointer is in the red range (B), the fuel level caution lamp (D) lights up in red.

The pointer cannot show the correct position for a while after the starting switch is turned to the ON position. It is not an abnormality.

SERVICE METER

The service meter shows the total hours of operation of the machine.

While the engine is in operation, the service meter increases even if the machine does not move. The service meter advances 0.1 every 6 operation minutes, regardless of the engine speed.

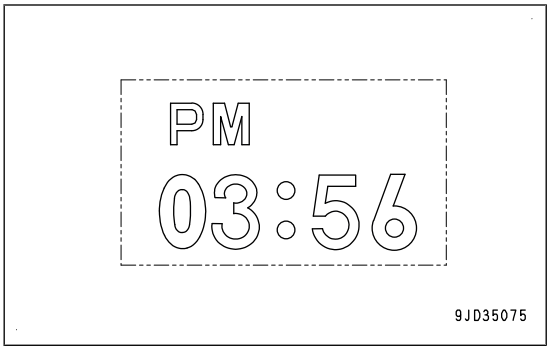


CLOCK

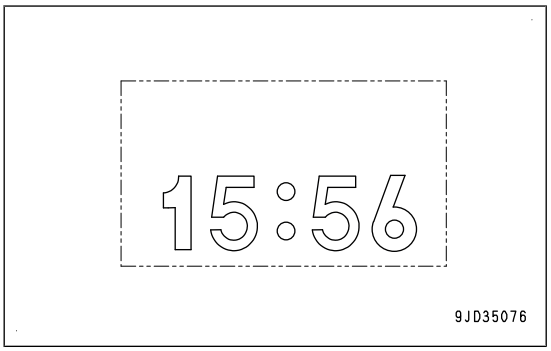
The clock shows the current time.

You can select the display from12-hour display and 24-hour display.

- 12-hour display



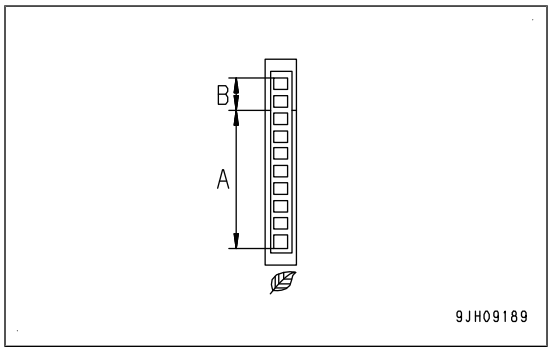
- 24-hour display



REMARK

- If the battery is disconnected for a long period for storage or such, the time information will be lost in some cases.
- For the setting of clock display, time adjustment, see “CLOCK ADJUSTMENT (3-80)”.

ECO GAUGE



ECO gauge shows the instantaneous fuel consumption.

The instantaneous fuel consumption shows the fuel consumption ratio at each moment, and changes by the work load and engine speed.

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

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

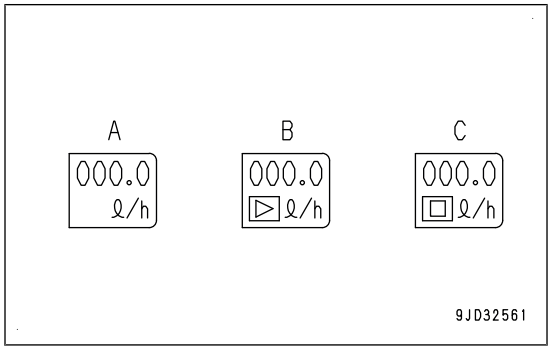
REMARK

Even if the gauge is in the yellow range, this is not an abnormality of the machine. But make the engine output as low as possible, and do the energy saving operation in the green range for conservation of global environment. Also, energy saving operation is possible if travel frequency is reduced. It is recommended to reconsider the construction method.

FUEL CONSUMPTION GAUGE

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

You can change the display on the fuel consumption gauge between the average fuel consumption of a day and the average fuel consumption during a selected period (split fuel consumption).

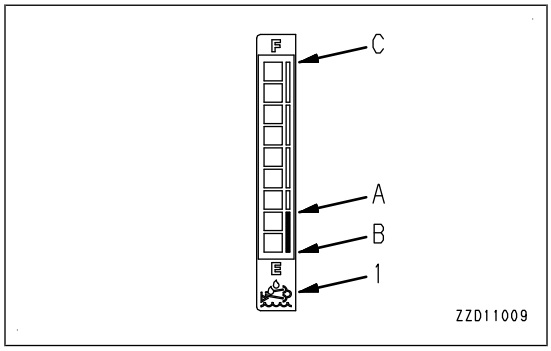


(A): The average fuel consumption of a day (from 0:00 a.m. of the day to 0:00 a.m. of the next day)

(B): The split fuel consumption during measurement

(C): The split fuel consumption while measurement is stopped

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): Shows the red range

(A) to (C): Shows the 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.

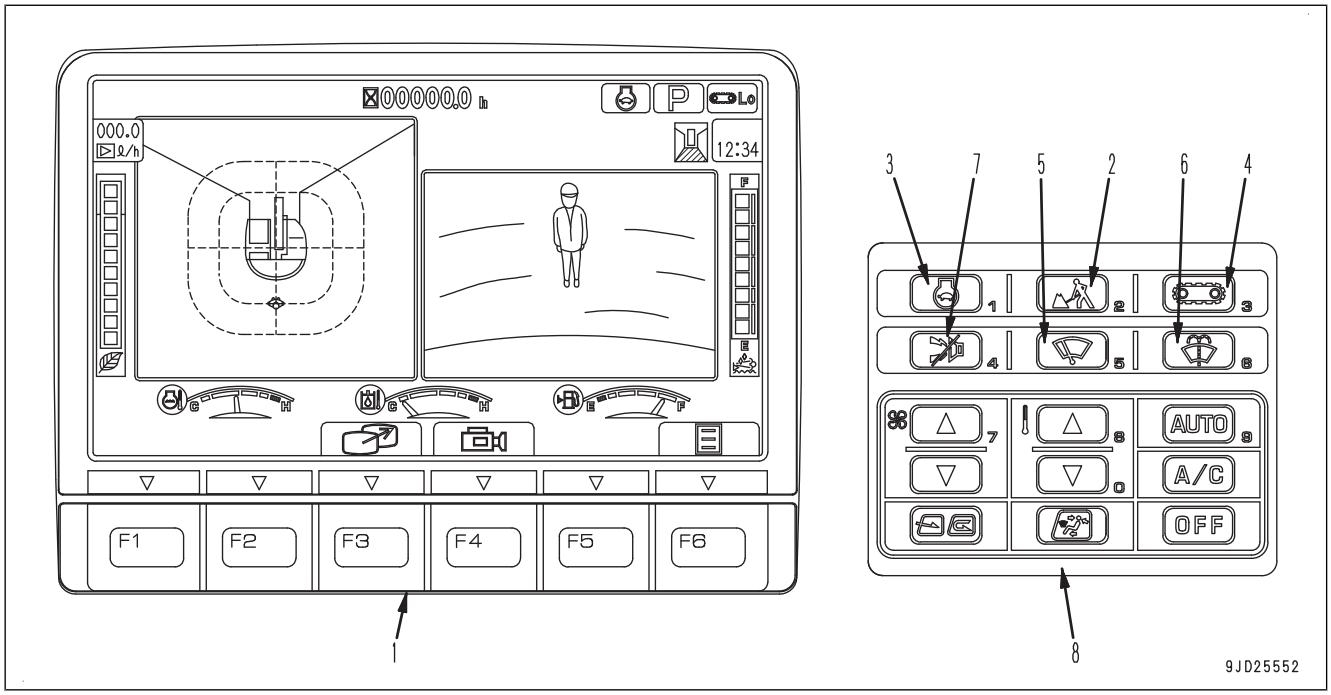
When remaining level of DEF cannot be detected, DEF level caution lamp (1) lights up in white.

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.

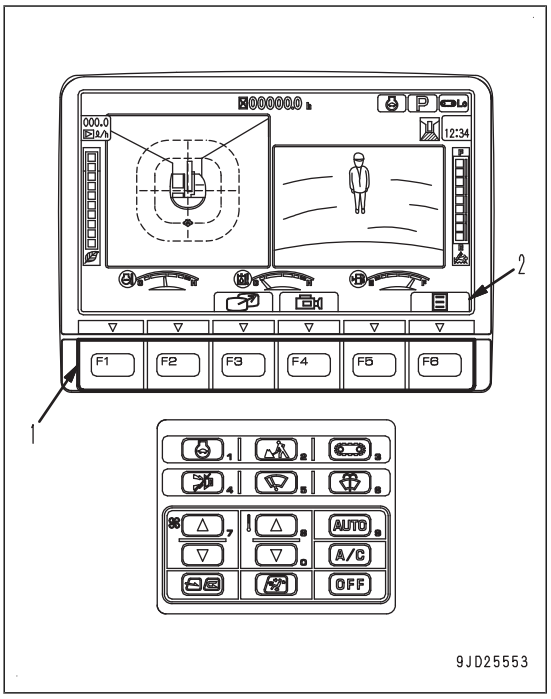
MONITOR SWITCH



(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 SWITCH AND GUIDANCE ICON

- There are 6 function switches (1) (F1 to F6) at the bottom of the monitor display. The function of each switch changes in response to the content of the screen.
- The function of the function switch (1) on each screen can be checked by the guidance icon (2) that is shown above the function switch.
- While the guidance icon (2) is not shown, the function switch (1) does not operate even if it is pushed.
- Even if the guidance icon (2) is pushed, it does not operate. Push the function switch (1) directly below the guidance icon (2) to operate the function.

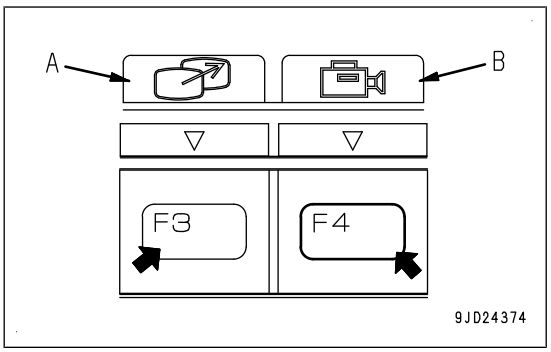


When the monitor display shows the standard screen, the types of guidance icons and functions of the function switches are as follows.

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

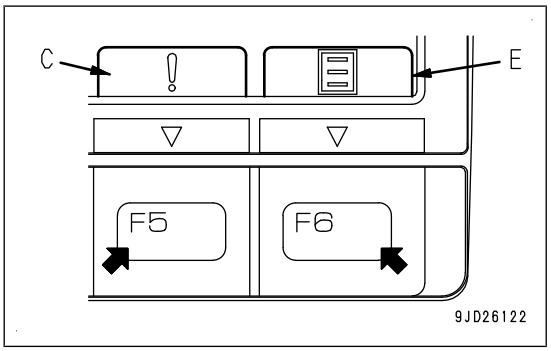
(A) Switch F3: Monitor screen selector switch

(B) Switch F4: Camera image selector switch



(C) Switch F5: “Current Abnormality” display switch

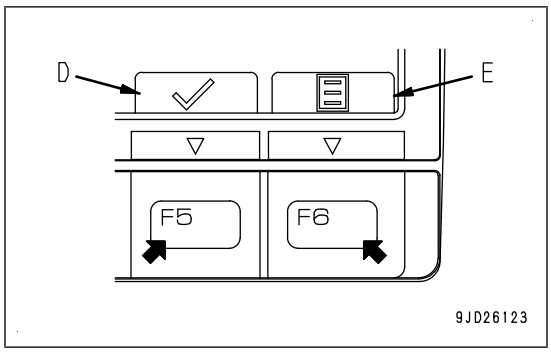
(only while the caution lamp is lit)



(D) Switch F5: ECO guidance erase switch

(only while the ECO guidance display is shown)

(E) Switch F6: User menu display switch



REMARK

- Even if some guidance icons look the same, their display positions and function switches can be different in response to the screen that shows the icons.
- For the guidance icons and their functions that are not explained above, see the pages where the control methods of each screen are explained.

WORKING MODE SELECTOR SWITCH

Working mode selector switch is a switch that set the movement and power of the work equipment.

Your work will be easily done when you select the mode that matches the contents of work.

P mode: For heavy-duty operation

E mode: For operation with emphasis on fuel consumption

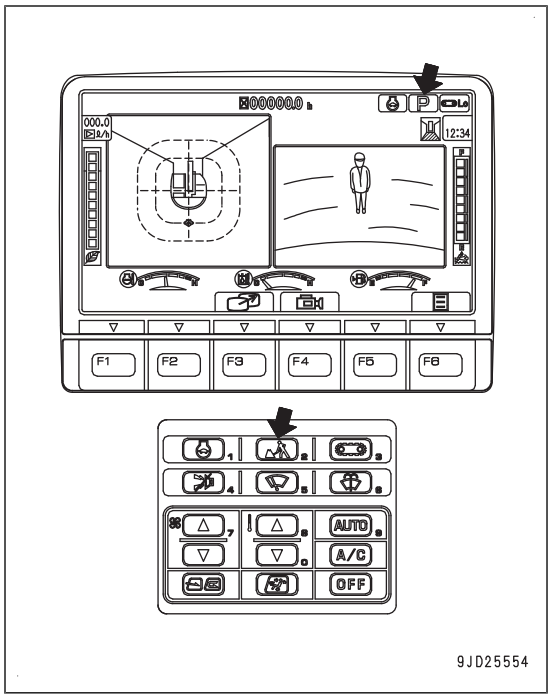
L mode: For fine control operation

B mode: For breaker operation

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

ATT/E mode: For operation of 2-way attachment like crusher, etc. and operations with emphasis on fuel consumption (for machines ready for installation of attachment)

- When you start up the monitor, the mode when the starting switch was turned to the OFF position is automatically set.
- When you push the working mode selector switch, the working mode selector screen is shown. “P”, “E”, “L”, “B”, “ATT/P”, “ATT/E” are shown on the working mode display on the top right of the monitor display for each mode.

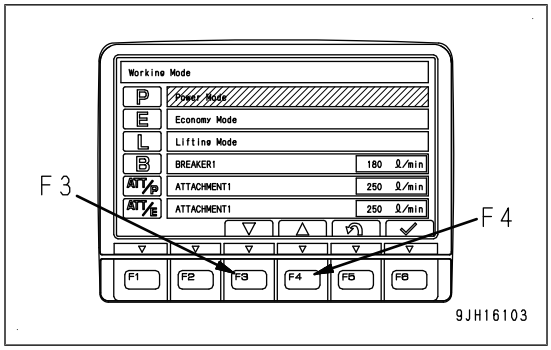


- For machines ready for installation of attachment, the attachment mode is additionally shown.

If you would like to automatically set the P, E, L, B, ATT/P, and ATT/E modes (initial option settings) when you start the engine, ask Komatsu distributor to change the settings.

Operation procedure

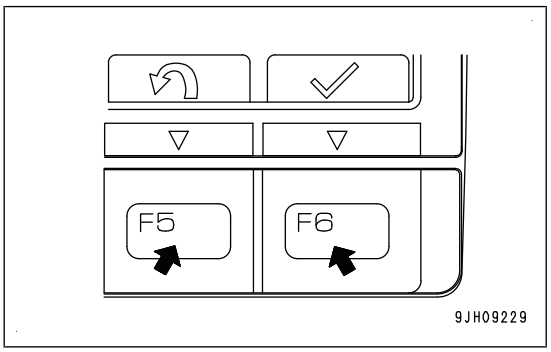
1. When you push the working mode selector switch, the working mode selector screen is shown on the monitor.



2. Push the switches F3, F4 at the bottom of the screen or the working mode selector switch to change the mode selection one by one.
   If you do not touch a switch for more than 5 seconds, the working mode selected at that time is automatically set, and the screen moves to step 3 and step 4.

   REMARK

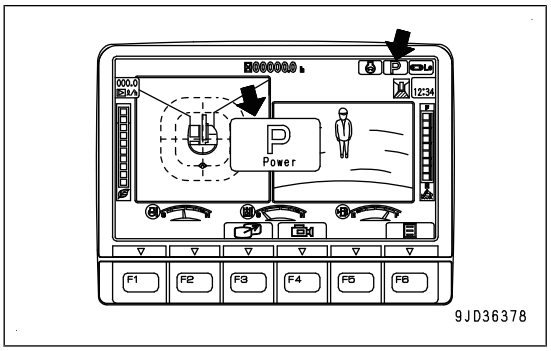
   To go back to the standard screen without changing the working mode, push the switch F5.



3. After you select the mode you want to change, push the switch F6 and the mode will be shown in the center of the monitor display.

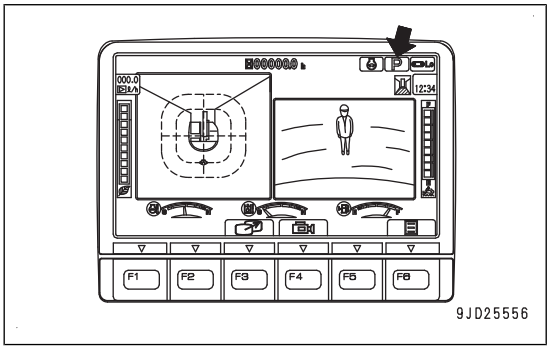
   (Example: Power mode: “P”)

4. After 2 seconds, the working mode display on the top right of the screen will be highlighted in yellow.



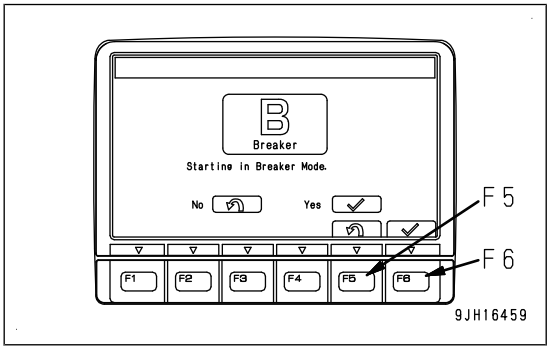
5. After 2 seconds, the screen goes back to the standard screen.

   The yellow work mode display, which was highlighted in step 4, goes back 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.



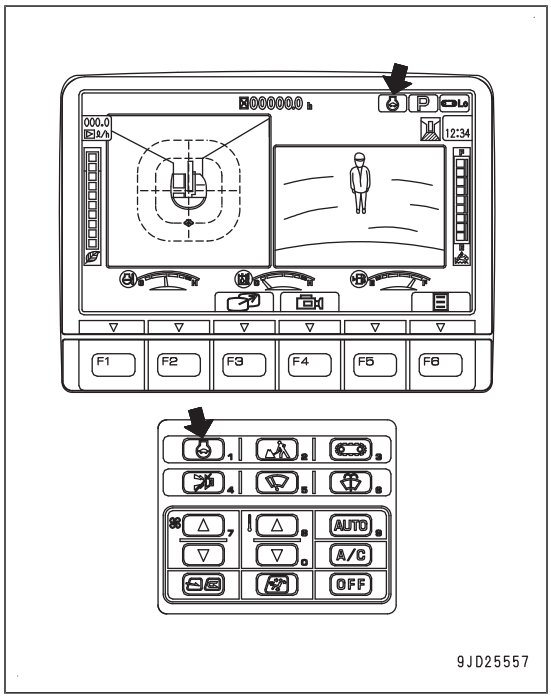
AUTO-DECELERATION SWITCH

Auto-deceleration switch is a switch that automatically decreases the engine speed when the control lever is in the NEUTRAL position and turns on the function that makes fuel consumption less.

Auto-deceleration pilot lamp is lit: Auto-deceleration ON

Auto-deceleration pilot lamp is not lit: Auto-deceleration OFF

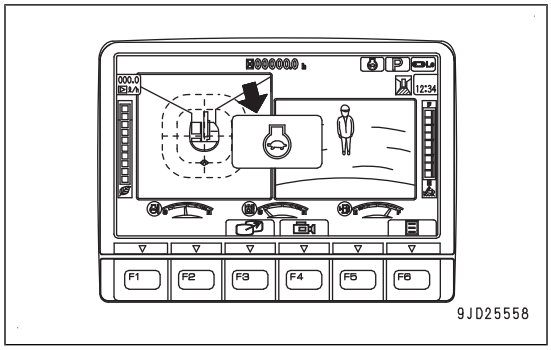
Each time you push the switch, the auto-deceleration turns on or off.



Auto-deceleration function

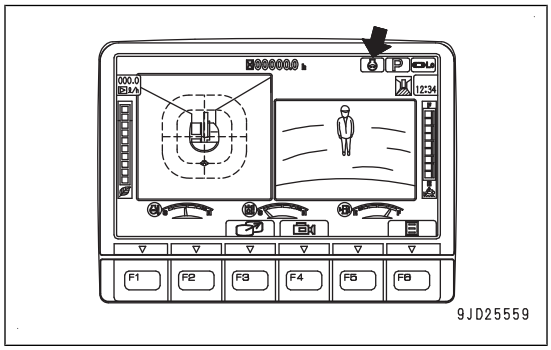
When the auto-deceleration function is turned on, the engine speed decreases from the work speed to the idle speed after about 4 seconds when the work equipment lever and travel lever are set to the NEAUTRAL position. This reduces fuel consumption. If you operate even one of these levers again in this state, the engine speed goes back to the original work speed and you can do the work.

1. When you push the auto-deceleration switch to turn on the auto-deceleration function, the mode is shown in the center of the monitor display and it goes back to the standard screen after 2 seconds.



2. The auto-deceleration pilot lamp is lit on the standard screen.

   (It is not lit when the auto-deceleration is turned off.)



TRAVEL SPEED SELECTOR SWITCH

⚠ WARNING

- **Stop the machine always before you change the travel mode with travel speed selector switch. If you change between high speed travel and low speed travel while you drive the machine, travel direction can deviate even in straight travel.**
- **Set the travel mode to the "Lo" when you load to and unload from a trailer.**

Travel speed can be changed in 2 levels with travel speed selector switch.

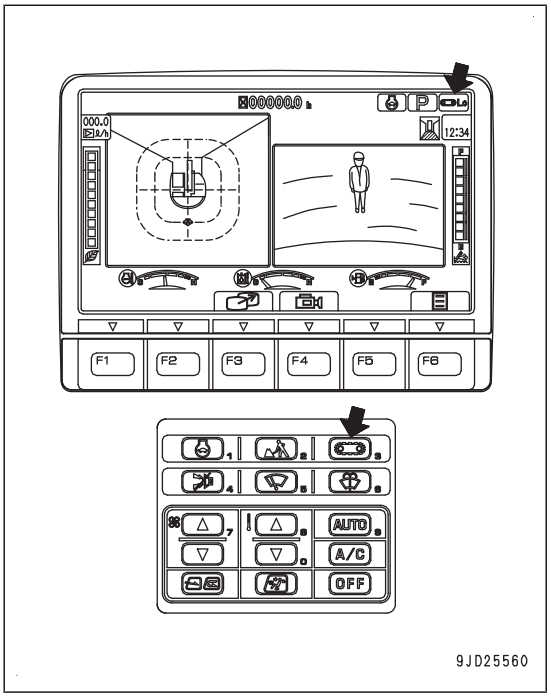
"Lo" lights up: Low speed travel

"Hi" lights up: High speed travel

"Lo" is automatically set when engine is started.

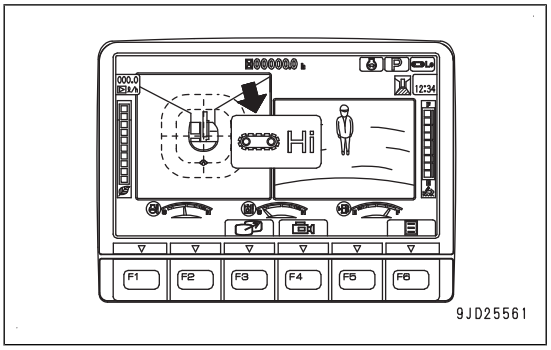
Each time you push the travel speed selector switch, the setting changes between "Lo" and "Hi", alternately.

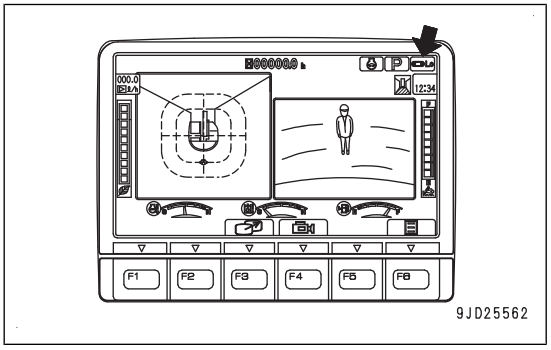
Even when you drive the machine in high speed travel ("Hi"), it changes to low speed travel ("Lo") automatically when travel force is needed on soft ground or slope. You need not change the switch. For the travel speed display on the monitor display, "Hi" (high speed) stays lit.



REMARK

Each time you change the travel speed selector switch, the mode is shown in the center of the monitor display, and after 2 seconds, the screen goes back to the standard screen.





WIPER SWITCH

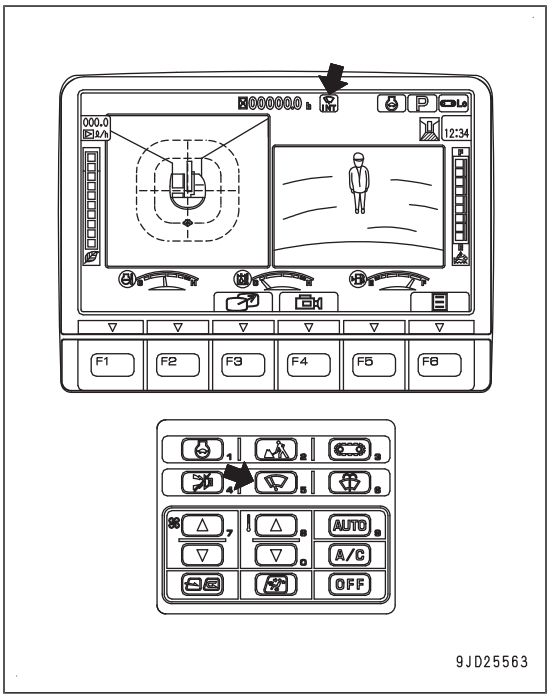
Wiper switch operates the windshield wiper at the front window glass.

Each time you push the switch, the operation changes as “INT” →“ON”→STOP (lamp goes out).

When the “INT” of wiper pilot lamp is lit: Windshield wiper operates intermittently.

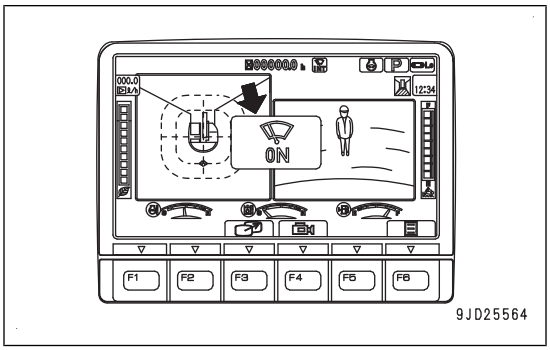
When the “ON” of wiper pilot lamp is lit: Windshield wiper operates continuously.

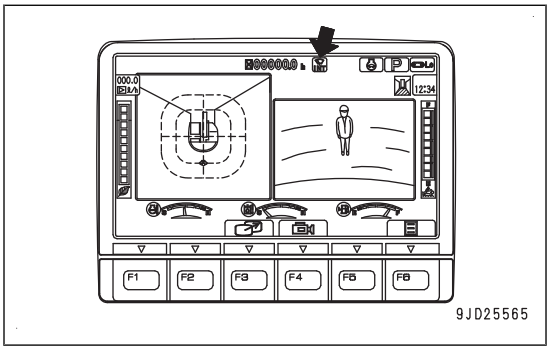
When the wiper pilot lamp in not lit: Windshield wiper is stopped.



REMARK

Each time you change the wiper switch, the mode is shown in the center of the monitor display, and after 2 seconds, the screen goes back to the standard screen.

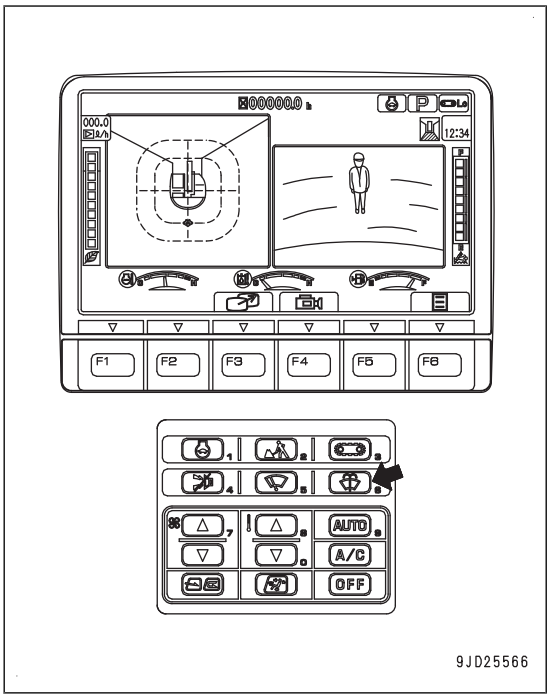




WINDOW WASHER SWITCH

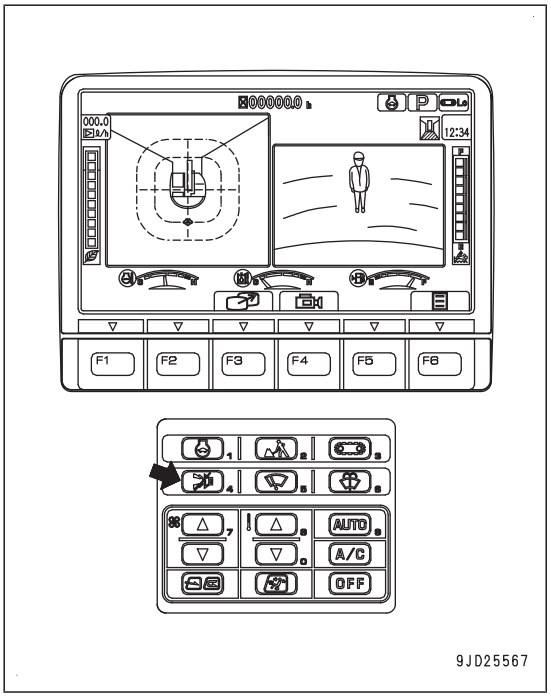
When you push the window washer switch, window washer fluid is sprayed to the front window glass. When you let go of the switch, it stops.

- If you continue to push the switch when the windshield wiper is stopped, wind washer fluid is sprayed and windshield wiper operates continuously at the same time. When you let go of the switch, windshield wiper operates 2 times and stops.
- If you continue to push the switch when the windshield wiper operates intermittently, wind washer fluid is sprayed and windshield wiper operates continuously at the same time. When you let go of the switch, windshield wiper operates 2 times and goes back to intermittent operation.



BUZZER CANCEL SWITCH

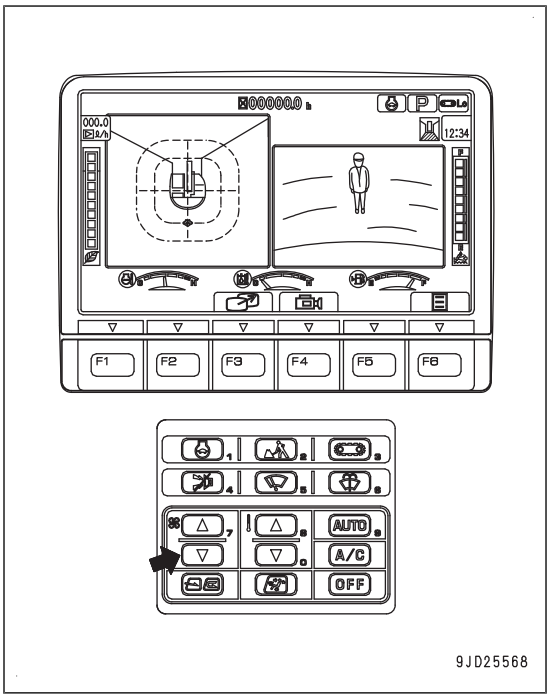
The buzzer cancel switch is used to stop the alarm buzzer for the warning item that has a problem.



AIR CONDITIONER SWITCH

The air conditioner switch and numeric keypad consist of 9 types of switches.

For details of the switches, see “AIR CONDITIONER (3-238)”.



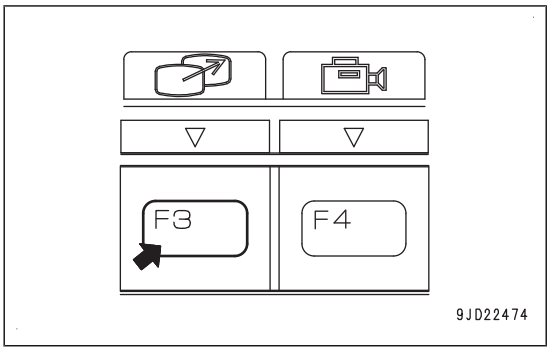
FUNCTION SWITCH

Function switch operation on the standard screen

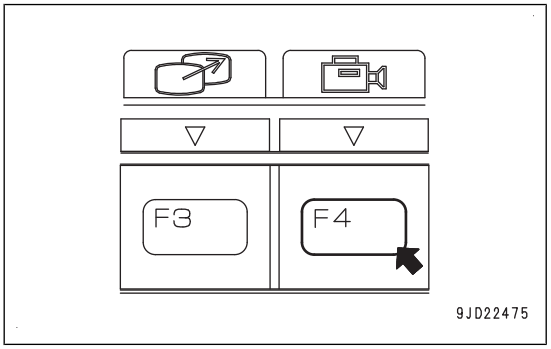
CAMERA IMAGE SELECTOR SWITCH

On the standard screen, push the switch F3 to change the display to the camera image only.

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

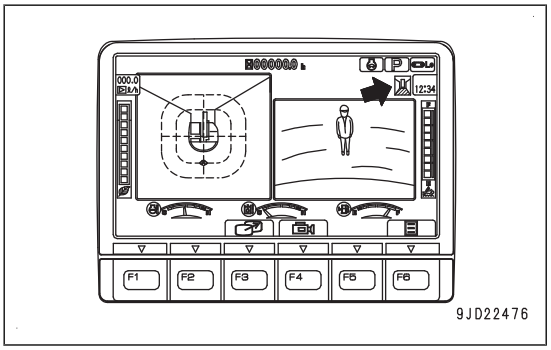


- When the switch F4 is pushed, the camera image on the right, left, or rear camera installed to the machine can be changed.
- The machine monitor screen automatically changes to the screen that shows the bird's eye view display of the KomVision when you do the work equipment, swing, travel, or attachment operation.



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

The green range of the camera image selection display shows the camera position of the shown image.



Camera switch display	Shown camera position
 9JD22411	Rear camera
 9JD22412	Right rear camera
 9JD22413	Rear left camera
 G0126301	Front right camera (option)

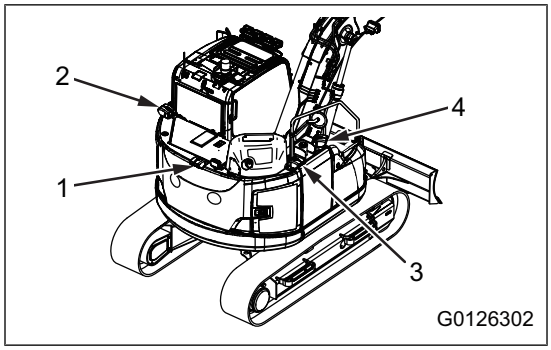
The shooting direction of the camera on the machine is as follows.

(1) Rear of machine

(2) Left side of machine

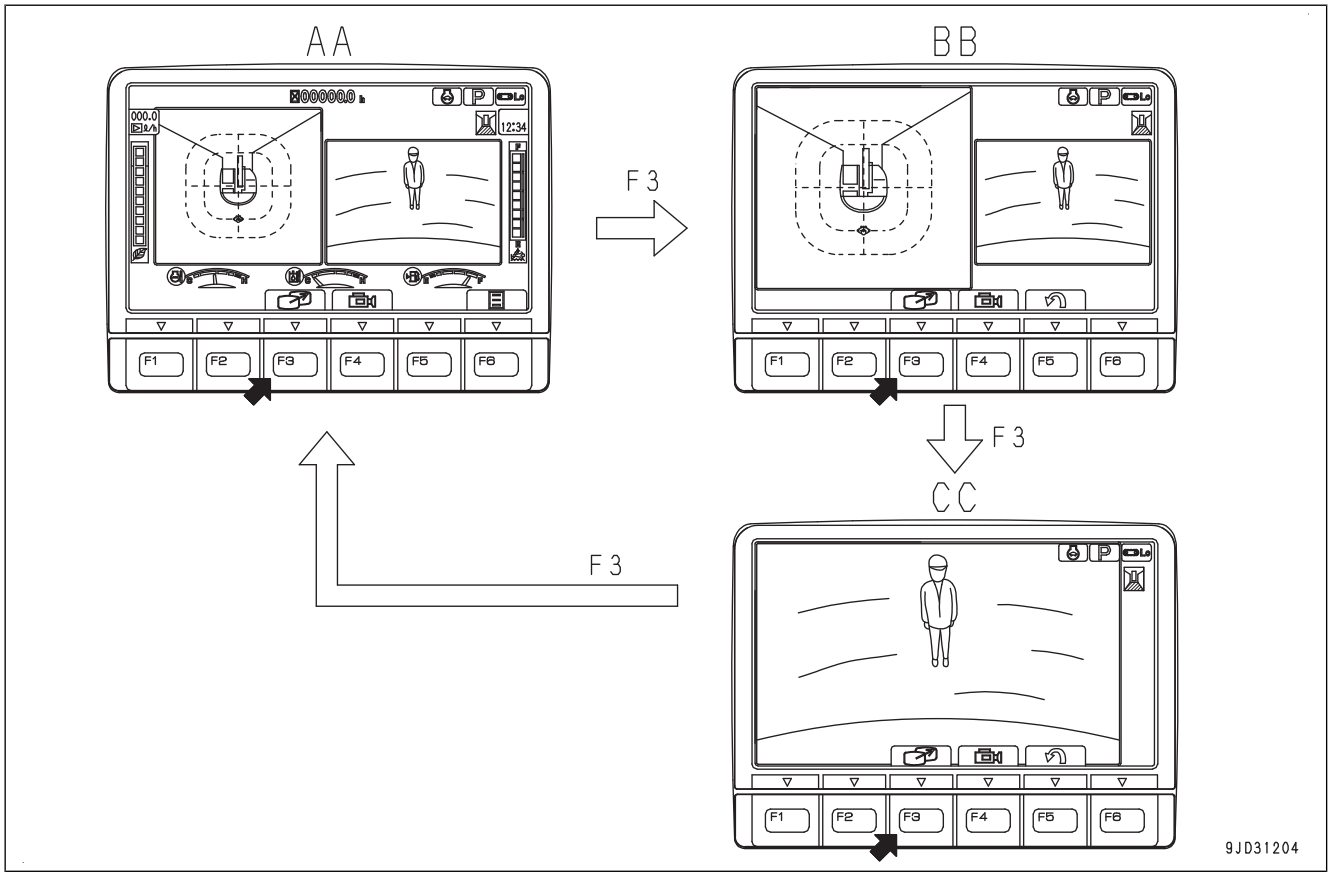
(3) Right side of machine

(4) Front right of machine (option)



Operation on the camera image display screen

This is the explanation on the method to change the camera image display on the monitor.



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

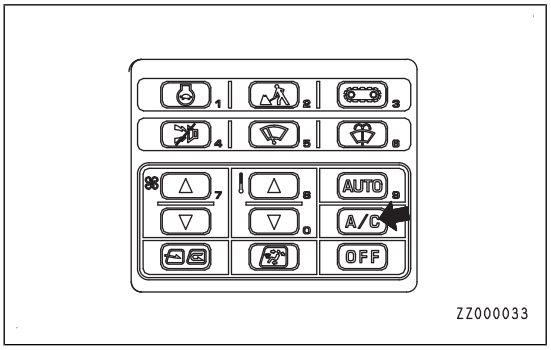
- On the standard screen AA, the synthesized image to show the area around the machine from above and the image of the camera loaded into the machine are shown on the left and right sides of the machine monitor, respectively.
- On the standard screen AA, when the switch F3 is pushed, the enlarged bird's eye view display BB is shown.
- If the switch F3 is pushed on the enlarged bird's eye view display BB, the camera image screen CC is shown. On the camera image screen CC, the camera image is shown in the entire monitor.
- If the switch F3 is pushed on the camera image screen CC, the standard screen AA is shown.
- The screen automatically changes to the standard screen AA while the camera image screen CC is shown when operating work equipment, swing, travel and attachment.

Other mode operations while full-screen camera image is shown

Even when the full-screen camera image is shown, you can conduct the mode operations below.

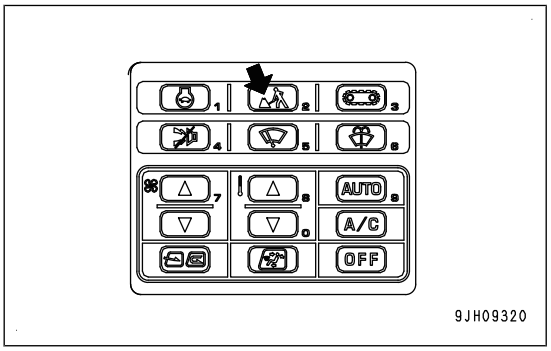
- The air conditioner can be operated.

  When you operate the air conditioner switch, the screen changes to the “A/C Setting” screen. When the screen changes to “A/C Setting ” screen, push the switch F6 to go back to the full-screen camera image. In addition, if no operation is done for 5 seconds after the screen changes to “A/C Setting” screen, the screen automatically goes back to the full-screen camera image.



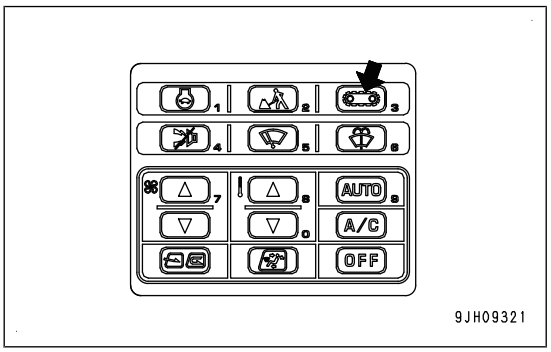
- When you push the working mode selector switch, you can change the working mode.

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



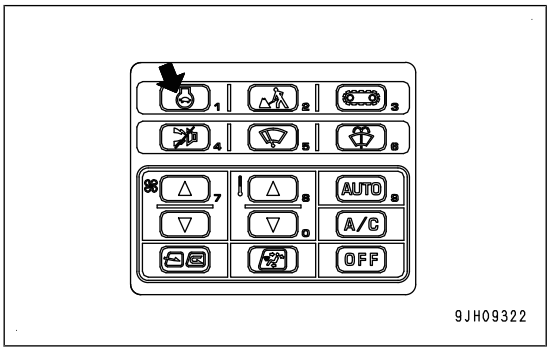
- When you push the travel speed selector switch, you can change the travel speed.

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



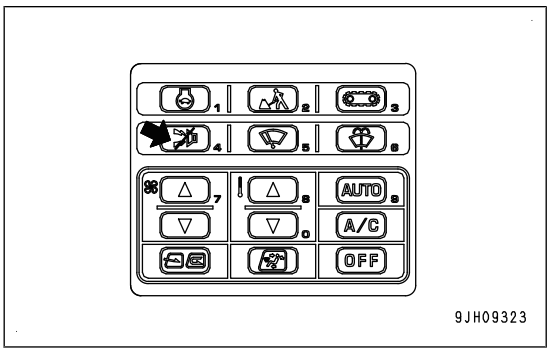
- Push the auto-deceleration switch to turn on or off the auto-deceleration function.

  Even if the auto-deceleration switch is pushed, the full-screen camera image display does not change to a different screen or go back to the standard screen display.



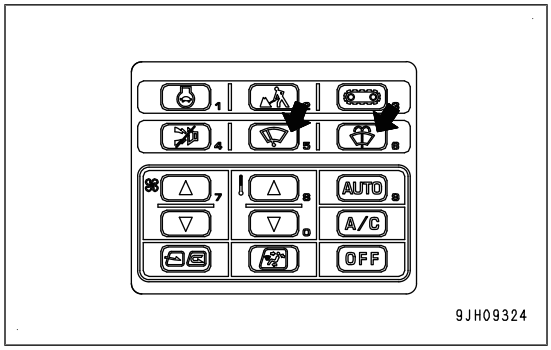
- The buzzer cancel switch is used to stop the alarm buzzer for abnormality of the warning item.

  Even if the buzzer cancel switch is pushed, the full-screen camera image display does not change to a different screen or go back to the standard screen.



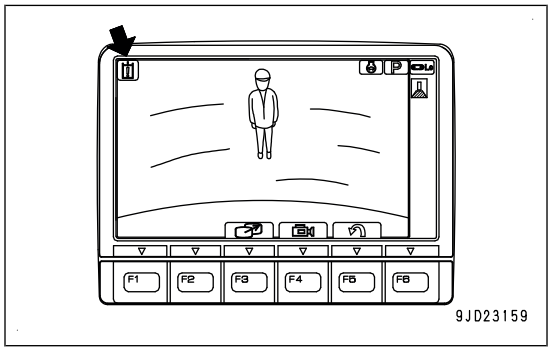
- When you push the wiper switch, you can operate the windshield wiper.

  Even if the wiper switch is pushed, the full-screen camera image display does not change to a different screen or go back to the standard screen.
- When you push the window washer switch, you can spray window washer.
  Even if the window washer switch is pushed, the full-screen camera image display does not change to a different screen or go back to the standard screen.



Actions against warning during full-screen camera image display

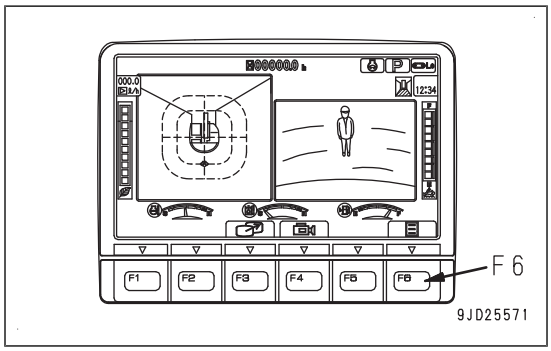
If a trouble occurs on the machine while the full-screen camera image is shown, the caution lamp flashes at the top left of the screen.



- If the caution lamp is shown, push the switch F3 to go back to the standard screen, and check the content of the abnormality or warning display.
  If no lever is operated for 10 seconds or longer while the caution lamp flashes, the screen automatically goes back to the standard screen.
  When the screen goes back to the standard screen, the caution lamp at the top left of the screen goes off and the caution lamp and action level are shown on the center of the screen.
- If the caution lamp is shown, move the machine, set it in a safe posture, and do the inspection immediately.

USER MENU DISPLAY SWITCH

When the switch F6 is pushed on the standard screen, the user menu screen for each setting of the machine is shown on the monitor display.



USER MENU

You can check settings and state while the machine is stopped.

Change the screen as standard screen > menu switch, and the screen changes to the user menu screen.

There are items that follow in the user menu.

(a) Energy Saving Guidance

(b) Machine Setting

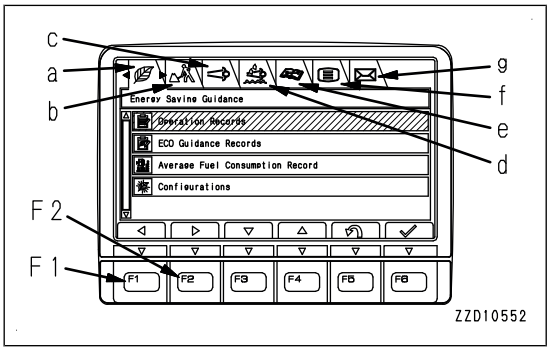
(c) Aftertreatment Devices Regeneration

(d) SCR Informatio

(e) Maintenance

(f) Monitor Setting

(g) User Message



USER MENU CONTENTS

USER MENU SCREEN 3-65
ENERGY SAVING GUIDANCE 3-66
OPERATION RECORDS 3-66
ECO GUIDANCE RECORDS 3-66
AVERAGE FUEL CONSUMPTION RECORD 3-67
CONFIGURATIONS 3-68
MACHINE SETTING 3-70
ECONOMY MODE ADJUSTMENT 3-70
BREAKER SETTING 3-71
ATTACHMENT SETTING 3-73
AUTO IDLE STOP TIMER SETTING 3-75
AFTERTREATMENT DEVICES REGENERATION 3-76
SCR INFORMATION 3-76
MAINTENANCE 3-77
RESET REMAINING TIME FOR MAINTENANCE 3-78
MONITOR SETTING 3-79
SCREEN ADJUSTMENT 3-79
SCREEN ADJUSTMENT (CAMERA) 3-80
CLOCK ADJUSTMENT 3-80
LANGUAGE SETTINGS 3-84
OPERATOR ID 3-85
KEY-ON CAMERA POSITION 3-86
MESSAGE DISPLAY 3-87
REPLY TO MESSAGE 3-88

USER MENU SCREEN

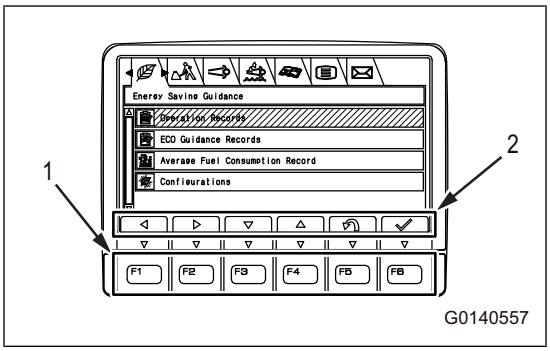
The user menu screen is shown only while the machine stops fully.

(1) Switch

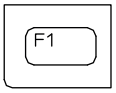
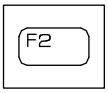
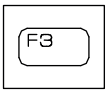
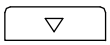
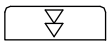
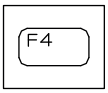
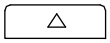
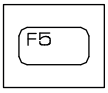
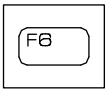
(2) Guidance icon

If no switch is operated for 30 seconds when the user menu screen is shown, the screen automatically goes back to the previous screen or the standard screen.

If the machine travels while the user menu screen is shown, the screen automatically goes back to the standard screen.



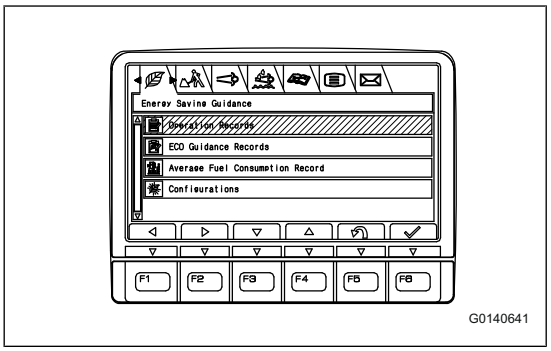
The switch (1) and the guidance icon (2) work on the user menu screen as shown below.

FUNCTION SWITCH	Guidance icon	Explanation
 G0140558	 G0140564	The left menu screen is shown. When on the left end, the right end menu screen is shown.
 G0140559	 G0140565	The right menu screen is shown. When on the right end, the left end menu screen is shown.
 G0140560	 G0140566	Selects the item 1 line below. On the last line, it selects the first line item.
	 G0140570	Shows the next page. On the last page, it shows the first page.
 G0140561	 G0140567	Selects the item 1 line above. On the first line, it selects the last line item.
	 G0140571	Shows the previous page. On the first page, it shows the last page.
 G0140562	 G0140568	Cancels the setting, and the screen goes back to the previous screen.
 G0140563	 G0140569	Shows the selected item and enters it.

ENERGY SAVING GUIDANCE

You can check the settings and information of the items that follow for the energy saving on “Energy Saving Guidance” menu screen.

- Operation Records
- ECO Guidance Records
- Average Fuel Consumption Record
- Configurations
  - Average Fuel Consumption Display
  - ECO Gauge Display
  - ECO Gauge Display Fuel Target Value
  - ECO Guidance Display
  - ECO Guidance Display at Key OFF



G0140641

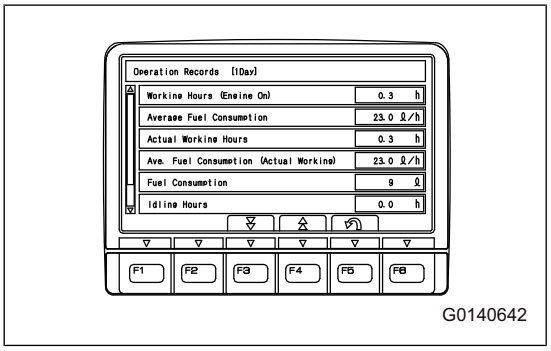
“Operation Records” and “ECO Guidance Records” can show information for one day, or a split measurement period.

OPERATION RECORDS

Change the screen as “Energy Saving Guidance” > “Operation Records”, and the screen shown in the figure is shown.

Information as shown below can be checked on the “Operation Records” screen.

- Working Hours (Engine On)
- Average Fuel Consumption
- Actual Working Hours
- Ave Fuel Consumption (Actual Working)
- Fuel Consumption
- Idling Hours
- Economy Mode Ratio



G0140642

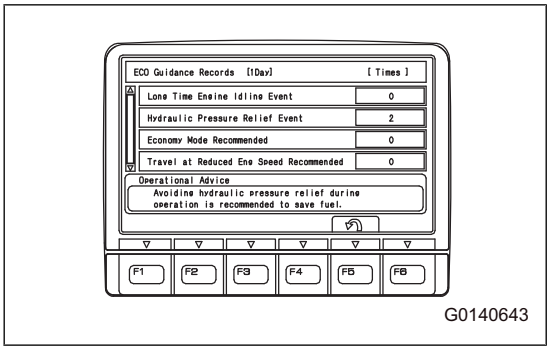
ECO GUIDANCE RECORDS

Change the screen as “Energy Saving Guidance” > “ECO Guidance Records”, and the screen shown in the figure is shown.

You can check the number of ECO guidance having been shown and the “Operational Advice”.

REMARK

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



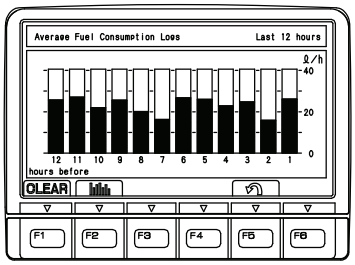
G0140643

AVERAGE FUEL CONSUMPTION RECORD

Change the screen as “Energy Saving Guidance” > “Average Fuel Consumption Record”, and the screen shown in the figure is shown.

You can do operations that follow on the “Average Fuel Consumption Record” screen.

- Change graph display
- Delete fuel consumption record

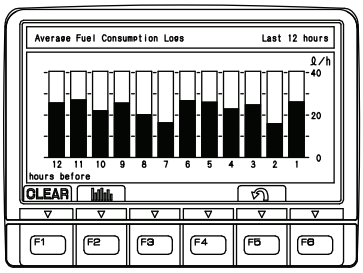


G0140644

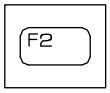
CHANGE GRAPH DISPLAY

“Average Fuel Consumption Record” screen can be shown in 2 types of display that follow. Each time you push the switch F2, the graph display changes alternately.

Average fuel consumption by 1 hour in the last 12 hours



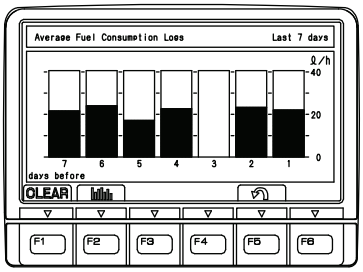
G0140644



G0140559

←→

Average fuel consumption by 1 day in the last 1 week



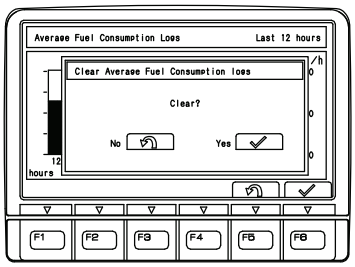
G0140645

CLEAR FUEL CONSUMPTION RECORD

1. Push the switch F1 on “Average Fuel Consumption Record” screen.

   “Clear average fuel consumption record.” screen is shown.

2. After each of the operations that follow, the screen goes automatically back to “Average Fuel Consumption Record” screen.
   - Push the switch F6 to clear the fuel consumption record.
   - Push the switch F5 to cancel the operation that clears the record.



G0140652

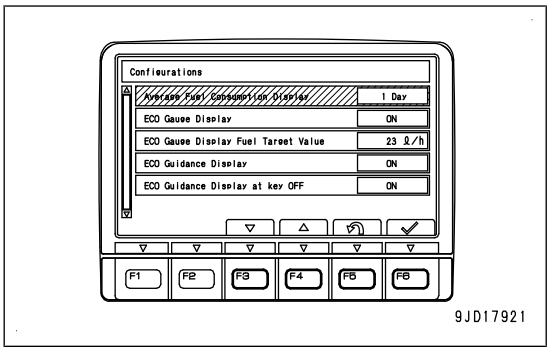
If you clear the fuel consumption record, the data of “Last 12 hours” and “Last 7 days” is cleared.

CONFIGURATIONS

Change the screen as “Energy Saving Guidance” > “Configurations”, and the screen shown in the figure is shown.

You can change the settings that follow on “Configurations” menu screen.

- Average Fuel Consumption Display
- ECO Gauge Display
- ECO Gauge Display Fuel Target Value
- ECO Guidance Display
- ECO Guidance Display at Key OFF



When you set the “ECO Gauge Display” to OFF, items of “ECO Gauge Display Fuel Target Value” are not shown.

When you set the “ECO Guidance Display” to OFF, items of “ECO Guidance Display at Key OFF” are not shown.

FUEL CONSUMPTION GAUGE DISPLAY

Change the screen as “Energy Saving Guidance” > “Configurations” > “Average Fuel Consumption Display”, and the screen shown in the figure is shown.

“Average Fuel Consumption Display” can be set as shown below.

1 Day

Shows the average fuel consumption on the fuel consumption gauge from 0:00 a.m. of the day to 0:00 a.m. of the next day.

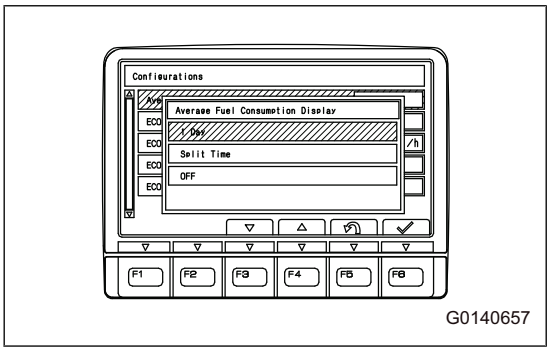
Split Time

Shows the average fuel consumption on the fuel consumption gauge during the split time measurement period.

Split measurement starts at the same time as it is selected.

OFF

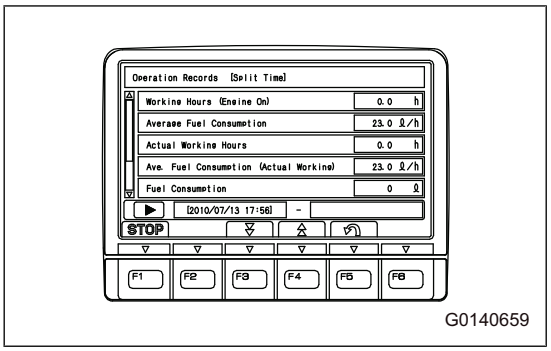
Fuel consumption gauge is not shown on the standard screen.



STOP SPLIT MEASUREMENT

When you start the split measurement, guidance icon is shown on the “Energy Saving Guidance” > “Operation Records”, or “Energy Saving Guidance” > “ECO Guidance Records” screen. (The figure shows “Operation Records” screen.)

Push the switch F1 to stop the split measurement.



ECO GAUGE DISPLAY

Change the screen as “Energy Saving Guidance” > “Configurations” > “ECO Gauge Display”, and the screen shown in the figure is shown.

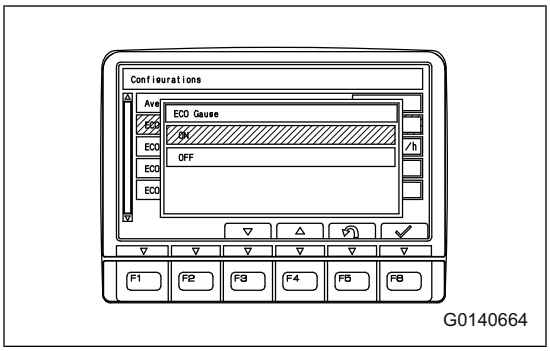
The display/non-display of the ECO gauge can be selected on “ECO Gauge Display” screen.

ON

The ECO gauge is shown on the standard screen.

OFF

The ECO gauge is not shown on the standard screen.



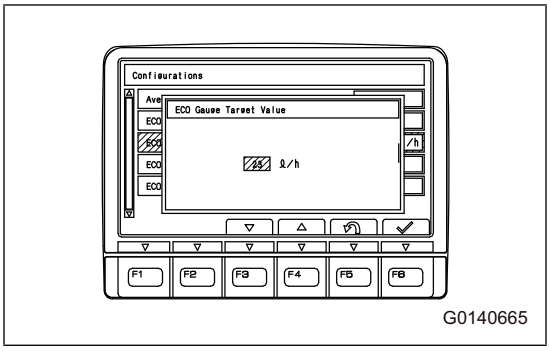
G0140664

ECO GAUGE DISPLAY FUEL TARGET VALUE

Change the screen as “Energy Saving Guidance” > “Configurations” > “ECO Gauge Display Fuel Target Value”, and the screen shown in the figure is shown.

On the “ECO Gauge Display Fuel Target Value” screen, you can change the target value of shown fuel consumption of ECO gauge (upper limit of green range)

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



G0140665

ECO GUIDANCE DISPLAY

Change the screen as “Energy Saving Guidance” > “Configurations” > “ECO Guidance Display”, and the screen shown in the figure is shown.

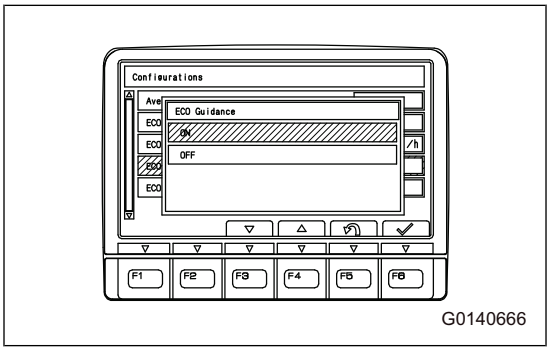
The display/non-display of the ECO guidance can be selected on “ECO Guidance Display” screen.

ON

The ECO guidance is shown on the standard screen.

OFF

The ECO guidance is not shown on the standard screen.



G0140666

GUIDANCE DISPLAY AT KEY OFF

Change the screen as “Energy Saving Guidance” > “Configurations” > “ECO Guidance Display at Key OFF”, and the screen shown in the figure is shown.

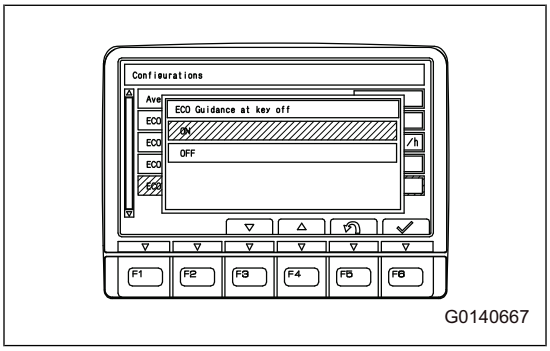
On the “ECO Guidance Display at Key OFF” screen, you can change the setting of DISPLAY/NOT DISPLAY of “Operational Advice” shown on the end screen.

ON

“Operational Advice” is shown on the end screen.

OFF

“Operational Advice” is not shown on the end screen.



G0140667

MACHINE SETTING

You can set the items that follow which are related to the machine on the “Machine Setting” menu screen.

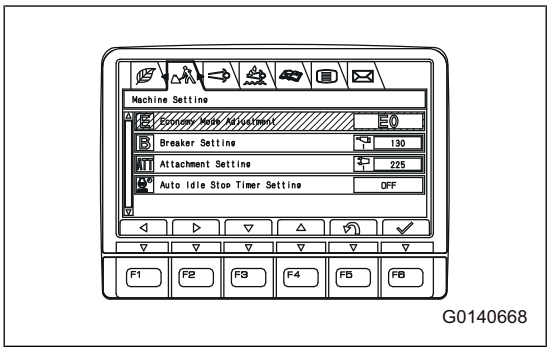
The figure shows the screen of a machine ready for installation of work equipment attachment such as breaker and crusher.

Standard machine

- Economy Mode Adjustment
- Auto Idle Stop Timer Setting

Machine ready for installation of work equipment attachment such as breaker and crusher

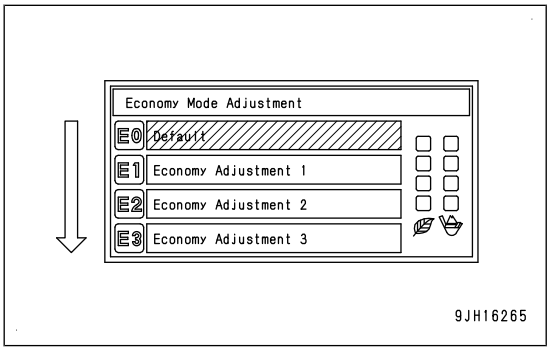
- Economy Mode Adjustment
- Breaker Setting
- Attachment Setting
- Auto Idle Stop Timer Setting



G0140668

ECONOMY MODE ADJUSTMENT

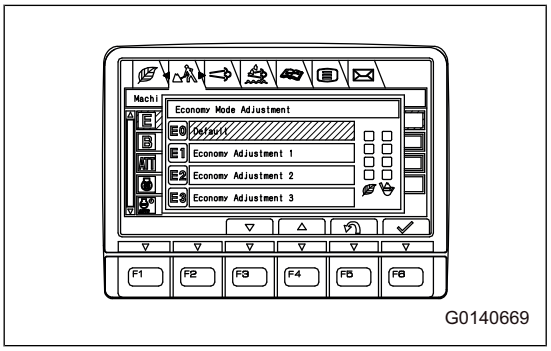
You can adjust the output of economy mode. In economy mode, the output decreases in the sequence of E0, E1, E2, and E3, and the fuel efficiency becomes better accordingly.



9JH16265

1. Change the screen as “Machine Setting” > “Economy Mode Adjustment”, and the screen shown in the figure is shown.
2. Select the desired setting with the switches F3 and F4.
3. Push the switch F6.

   When you cancel the selection, push the switch F5.

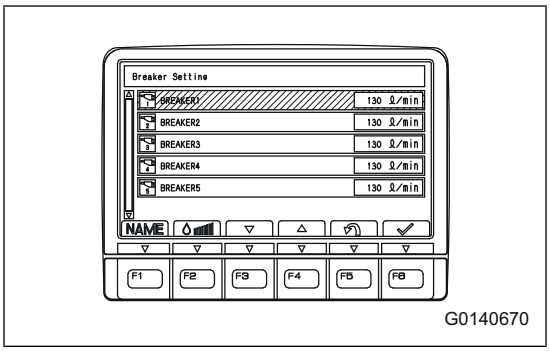


G0140669

BREAKER SETTING

1. Change the screen as “Machine Setting” > “Breaker Setting”, and the screen shown in the figure is shown.
2. Select the desired setting with the switches F3 and F4.
3. Push the switch F6.

   When you cancel the selection, push the switch F5.



G0140670

You can change the settings that follow on “Breaker Setting” screen.

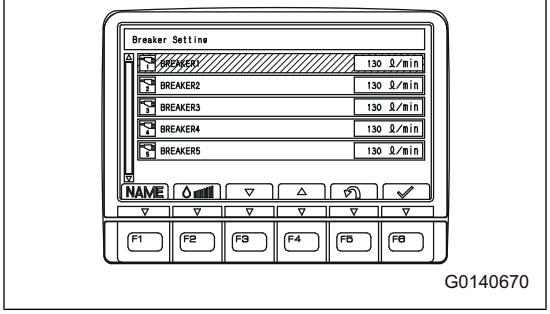
- Set the name of breaker.
- Set the flow rate of breaker.

You can register 5 types of contents for setting.

CHANGE BREAKER NAME SETTING

The characters that can be used are alphabets (A to Z), numbers (0 to 9), symbols (#, *, +, -, /) and blanks (spaces).

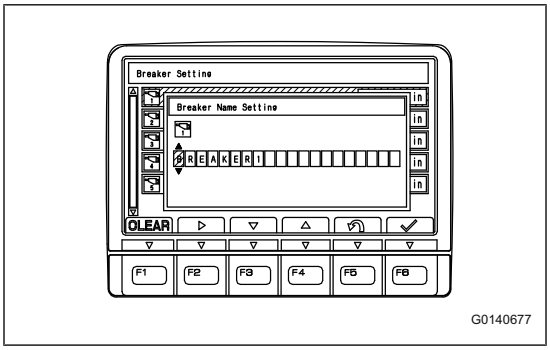
1. Select the item to be changed on “Breaker Setting” screen.



G0140670

2. Push the switch F1.

   “Breaker Name Setting” screen is shown.



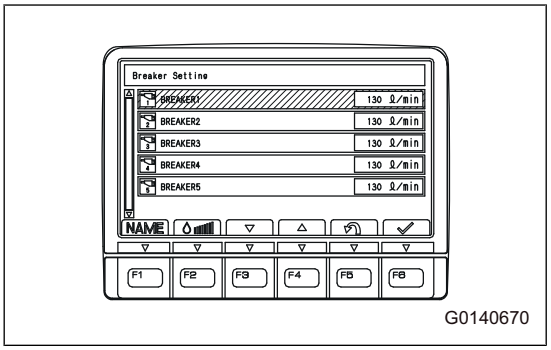
G0140677

3. Do the operations that follow to change the name.
   - Push the switch F1 to erase all the characters.
     If you delete all the characters, the default name is shown.
   - Push the switch F2 to move to the right.
   - Push the switch F3 to show the next alphabet (or number/symbol).
   - Push the switch F4 to show the previous alphabet (or number/symbol).
4. Push the switch F6.

   When you cancel the selection, push the switch F5.

CHANGE BREAKER FLOW SETTING

1. Select the item to be changed on “Breaker Setting” screen.



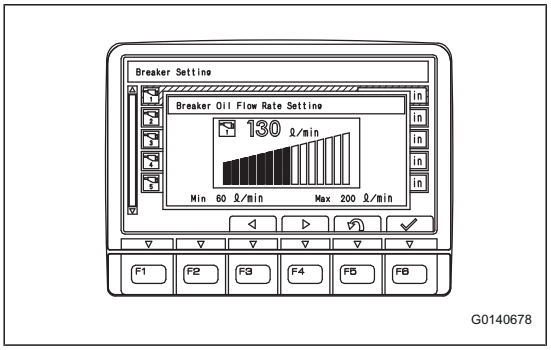
G0140670

2. Push the switch F2.

   “Breaker Oil Flow Rate Setting” screen is shown.

   The left end of the graph is the minimum adjustable flow rate.

   The right end of the graph is the maximum adjustable flow rate.



G0140678

3. Do the operations that follow to change the flow rate.
   - Push the switch F3 to reduce the flow rate.
   - Push the switch F4 to increase the flow rate.
4. Push the switch F6.

   When you cancel the selection, push the switch F5.

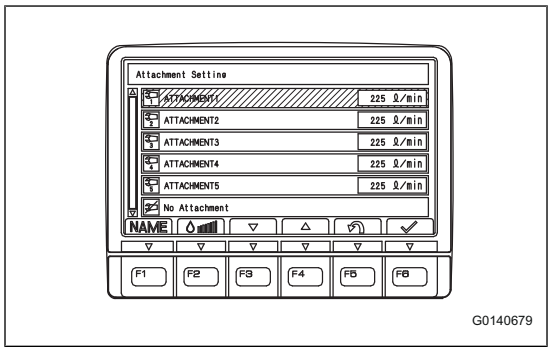
ATTACHMENT SETTING

1. Change the screen as “Machine Setting” > “Attachment Setting”, and the screen shown in the figure is shown.
2. Select the desired setting with the switches F3 and F4.
3. Push the switch F6.

   When you cancel the selection, push the switch F5.

   REMARK

   If you select the “No Attachment”, it will be P mode when the working mode is ATT/P, E mode when ATT/E.



You can change the settings that follow on “Attachment Setting” screen.

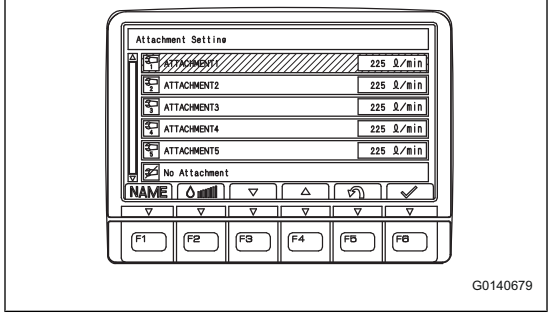
- Set the name of attachment.
- Set the flow rate of attachment.

You can register 5 types of contents for setting.

CHANGE ATTACHMENT NAME SETTING

The characters that can be used are alphabets (A to Z), numbers (0 to 9), symbols (#, *, +, -, /) and blanks (spaces).

1. Select the item to be changed on “Attachment Setting” screen.

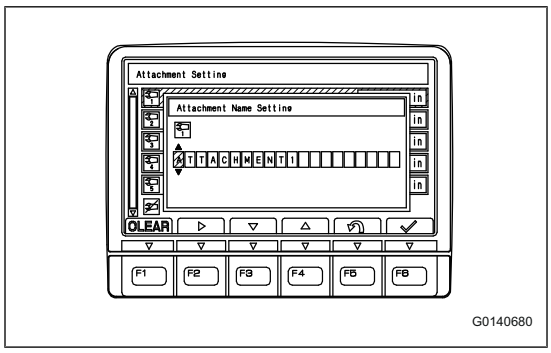


2. Push the switch F1.

   “Attachment Name Setting” screen is shown.

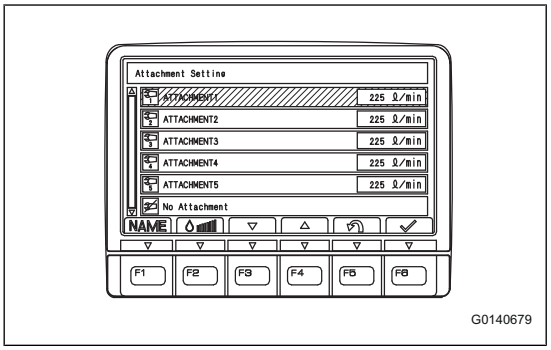
3. Do the operations that follow to change the name.
   - Push the switch F1 to erase all the characters.
     If you delete all the characters, the default name is shown.
   - Push the switch F2 to move to the right.
   - Push the switch F3 to show the next alphabet (or number/symbol).
   - Push the switch F4 to show the previous alphabet (or number/symbol).
4. Push the switch F6.

   When you cancel the selection, push the switch F5.



CHANGE ATTACHMENT FLOW SETTING

1. Select the item to be changed on “Attachment Setting” screen.

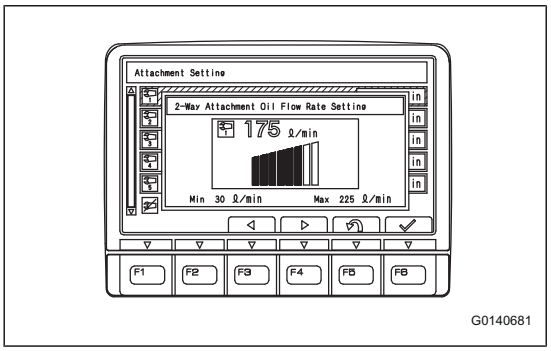


2. Push the switch F2.

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

   The left end of the graph is the minimum adjustable flow rate.

   The right end of the graph is the maximum adjustable flow rate.



3. Do the operations that follow to change the flow rate.
   - Push the switch F3 to reduce the flow rate.
   - Push the switch F4 to increase the flow rate.
4. Push the switch F6.

   When you cancel the selection, push the switch F5.

AUTO IDLE STOP TIMER SETTING

Auto idle stop function stops the engine to reduce fuel consumption when a period of time has passed in low idle state. It operates when all of the conditions below are satisfied.

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

REMARK

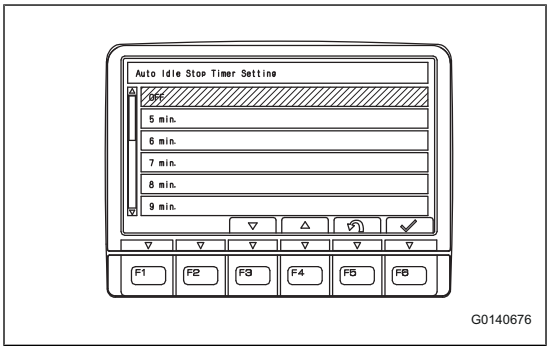
While the auto idle stop is activated, only the engine is stopped and the machine monitor, inverter, etc., as well as the electrical components including the air conditioner, radio, lamps, and wipers keep their states before the engine is stopped.

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

1. Change the screen as “Machine Setting” > “Auto Idle Stop Timer Setting”, and the screen shown in the figure is shown.
2. Select the desired time with the switches F3 and F4.

   When you select “OFF”, the auto idle stop function is disabled.
3. Push the switch F6.

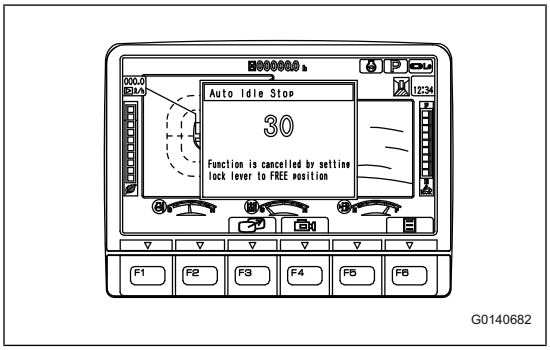
   The setting is changed and the screen goes back to “Machine Setting” menu screen.



G0140676

4. 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.

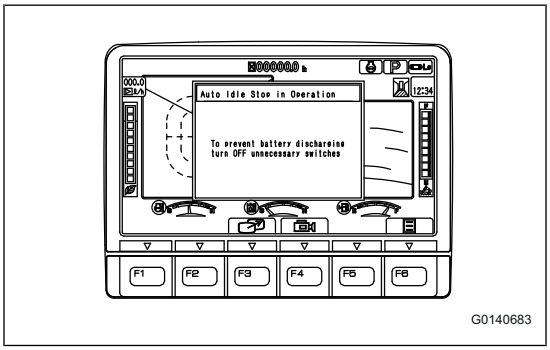


G0140682

5. When countdown reaches 0, the engine stops and the screen changes to the “Auto Idle Stop in Operation” screen.

   REMARK

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

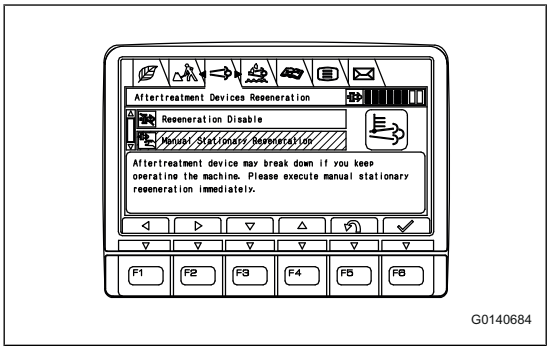


G0140683

AFTERTREATMENT DEVICES REGENERATION

On “Aftertreatment Devices Regeneration” menu screen, you can do the settings that related to the aftertreatment devices regeneration as follows.

- Regeneration Disable: Cancel/set the aftertreatment devices regeneration
- Manual Stationary Regeneration: Start the manual stationary regeneration



G0140684

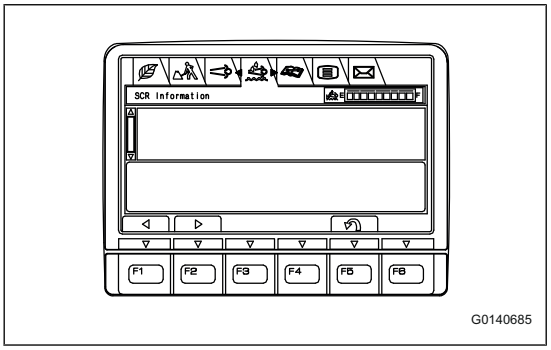
Aftertreatment regeneration is set to start automatically in default setting.

For the setting of the aftertreatment devices regeneration, see OPERATION, “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-124)”.

SCR INFORMATION

Each item in “” menu (d) is for displaying .

On “SCR Information” menu screen, you can see the information related to SCR and DEF.



G0140685

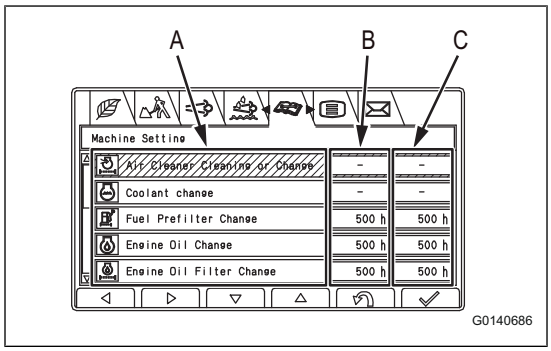
MAINTENANCE

On the “Maintenance” menu screen, you can check the information related to the maintenance.

(A) Maintenance item

(B) Default maintenance interval settings (h)

(C) Remaining time to maintenance (h)



- The color changes when the remaining time to next maintenance (C) is less than maintenance notice time.
  Default maintenance notice time setting is 30 hours.
  Consult your Komatsu distributor if you want to change the maintenance notice time.
  - When the remaining time to maintenance is between 30 hours to 1 hour, the color is yellow.
  - When the remaining time to maintenance becomes 0 hour, the color becomes red.
- When you use the engine oil for cold district, the maintenance interval must be changed.
  Ask Komatsu distributor for change of maintenance interval for “Engine Oil Change” and “Engine Oil Filter Change”.

The items shown on “Maintenance” menu screen are as follows.

List of maintenance items and default interval settings

For the items of which the remaining interval is “-”, consult your Komatsu distributor and set the applicable interval.

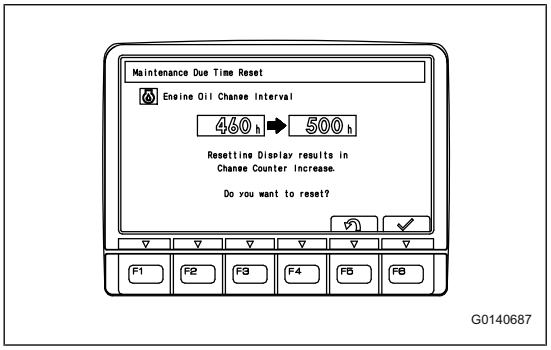
Item	Interval (h)	Item	Interval (h)
Air Cleaner Cleaning or Change	-	Swing Machinery Case Oil Change	1000
Coolant Change	-	DEF Tank Breather Change	1000
Fuel Prefilter Change	500	Final Drive Case Oil Change	1000
Engine Oil Change	500	Final Drive Case Oil Change	1000
Engine Oil Filter Change	500	KCCV Filter Change	2000
Hyd Oil Tank Breather Change	1000	DEF Filter Change	2000
Fuel Main Filter Change	1000	KDPF Filter Cleaning	4500
Hydraulic Oil Filter Change	1000	DEF Tank Washing	4500
PTO Gear Case Oil CheckRefilling	1000	Hydraulic Oil Change	5000

RESET REMAINING TIME FOR MAINTENANCE

1. Select an item to reset the remaining time on “Maintenance” screen, and then hold down the switch F6 for 1.5 seconds or longer.

   “Maintenance Due Time Reset” screen is shown.

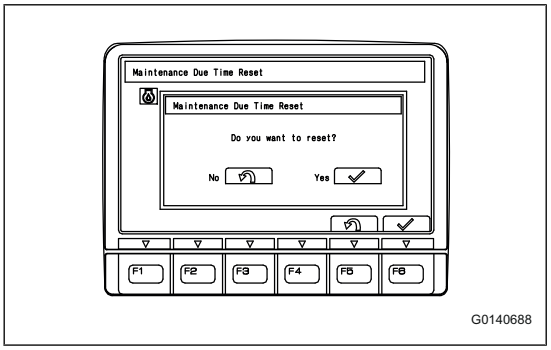
   If the time you push the switch F6 is too short, operation sound can sound but the screen does not change to the screen shown in the figure.



2. Push the switch F6.

   Pop-up screen is shown for confirmation.

   When you cancel the reset, push the switch F5.



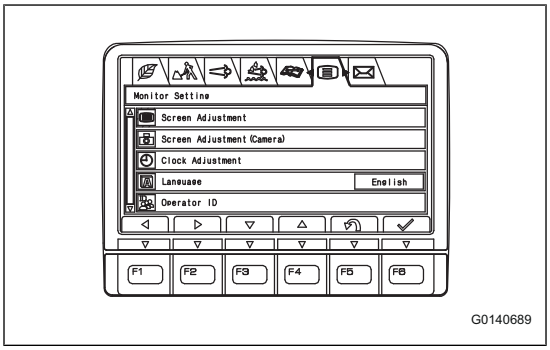
3. Push the switch F6.

   The remaining time to maintenance is reset and the screen goes back to “Maintenance” menu screen.

   When you cancel the reset, push the switch F5.

MONITOR SETTING

You can check the settings and information that follow for the monitor on “Monitor Setting” menu screen.



- Screen Adjustment
- Screen Adjustment (Camera)
- Clock Adjustment
  - GPS Synchronization
  - Calendar
  - Time
  - 12h/24h Mode
  - Daylight Saving Time
- Language
- Operator ID
- Key-on Camera Position

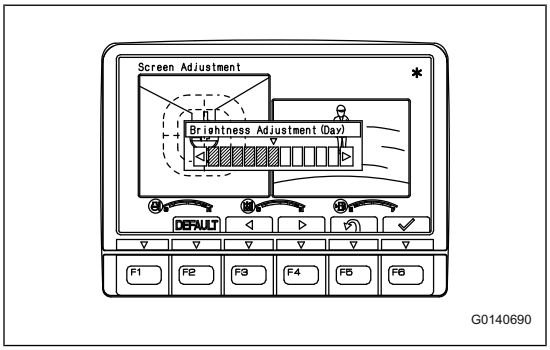
SCREEN ADJUSTMENT

You can adjust the brightness of the screen on “Screen Adjustment ” menu. Adjust the brightness if the screen is dark.

You can adjust the brightness in the 2 modes shown below.

- Night mode: When adjustment is done with the lamp switch at the night position
- Day mode: When adjustment is done with the lamp switch at the day position

When the “*” mark is shown on the right top of the “Screen Adjustment” screen, brightness adjustment cannot be done in some cases. The machine monitor adjusts automatically the brightness to protect the liquid crystal.



1. Change the screen as “Monitor Setting” > “Screen Adjustment ”, and the screen shown in the figure is shown.
2. Do the procedure below to adjust the brightness to the desired one.
   - Push the switch F4 to make it brighter.
   - Push the switch F3 to make it darker.
   - Push the switch F2 to let the value go back to the default value.
3. Push the switch F6.

   When you cancel the adjustment, push the switch F5.

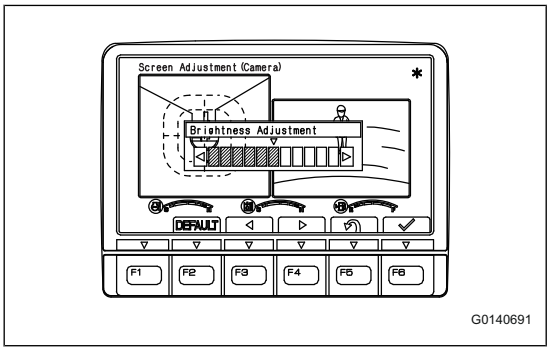
SCREEN ADJUSTMENT (CAMERA)

You can adjust the brightness of the screen on “Screen Adjustment (Camera)” menu. Adjust the brightness if the screen is dark.

When the “*” mark is shown on the right top of the “Screen Adjustment” screen, brightness adjustment cannot be done in some cases. The machine monitor adjusts automatically the brightness to protect the liquid crystal.

1. Change the screen as “Monitor Setting” > “Screen Adjustment (Camera)”, and the screen shown in the figure is shown.
2. Do the procedure below to adjust the brightness to the desired one.
   - Push the switch F4 to make it brighter.
   - Push the switch F3 to make it darker.
   - Push the switch F2 to let the value go back to the default value.
3. Push the switch F6.

   When you cancel the adjustment, push the switch F5.



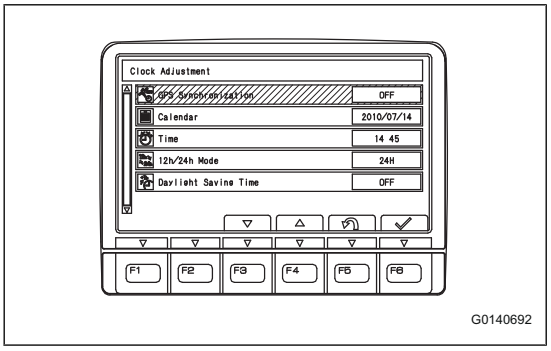
G0140691

CLOCK ADJUSTMENT

Change the screen as “Monitor Setting” > “Clock Adjustment”, and the screen shown in the figure is shown.

You can do settings and checks that follow for the clock on “Clock Adjustment” menu screen.

- GPS Synchronization
- Calendar
- Time
- 12h/24h Mode
- Daylight Saving Time



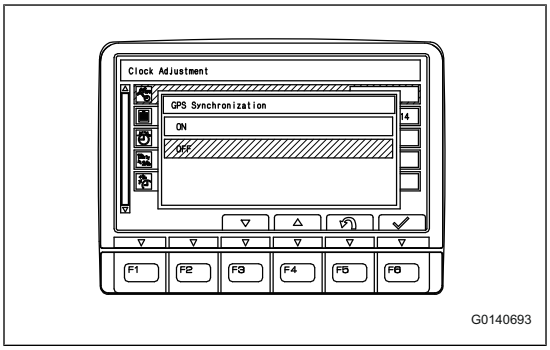
G0140692

You cannot select “Calendar” and “Time” menus when “GPS Synchronization” is set to ON.

After the machine has been stored for a long time, adjust the date and time with “Calendar” and “Time” again.

GPS SYNCHRONIZATION

Change the screen as “Monitor Setting” > “Clock Adjustment” > “GPS Synchronization”, and the screen shown in the figure is shown.



If the machine has KOMTRAX which has been established, the date and time shown on the machine monitor are synchronized with information from GPS satellites when the “GPS Synchronization” is selected.

ON

The information of the date and time shown on the machine monitor are gotten from GPS satellites and corrected automatically.

OFF

The date and time shown on the machine monitor are not corrected automatically.

If the machine cannot receive the radio waves from GPS satellites, turn it to OFF, and correct them with “Calendar” and “Time”.

CALENDAR

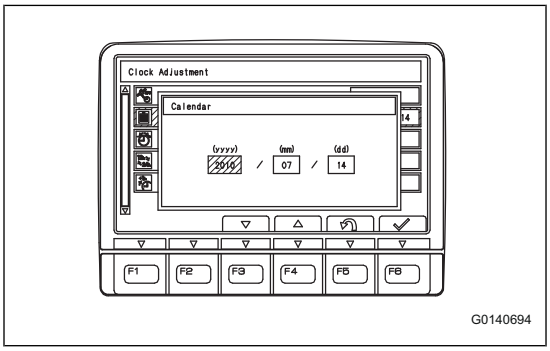
The date of the machine monitor can be adjusted on “Calendar” screen.

1. Change the screen as “Monitor Setting” > “Clock Adjustment” > “Calendar”, and the screen shown in the figure is shown.

   “Year” display part becomes yellow.

2. Adjust the “Year” with the switches F3 and F4.

   When you cancel the adjustment, push the switch F5.

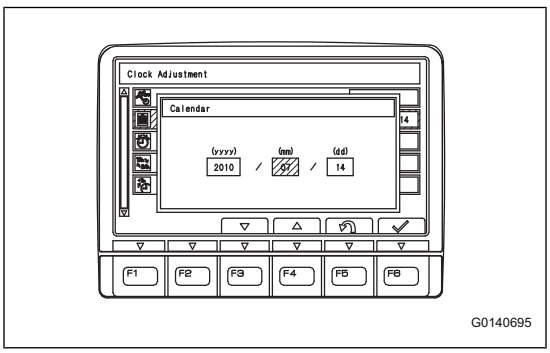


3. Push the switch F6.

   “Month” display part becomes yellow.

4. Adjust the “Month” with the switches F3 and F4.

   When you adjust “Year” again, push the switch F5.



5. Push the switch F6.

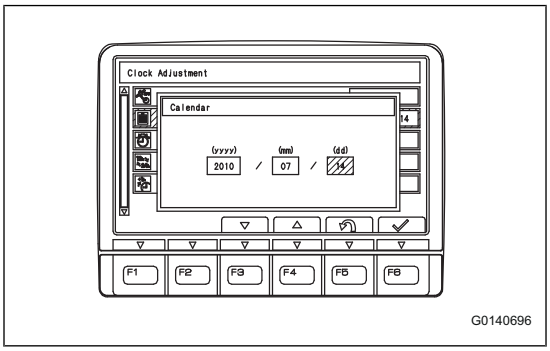
   “Day” display part becomes yellow.

6. Adjust the “Day” with the switches F3 and F4.

   When you adjust “Month” again, push the switch F5.

7. Push the switch F6.

   The date has been changed as it is shown on the machine monitor, and the screen goes back to the “Clock Adjustment” menu screen.



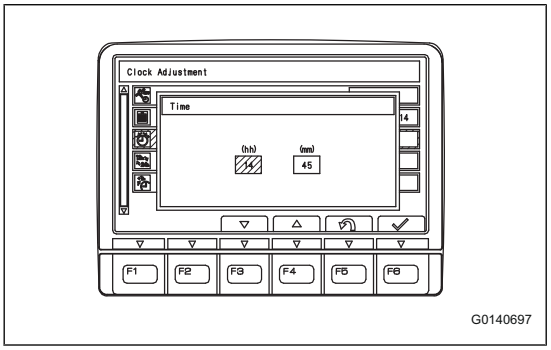
TIME SETTING

You can adjust the time of the machine monitor on “Time” screen.

1. Change the screen as “Monitor Setting” > “Clock Adjustment” > “Time”, and the screen shown in the figure is shown.

   “Hour” display part becomes yellow.
2. Adjust the “Hour” with the switches F3 and F4.

   When you cancel the setting, push the switch F5.



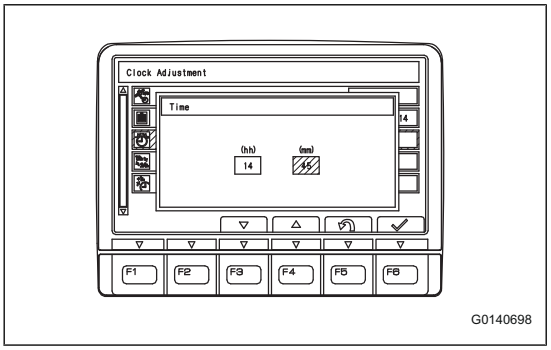
G0140697

3. Push the switch F6.

   “Minute” display part becomes yellow.
4. Adjust the “Minute” with the switches F3 and F4.

   When you adjust “Hour” again, push the switch F5.
5. Push the switch F6.

   The time has been changed to the time shown on the machine monitor, and the screen goes back to the “Clock Adjustment” menu screen.

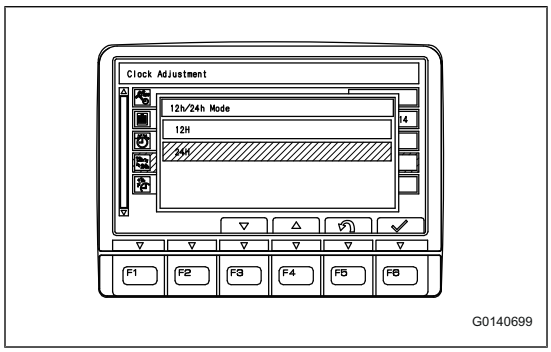


G0140698

12H/24H MODE

You can set the clock for the 12-hour display (AM/PM) or 24-hour display on “12h/24h Mode” screen.

Change the screen as “Monitor Setting” > “Clock Adjustment” > “12h/24h Mode”, and the screen shown in the figure is shown.



12H

The clock is set to the 12-hour display (AM/PM).

24H

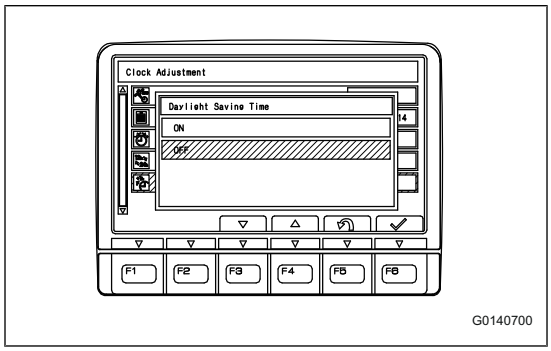
The clock is set to the 24-hour display.

DAYLIGHT SAVING TIME

Standard time and daylight saving time can be changed on the “Daylight Saving Time” screen.

Daylight saving time is the practice to set the clock one hour advance in summer to let people use the longer daytime hours in a day effectively.

Change the screen as “Monitor Setting” > “Clock Adjustment” > “Daylight Saving Time”, and the screen shown in the figure is shown.



ON

Time is shown on clock 1 hour advance than the standard time.

OFF

Time is shown on clock in the standard time.

LANGUAGE SETTINGS

You can change the language for the machine monitor display on the “Language” screen.

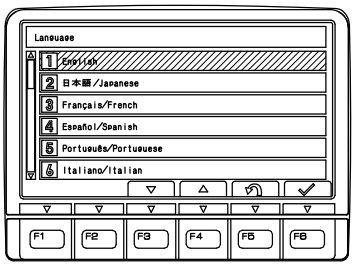
The languages that can be selected are as follows.

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. Change the screen as “Monitor Setting” > “Language”, and the screen shown in the figure is shown.
2. Select the desired language with the switches F3 and F4.
3. Push the switch F6.

   When you cancel the selection, push the switch F5.

   The language is selected and the screen goes back to “Monitor Setting” menu screen.



G0140701

OPERATOR ID

You can check and change ID which is in the identification state on “Operator ID” screen.

When the operator identification function is disabled, “Operator ID” is not shown on “Monitor Setting” menu screen.

REMARK

Consult your Komatsu distributor for setting, change, or cancel of the operator identification function.

Operator identification function

NOTICE

Do not use the operator identification function to enhance the security. The operator identification function has no effect of security enhancement or theft prevention.
We will not be responsible for theft or damage of the machine caused by the actions that follow.

- **Misuse of ID**
- **Unauthorized use of ID by unauthorized person**

If you use the operator identification function, you can see the operation information for each operator ID.

The operator identification function can be set to one of the settings below.

- The machine cannot be started unless the ID is identified.
- ID input can be skipped and machine can be operated even if it is not identified.

Consult your Komatsu distributor for the setting.

Check identified ID

If the machine can be operated even if the ID is not identified, you can check the operator ID with the operator identification function on “Monitor Setting” screen.

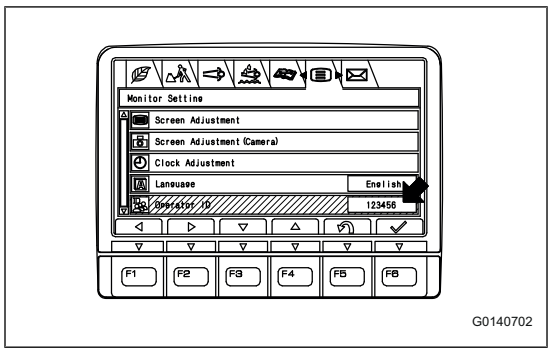
Items on the “Operator ID” are shown only when the operator identification function is enabled.

Identified ID is shown in a column of items.

“****” is shown if the machine does not identify the ID when the operator ID input is skipped and the machine is started.

REMARK

If the machine cannot be started unless the ID is identified, the identified ID is not shown in a column of items.



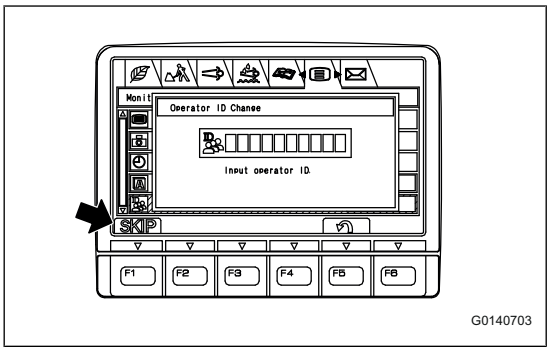
CHANGE OPERATOR ID DURING IDENTIFICATION STATE

1. Change the screen as “Monitor Setting” > “Operator ID ”, and the screen shown in the figure is shown.
2. Input the operator ID with numeric keypad of the monitor switch.
   - If numeric value is inputted, one value can be deleted when you push the switch F5.
   - When you cancel the inputted value, delete all the numeric value and push the switch F5.
   - If the “SKIP” is shown above the switch F1, you can skip the input of ID. Push the switch F1 for operator ID not to be identified.
3. Push the switch F6.

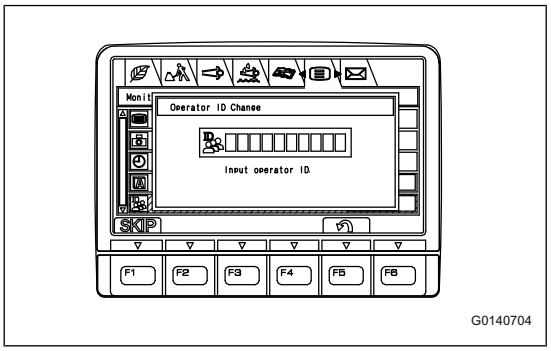
   The operator ID is changed, and the screen goes back to “Monitor Setting” menu screen.

   REMARK

   When you push the switch F6 after you input the operator ID that is not registered on “Operator ID Change” screen, a message is shown and the screen goes back to “Monitor Setting” menu screen.
   In this case, the operator ID under the identification process is not changed.



G0140703

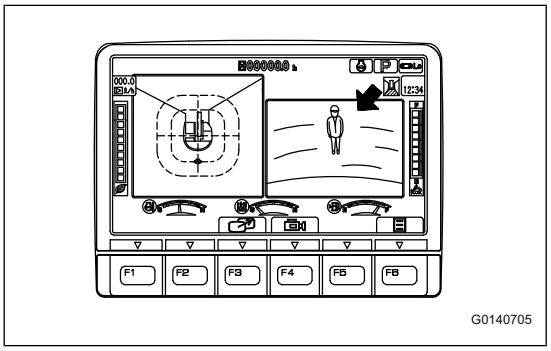


G0140704

KEY-ON CAMERA POSITION

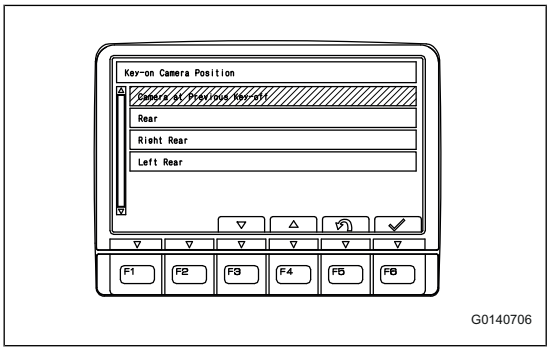
On “Key-on Camera Position” menu, you can select the camera image which will be displayed on the right side on the screen when starting up the machine monitor.

- 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.



G0140705

1. Change the screen as “Monitor Setting” > “Key-on camera position”, and the screen shown in the figure is shown.
2. Select one camera position to be displayed on the right side with the switches F3 and F4.



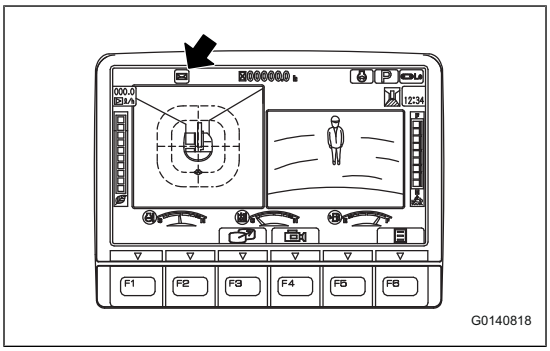
G0140706

MESSAGE DISPLAY

You can check the message when you push the switch F6 while the message display is lit as shown in the figure.

The message will be deleted when its expiration date comes or when a new message is received.

 G0140819	There is an unread message.
 G0140820	There is a read message to which no reply is made. Reply to your Komatsu distributor.
Not lit	There is no message.



G0140818

Messages from Komatsu distributor are shown on the machine monitor.

(A) Title of message

When no message has been received, “No message.” is shown.

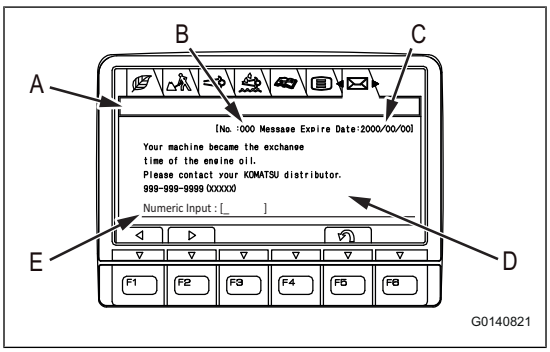
(B) Serial No. of message

(C) Validity

(D) Text

(E) “Numeric Input” column

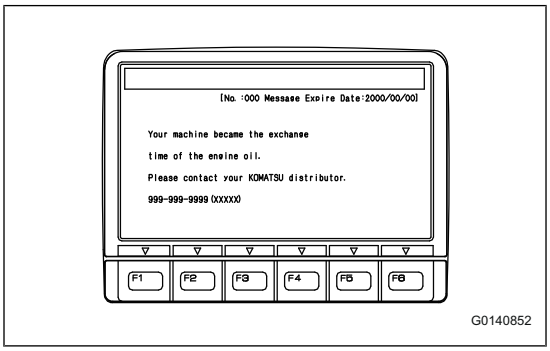
This is shown if the message needs reply.



G0140821

REMARK

If the starting switch is turned to the OFF position when there is an unread message, the message will be shown on the end screen.



G0140852

REPLY TO MESSAGE

When the “Numeric Input” column is shown, send a reply with the procedures that follow.

1. Check the number of the selected item which is described in the body text (D).
2. Input the number of selected item with monitor switch.

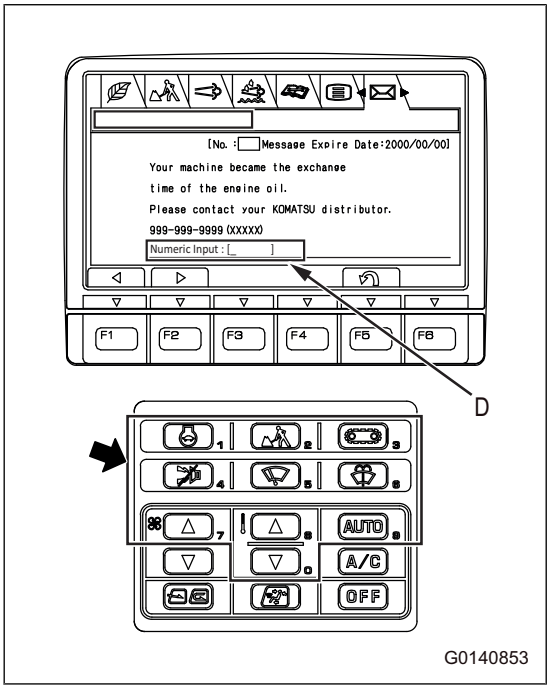
   Inputted value is shown in the “Numeric Input” column.

   If you input an incorrect number, push the switch F5, and you can clear a character at a time.
3. Check the inputted contents, and push the switch F6.

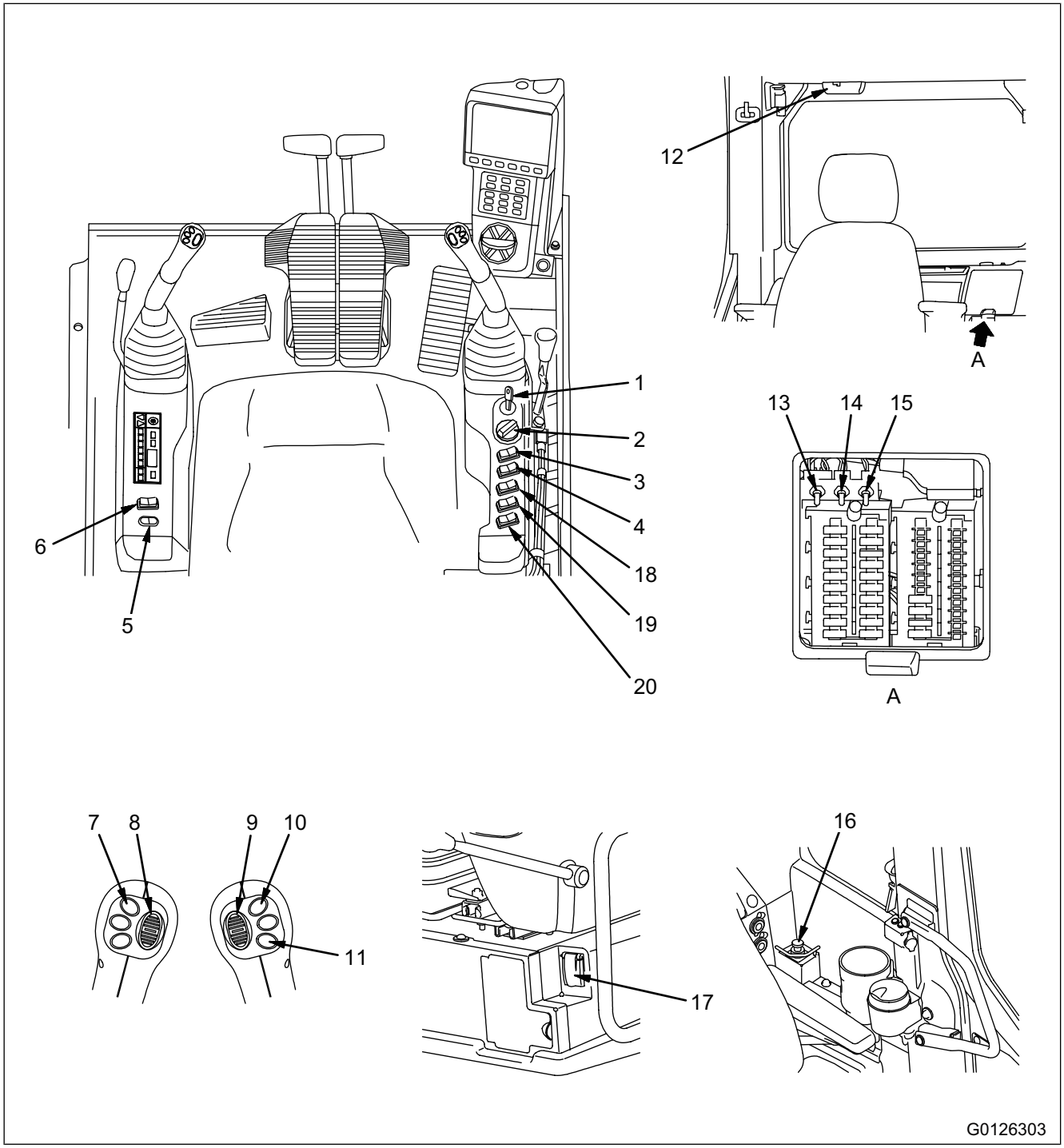
   “Do you send Numeric Input?” is shown.
4. Push the switch F6.

   When you change the number of selected item, push the switch F5.

   The input value is sent out.



NAMES OF SWITCH PANEL EQUIPMENT



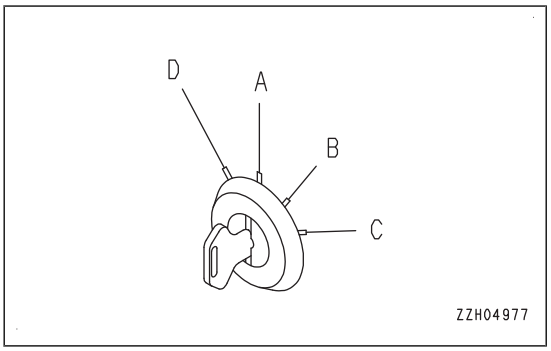
(1) Starting switch
(2) Fuel control dial
(3) Lamp switch
(4) Swing lock switch
(5) Seat heater switch
(6) Quick coupler main switch
(7) Quick coupler operation switch
(8) 2nd-line attachment proportional switch
(9) 1st-line attachment proportional switch
(10) Breaker operation switch
(11) Horn switch
(12) Room lamp switch
(13) Pump secondary drive switch
(14) Swing parking brake cancel switch
(15) Lock lever automatic lock cancel switch
(16) Cigarette lighter
(17) Engine shutdown secondary switch
(18) Revolving lamp switch

(19) Additional lamp switch

(20) Lower wiper switch (if equipped)

STARTING SWITCH

You can start and stop the engine with the starting switch.



(A): OFF position

The starting switch key can be put in or removed. The electrical current to the electrical system other than the room lamp stops being supplied, and the engine stops.

(B): ON position

Electric current flows through the charge circuit and lamp circuit. Keep the starting switch key in this position while the engine is in operation.

(C): START position

This is the engine start position. During the cranking, keep it at this position. When the engine is started, immediately take your hand off the key. When you let go of the key, it automatically goes back to the ON position (B).

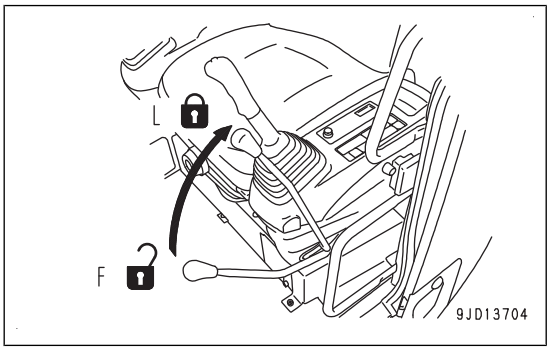
(D): HEAT (preheating) position

When you start the engine in cold weather, set the starting switch to this position.

When the key is turned to the HEAT position (D), the preheating pilot lamp lights up. Hold the key at this position until the preheating pilot lamp goes off. Take your hand off the key immediately after the preheating pilot lamp flashes. When you take your hand off the key, the switch goes back to the OFF position (A). Turn the key to the START position (C) immediately to start the engine.

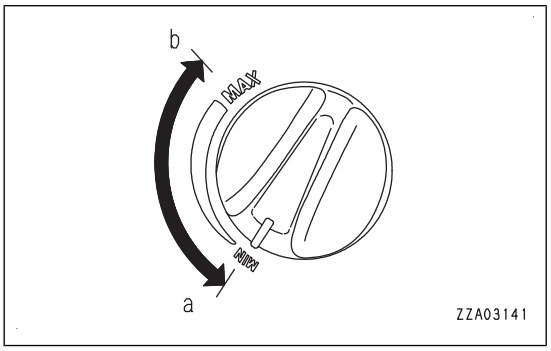
REMARK

To start the engine, the lock lever must be set in the LOCK position (L).
Make sure that the lock lever is at the LOCK position (L), and operate the starting switch.



FUEL CONTROL DIAL

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



(a) Low idle (MIN)

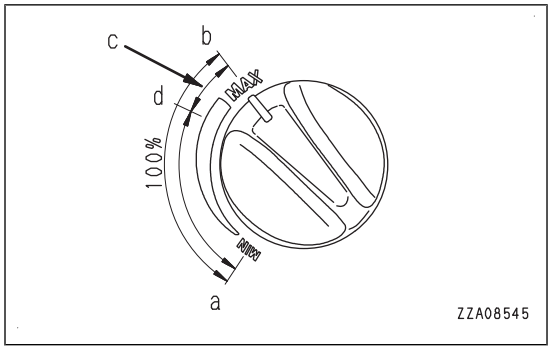
The position where the dial is turned fully to the left

(b) High idle (MAX)

The position where the dial is turned fully to the right

REMARK

This machine uses optimum matching control of main pump by the electronic control for the engine. There is a dead zone on the dial in response to the working mode as shown below, but this is not a problem.



Range (c)

Dead zone (constant engine speed)

P mode: 29%

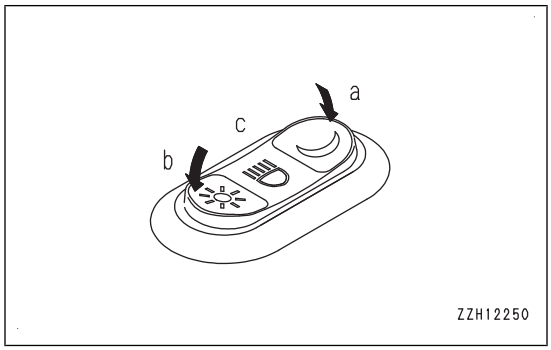
E mode: 36%

Position (d)

High idle

LAMP SWITCH

The working lamp or the monitor illumination lights up with the lamp switch.



(a) Night position

The lamps light up and the monitor illumination is set to night mode.

(b) Day position

The lamps light up and the monitor illumination is set to day mode.

(c) OFF position

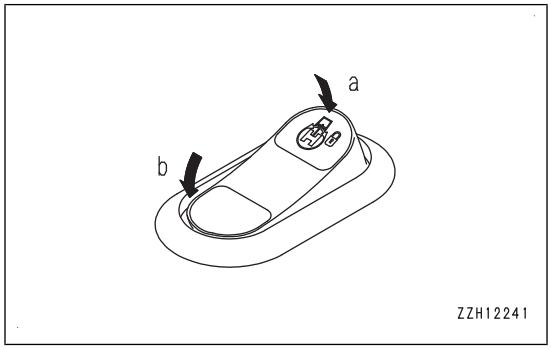
The lamps go off and the monitor illumination is set to day mode.

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.

SEAT HEATER SWITCH

This seat heater switch is used to warm the seat.

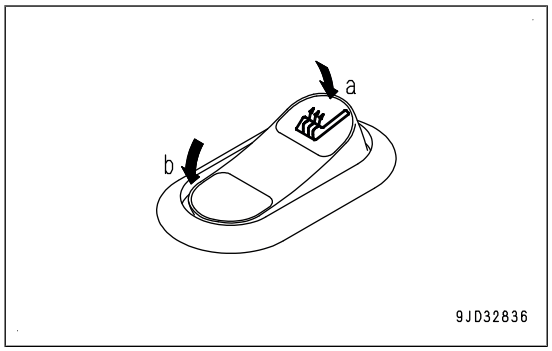
(a) ON

Start the seat heating and the seat becomes warm.

(b) OFF

Stops the seat heating.

When the seat heater switch is turned ON, the heater in the seat operates. When the seat surface temperature exceeds approximately 20℃, the heater is turned OFF automatically. When the temperature decreases below approximately 10℃, the heater is turned ON automatically.



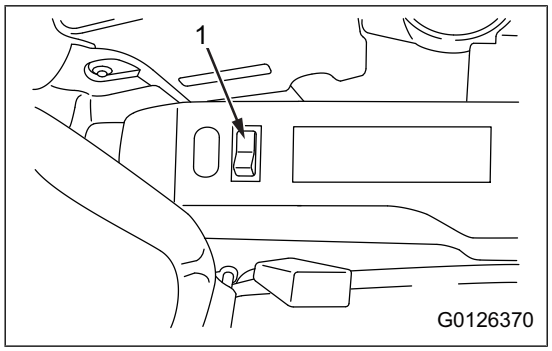
REMARK

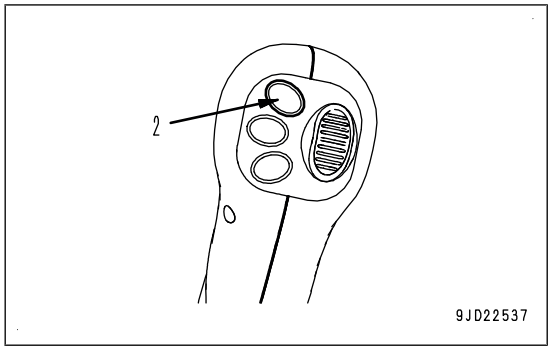
When the seat surface temperature is above approximately 20℃, the heater does not operated even if switch is turned ON.

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 the ATTACHMENTS AND OPTIONS, “HANDLE QUICK COUPLER (3-120)”.

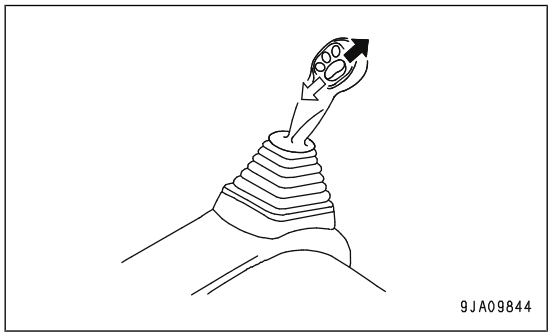




2ND-LINE ATTACHMENT PROPORTIONAL SWITCH

Proportional control rolling switch.

The 2nd-line attachment proportional switch operates the 2nd attachment circuit (e.g. clamshell rotation). The 2nd-line attachment proportional switch is a roller proportional control switch. Rolling the switch up produces rotation in one direction, rolling down produces rotation in the opposite direction. Slight movement of the roller will give slight movement of the clamshell; full movement of the roller will give faster movement of the clamshell.

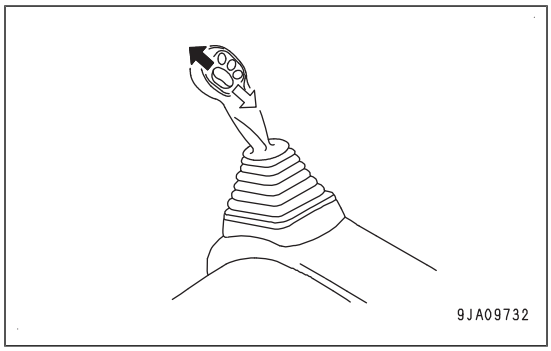


1ST-LINE ATTACHMENT PROPORTIONAL SWITCH

Operate the 1st-line attachment proportional switch when you use general attachments.

You can increase or decrease the flow rate by the switch stroke.

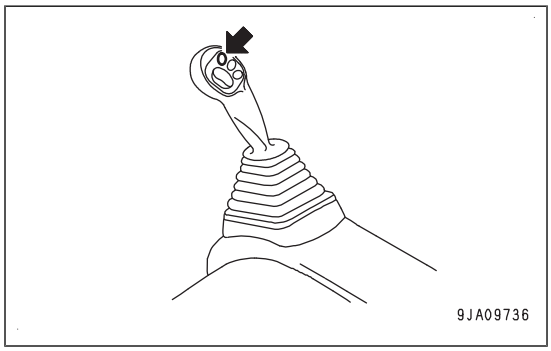
It operates only when the attachment mode is set on the machine monitor.



BREAKER OPERATION SWITCH

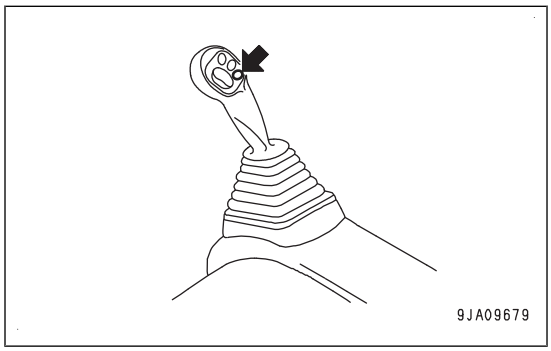
Use the breaker operation switch to operate the breaker.

For details on how to handle the breaker control switch, see “HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-28)”.



HORN SWITCH

You can operate the horn with the horn switch.



ROOM LAMP SWITCH

NOTICE

After you use the room lamp, be sure to turn the switch to the OFF position. If you forget to turn off the lamp, it can cause the battery to discharge.

The room lamp switch is used to turn on the room lamp.

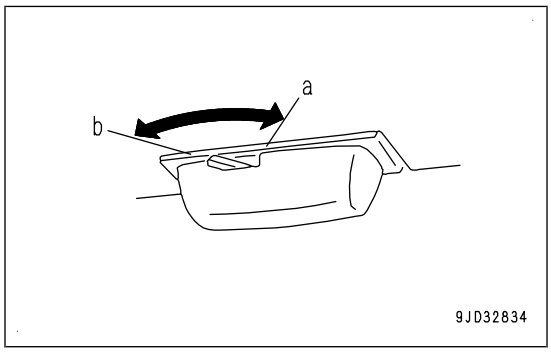
The room lamp lights up even when the starting switch is at the OFF position.

(a) ON position

Lights up

(b) OFF position

Not lit



PUMP SECONDARY DRIVE SWITCH

NOTICE

- **Do not use the pump secondary switch when the machine is normal. If there is an abnormal part, immediately repair it.**
- **If you use this switch in the emergency position by mistake when the machine is normal, “L03” is shown on the machine monitor.**
  If “L03” is shown when you do the work, check that the switch is in the normal position.

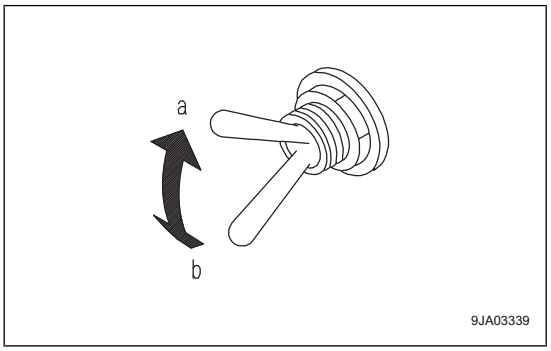
Pump secondary drive switch is a switch that enables the work equipment and the machine to move temporarily when there is an abnormality in pump control system. When “L03” is shown by an abnormality in pump control system, the work can be done if you turn this switch to the emergency position (a).

(a) EMERGENCY

When abnormal (switch is set to up)

(b) NORMAL

When normal (switch is set to down)



SWING PARKING BRAKE CANCEL SWITCH

NOTICE

Do not use the swing parking brake cancel switch when the machine is normal. If there is an abnormal part, immediately repair it.

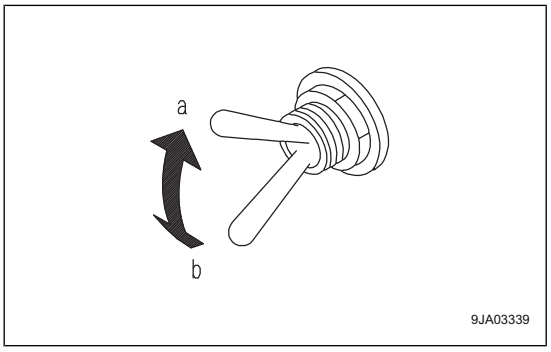
The swing parking brake cancel switch makes swing operations possible temporarily when there is a problem in the swing parking brake system. When the upper structure does not swing but the machine monitor does not show “L03”, move this switch to the CANCEL position (a), and there is a possibility that you can do the operation.

(a) CANCEL

When abnormal (switch is set to up)

(b) NORMAL

When normal (switch is set to down)



LOCK LEVER AUTOMATIC LOCK CANCEL SWITCH

NOTICE

Use the lock lever automatic lock cancel switch only when you need to temporarily move the machine or the work equipment in an abnormal and emergency condition. If there is an abnormal part, immediately repair it.

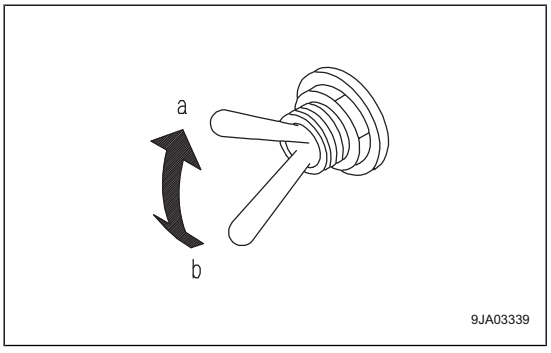
If the lock lever automatic lock function is abnormal, even when the lock lever is canceled normally in the condition that the work equipment control lever or travel lever is in the NEUTRAL position, this function works by mistake and the machine or the work equipment cannot move. If you set the lock lever automatic lock cancel switch to the CANCEL position (a), the machine or the work equipment can be operated temporarily. For the lock lever automatic lock function, see “LOCK LEVER (3-98)”.

(a) CANCEL

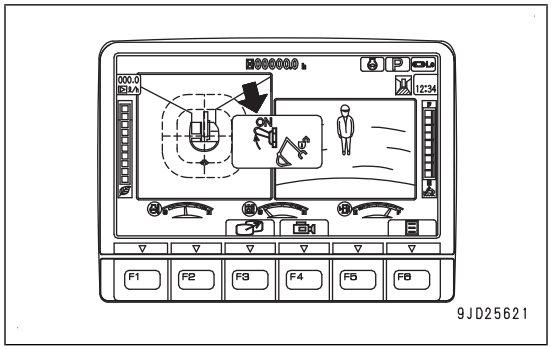
When in problem and emergency (switch is set to up)

(b) NORMAL

When normal (switch is set to down)



- When the lock lever automatic lock cancel switch is set to the CANCEL position (a), the lock lever automatic lock cancel pilot lamp lights up. At the same time, the mode is shown in the center of the monitor display, and after 2 seconds, the screen goes back to the standard screen.
- If you canceled the switch to move the machine or the work equipment temporarily, stop the engine, move back the switch to the NORMAL position (b). After that, consult your Komatsu distributor for repair.



CIGARETTE LIGHTER

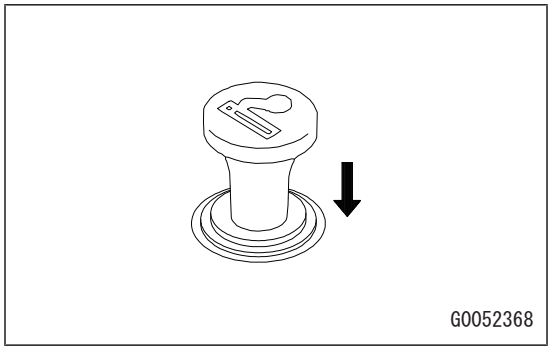
NOTICE

This cigarette lighter provides 24V power supply. Do not use as a power supply for a 12V device.

You can light a cigarette with the cigarette lighter.

When you push in the cigarette lighter, it goes back to the original position in some seconds. When it goes back to the original position, pull it out to use.

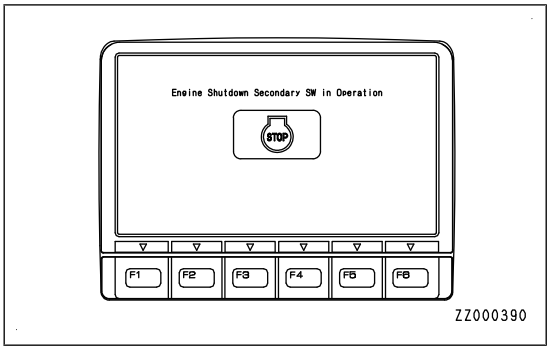
If the cigarette lighter is removed, the socket can be used as an 85W (24V×3.5A) power supply.



ENGINE SHUTDOWN SECONDARY SWITCH

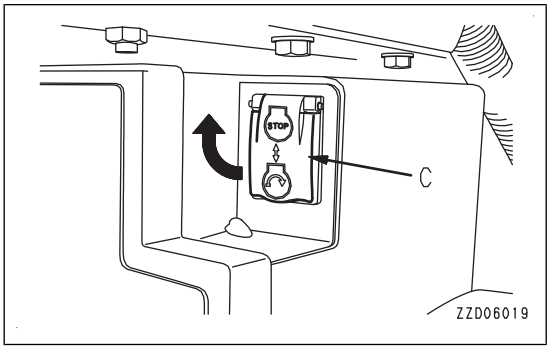
NOTICE

- **Do not use the engine shutdown secondary switch when the machine is normal. If there is an abnormal part, immediately ask for repair.**
- **If the engine shutdown secondary switch is set to the stop engine position by mistake while the machine operates normally, "Engine Shutdown Secondary SW in Operation" is shown on the machine monitor. When the "Engine Shutdown Secondary SW in Operation" is shown on the machine monitor, check that the switch is in the normal position. If it is in the stop engine position, move the switch back to the normal position.**



When the engine is not stopped even after you turned the starting switch to the OFF position, use the engine shutdown secondary switch to stop the engine.

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



2. Set the engine shutdown secondary switch to the upper position (a) to stop the engine.

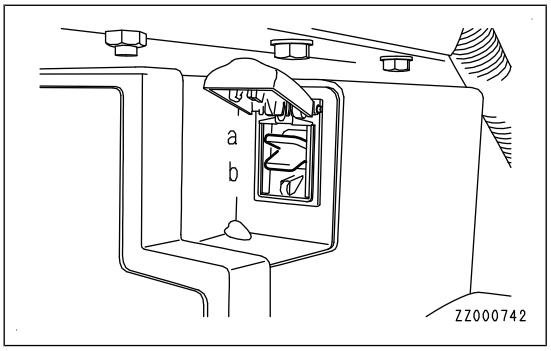
   (a) ENGINE STOP

   When it is abnormal (switch is set to upper position)

   (b) NORMAL

   When it is normal (switch is set to lower position)

Close the cover (C). The engine shutdown secondary switch automatically goes back to the NORMAL position (b).



REVOLVING LAMP SWITCH

(Option)

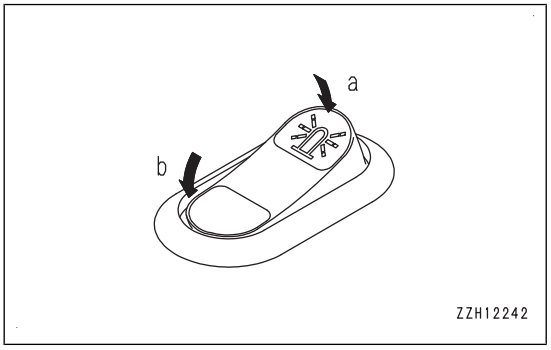
Revolving lamp switch is used to light up the yellow revolving lamp on top of the cab.

(a) ON position

Lights up

(b) OFF position

Not lit



ADDITIONAL LAMP SWITCH

(Option)

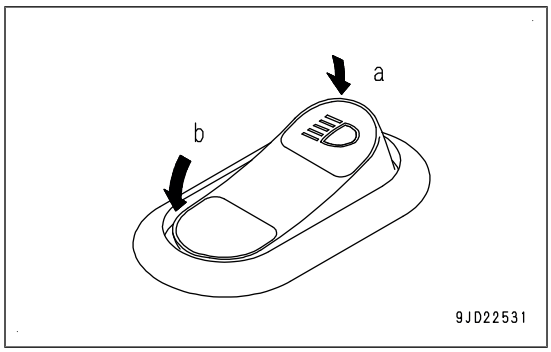
Additional lamp switch is used to light up the additional lamp (headlamp, rear lamp)

(a) ON position

Lights up

(b) OFF position

Not lit



LOWER WIPER SWITCH

(if equipped)

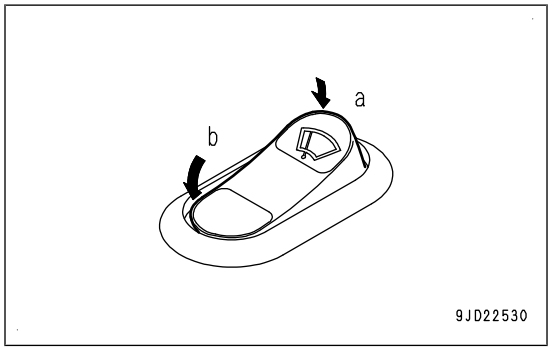
The lower wiper switch actuates the cab front lower wiper.

(a) Wiper position

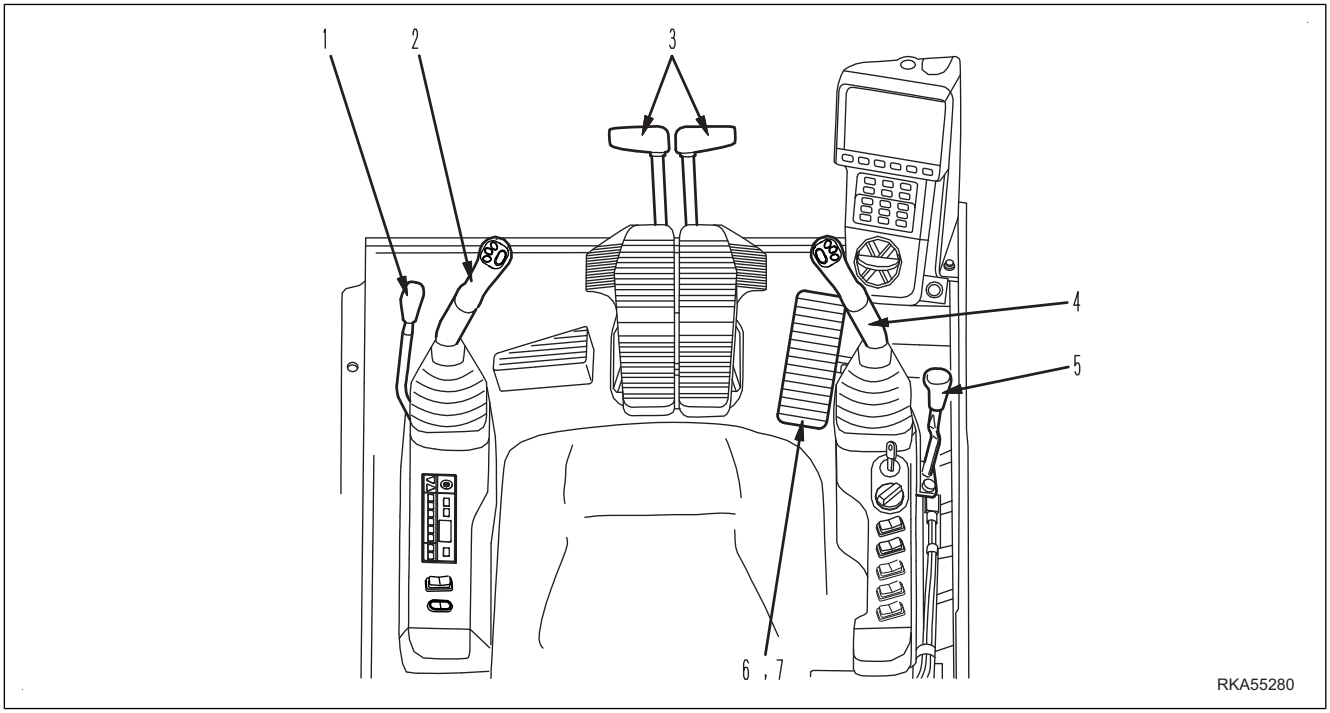
It actuates the lower wiper.

(b) Stop position

The lower wiper stops.



NAMES OF CONTROL LEVERS AND PEDALS



(1) Lock lever

(2) L.H. work equipment control lever (with auto-deceleration mechanism)

(3) Travel lever (with pedal, auto-deceleration mechanism)

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

(5) Blade control lever (with auto-deceleration mechanism)

(6) Attachment control lever (with auto-deceleration mechanism)

(7) Lock pin (with auto-deceleration mechanism)

LOCK LEVER

⚠ WARNING

- **When you stand up from the operator's seat, set the lock lever securely to the LOCK position. If the lock lever is in the FREE position and the control lever and control switch are touched by mistake, it can cause serious personal injury or death.**
- **Make sure that the lock lever is securely in the LOCK position.**
- **When you pull up or push down the lock lever, be careful not to touch the work equipment control levers. Make sure that your clothes do not get caught by the work equipment control levers.**
- **Before you set the lock lever to the FREE position, make sure that all levers and pedals are set to the NEUTRAL position. If they are not in the NEUTRAL position, the work equipment or machine possibly moves suddenly and it can cause a serious personal injury or death.**

The lock lever locks the work equipment operations, swing, travel, and attachment (option) operations.

Hold the red part at the tip of the lock lever (1), and operate it.

(L) LOCK position

The machine does not move even if each control lever and attachment control pedal (option) are operated.

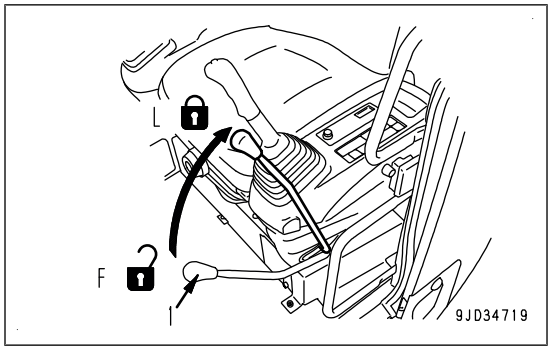
(F) FREE position

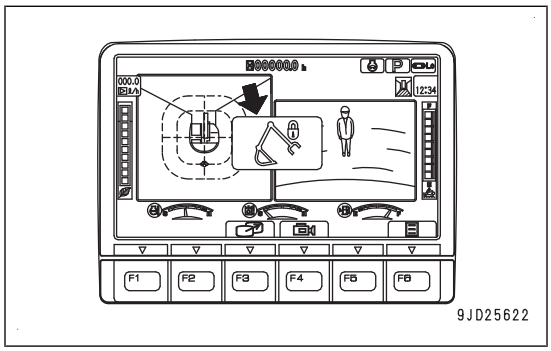
The machine moves in response to the operation of levers or attachment control pedals (option).

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

REMARK

Lock lever operates in hydraulic lock method. Machine does not move while the control levers or control switches move when the lock lever is in the LOCK position (L).





Automatic lock function of lock lever

⚠ WARNING

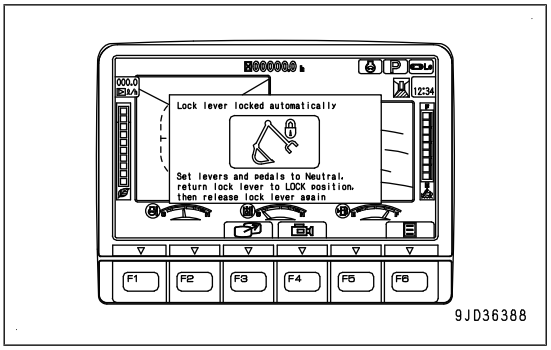
- **The lock lever automatic lock function helps the operator to make a judgment and to reduce damage caused by accident. It is not a function that can stop the work equipment or machine in all situations.**
- **Do not overestimate the lock lever automatic lock function. Even if this function is activated, the work equipment or machine does not stop immediately, but it possibly stops after some movement. The function does not operate in some cases that follow.**
  - **When the hydraulic oil temperature is low (When the hydraulic oil temperature caution lamp shows low temperature)**
  - **When the viscosity of the hydraulic oil used is higher than that of the genuine hydraulic oils which Komatsu recommends**
    For the genuine hydraulic oil which Komatsu recommends, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)".
  - **When the system has a failure.**
- **Before you set the lock lever to the FREE position, make sure that all levers and pedals are set to the NEUTRAL position. If they are not in the NEUTRAL position, the work equipment or machine possibly moves suddenly and it can cause a serious personal injury or death.**

Automatic lock function of lock lever is a function that makes the machine state to be the same as that of when lock lever is automatically locked even when you cancel the lock lever while you operate the work equipment control lever and travel lever. This is to prevent the operation of the work equipment or machine to continue.

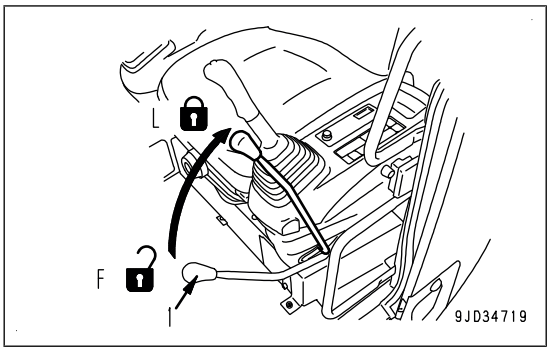
When this function is activated, the operation of the work equipment, swing, travel, and attachment operation are locked automatically and the message as in the figure is shown.

While this function is in operation, the machine does not move even when each control lever and attachment control switch are operated while the lock lever is in the FREE position (F).

When you cancel the lock, do as follows.



1. Move the lock lever back to the LOCK position (L).
2. Check that control levers and attachment control switch are in NEUTRAL state.
3. Set the lock lever to the FREE position (F).

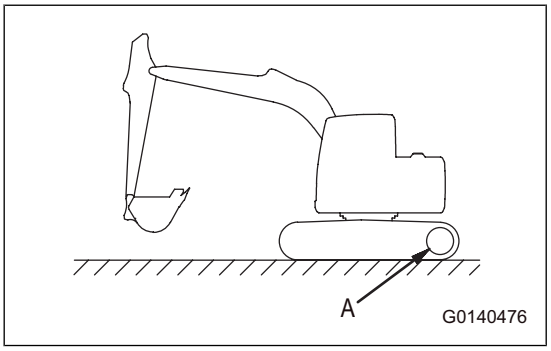


TRAVEL LEVER

⚠ WARNING

- **Be very careful for travel and steering with the pedals, and do not put your foot on the pedals unless necessary. If you operate the machine with your foot on the pedals and push them by mistake, the machine can suddenly start to travel. It can cause a serious personal injury or death.**
- **When you operate the travel lever, make sure the direction of the track frame if it faces forward or backward. (The track frame is set toward the front side when the sprocket side (A) is at the rear.)**

  When the track frame is set toward the rear side, the operation direction of the travel lever is the opposite to the direction of the movement of machine (forward/ reverse, right/left swing).



Use the travel lever to shift the travel direction to forward/ reverse. Description in the ( ) is for the pedal operation.

(a) FORWARD

The travel lever is pushed forward.

(The front part of the pedal is pushed.)

(b) REVERSE

The travel lever is pulled back.

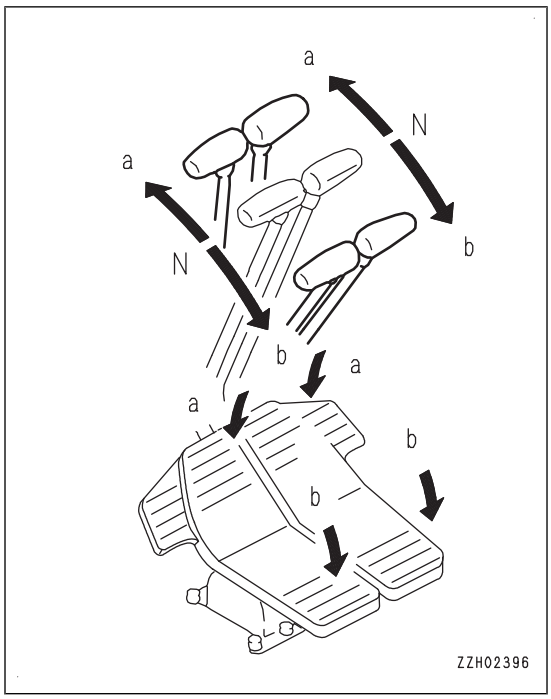
(The rear part of the pedal is pushed.)

N (NEUTRAL)

The machine stops.

REMARK

If the travel lever is shifted from the NEUTRAL position to the FORWARD position or the REVERSE position, the alarm makes a sound to warn that the machine starts to move.



WORK EQUIPMENT CONTROL LEVER

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

Swing operation

(a) Swing RIGHT

(b) Swing LEFT

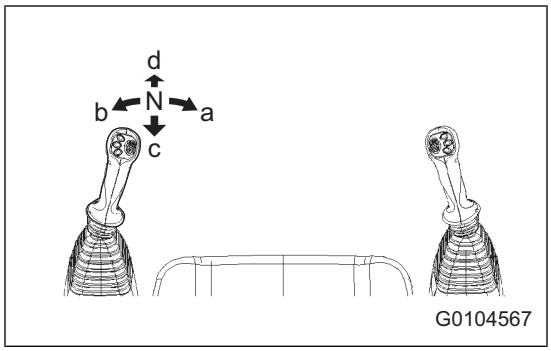
Arm operation

(c) Arm IN

(d) Arm OUT

(N) NEUTRAL

The upper structure and arm are held at current position.



Use the R.H. work equipment control lever to operate the boom and bucket.

Boom operation

(e) Boom RAISE

(f) Boom LOWER

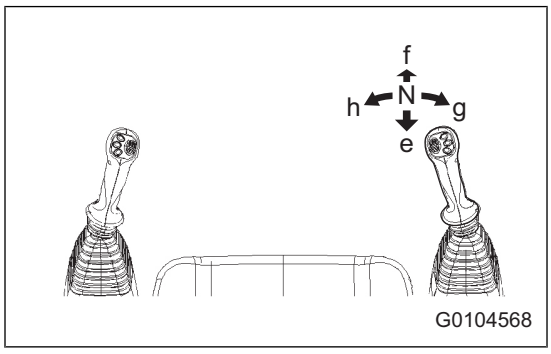
Bucket operation

(g) Bucket DUMP

(h) Bucket CURL

(N) NEUTRAL

Boom and bucket are held at current position.

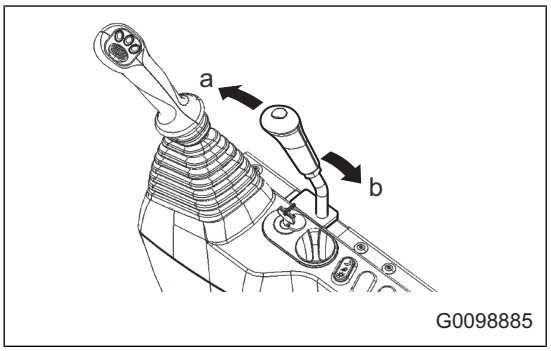


BLADE CONTROL LEVER

The blade control lever is used to control the blade.

(a): LOWER

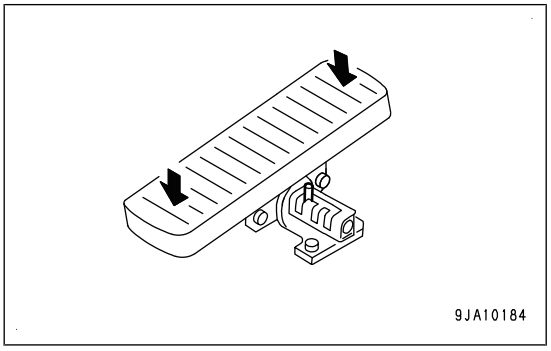
(b): RAISE



ATTACHMENT CONTROL PEDAL

Use the attachment control pedal to control the attachment.

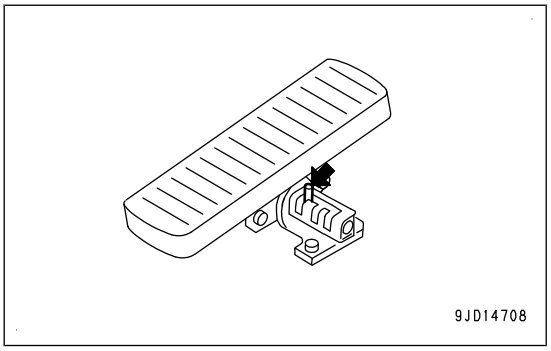
For details on how to handle the attachment control pedal, see “HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-28)”.



LOCK PIN

Use the pin lock to lock the attachment control pedal.

For details on how to handle the lock pin, see “HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT (6-28)”.



OTHER EQUIPMENT

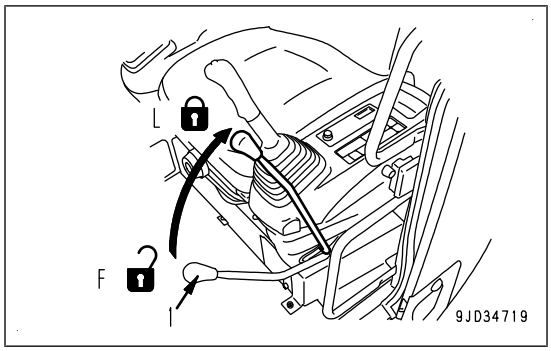
OPEN AND CLOSE CEILING WINDOW

⚠ WARNING

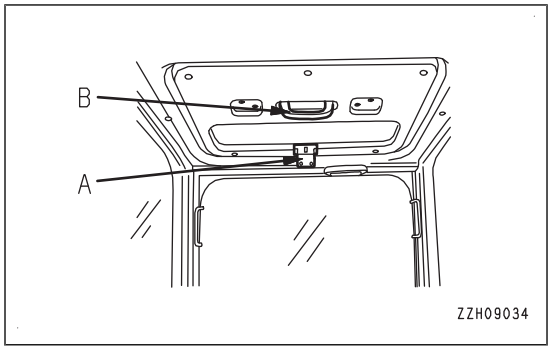
When you stand up from the operator's seat, set the lock lever securely to the LOCK position. If the lock lever is at the FREE position and the control lever, control pedal, or control switch is touched by mistake, it can cause serious personal injury or death.

When you open

1. Hold the red part on the top of the lock lever (1), and then securely operate it to the LOCK position (L).



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



When you close

1. Hold the handle (B), and lower the ceiling window.
2. Apply the lock (A).

If the lock cannot be applied, open the ceiling window one time, and pull down again.

OPEN AND CLOSE CAB FRONT WINDOW

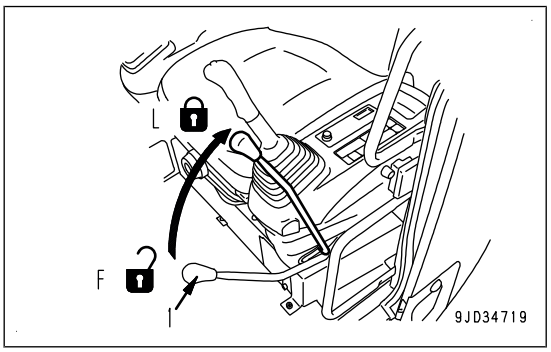
⚠ WARNING

- **Be sure to set the lock lever in the LOCK position when you open or close the front window, lower window, or door. If the lock lever is at the FREE position and the control lever, control pedal, or control switch is touched by mistake, it can cause serious personal injury or death.**
- **Lower the work equipment to the level ground, stop the engine, and then open or close the front window.**
- **When you open the front window, hold the handle securely with two hands to pull up. Do not let go of it until it is locked by the automatic lock catch.**
- **When you close the front window, tightly hold the handle with both hands. There is a danger that the window falls by its own weight.**

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

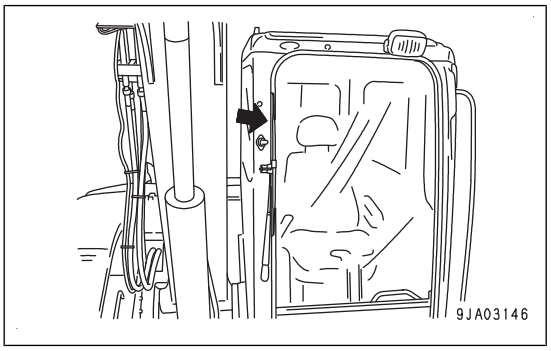
When you open

1. Lower the work equipment to the ground on a level area, and stop the engine.
2. Hold the red part on the top of the lock lever (1), and then securely operate it to the LOCK position (L).



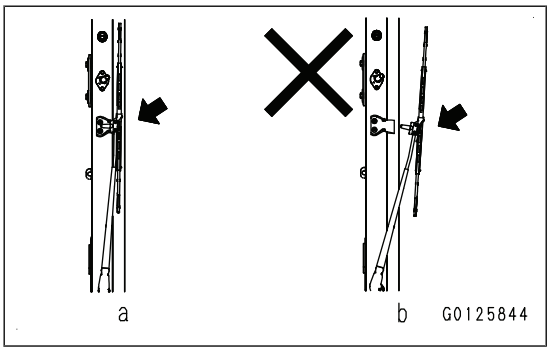
3. Make sure that the wiper blade is stowed in the right pole.

   If the wiper blade is in incorrect stowing position (b), lift it to move to the correct stowing position (a). If the wiper blade cannot go back to the correct stowing position, consult your Komatsu distributor for repair.



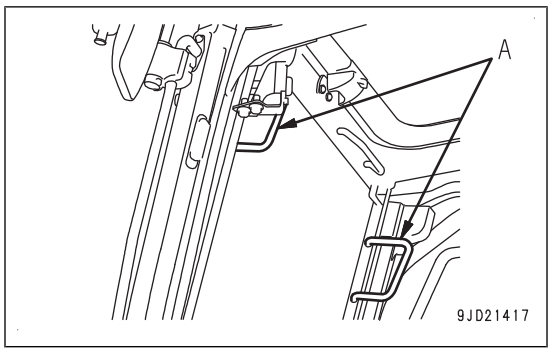
(a) Correct stowing position

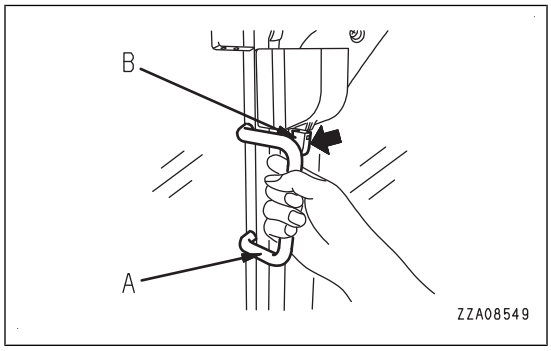
The wiper blade is on the cab.
(b) Incorrect stowing position
The wiper blade is on the glass.



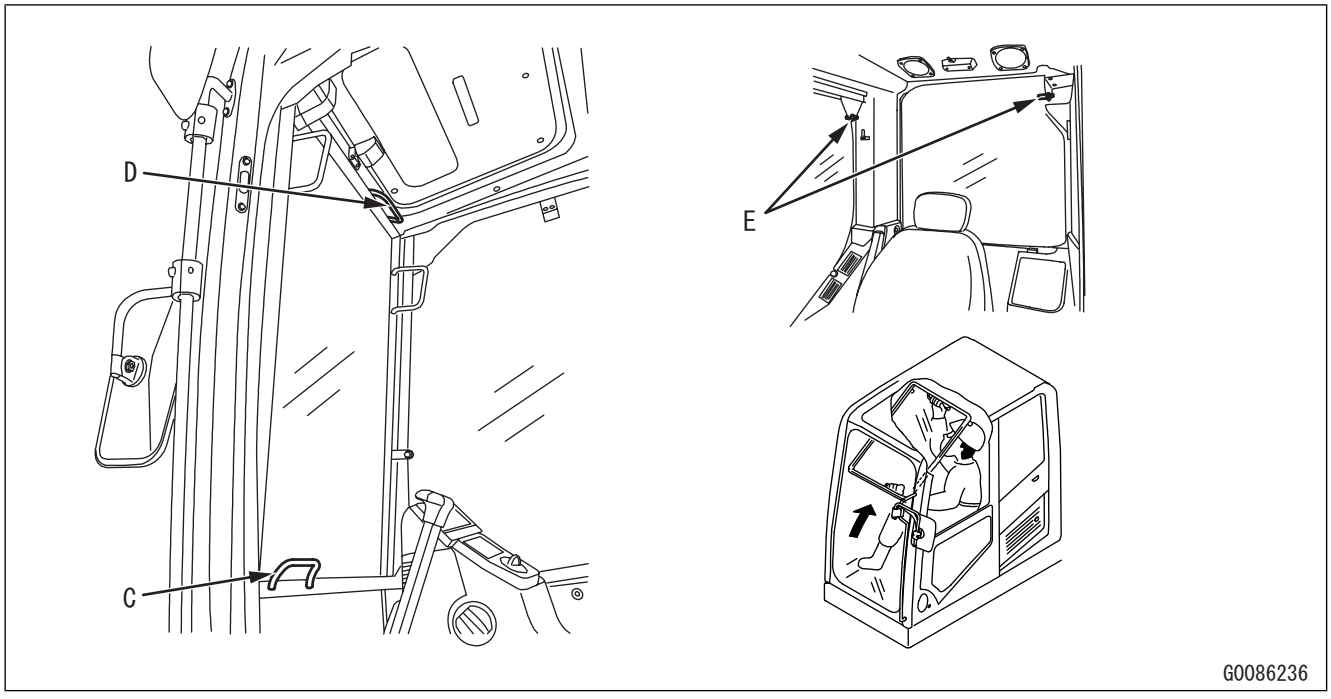
4. Hold the handles (A) (2 places) on the right and left top sides of the front window, and pull the levers (B) (2 places) to release the lock on the top of the front window.

   Upper part of the front window comes off.





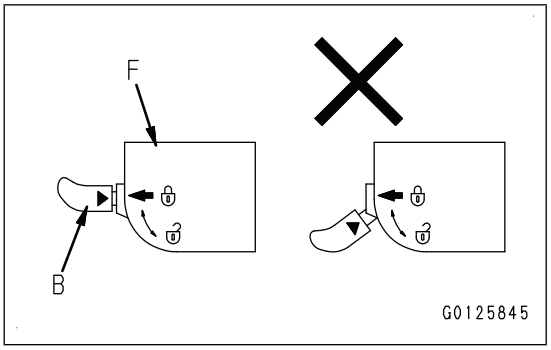
5. Pull up the lower handle (C) with your left hand from the inside of the operator's cab, hold the top handle (D) and pull it up with your right hand, and then push it against the lock catches (E) at the rear of the cab securely to lock the window.



REMARK

Do not hold and pull up the front window by the handles (A) on the right and left sides of top of the front window. The handles (A) are not to pull up the front window.

6. Visually check that the lever (B) is securely in the LOCK position.
   - The lock is engaged if the arrow on the lock case (F) is the same as the position of the arrow on the lever (B).
   - If the position of the arrow on the lock case (F) and the position of the arrow on the lever (B) do not match, do the operation in item 5 again and again to lock.



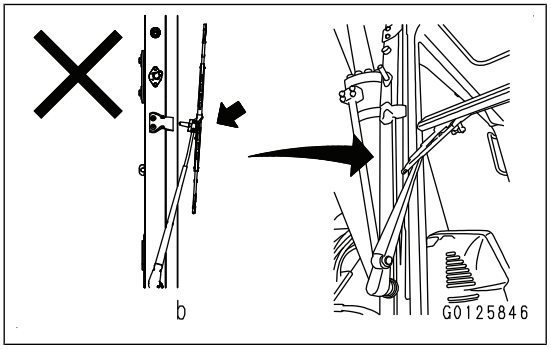
When you close

⚠ CAUTION

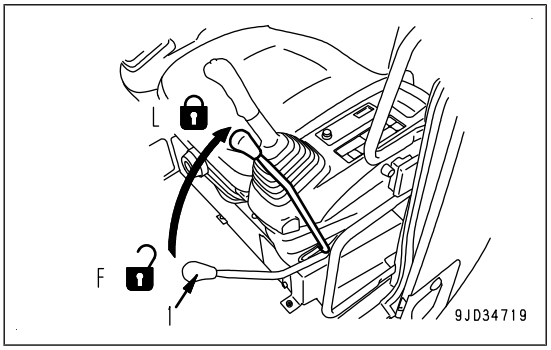
When you close the front window, lower it slowly and be careful not to get your hand caught.

NOTICE

Make sure 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 stowed at the incorrect position (b), be careful that the wiper blade can break.

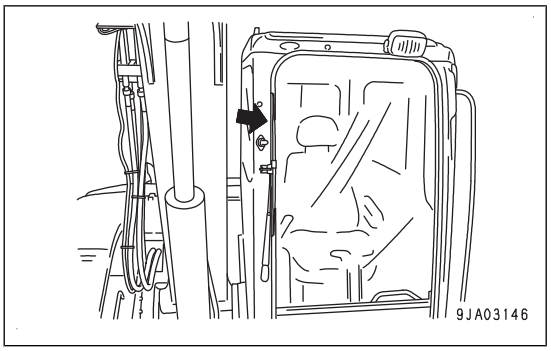


1. Lower the work equipment to the ground on a level area, and stop the engine.
2. Hold the red part on the top of the lock lever (1), and then securely operate it to the LOCK position (L).



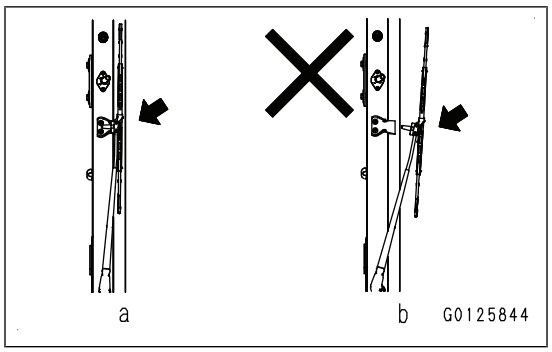
3. Make sure that the wiper blade is stowed in the right pole.

   If the wiper blade is in incorrect stowing position (b), lift it to move to the correct stowing position (a). If the wiper blade cannot go back to the correct stowing position, consult your Komatsu distributor for repair.

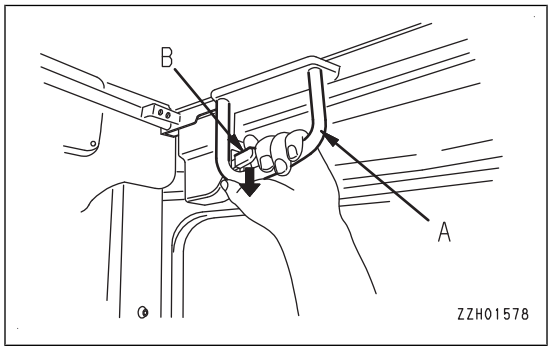


(a) Correct stowing position

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



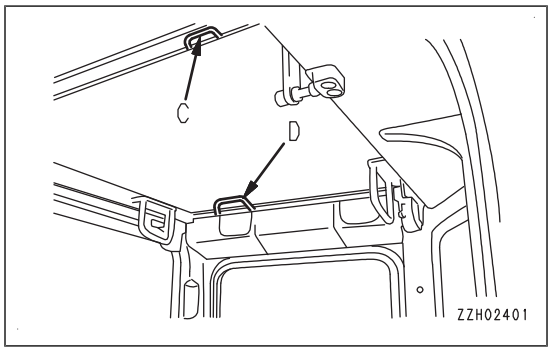
4. Hold the right and left handles (A), and pull down the lever (B) to release the lock.

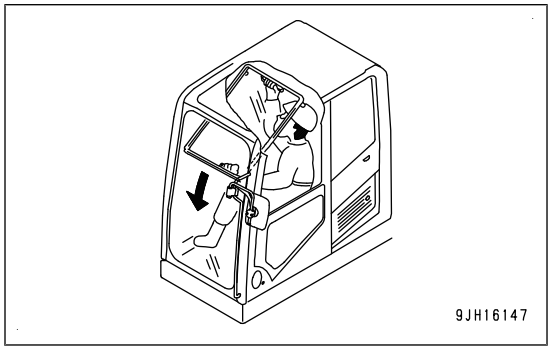


5. Hold the handle (C) at the bottom of the front window with your left hand and the handle (D) at the top with your right hand, push the window to the front, and lower it slowly.

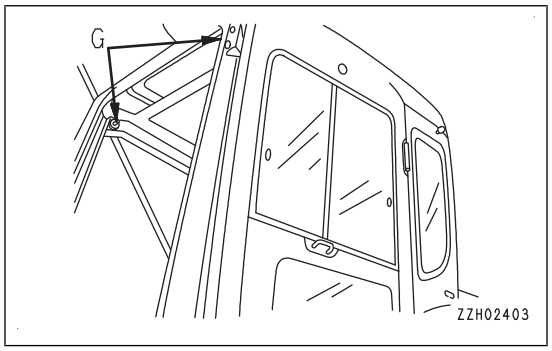
REMARK

Do not hold and pull down the front window by the handles (A) on the right and left sides of top of the front window. The handles (A) are not to pull down the front window.

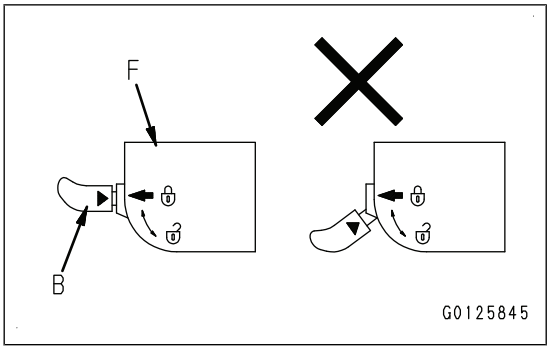




6. When the bottom of the window reaches the top of lower window, push the top of the window to the front to push it against right and left lock catches (G) and engage the lock.



7. Visually check that the lever (B) is securely in the LOCK position.
   - The lock is engaged if the arrow on the lock case (F) is the same as the position of the arrow on the lever (B).
   - If the position of the arrow on the lock case (F) and the position of the arrow on the lever (B) do not match, do the operation in item 6 again and again to lock.

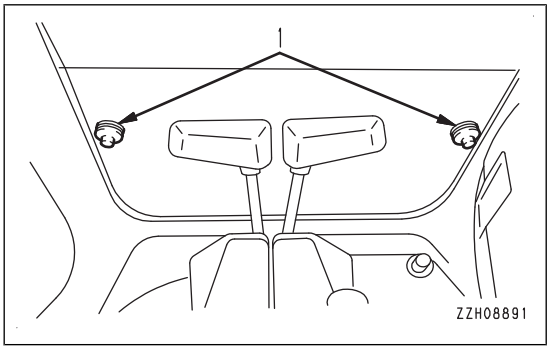


Removal of front window (lower side)

NOTICE

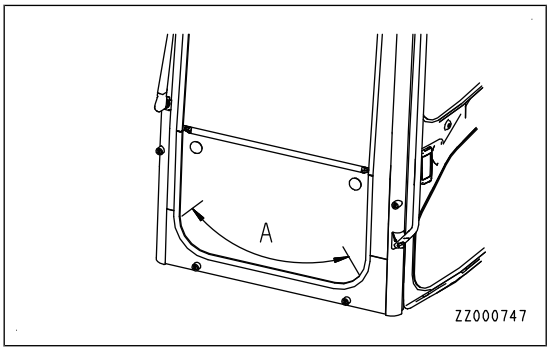
When you stow the glass, lock it securely and check that there is no play. If there is a play or the lock is not fully applied, there is a danger that the glass can fall.

1. Hold the knobs (1) and pull them up while the front window is open, and remove the lower window.

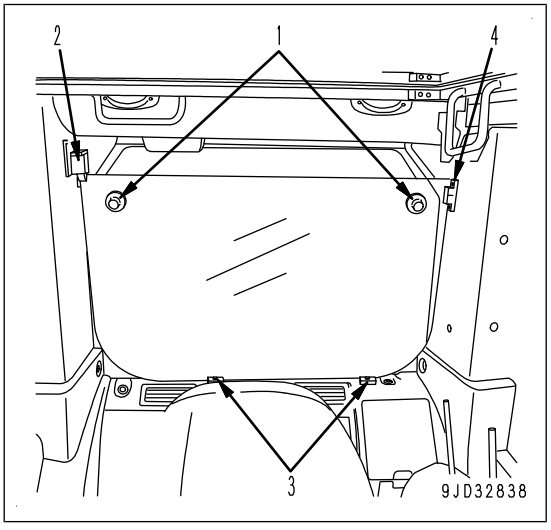


REMARK

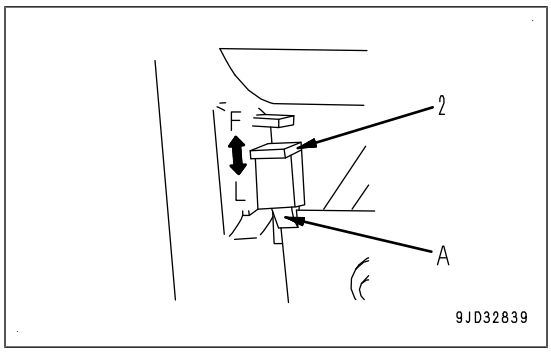
Clean the range (A), and remove the lower window. If dust is accumulated on the lower front of the front window, it is not easy to remove the lower window. Also, dirt such as dust attached to the glass enters the cab when the lower window is stored.



2. Store the removed lower window behind the operator's cab by the procedure that follows.
   1) Let the protrusion of the knobs (1) on the glass be on the inside, and insert the bottom of the glass into the grooves (3) on the seat.
   2) Insert the upper right part of the glass into the groove (4) on the seat.



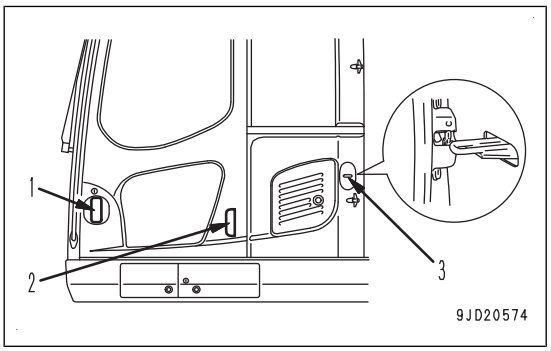
3) Push the lock (2) to the free position (F). Tooth (A) will come up, so push the glass against it, then release the lock (2) and secure the top of the glass.
4) When the lock (2) is released, it will return to LOCK position (L) and tooth (A) will go down.
5) When you remove the lower window from the stowing position, do the stowing procedure in the reverse order.



SLIDE DOOR

⚠ CAUTION

- **Before you use the machine, make sure that the slide door is locked regardless whether the door is open or closed.**
- **Park the machine on a flat ground when you open or close the door. Be very careful when you open or close the slide door if the machine is stopped on a slope. There is a danger that door opens and closes suddenly by its own weight.**
- **When you open or close the door, be sure to hold the door handle (1) and the knob (2).**
- **Be careful not to pinch your hand with the front pillar or the center pillar.**
- **Call out a warning before you open or close the door when there is anyone in the cab.**



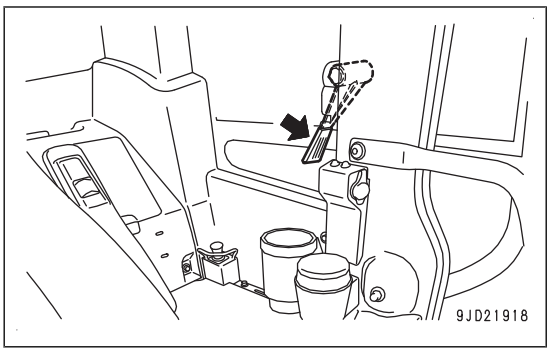
If the door is locked in open state, pull the door handle (1) rearward one time to release the lock (3).

EMERGENCY ESCAPE HAMMER

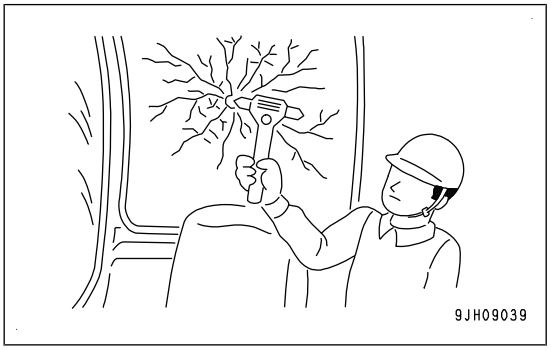
⚠ CAUTION

- **If it is necessary to break the window glass with the hammer, be very careful not to get injured with broken pieces of glass.**
- **When you escape, remove all 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.**

The hammer is provided to break the glass. Escape through the window in case of emergency when you cannot open the cab door.



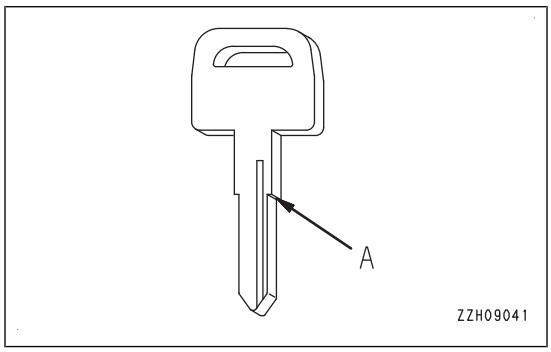
Use the hammer to break the glass and escape through the window.



COVER WITH LOCK

Use the starting switch key to open and close the cover with lock.

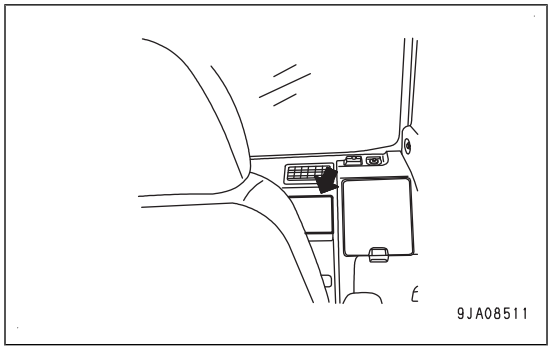
Insert the key until the part (A) touches, and then turn the key. If the key is turned when it is not inserted to the end, it can be damaged.



MAGAZINE BOX

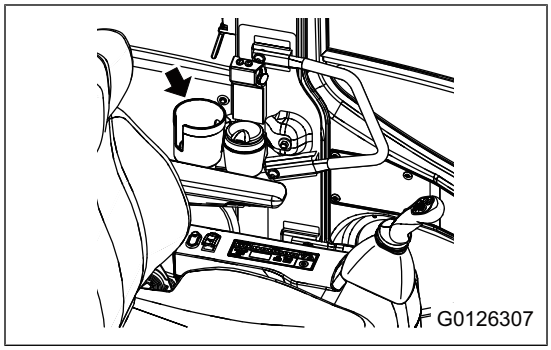
A pocket is provided the rear inside the cab for keeping Operation and Maintenance Manual and oil chart.

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



CUP HOLDER

The cup holders are in the positions shown in the figure.

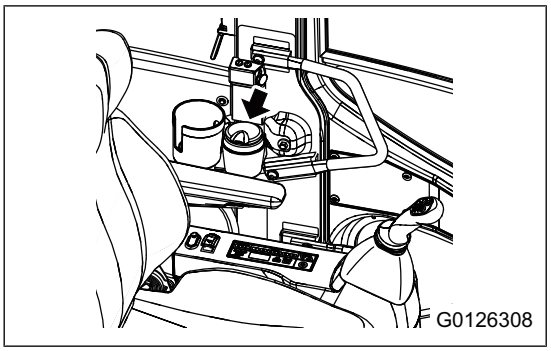


ASHTRAY

NOTICE

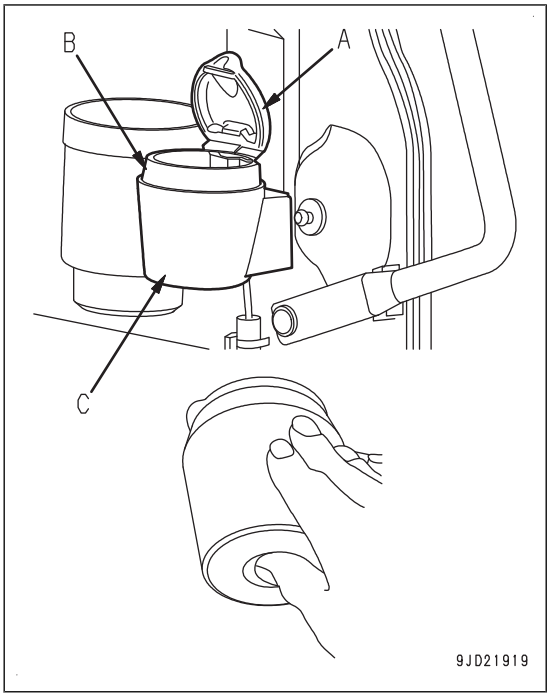
When you remove the ashtray, if you hold the ashtray lid (A) and twist it, the ashtray can be damaged.

The ashtray is in the position shown in the figure.



Be sure to extinguish your cigarette before you put it in the ashtray, and close the lid (A).

When you remove the ashtray, open the ashtray lid (A), and then hold the ashtray body (B) and twist it right and left to remove. Or, push up the ash tray body (B) with a finger through the hole under the ash tray holder (C).



POWER SUPPLY OUTLET

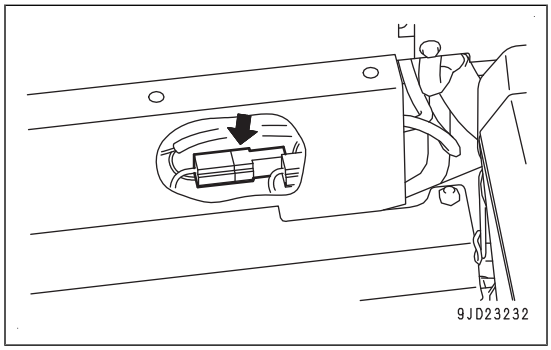
NOTICE

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

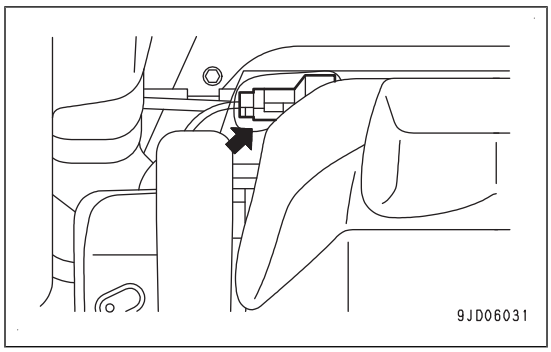
The connectors to take out electric power for optional parts are fixed to the right and left under the floor console. Remove them before use.

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

Left connector No.: M10



Right connector No.: M09



For the connection type connector, see the table below.

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

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

24V power supply

NOTICE

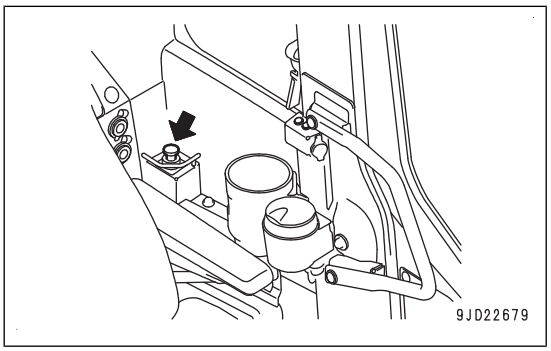
Do not use as a power supply for a 12V device. This will cause failure of the equipment.

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

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

REMARK

Use this power source while engine is running.



12V power supply

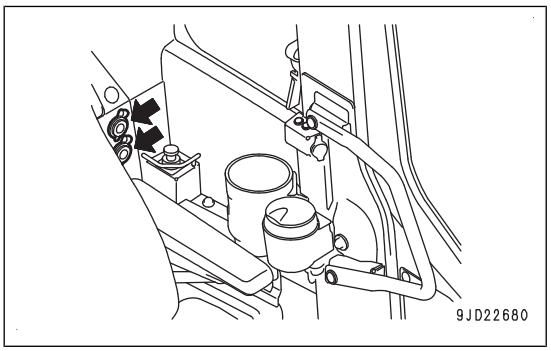
Capacity of this power supply is 144W (12V x 12A).

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

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

REMARK

Use this power source while engine is running.

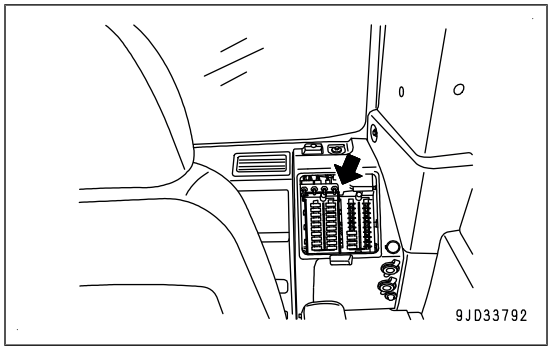


FUSE

NOTICE

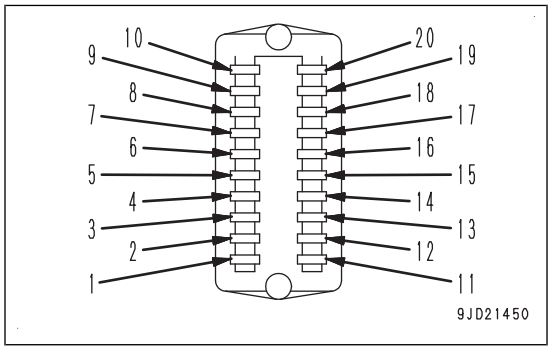
Before you replace the fuses, be sure to turn the starting switch to the OFF position. Check that the system operating lamp is not lit. Then turn the battery disconnect switch key to the OFF position.

- Fuse holder is installed on the inside of the cover on the left side behind the operator's seat.
- It protects the electrical component and wiring from burning out.
- If the fuse is corroded, looks white powdery, and there is looseness between the fuse holder and the fuse, replace the fuse.
- When you replace the fuse, replace it with one of the same capacity.

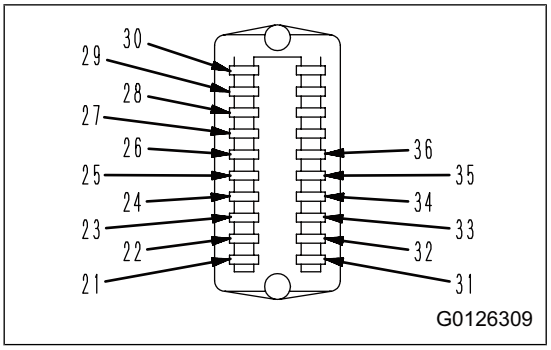


Fuse capacities and circuit names

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

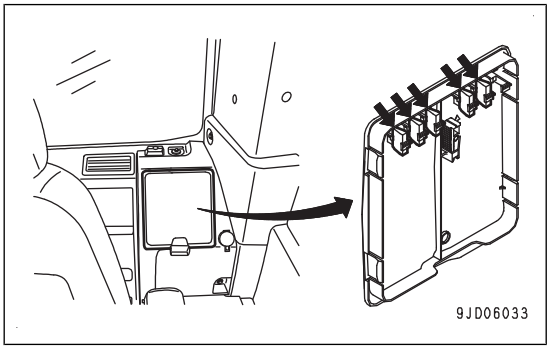


No.	Fuse	Name of circuit
(21)	10A	CAB head light (1)
(22)	10A	CAB rear light
(23)	10A	Lower wiper
(24)	10A	Quick coupler
(25)	10A	Refuel pump
(26)	10A	CAB head light (2)
(27)	10A	Optional light
(28)	20A	Auto greasing
(29)	30A	Optional heater
(30)	10A	Spare
(31)	20A	Sensor power supply relay (1)
(32)	10A	Sensor power supply relay (2)
(33)	10A	DEF pump heater
(34)	20A	DEF heater relay
(35)	20A	KOMTRAX OPT(1) (continuous power supply)
(36)	15A	KOMTRAX OPT(2)

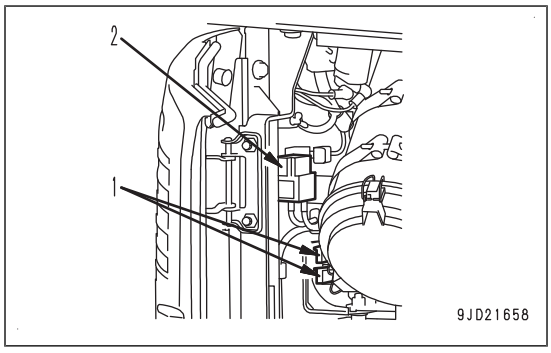


REMARK

- The replacement spare fuses are installed behind the fuse holder lid at the rear left of the operator's seat.
- After the spare fuses are used, refill them immediately.
- One spare fuse is installed for each 5A, 10A, 20A, 25A, and 30A.



FUSIBLE LINK



NOTICE

Before you replace the fusible link, be sure to turn the starting switch to the OFF position. Make sure that the system operating lamp is not lit, and then turn the battery disconnect switch key to the OFF position.

If the phenomenon that follows occurred, open circuit of the fusible link is the possible cause. Open the rear left cover, inspect the fusible link, and replace it.

- If the engine starting motor does not operate even when the engine starting switch key is turned to the START position, fusible link (1) may be broken.
- If the engine does not start easily in cold weather even if the starting switch is set to HEAT (preheat) position, fusible link (2) may be broken.

REMARK

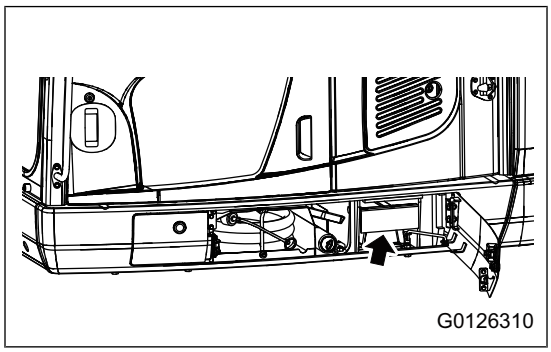
A fusible link refers to the large-sized fuse wiring installed in the high current flow portion of the circuit.
It protects electrical components and wiring from burning, in the same way as an ordinary fuse.

No.	Capacity	Name of circuit	Connector No.	Part No.
(1)	65A	Standard power supply	F02	22U-06-11270
		Continuous power supply	F03	
(2)	120A	Preheat	F06	421-06-22830

TOOL BOX

When you open the left side cover of the machine, you will find the standard tool box.

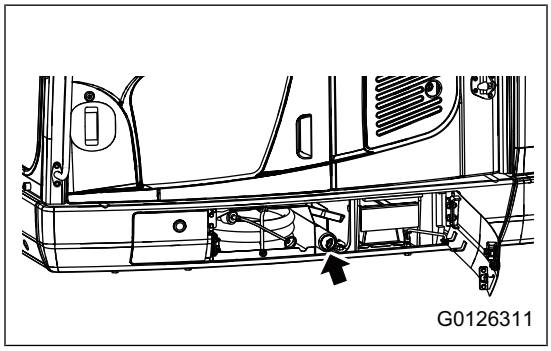
Put tools in the attached tool bag to store tools.



GREASE PUMP HOLDER

When you open the left side cover of the machine, you will find the storage place for the grease pump.

Put the nozzle of the grease pump into the hole at the end, put it to the end and store it.



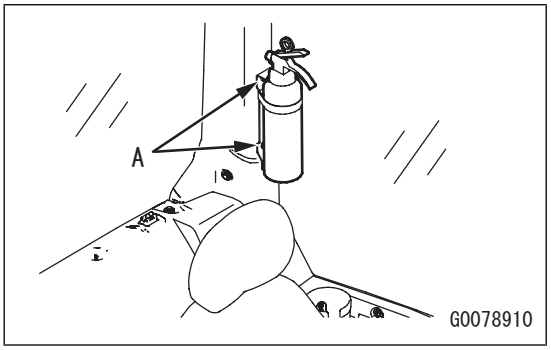
FIRE EXTINGUISHER

(option)

You can fix the fire extinguisher in the position (A) shown in the figure.

For the parts necessary to fix it, consult your Komatsu distributor.

The directions are described on the nameplate attached to the fire extinguisher. Carefully read and understand them for the possibility of fires.



BATTERY DISCONNECT SWITCH

⚠ CAUTION

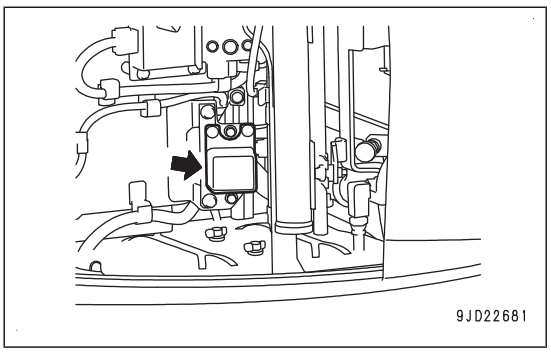
- **Do not operate the battery disconnect switch while the engine is running. The large current occurred from the alternator can burn the electric parts and it causes a fire in some cases. Operate the battery disconnect switch only when the engine is stopped.**
- **Remove the switch key always when you turn the battery disconnect switch to the OFF position. If other person turns the key to the ON position carelessly, this is very dangerous.**

NOTICE

- **Keep the battery disconnect switch in the ON position except the cases that follow.**
  - **When you store the machine for a long time (more than a month)**
  - **When you repair the electrical system**
  - **When you do the electric welding**
  - **When you handle the battery**
  - **When you replace the fuse or such**
- **Do not turn the battery disconnect switch to the OFF position while the system operating lamp is lit. If you turn it to the OFF position while the lamp is lit, the data in the controller can be lost and system trouble can occur.**
- **If the switch is turned to the OFF position, all the electrical system is cut out and the functions of KOMTRAX stop. In addition, the time information of the clock and the radio tuning information can be lost. In this case, set them again. For details, see "CLOCK ADJUSTMENT (3-80)" and "RADIO (3-252)".**

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

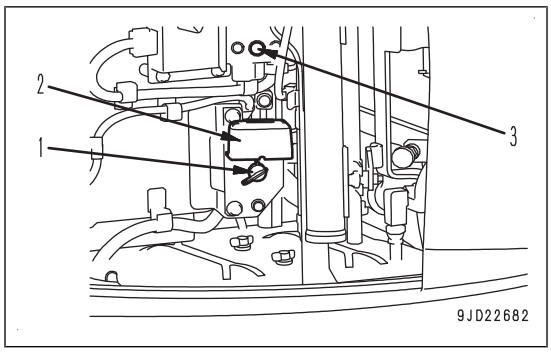
This is inside the battery inspection cover.



You can find the battery disconnect switch when you pull up the rubber cover (2).

REMARK

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



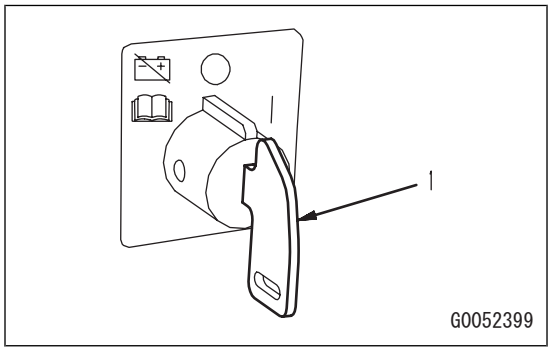
(O): OFF position

The switch key (1) can be inserted or removed. The current from the battery is cut out.

(I): ON position

The electric current from the battery flows into the circuit.

Before you start the machine, be sure to set it to this position.



SYSTEM OPERATING LAMP

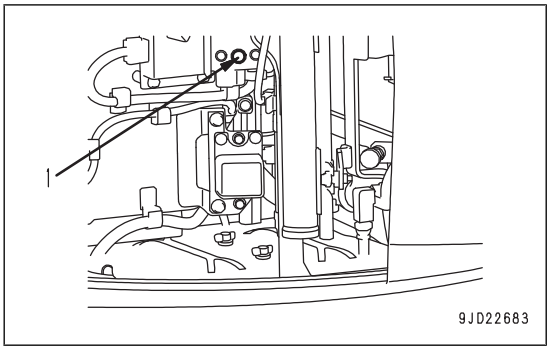
NOTICE

While the system operating lamp is lit, do not set the battery disconnect switch to the OFF position. You can lose the data in the controller.

The system operating lamp shows that the electric power is supplied to the controller mounted on the machine.

The system operating lamp lights up while the power is supplied to the controller. Normally, it goes off in Approximately 1 to 7 minutes after the starting switch is turned to the OFF position.

Before you set the battery disconnect switch to the OFF position, make sure that the system operating lamp is not lit.



REMARK

- Even if the starting switch is in the OFF position, the controller can operate in some cases.
  The system operating lamp lights up while the controller is in operation. It is not a problem.
- After the starting switch is turned to the OFF position, the system operating lamp keeps lit for a long time in some cases.
  Consult your Komatsu distributor if the system operating lamp keeps lit for a long time.
- Even if the system operating lamp is not lit, the lamp can illuminate in the dark. It is because of very small leakage of current in the controller, and it is not a problem.

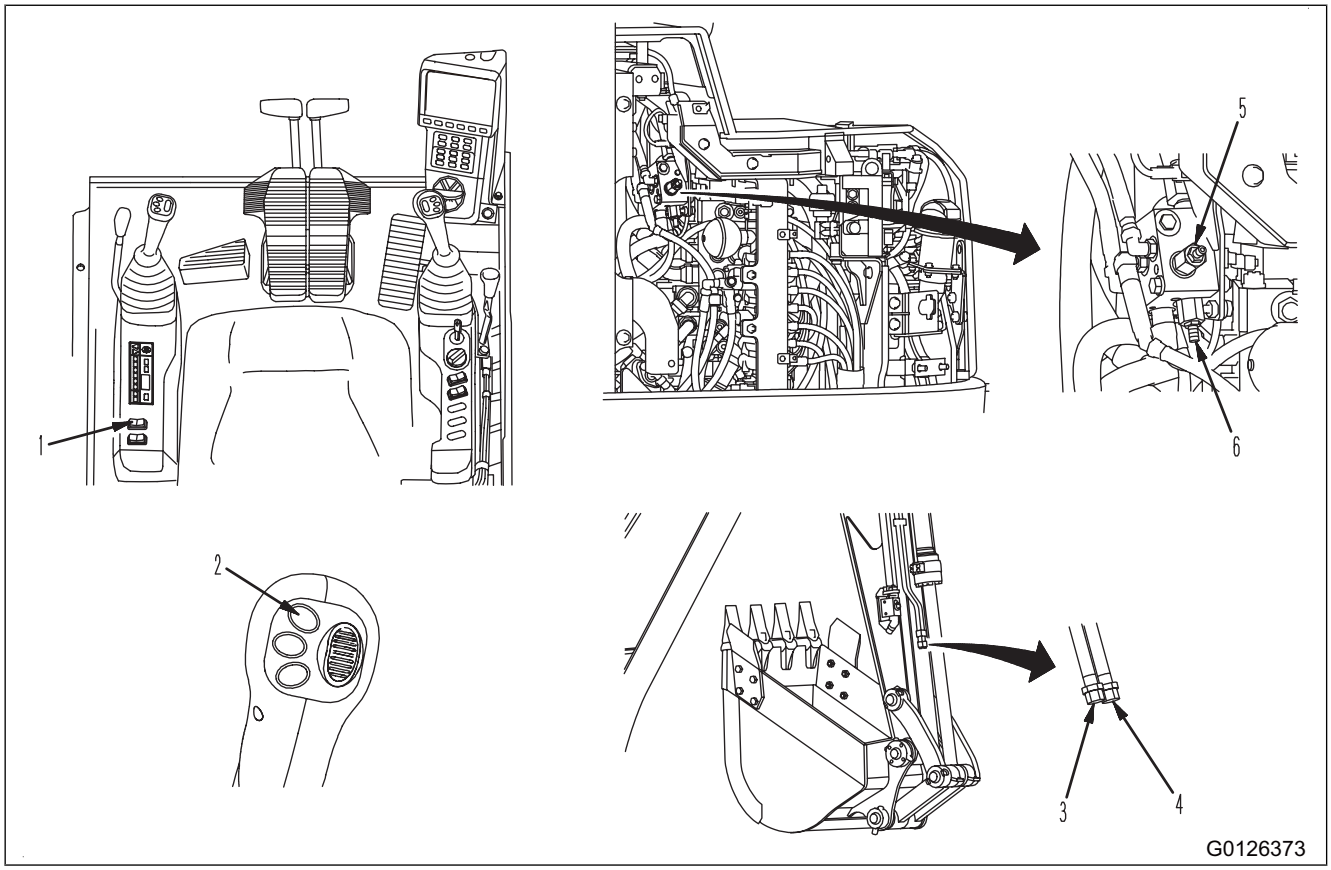
HANDLE QUICK COUPLER

⚠ WARNING

Handling the quick coupler involves a risk. Handling it without caution may cause serious personal injury or death. Observe the following caution strictly.

- Use such a quick coupler that you can check it from the operator position that the attachment or bucket is completely locked.
- Use only quick coupler which include a pilot operated check valve in the locking cylinder. This is to eliminate the risk of the bucket or attachment which may move if the oil pressure is lost. Consult the manufacturer of the quick coupler if there is anything unclear.
- Read thoroughly the Operation and Maintenance Manual for the quick coupler, and follow the recommendations. Consult your Komatsu distributor if there is anything unclear in installation or operation.
- Pressure regulation valve (5) and (6) allow the attachment pressure and the release pressure for the quick coupler to be limited according to the coupler manufacture's recommendation respectively.
  Maximum circuit pressure: 34.8MPa {355kgf/cm^2}
- Be sure that the quick coupler has been installed by a qualified technician. Consult your Komatsu distributor if there is anything unclear.

QUICK COUPLER EQUIPMENT NAME



1. Quick coupler main switch
2. Quick coupler operation switch
3. Piping (quick coupler lock direction)
4. Piping (quick coupler release direction)
5. Adjustable pressure adjustment valve (Attach)
6. Adjustable pressure adjustment valve (Release)

REMOVE ATTACHMENT

⚠ WARNING

Pressure in the system can cause injury. Follow all instructions in "REMOVE AND INSTALL ATTACHMENT (6-36)".

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.

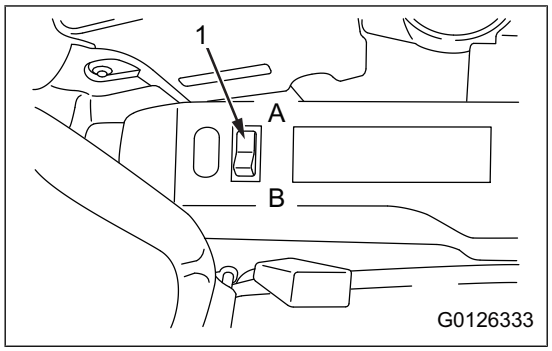
   (1) Operation switch

   NOTICE

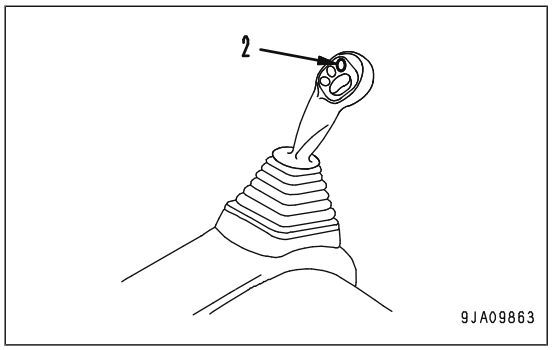
   The switch has a safety lock mechanism to prevent accidental operation. Slide the lock towards you then rock the switch. The lamp on the switch will come on and a warning buzzer will sound.
   Operation will only take place if button (2) is also pressed.

   (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.
3. Depending on the design of the quick coupler it may be necessary to operate one of the hydraulic functions of the machine (bucket, boom, arm or swing) to raise the pressure in the hydraulic system.



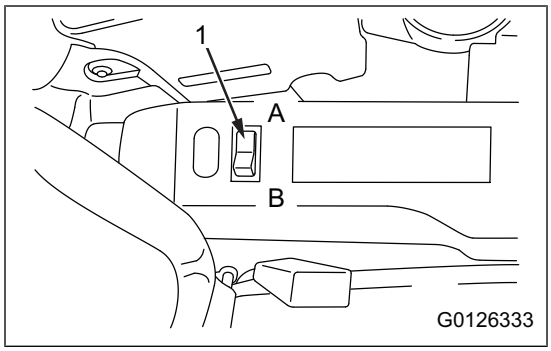
The quick coupler will now release the attachment/bucket.

INSTALL 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. 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 “REMOVE AND INSTALL ATTACHMENT (6-36)”.

   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 Komatsu Diesel Particulate Filter (KDPF)

⚠ CAUTION

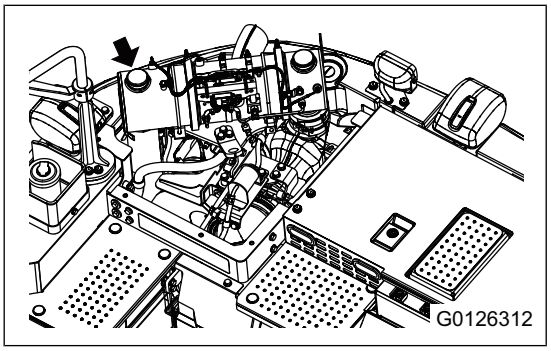
- **In this machine, the exhaust gas temperature during the aftertreatment devices regeneration will be higher than that of the previous models, and the temperature possibly remains high even after the regeneration is completed.**
  Do not come near the exhaust pipe outlet and around the aftertreatment devices not to get burn injury.
  Also, do not let flammable materials be near the outlet of the exhaust pipe or the aftertreatment devices to prevent fire.
- **When there are thatched houses, dry leaves or pieces of paper near the job site, set the system to the regeneration disable. It is because to prevent the fire hazards due to exhaust gas caused during the aftertreatment devices regeneration.**

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

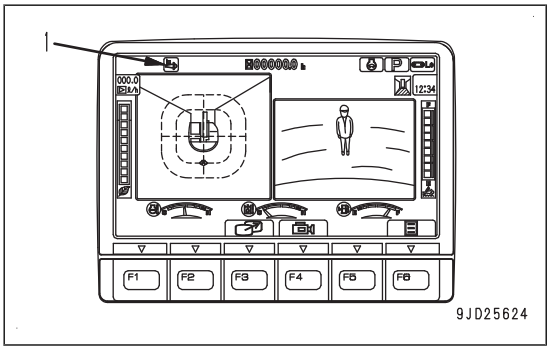
If soot is accumulated to some level in KDPF, a purification process to burn the soot is done automatically to keep the filtering performance of KDPF high.

This purification treatment is called “regeneration”.

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


G0126312

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



REMARK

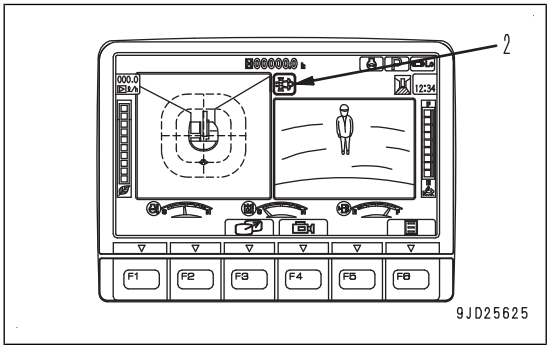
Even if the aftertreatment devices regeneration pilot lamp (1) lights up, the machine does not need to be stopped and the work can be continued, unless the caution lamp is shown at the center of the machine monitor.

The KDPF regeneration is done automatically, but the accumulated soot is not burned sufficiently in some cases, and the filtering function does not become better in some operating conditions.

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

There are 2 types of display on the machine monitor which require the manual stationary regeneration in response to the level of urgency.

If the lock lever is in the LOCK position, the manual stationary regeneration is possibly started automatically to protect the KDPF system.

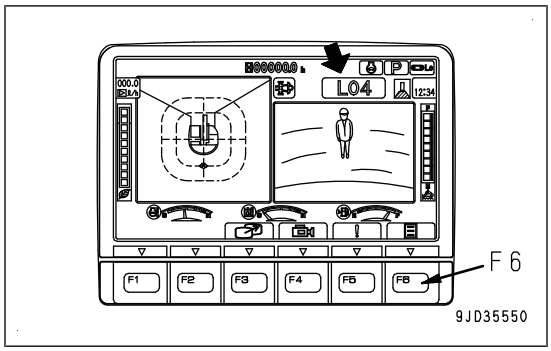


NOTICE

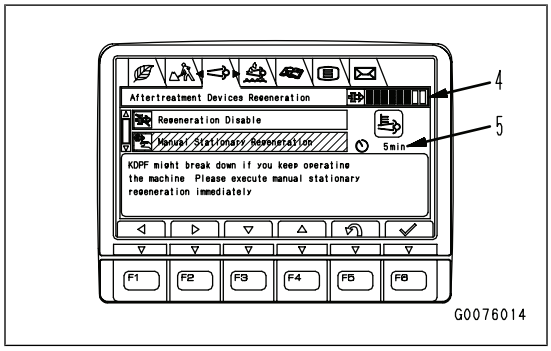
Do not stop the engine when the aftertreatment devices regeneration is in operation.
When you stop the engine, stop the aftertreatment devices regeneration first. See “SET AFTERTREATMENT DEVICES REGENERATION DISABLE”, and run the engine at low idle for approximately 5 minutes. And then, stop the engine.

If the KDPF soot accumulation caution lamp (2) lights up in red, the engine output power will be limited to protect the engine and KDPF system. To restore the engine power, do "PROCEDURE FOR MANUAL STATIONARY REGENERATION".

When the accumulated soot in the KDPF exceeds the specified level, and if you do not do "PROCEDURE FOR MANUAL STATIONARY REGENERATION", the action level "L04" lights up in red. Stop the machine immediately, and ask your Komatsu distributor for the inspection and maintenance.



REMARK

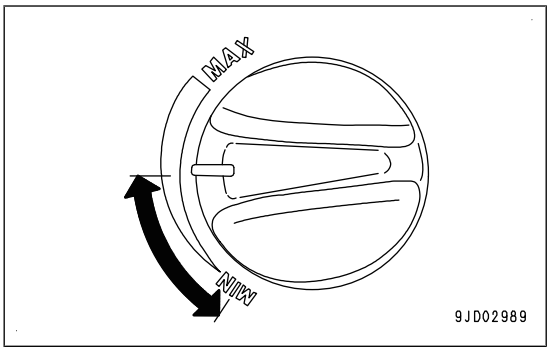


- The soot accumulation level (4) can be checked on "Aftertreatment Devices Regeneration" screen.

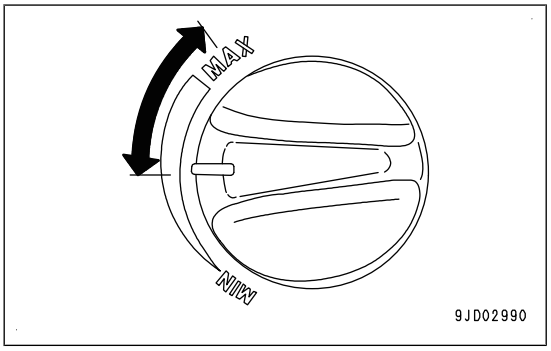
  Push the switch F6 on the standard screen to show "Aftertreatment Devices Regeneration" screen of the user menu.
- You can check the remaining regeneration time (5) on "Aftertreatment Devices Regeneration"screen. The shown remaining regeneration time is an approximate value and it can be different from the actual regeneration time.
- The soot accumulation quantity decreases in some cases without the regeneration in response to the operating condition. It is because the high-performance catalyst and high-temperature exhaust heat burns the soot in the filter of KDPF.
- Even when the soot accumulation level is low, the automatic regeneration is done and the manual stationary regeneration is requested to protect the system in some cases. Especially, if you run the engine at idle continually, the regeneration is done frequently, but this is not a problem.
- Even just after the regeneration is completed, the soot accumulation level does not become "0". This is caused by the accumulated non-flammable material in the exhaust gas, and this is not a problem.
- Non-flammable material which cannot be burned in the regeneration is accumulated in the filter of KDPF. You need to clean the filter or replace it at regular intervals.
- The engine speed or engine sound changes during or after the regeneration. This is caused by the control for better regeneration, and this is not a problem.
- The smell of the exhaust gas is different from that of the conventional diesel engine because of the exhaust gas filtering function.
- White smoke is discharged for a short time just after the engine is started or during the regeneration in the cold season, but this is not a problem.
- Komatsu recommends the use of Komatsu genuine engine oil for KDPF. If the engine oil other than Komatsu genuine oil for the KDPF is used, the cleaning interval of the KDPF filters can become short or there can be bad effects on the engine such as reduced lubrication function by deteriorated oil and it can cause machine failure. In addition, the regeneration interval becomes short and the fuel consumption increases in some cases.
- Ash is easy to be accumulated in KDPF when the biofuel is used. Thus, the regeneration of KDPF can possibly become more frequent if the mixing ratio of the biofuel is high.

REMARK

If heavy-duty operation is done for more than 30 minutes with the fuel control dial between the Low idle (MIN) position and the High idle (MAX) position, soot is accumulated much and the action level “L03” can be shown, but it is not a problem.

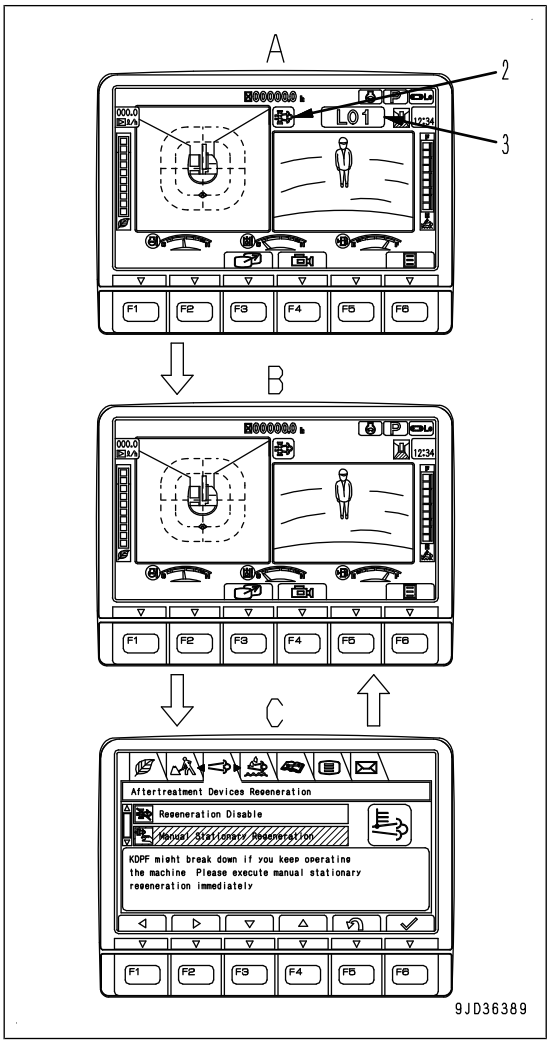


Do the manual stationary regeneration, and then turn the fuel control dial to above the midpoint between the Low idle (MIN) position and the High idle (MAX) position to continue the operation.



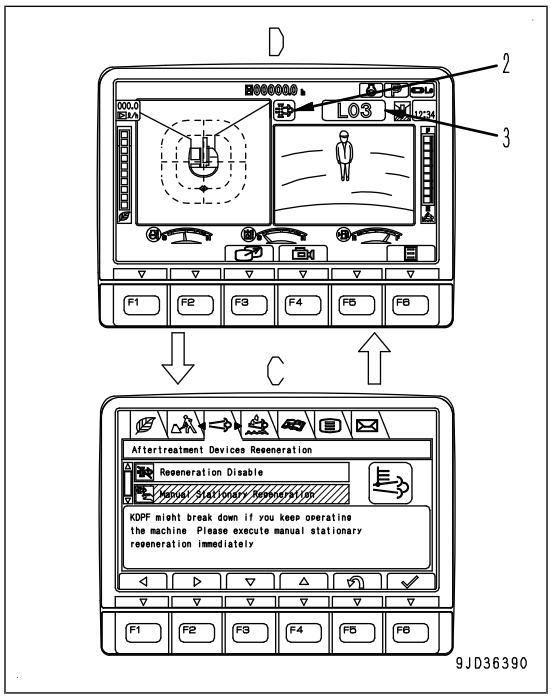
When the degree of urgency is low

- If the KDPF soot accumulation caution lamp (2) lights up in yellow (action level (3): “L01”), screen (A) is shown first.
- The action level goes off 2 seconds after and the screen changes to the standard screen (B).
- If the lock lever is set to the LOCK position or all the control levers and pedals are set in the NEUTRAL position, the screen changes to “Aftertreatment Devices Regeneration” screen (C) after 3 seconds only the first time. If the manual stationary regeneration is not done, the screen goes back to the standard screen (B) after 30 seconds.
  Then, if the accumulated soot does not decrease, “Aftertreatment Devices Regeneration” screen (C) is shown for 30 seconds every 2 hours.
- If the KDPF soot accumulation caution lamp (2) lights up in yellow, stop the machine in a safe area after you complete the work, and do the manual stationary regeneration.



When the degree of urgency is high

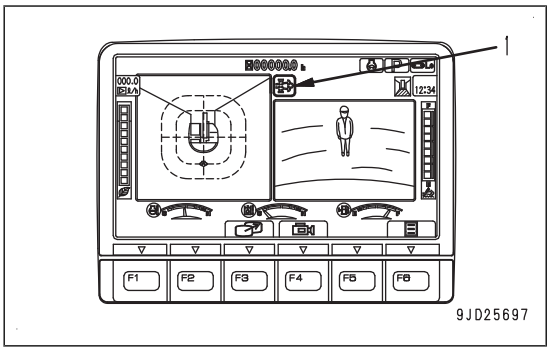
- If the KDPF soot accumulation caution lamp (2) lights up in red (action level (3): “L03”), screen (D) is shown.
- If the lock lever is set to the LOCK position or all the control levers and pedals are set in the NEUTRAL position, the screen changes to “Aftertreatment Devices Regeneration” screen (C) after 3 seconds. After that, “Aftertreatment Devices Regeneration” screen (C) and standard screen (D) are automatically shown alternately in response to the lever operation until you do the manual stationary regeneration.
- If the KDPF soot accumulation caution lamp (2) lights up in red, immediately stop the machine in a safe area and do the manual stationary regeneration.



MANUAL STATIONARY REGENERATION

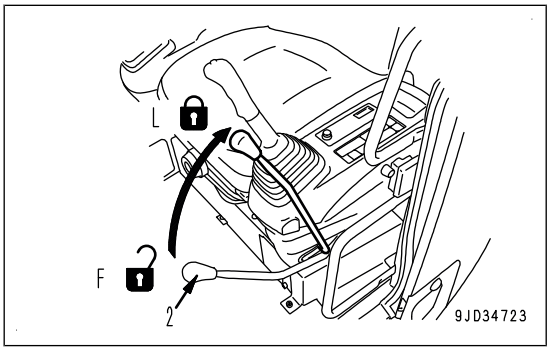
⚠ CAUTION

During the aftertreatment devices regeneration, the exhaust gas temperature can become higher than the conventional models. Do not come near the exhaust pipe outlet and around the aftertreatment devices not to get burn injury. Also, do not let flammable materials be near the outlet of the exhaust pipe or the aftertreatment devices to prevent fire.

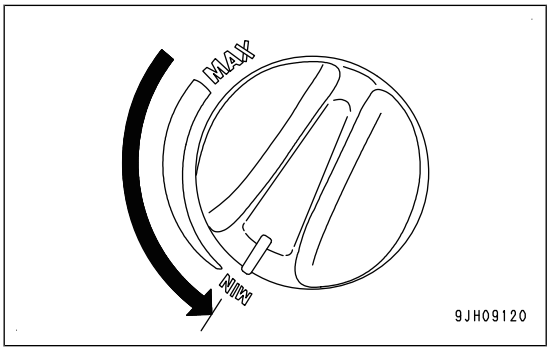


The manual stationary regeneration can be done while the KDPF soot accumulation caution lamp (1) is lit.

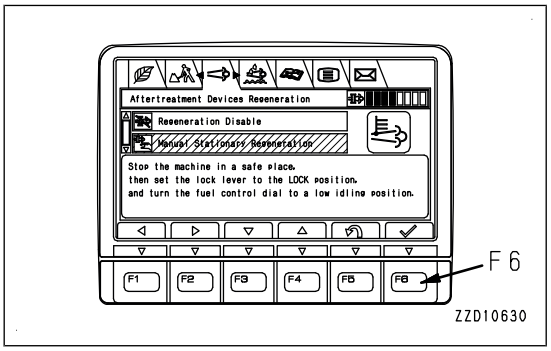
1. Move the machine to a safe place and stop it while the engine is running.
2. Check that there is no person or flammable material around the machine (especially in the direction of the exhaust gas flow).
3. Operate the operating part (2) of the lock lever to set it to the LOCK position (L).
   Unless they are set to the LOCK position, the manual stationary regeneration cannot be done.



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

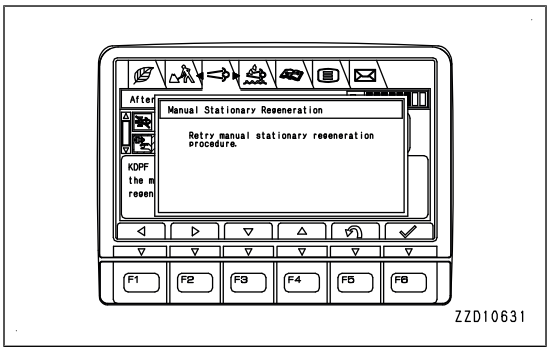


5. Push the switch F6 to show “Aftertreatment Devices Regeneration” screen.
6. Select “Manual Stationary Regeneration”, check again that there is no people or flammable materials around the machine, and then push the switch F6.
   If the machine needs to be moved again for the safety, move it to a safe area and do the procedure from the step 1 again.

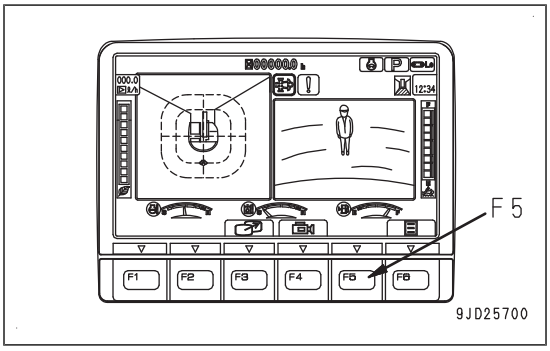


REMARK

After you push the switch F6 in the step 6, the screen of the figure is possibly shown. This shows that the operations in the steps 1 to 4 were not done correctly or there is a failure other than the KDPF soot accumulation abnormality. Check the operation of the engine, check that the lock lever is in the LOCK position (L), and that the fuel control dial is set to the Low idle (MIN) position, then do the procedure again from the step 6.

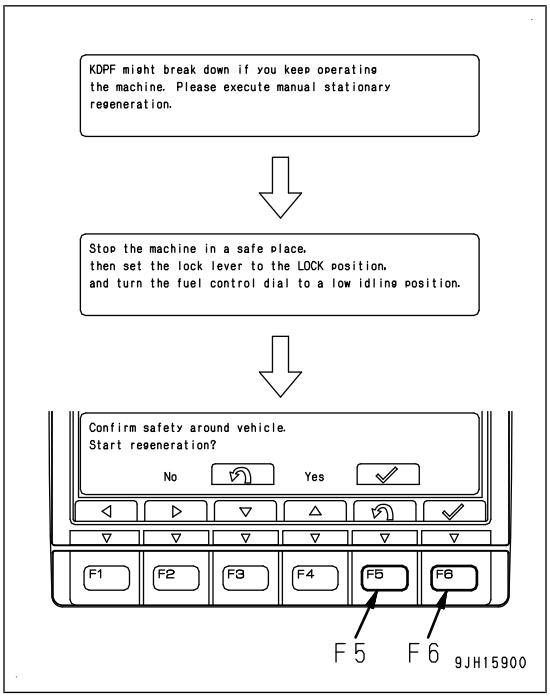


If the manual stationary regeneration remains disabled, go back to the standard screen, push the switch F5 to check the contents of other troubles, stop the work and then do inspection and maintenance.

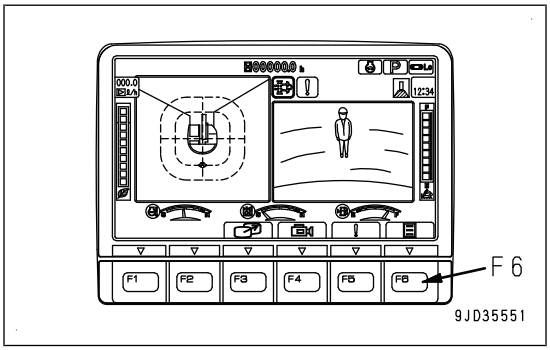


REMARK

- The explanation of the manual stationary regeneration is shown in 3 parts on the machine monitor. When you push the switch F6, the regeneration is started immediately regardless of which part is shown. When you push the switch F5, the screen goes back to the standard screen.

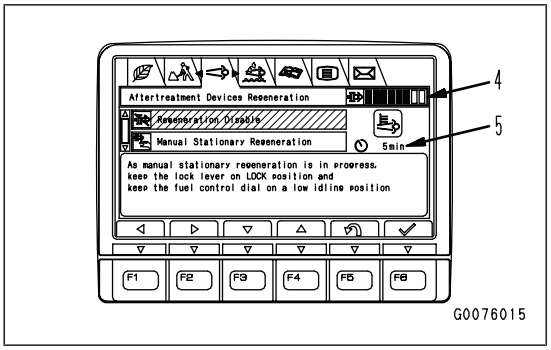


- If no machine monitor switch is operated, the explanation of the manual stationary regeneration is shown for 30 seconds and the screen goes back to the standard screen. At this time, to show the explanation of the manual stationary regeneration again, push the switch F6 on the standard screen to show “Aftertreatment Devices Regeneration” screen.

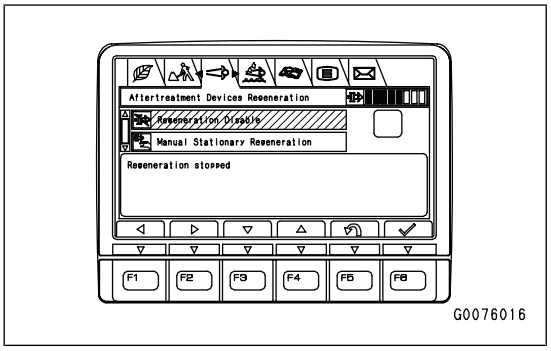


7. The screen in the figure is shown during the manual stationary regeneration.

   It can take 40 minutes or longer to complete the manual stationary regeneration. Do not touch switches on the screen nor operate the fuel control dial until the regeneration is completed and the screen goes back to the standard screen.



REMARK



- You can check the progress of the manual stationary regeneration for soot accumulation by the number of lamps lit for the soot accumulation level (4). The manual stationary regeneration starts at the soot accumulation level “4” or higher, and it is completed when all the level lamps go off.
- The time required for the manual stationary regeneration is different by the soot accumulation level or the ambient temperature when it is started. If the regeneration starts at soot accumulation level “6” or higher, it possibly takes approximately 2 hours to complete.
- 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 can start in some cases even when the soot accumulation level is “0” to “3”. In this case, the soot accumulation level does not decrease, but this is not a failure. Current status is not shown on the monitor. 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. Turn back the lock lever to the LOCK position (L) and turn the fuel control dial back to the Low idle (MIN) position, then do 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. For details, see the procedures for the aftertreatment devices regeneration disable and its cancellation shown below.
  When you start the manual stationary regeneration again, keep the safety of the machine and around it, then cancel the regeneration disable.

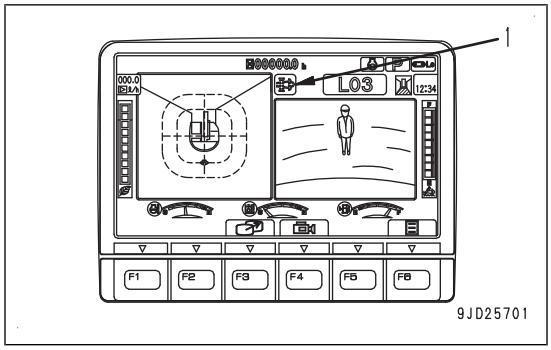
8. After the manual stationary regeneration is completed, the screen automatically goes back to the standard screen.

SET AFTERTREATMENT DEVICES REGENERATION DISABLE

If there is a possible danger caused by the automatic active regeneration that increases the exhaust temperature, and in such a case as there are flammable materials around the machine, you can set that the aftertreatment devices regeneration will not be automatically done. Also you can stop the regeneration that is currently in operation.

NOTICE

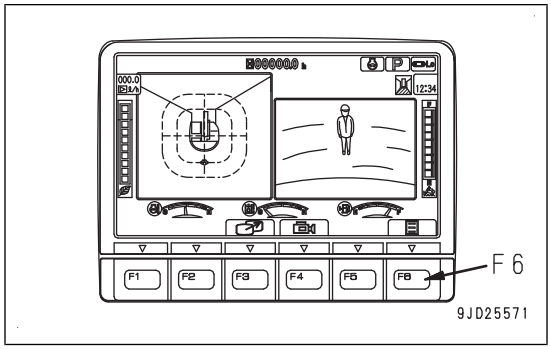
Even if the regeneration is disabled, the KDPF soot accumulation caution lamp (1) lights up if soot is accumulated and the manual stationary regeneration is required. When the KDPF soot accumulation caution lamp lights up, move the machine to a safe place and do the manual stationary regeneration.
If you continue the operation without the manual stationary regeneration done, it can cause a failure of KDPF or the engine.



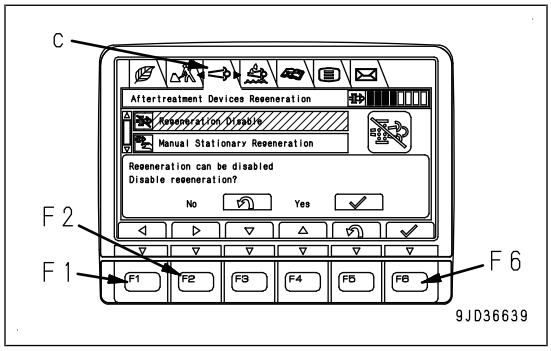
While regeneration is not operated: Setting for regeneration disable

(When the aftertreatment devices regeneration pilot lamp is not lit on the standard screen)

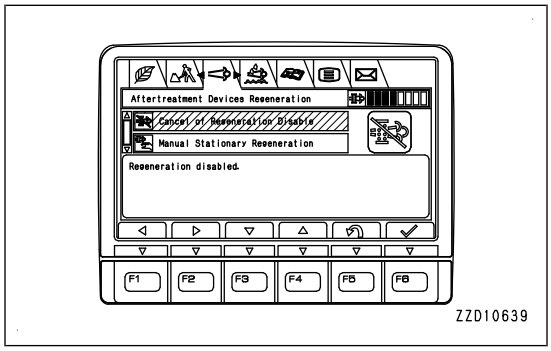
1. On the standard screen, push the switch F6.



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

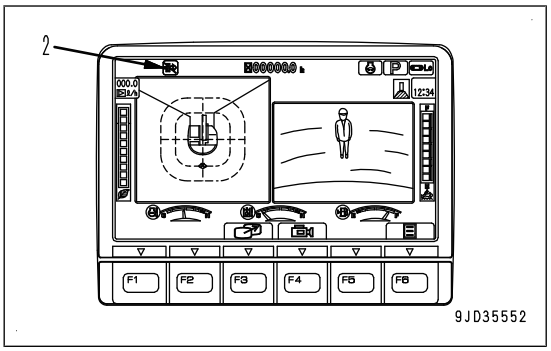


3. If you select the “Regeneration Disable” and push the switch F6, then the regeneration function is disabled and the regeneration will not be done.

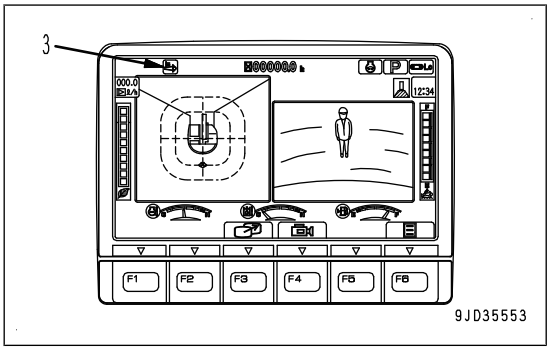


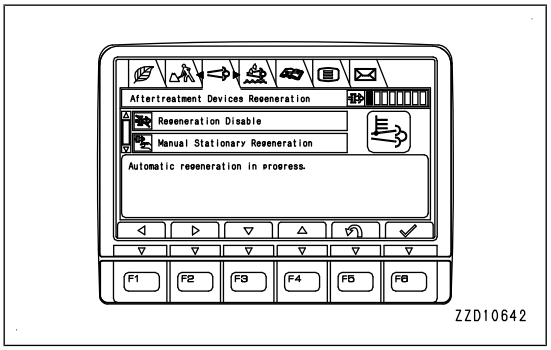
REMARK

- You can check that the regeneration is disabled by the status that the aftertreatment devices regeneration disable pilot lamp (2) is lit on the standard screen.
- You can cancel the setting of regeneration disable when you turn the starting switch to the OFF position. If you need to keep the automatic regeneration disabled, do the above procedure each time you start the engine.



- When the regeneration is done to protect the system, the aftertreatment devices regeneration pilot lamp (3) can light up even if the regeneration disable is set. It is not a problem. Also, during the regeneration to protect the system, the regeneration disable cannot be operated.
- In the regeneration to protect the system, the exhaust temperature is lower than that of when the regeneration is done to burn soot, and is almost the same level as the normal exhaust gas temperature.

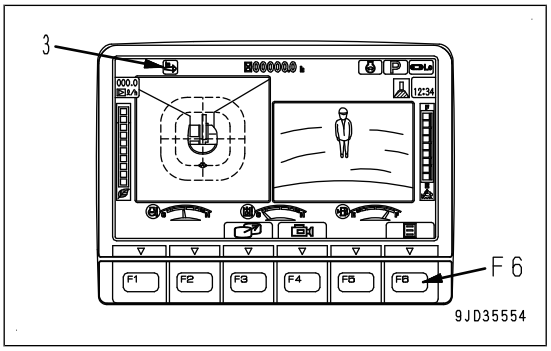




While regeneration is in operation: Regeneration disable

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

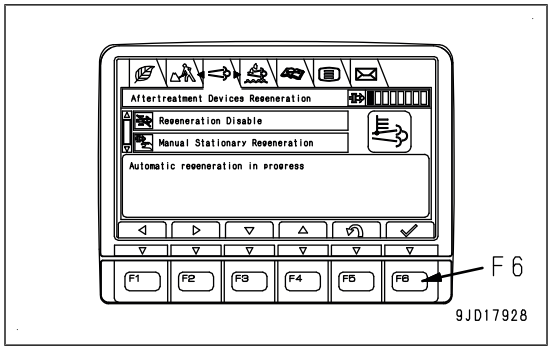
1. Push the switch F6 on the standard screen, and “Aftertreatment Devices Regeneration” screen is shown.

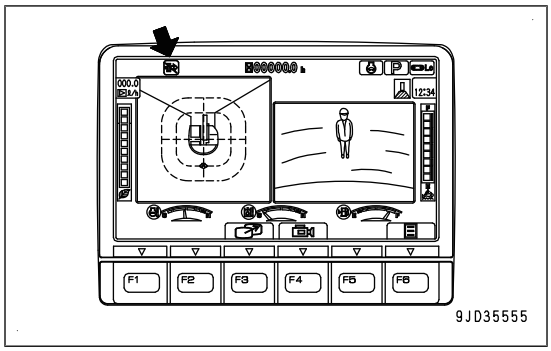


2. If you select the “Regeneration Disable” and push the switch F6, the regeneration stops.

REMARK

In the regeneration to protect the system, there is a possibility that the regeneration cannot be disabled. It is not a problem.





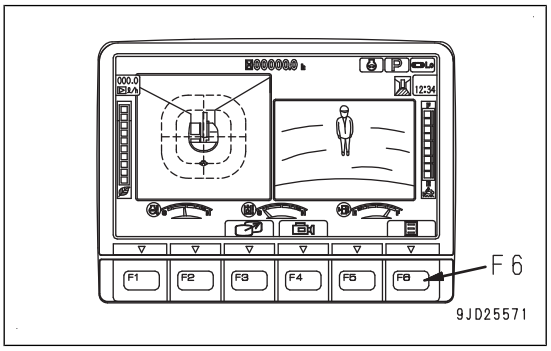
CANCEL AFTERTREATMENT DEVICES REGENERATION DISABLE

⚠ CAUTION

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

1. Push the switch F6 on the standard screen, and “Aftertreatment Devices Regeneration” screen is shown.

   (If the screen is not shown, operate the switches F1 and F2 to show “Aftertreatment Devices Regeneration” screen.)

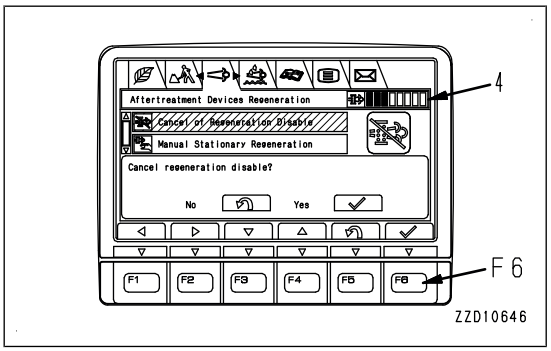


2. If you select “Cancel of Regeneration Disable”, and push the F6 switch, then the regeneration disable is canceled.

   If 3 or more lamps of the soot accumulation level (4) light up, the regeneration starts automatically.

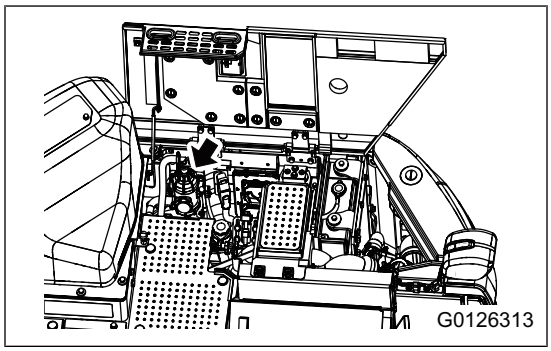
   REMARK

   - When you cancel the regeneration disable, set the parking brake switch and the work equipment lock switch to the LOCK position and set the fuel control dial to the Low idle (MIN) position, and then cancel the regeneration disable.
   - You can cancel the regeneration disable setting when you turn the starting switch to the OFF position to stop the engine.



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 WARNING

The urea SCR System is a device which decomposes poisonous nitrogen oxides (NOx) in the exhaust gas into harmless nitrogen and water. DEF is sprayed into the exhaust gas to let nitrogen oxides and ammonia (NH3) from the DEF react for the conversion to nitrogen and water.

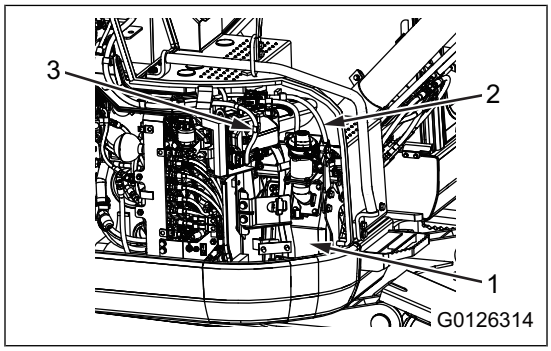
The urea SCR system has functions to monitor the system operation and to save the information of the abnormal state. The information is used for the system diagnostics and also for Inducement required on the engine system that uses the urea SCR system. The inducement level is shown to the operator as a visual warning and by the alarm buzzer. The inducement of the engine corrects the inappropriate behavior of the urea SCR system. Warnings in Inducement of the urea SCR system starts from the display on the machine monitor, and the alarm buzzer operates step by step to lower the engine output to protect the engine.

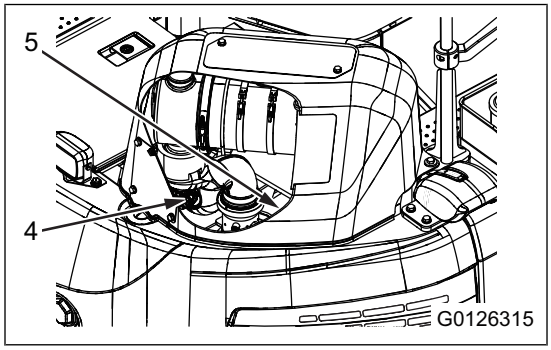
The urea SCR system also monitors if the failures of the system occur again. If other failure is sensed in 40 hours or below after the first failure is sensed, this function senses the event.

The Komatsu's Urea is composed of two systems; the DEF system and the SCR catalyst assembly.

DEF is supplied from the DEF system into the exhaust system. The DEF system consists of the DEF tank (1), DEF hose (2), DEF pump (3), and DEF injector (4). The SCR assembly is shown by (5).

If the purification function of Urea SCR System is lowered by the operating conditions, the regeneration can be done to protect the urea SCR system regardless of the quantity of the accumulated soot in the KDPF.





NOTICE

- **Do not put the fluid other than DEF into the DEF tank. If foreign material goes in the DEF system or urea deposits caused by dryness occur, the devices can have a malfunction.**
- **Do not do the work other than replacement of the DEF filter. Do not disassemble and make modification of the devices of the DEF system.**
- **Do not paint the injector or pump. The paint can deteriorate the devices. When you paint the parts around the injector and pump, be careful not to let the paint get on the injector and pump.**
- **Be sure to use DEF that agrees with the quality standard. If some additive agents are added or water are mixed into DEF and that mixture is used, the devices will not operate correctly, and they will not applicable for the exhaust gas regulations. In addition, it can cause failures in the engine system. If the liquid other than DEF is added, consult your Komatsu distributor.**

Operation of urea SCR system

The urea SCR system automatically starts operation immediately after the engine is started.

Even after the engine starting switch is turned to the OFF position, the devices will be in operation for several minutes to purge the DEF in the injector and in the supply pump to the DEF tank. It is not a problem. If DEF goes back to the tank, the devices stop automatically.

Do not turn OFF the battery disconnect switch while the devices are in operation. When the devices complete their shutdown step, make sure that the system operating lamp is not lit, and turn off the battery disconnect switch.

About the operation in cold weather

DEF freezes at -11℃.

The heating system to thaw frozen DEF is installed to the urea SCR system. If DEF is frozen while the machine is stopped, the system makes DFF warm to prevent freezing of DEF during operation.

In case DEF freezes while the machine is stopped, when the engine is started, the heating system automatically starts to thaw frozen DEF. The devices operate only after DEF is thawed and supplied. This is an interval in the start of function of the pump and injector.

The heating system is also activated automatically during the operation to prevent freezing of DEF when the ambient temperature falls below the threshold where DEF in the system possibly freezes. When the ambient temperature decreases more to the temperature where DEF can freeze, the DEF system automatically purges DEF back to the tank while the heating is in operation, and it stops the operation. When the ambient temperature increases to the temperature where DEF system becomes functional, the operation starts again automatically.

Short duration of white smoke from the exhaust pipe can be seen after the engine is started in cold weather. But it is not a problem.

Inducement strategy when the DEF tank level becomes low

When the quantity of DEF in the tank decreases, the Inducement strategy will be activated.

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

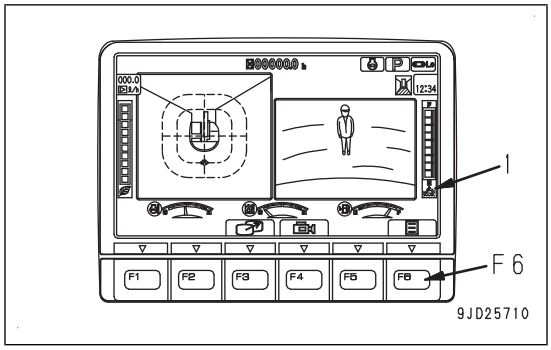
The DEF level caution lamp (1) on the machine monitor lights up, the alarm buzzer operates, the action level is shown, and Inducement strategy is activated. Inducement strategy includes the engine output deration, speed limit, or other warning to let the operator add DEF or repair the SCR system.

The waning level changes in the sequence of “Warning”, “Continuous Warning”, “Low level Inducement”, and “Severe Inducement”.

The DEF level caution lamp (1) on the machine monitor lights up, the alarm buzzer operates, and the action level is shown on the machine monitor. And then, the engine output is derated step by step.

In the action level “L03 (Low level Inducement)” and “L04 (Severe Inducement)”), the engine output will be derated. When the action level “L03” or “L04” is shown, move the machine to a safe area, and add DEF.

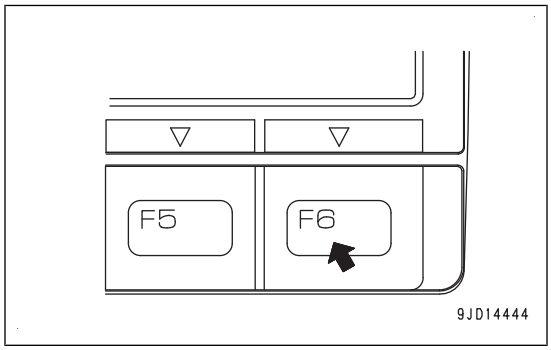
The content of the warning can be checked on “SCR Information” screen of the user menu.



Do the operations that follow.

Push the switch F6 to show “SCR Information” screen of the user menu.

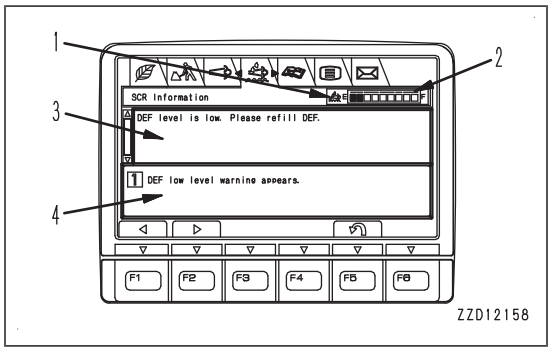
If the lock lever is set to the LOCK position or the travel lever and control levers are in the NEUTRAL position for over 3 seconds, “SCR Information” screen of the user menu will pop up automatically while the Urea SCR system is in Inducement.



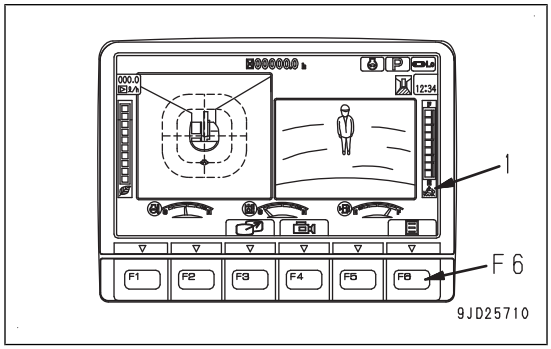
“SCR Information” screen shows the DEF level caution lamp (1), the DEF level gauge (2), information on the Urea SCR System condition (3), and the current status of Inducement (4).

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

When the buzzer sound starts, “buzzer cancel switch” does not work unless DEF is added.

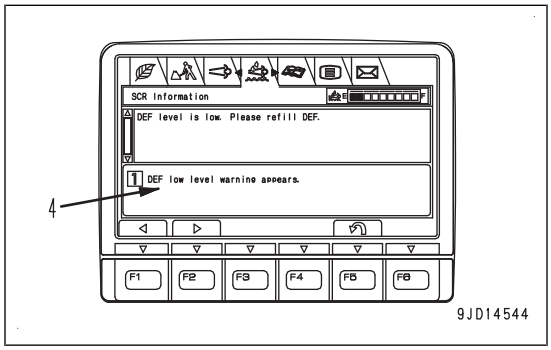


- Warning:
  2 segments of the DEF level gauge light up in red.
  The DEF level caution lamp (1) lights up in red.
  The alarm buzzer does not operate.
  No action level is shown.
  Push the switch F6 to show “SCR Information” screen.

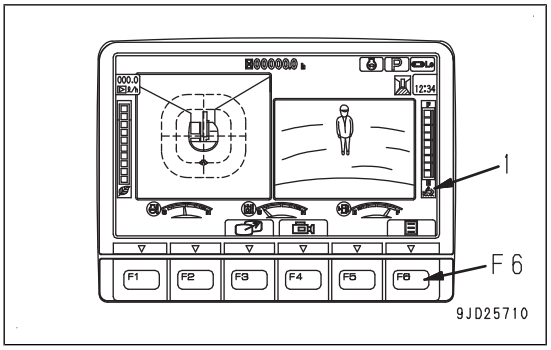


Inducement status (4): 1 “DEF low level warning appears.”

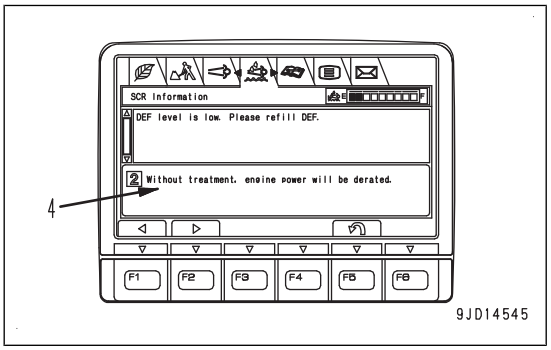
Add DEF to the DEF tank immediately.



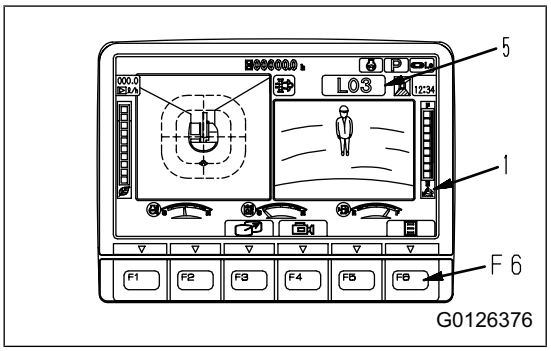
- Continuous Warning:
  The alarm buzzer operates in “Triple-beep alarm”.
  2 segments of the DEF level gauge light up in red.
  The DEF level caution lamp (1) lights up in red.
  No action level is shown.
  Push the switch F6 to show “SCR Information” screen.



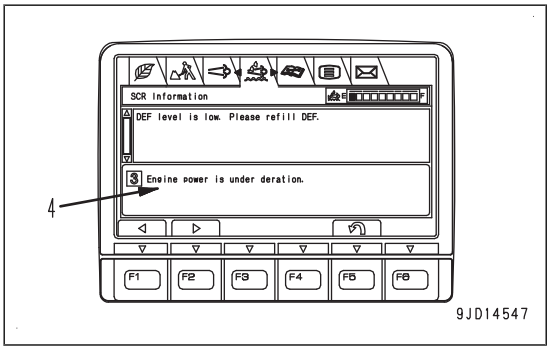
  Inducement status (4): 2 “Without treatment, engine power will be derated.”
  Add DEF to the DEF tank immediately.



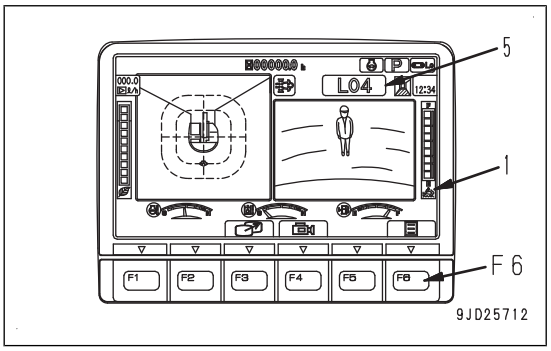
- Low level Inducement:
  The alarm buzzer operates in intermittent alarm.
  1 segment of the DEF level gauge lights up in red.
  The DEF level caution lamp (1) lights up in red.
  The action level “L03” is shown in red (5).
  Push the switch F6 to show “SCR Information” screen.



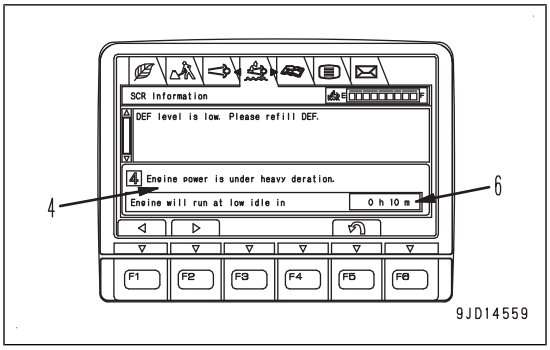
  Inducement status (4): 3 “Engine power is under deration.”
  Add DEF to the DEF tank immediately.



- Severe Inducement:
  The alarm sound operates in continuous alarm.
  All the segments of the DEF level gauge go off.
  The DEF level caution lamp (1) lights up in red.
  The action level “L04” is shown in red (5).
  Push the switch F6 to show “SCR Information” screen.
  When all segments of the DEF level gauge go off, DEF refilling quantity is 12.6ℓ to fill up the DEF tank.



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

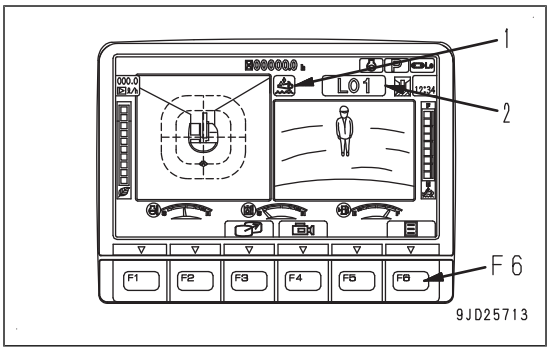


The engine output can be restored temporarily from the Inducement strategy. At “Severe Inducement”, the engine output can be restored to “Low level Inducement” temporarily through the operation of the machine monitor . For the engine output restoration procedure, see the section of “Temporary Restoration from Inducement” in this manual. At the level of “Severe Inducement”, move the machine to a safe area with the engine output restoration function, and add DEF.

Inducement strategy when failures are found in urea SCR system devices (Except for failures in KDPF system)

If a failure is sensed in the DEF quality or in the urea SCR system, the Inducement strategy starts.

The waning level changes in the sequence of “Warning”, “Continuous Warning”, “Low level Inducement”, and “Severe Inducement”. The DEF system caution lamp is shown on the machine monitor (1), the action level is shown on the machine monitor (2) as a visual warning, and the alarm buzzer operates to do the Inducement strategy step by step. The action level starts at “L03 (Low level Inducement)”, and the Inducement strategy changes to the next step after “L04 (Severe Inducement)” is shown. If “L03” is shown, move the machine to a safe area and consult your Komatsu distributor.

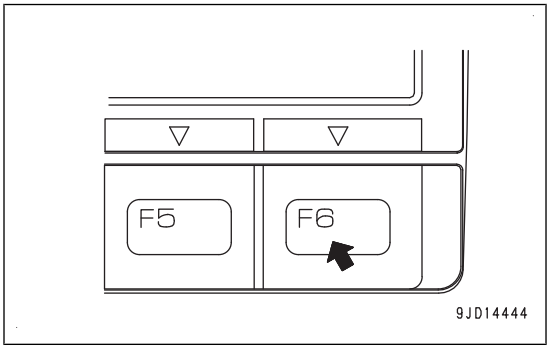


The content of the warning can be checked on “SCR Information” screen of the user menu.

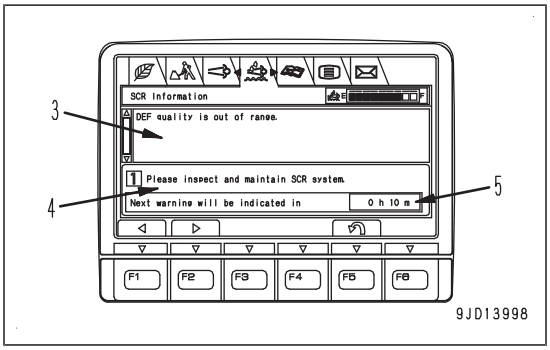
Do the operations that follow.

Push the switch F6 to show “SCR Information” screen of the user menu.

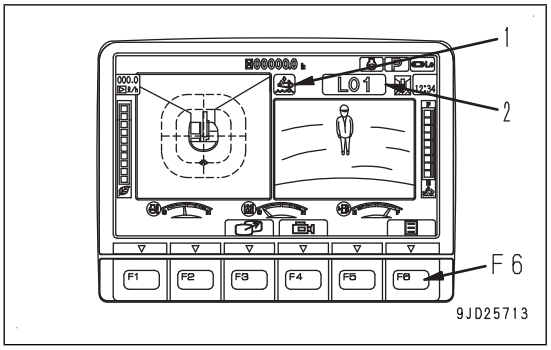
If the lock lever is set to the LOCK position or the travel lever and control levers are in the NEUTRAL position for over 3 seconds, “SCR Information” screen of the user menu will pop up automatically while the Urea SCR system is in Inducement.



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

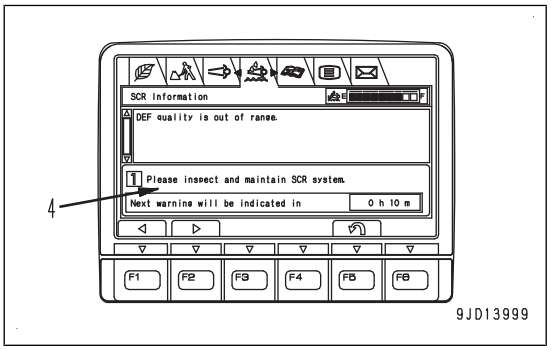


- Warning:
  The alarm buzzer does not operate.
  The DEF system caution lamp (1) lights up in yellow.
  Action level “L01” lights up in yellow on the machine monitor (2) for 2 seconds and goes off.
  Push the switch F6 to show “SCR Information” screen.

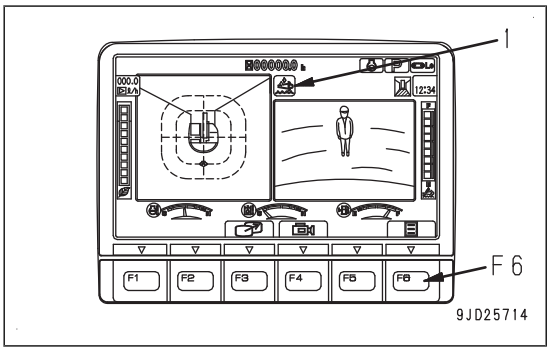


  “SCR Information” screen message (4): 1 “Please inspect and maintain SCR system.”

  Move the machine to a safe area, and consult your Komatsu distributor.
  Unless all failures are repaired after “Warning” started, the Inducement changes to “Continuous Warning” after 5 hours.

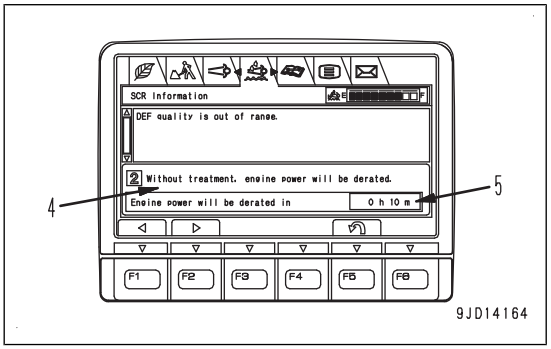


- Continuous Warning:
  The alarm buzzer operates in “Triple-beep alarm”.
  The DEF system caution lamp (1) lights up in yellow.
  Unless all failures are repaired after “Warning” started, the Inducement changes to “Continuous Warning” after 5 hours.
  Push the switch F6 to show “SCR Information” screen.

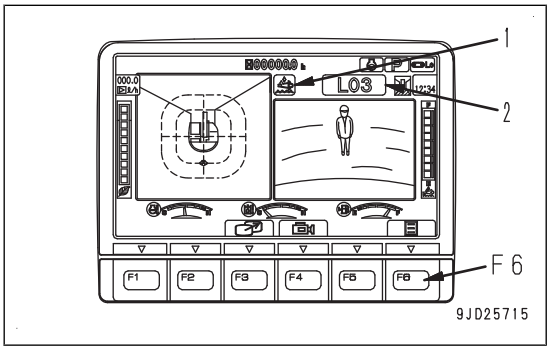


  “SCR Information” screen message (4): 2 “Without treatment, engine power will be derated.”

  Move the machine to a safe area, and consult your Komatsu distributor.
  “Continuous Warning” continues for 5 hours. The remaining time (hours and minutes) to “Low level Inducement” is shown in the column (5) of “SCR Information” screen.
  At “Low level Inducement”, the engine output is lowered.

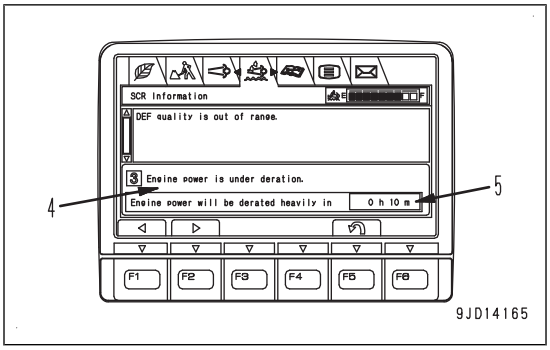


- Low level Inducement:
  The alarm buzzer operates in intermittent alarm.
  The DEF system caution lamp (1) lights up in red.
  The action level “L03” is shown in red (2).
  Push the switch F6 to show “SCR Information” screen.

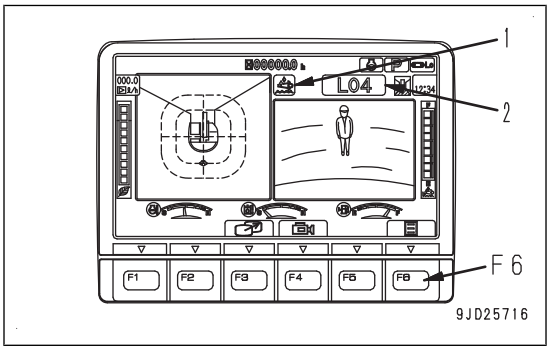


“SCR Information” screen message (4): 3 “Engine power is under deration.”

The machine operation will be limited by Inducement.
Move the machine to a safe area, and consult your Komatsu distributor.
“Low level Inducement” continues for 10 hours. The remaining time (hours and minutes) to “Severe Inducement” is shown in the column (5) of “SCR Information” screen.
At “Severe Inducement”, the engine output is lowered more.

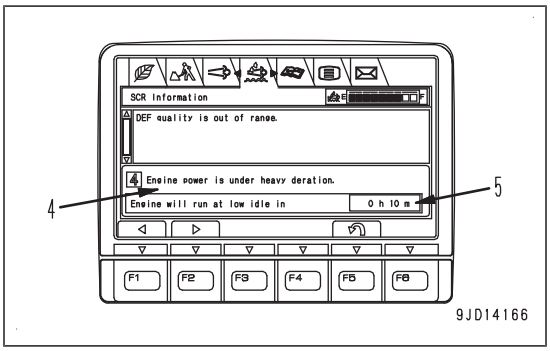


- Severe Inducement:
  The alarm sound operates in continuous alarm.
  The DEF system caution lamp (1) lights up in red.
  The action level “L04” is shown in red (2).
  Push the switch F6 to show “SCR Information” screen.



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

Because of the more deration of the engine output, the machine operation will be limited more.
“Severe Inducement” is the last step.
Unless all “SCR system” failures are corrected, the engine output will be kept derated.

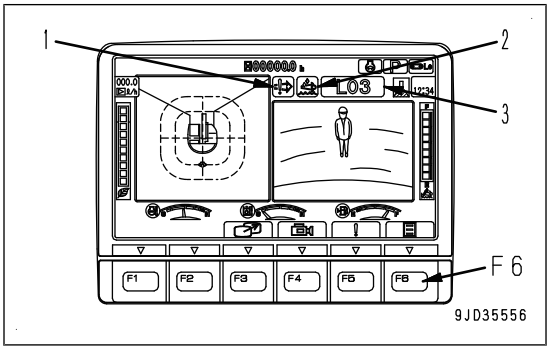


The engine output can be restored temporarily from the Inducement strategy. If the engine output must be restored after “Severe Inducement”, move the machine to a safe area after it is restored, and consult your Komatsu distributor for inspection and maintenance. At “Severe Inducement”, the engine output can be restored to “Low level Inducement” temporarily. The operator can restore engine power through the machine monitor. For the engine output restoration procedure, see the section of “Temporary Restoration from Inducement” in this manual.

Inducement strategy when KDPF system failure is found in urea SCR system

If the KDPF system failure is sensed in the urea SCR system, the Inducement strategy starts.

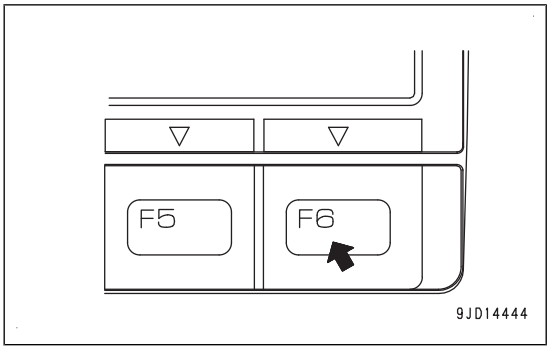
The waning level changes in the sequence of “Warning”, “Continuous Warning”, “Low level Inducement”, and “Severe Inducement”. The KDPF system caution lamp (1) or DEF system caution lamp (2) is shown, the action level is shown on the machine monitor (3) as a visual warning, the alarm buzzer operates, the engine output is lowered, and the Inducement strategy is done step by step. The action level starts at “L03 (Warning, Continuous Warning, Low level Inducement)”, and the Inducement strategy changes to the next step after “L04 (Severe Inducement)” is shown. When the system goes to “Severe Inducement”, the engine output will be derated more. When action level “L03” is shown, move the machine to a safe area and consult your Komatsu distributor.



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

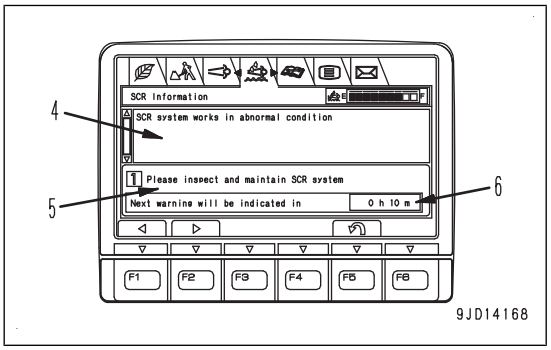
Do the operations that follow.

Push the switch F6 to show “SCR Information” screen of the user menu.

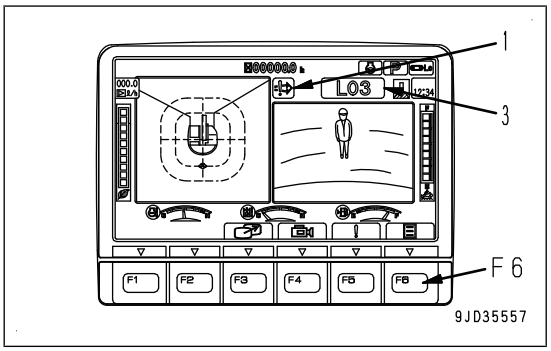


If the lock lever is set to the LOCK position or the travel lever and control levers are in the NEUTRAL position for over 3 seconds, “SCR Information” screen of the user menu will pop up automatically while the Urea SCR system is in Inducement.

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

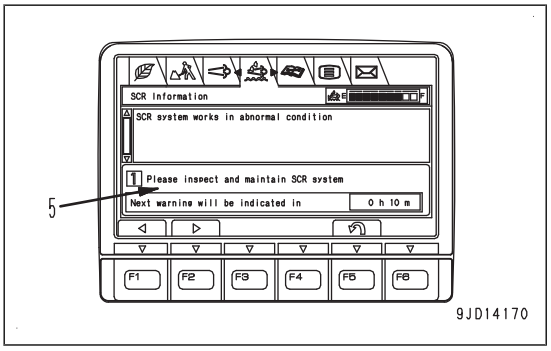


- Warning:
  The alarm buzzer operates in intermittent alarm.
  The KDPF system caution lamp (1) lights up in red.
  The action level “L03” is shown in red (3).
  Push the switch F6 to show “SCR Information” screen.

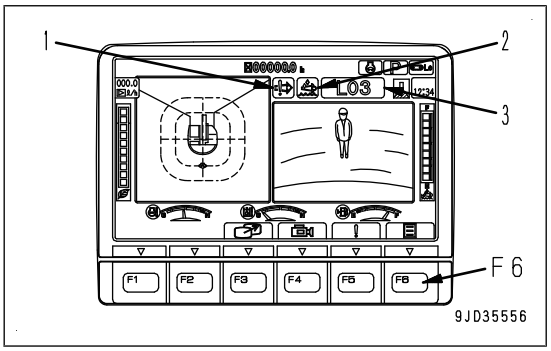


“SCR Information” screen message (5): 1 “Please inspect and maintain SCR system.”

The engine output is derated.
Move the machine to a safe area, and consult your Komatsu distributor.
Unless all failures are repaired after “Warning” started, the Inducement changes to “Continuous Warning” after 5 hours.

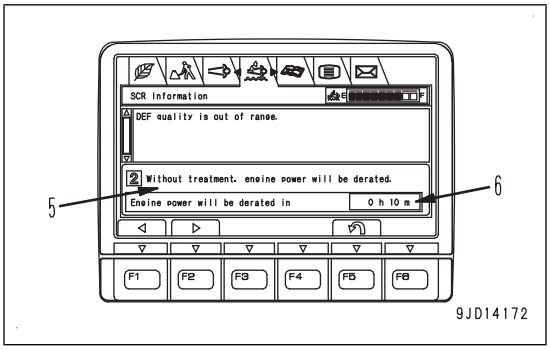


- Continuous Warning:
  The alarm buzzer operates in “Triple-beep alarm”.
  The KDPF system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in yellow.
  The action level “L03” is shown in red (3).
  Push the switch F6 to show “SCR Information” screen.

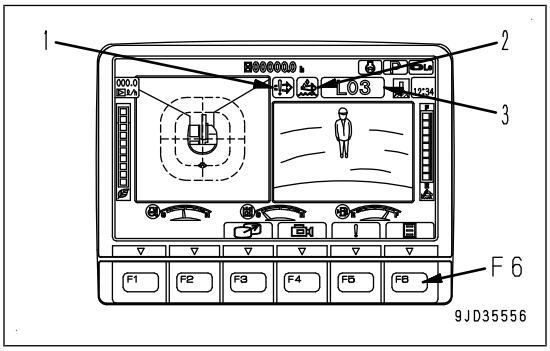


“SCR Information” screen message (5): 2 “Without treatment, engine power will be derated.”

Move the machine to a safe area, and consult your Komatsu distributor.
“Continuous Warning” continues for 5 hours. The remaining time (hours and minutes) to “Low level Inducement” is shown in the column (6) of “SCR Information” screen.
At “Low level Inducement”, the engine output is lowered.

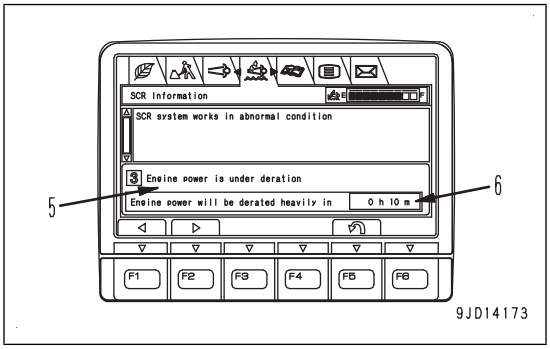


- Low level Inducement:
  The alarm buzzer operates in intermittent alarm.
  The KDPF system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in red.
  The action level “L03” is shown in red (3).
  Push the switch F6 to show “SCR Information” screen.

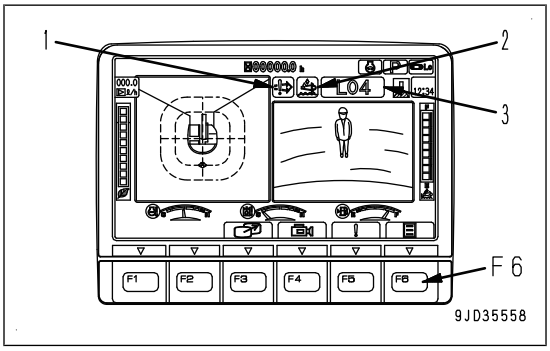


“SCR Information” screen message (5): 3 “Engine power is under deration.”

The machine operation will be limited by Inducement.
“Low level Inducement” continues for 10 hours. The remaining time (hours and minutes) to “Severe Inducement” is shown in the column (6) of “SCR Information” screen.
At “Severe Inducement”, the engine output is lowered more.
Move the machine to a safe area, and consult your Komatsu distributor.

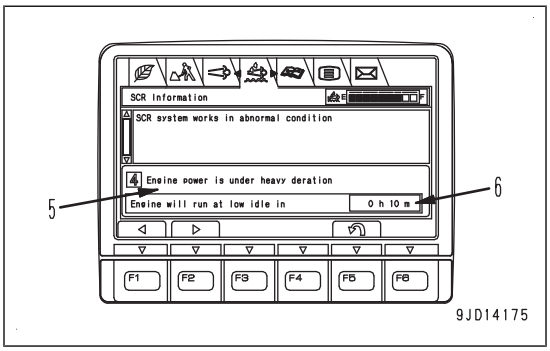


- Severe Inducement:
  The alarm sound operates in continuous alarm.
  The KDPF system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in red.
  The action level “L04” is shown in red (3).
  Push the switch F6 to show “SCR Information” screen.



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

Because of the more deration of the engine output, the machine operation will be limited more.
If the restoration of the KDPF system failure is not done, the engine output will be kept derated.

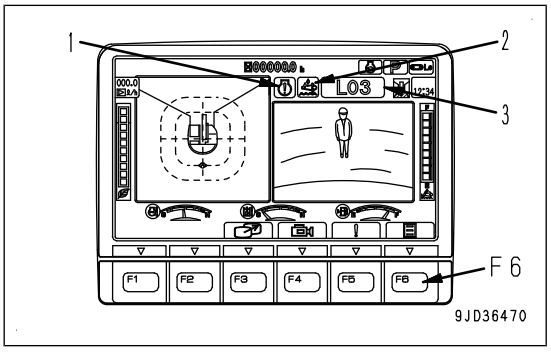


The engine output can be restored temporarily from the Inducement strategy. At “Severe Inducement”, the engine output can be restored temporarily. At “Severe Inducement”, the engine output can be restored to “Low level Inducement” temporarily. The operator can restore engine power through the machine monitor.

For the engine output restoration procedure, see the section of “Temporary Restoration from Inducement” in this manual. If Inducement goes to “Severe Inducement” and it becomes necessary to restore engine power temporarily, use the engine power restoration function to move the machine to a safe area and consult your Komatsu distributor for inspection and maintenance.

Inducement strategy when EGR valve system failure is found in urea SCR system devices

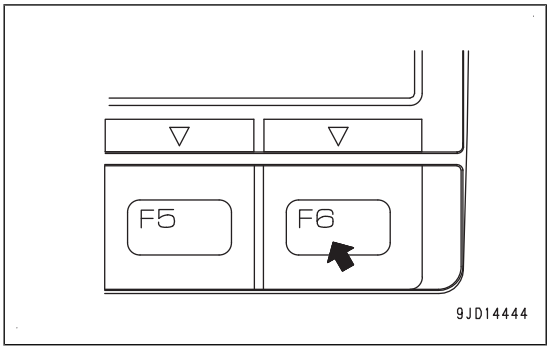
If the EGR valve system failure is sensed in the urea SCR system, the Inducement strategy starts.



The waning level changes in the sequence of “Warning”, “Continuous Warning”, “Low level Inducement”, and “Severe Inducement”. The engine system caution lamp (1) or DEF system caution lamp (2) is shown, the action level is shown on the machine monitor (3) as a visual warning, the alarm buzzer operates, the engine output is lowered, and the Inducement strategy is done step by step until the engine speed is fixed at low idle. The action level starts at “L03 (Warning, Continuous Warning, Low level Inducement)”, and the Inducement strategy changes to the next step after “L04 (Severe Inducement)” is shown. When the system goes to “Severe Inducement”, the engine output will be derated more. When action level “L03” is shown, move the machine to a safe area and consult your Komatsu distributor.

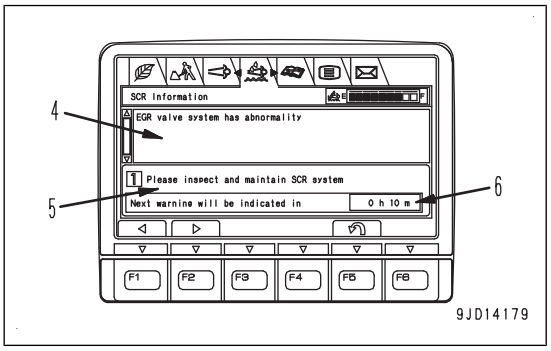
The content of the warning can be checked on “SCR Information” screen of the user menu.

Do the operations that follow.



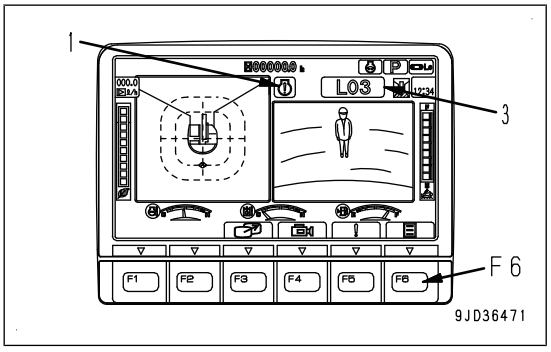
Push the switch F6 to show “SCR Information” screen of the user menu.

If the lock lever is set to the LOCK position or the travel lever and control levers are in the 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.



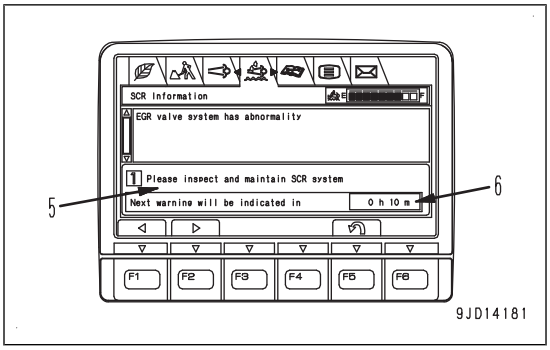
“SCR Information” screen shows remaining time to the next Inducement status in the column (6), and information on the Urea SCR System condition (4), and the current status of Inducement (5).

- Warning:
  The alarm buzzer operates in intermittent alarm.
  The engine system caution lamp (1) lights up in red.
  The action level “L03” is shown in red (3).
  Push the switch F6 to show “SCR Information” screen.

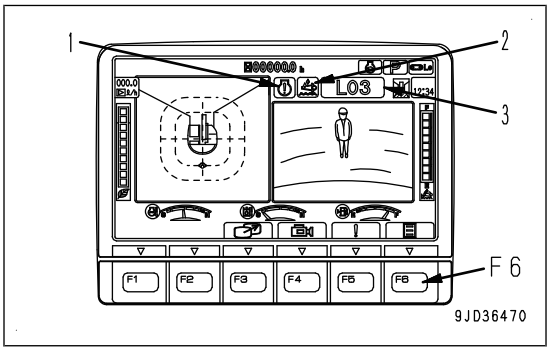


"SCR Information" screen message (5): 1 "Please inspect and maintain SCR system."

The engine output is derated.
Move the machine to a safe area, and consult your Komatsu distributor.
Unless all failures are repaired after "Warning" started, the Inducement changes to "Continuous Warning" after 5 hours.

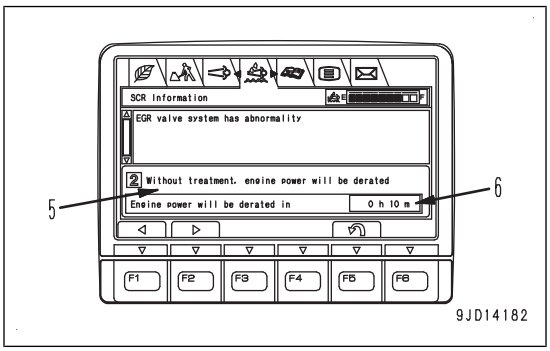


- Continuous Warning:
  The alarm buzzer operates in "Triple-beep alarm".
  The engine system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in yellow.
  The action level "L03" is shown in red (3).
  Push the switch F6 to show "SCR Information" screen.

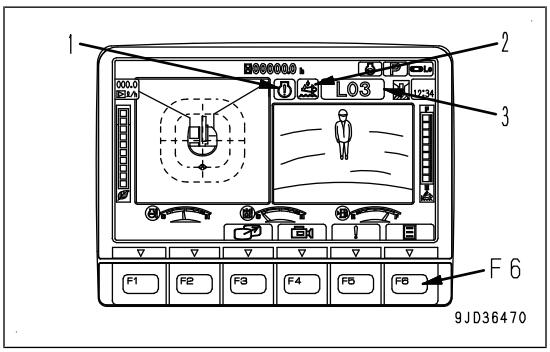


"SCR Information" screen message (5): 2 "Without treatment, engine power will be derated."

Move the machine to a safe area, and consult your Komatsu distributor.
"Continuous Warning" continues for 5 hours. The remaining time (hours and minutes) to "Low level Inducement" is shown in the column (6) of "SCR Information" screen.
At "Low level Inducement", the engine output is lowered.

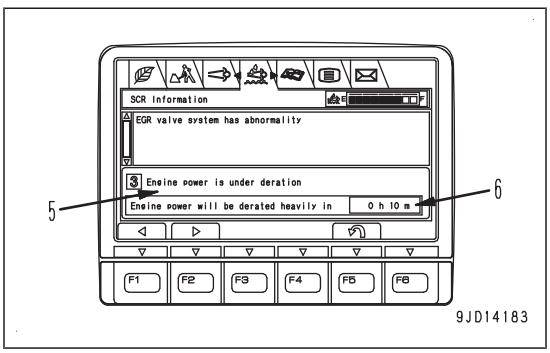


- Low level Inducement:
  The alarm buzzer operates in intermittent alarm.
  The engine system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in red.
  The action level "L03" is shown in red (3).
  Push the switch F6 to show "SCR Information" screen.

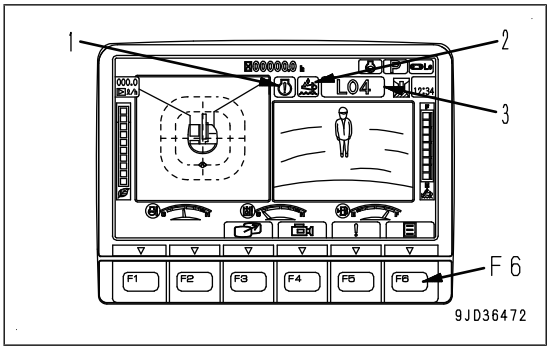


"SCR Information" screen message (5): 3 "Engine power is under deration."

The machine operation will be limited by Inducement.
"Low level Inducement" continues for 10 hours. The remaining time (hours and minutes) to "Severe Inducement" is shown in the column (6) of "SCR Information" screen.
At "Severe Inducement", the engine output is lowered more.
Move the machine to a safe area, and consult your Komatsu distributor.

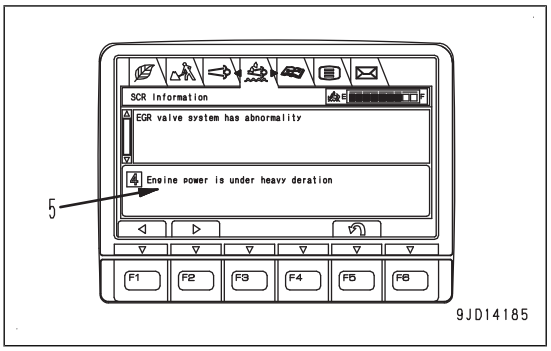


- Severe Inducement:
  The alarm sound operates in continuous alarm.
  The engine system caution lamp (1) lights up in red.
  The DEF system caution lamp (2) lights up in red.
  The action level “L04” is shown in red (3).
  Push the switch F6 to show “SCR Information” screen.



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

Because of the more deration of the engine output, the machine operation will be limited more.
If the restoration of the EGR valve system failure is not done, engine power will kept be derated.



The engine output can be restored temporarily from the Inducement strategy. At “Severe Inducement”, the engine output can be restored temporarily. At “Severe Inducement”, the engine output can be restored to “Low level Inducement” temporarily. The operator can restore engine power through the machine monitor. For the engine output restoration procedure, see the section of “Temporary Restoration from Inducement” in this manual. If Inducement goes to “Severe Inducement” and it becomes necessary to restore engine power temporarily, use the engine power restoration function to move the machine to a safe area and consult your Komatsu distributor for inspection and maintenance.

Temporary Restoration from Inducement

Temporary Restoration from Inducement is one of the Inducement strategies included in the urea SCR system.

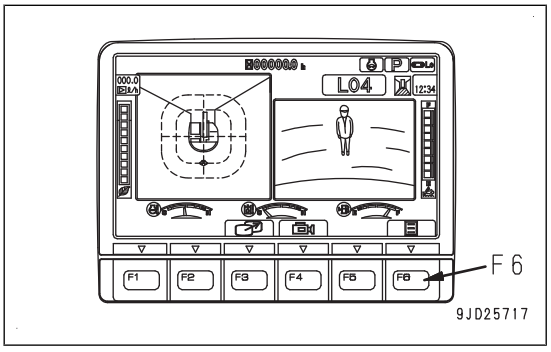
When the urea SCR system goes to “Severe Inducement”, the engine output will be lowered more. This possibly makes it hard to move the machine to a safe area for refill of DEF or inspection and repair of the urea SCR system. For temporary remedies against this problem, the operator can restore the engine output for a short time to the deration of “Low level Inducement” through the machine monitor. “Temporary Restoration from Inducement” does not restore the engine output fully.

“Temporary Restoration from Inducement” can be activated only when the urea SCR system is at “Severe Inducement”. The maximum duration is limited to 30 minutes in each restoration operation, and only 3 operations are allowed to correct all the failures of the urea SCR system.

If the system goes to “Severe Inducement”, use “Temporary Restoration from Inducement” immediately.

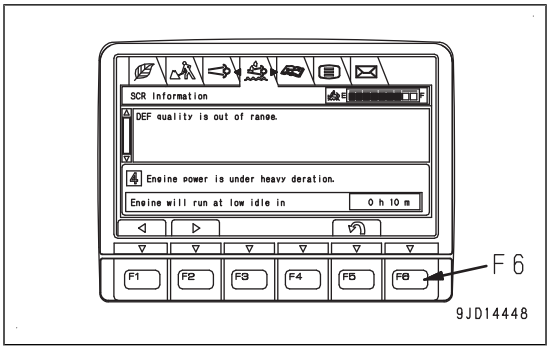
Procedure to activate “Temporary Restoration from Inducement”

1. Push F6 to show “SCR Information” screen when the standard screen is shown, only when the urea SCR system is in “Severe Inducement”.



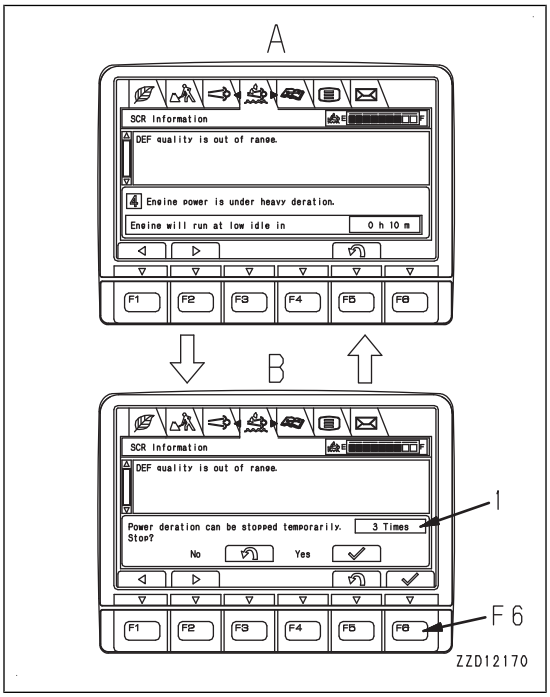
2. When F6 is pushed, the menu window pops up in the lower half of “SCR Information”.

   The menu window that pops up in the lower half of “SCR information” shows the figures A and B every 15 seconds.



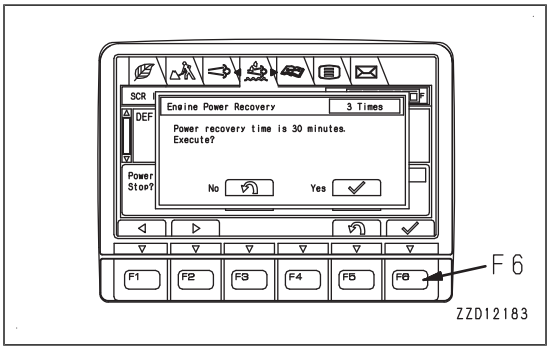
3. Push F6 while the pop-up menu of window B is shown.

   “Engine Power Recovery” will be shown.
   If F6 is not pushed for 30 seconds, “Standard Screen” will be shown, and push F6 to start again.
   The remaining number of operations of “Temporary Restoration from Inducement” is shown in the column (1) of the pop-up menu window B.

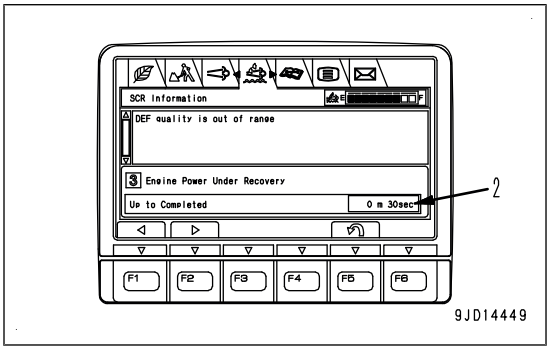


4. Push F6 while “Engine Power Recovery” window is shown.

   “Temporary Restoration from Inducement” is activated, the engine output deration goes back to “Low level Inducement”, and the engine output is restored for 30 minutes.



   The remaining time (minutes and seconds) of “Temporary Restoration from Inducement” is shown in the column (2) on “SCR Information” screen.

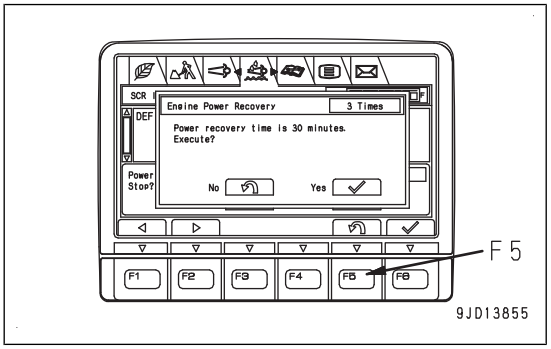


If you do not activate “Temporary Restoration from Inducement” on “Engine Power Recovery” screen, do the operations that follow.

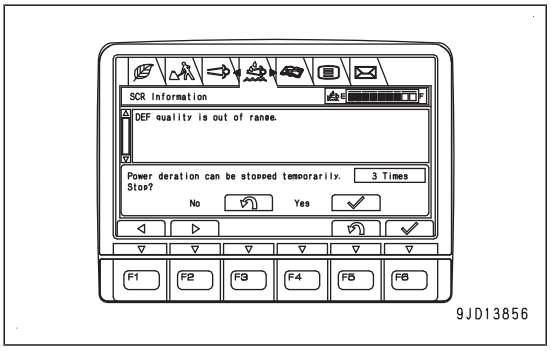
When “Temporary Restoration from Inducement” function is not used

1. Push F5 while “Engine Power Recovery” is shown.

   Do this procedure as an alternative to the step 4 in “Temporary Restoration from Inducement”.

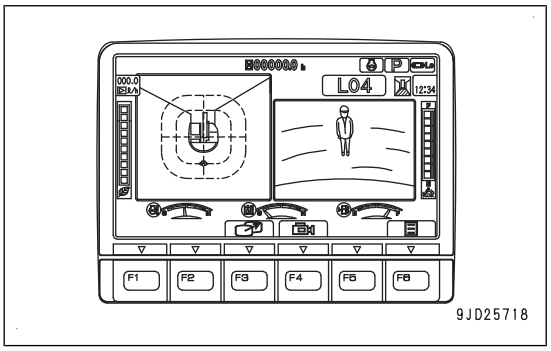


   “SCR Information” screen is shown.



2. Operate the control lever to show “Standard Screen”.

   “Temporary Restoration from Inducement” function is deactivated.



Function to monitor failures to be occurred again in 40 hours or below

The urea SCR system has functions to monitor the system operation and to save the information of the abnormal state. The information is used to monitor failures to be occurred again by “Abnormality Recurrence Counter”. “Abnormality Recurrence Counter” is required by the authorities. The function monitors the failure that causes Inducement other than the quantity of DEF in the tank for 40 hours.

If other failures are sensed in 40 hours or below in the urea SCR system after the previous failures were corrected, regardless of the level of the previous Inducement and whether the new failures are the same as the previous ones or not, it is judged as the failure occurs again.

If a failure is found again, the Inducement changes to “Severe Inducement”.

If the previous Inducement is “Warning”, “Continuous Warning”, or “Low level Inducement”, Inducement goes back to the state when the previous failures are corrected, and the remaining time from that state to the next Inducement is shown. The alarm starts again from the previous Inducement.

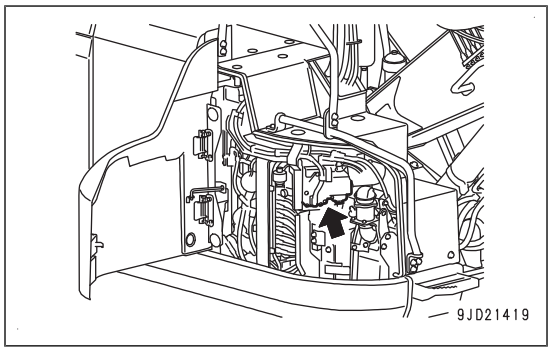
If this occurs, use “Temporary Restoration from Inducement” and move the machine to a safe area, and consult your Komatsu distributor.

The maximum duration of power restoration is 30 minutes and 3 operations are allowed.

To activate “Temporary Restoration from Inducement”, see “Temporary Restoration from Inducement” 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

⚠ WARNING

- **Do not disassemble, repair, modify, or move the communication terminal, antennas, and cables of the wireless communication device. It can cause a failure or fire on the wireless equipment or the machine itself.**
- **Near the blasting jobsite, there is a danger of explosion because of use of the wireless equipment, and serious personal injury or death could be caused. If it is necessary to operate the machine in the range of 12m from the remote blasting device, the power supply cable of the wireless communication device must be disconnected.**

KOMTRAX is a vehicle management system that remotely manages the machines with the KOMTRAX device by the satellite communication or portable radio communication.

The GPS (Global Positioning System) receiver, and communication system are installed in the vehicle management system.

The machine information such as the machine maintenance, maintenance management, operation situation management, and machine location management is collected from the inner network of the machine. It is used for the machine management by the customer and improvement of our products and service.

Types of information which are sent from machine can be different by machines of customers. About the station set-up for the KOMTRAX communication, consult your Komatsu distributor.

POWER SUPPLY FOR KOMTRAX

- Even when the starting switch key is in OFF position, KOMTRAX system consumes a small amount of electric power.
  It is recommended to start the engine periodically to charge the battery.
- When you use the battery disconnect switch, turn the starting switch to the OFF position, and after you check that the system operating lamp is not lit, set the battery disconnect switch key to the OFF position and pull it out.
  When the battery disconnect switch is turned to the OFF position, it can prevents the consumption of the battery power, but the functions of KOMTRAX stop at the same time.
- If the power supply cable of KOMTRAX system device needs to be disconnected, consult your Komatsu distributor.

MACHINE OPERATIONS AND CONTROLS

CHECKS AND ADJUSTMENT BEFORE YOU START ENGINE

WALK-AROUND CHECK

⚠ WARNING

- **Fully inspect the high temperature part around the engine such as muffler, aftertreatment devices or turbocharger and around the battery that no flammable is accumulated, no fuel leaks, no oil leaks. If there is an abnormality, make sure to repair it or consult your Komatsu distributor. If one of these is left not repaired, it can be a cause of a fire.**

Before you start the engine, look at the areas around and below the machine to check the items that follow.

- No bolt or nut is loose.
- There is no leakage of oil, fuel, or coolant.
- State of work equipment and hydraulic system are correct.
- There is no looseness or play in electric wire.
- No dirt is accumulated at the high temperature part.

If the machine inclines, make it level before check.

Do the inspections and cleaning every day as follows before you start the engine for the day's work.

1. Check the work equipment, cylinders, linkages, and hoses for damage, wear, clearance.

   Check the work equipment, cylinders, linkage and hoses for cracks, excessive wear, and abnormal clearance. If a problem is found, repair it.

2. Remove dirt from around the engine, battery, and radiator.

   Check for dirt accumulated around the engine and radiator. Also check for flammable materials (dry leaves, twigs, etc.) around the battery, engine muffler, or other high temperature engine parts. If dirt or flammable materials are found, remove them.

   For removal of dirt from the radiator, see “CHECK AND CLEAN FINS (4-68)”.

3. Check around the engine for coolant and oil leakage.

   Check the engine for oil leakage, and check the cooling system for coolant leakage. If a problem is found, repair it.

4. Check the fuel line for leakage.

   Check for leakage of fuel or damage to the hoses and tubes. If a problem is found, repair it.

5. Check and clean 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 a problem is found, consult your Komatsu distributor for repair.

6. Check the hydraulic component, hydraulic tank, hoses, and joints for oil leakage.

   Check for oil leakage. If a problem is found, repair the place where the oil leaks.

7. Check the undercarriage (track, sprocket, idler, guard) for a problem, wear, loose bolts, or oil leakage from rollers.

   If a problem is found, repair it.

8. Check the handrails and steps for abnormality and bolts for looseness.

   If a problem is found, repair it. Tighten the loose bolts again.

9. Check and clean the machine monitor.

   Check the machine monitor in the operator's cab for damage. If it has damage, replace it. When cleaning dust, etc. on the monitor surface, use a clean, soft, and dry cloth.

REMARK

When cleaning the stains deposited on the monitor surface such as dusts, brush them off using a clean, soft and dry cloth.
For sticky dirt such as oil, remove it with detergent such as glass cleaner for family use on the market (weakly acid to weakly alkaline which contains no abrasive), and then finish-wipe with a clean, soft, and dry cloth.

10. Check the windows for coming off and damage.

    Check the windows for coming off and damage. If one of them is broken, repair it. If the window comes off or be broken during operation, do not continue the operation but repair the window immediately.

11. 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 “ADJUST MIRRORS (3-173)”.

12. Check the seat belt and mounting hardware.

    Check the seat belt and mounting hardware for problem. If a damage is found, consult your Komatsu distributor to replace it with a new one.

13. Check the bucket with hook (option) for damage.

    Check the hook, guide, and hook mount for damage. If a problem is found, consult your Komatsu distributor for repair.

14. Check and clean the camera

    When you clean the camera, wipe off dirt with soft cloth.

    If you stand on an unbalanced footing or you are in an unbalanced posture when you clean the camera, you can fall and be injured. Put a stepladder or step on the level and firm ground, and clean the camera in a stable balance.

    Check the camera for problem. If a problem is found, consult your Komatsu distributor.

15. Remove dirt from around the aftertreatment devices.

    Check that there is no dirt or no flammable material (dry leaves, twigs, etc.) accumulated around the aftertreatment devices. If there is dirt or flammable material, remove it.

16. Check around the aftertreatment devices for exhaust gas leakage.

    Check the pipe that connects the turbocharger to the aftertreatment devices and also the KDPF connections for leakage of exhaust gas (and deposition of soot). If a problem is found, consult your Komatsu distributor for repair.

17. Check around SCR for exhaust gas leakage.

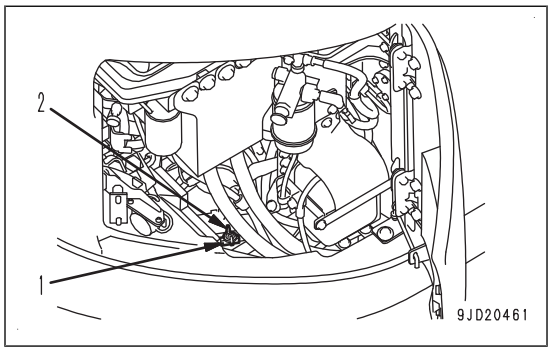
    Check the pipe between the KDPF and SCR and also the SCR connections for leakage of exhaust gas (and urea deposit). If a problem is found, consult your Komatsu distributor for repair

CHECK BEFORE STARTING

Check the items that follow before you start the engine for the day's work.

DRAIN WATER AND SEDIMENT FROM FUEL TANK

1. Open the inspection cover on the right side.
2. Put a container to collect drained fuel below the drain hose (1).
3. Open the drain valve (2) to discharge the sediment and water together with fuel.
4. When only clean fuel flows out, close the drain valve (2).
5. Close the inspection cover on the right side.



CHECK WATER SEPARATOR, DRAIN WATER AND SEDIMENT

NOTICE

If water in the transparent cup (2) freezes, wait until the frozen water is melted fully, and obey the procedure to drain water.

1. Open the fuel filter inspection cover on the right side of the machine.
2. Check that water and sediment are not accumulated.

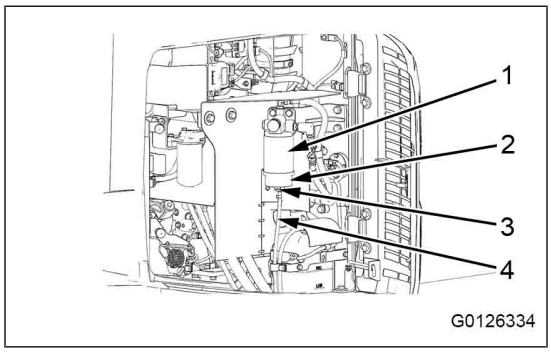
   The water separator is one unit with the fuel prefilter (1).

   Look through the transparent cup (2) to judge the water level and amount of sediment.

   If water or sediment is accumulated, do steps 3 to 5 to drain water.

   REMARK

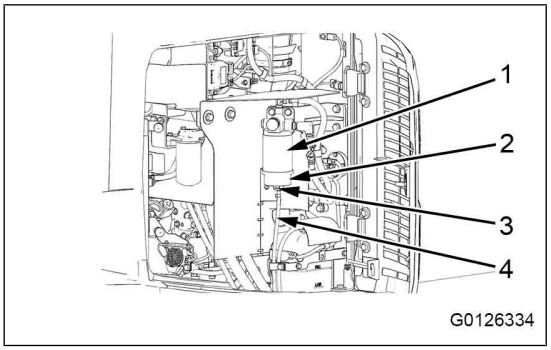
   - If the transparent cup (2) is so dirty that the inside cannot be seen, clean the transparent cup (2) when you replace the fuel prefilter cartridge (1).
   - If the drain valve (3) was removed when you clean, apply grease to O-ring and tighten until it touches the bottom.
3. Put a container under the drain hose (4) to drain the water.
4. Loosen the drain valve (3) and drain the water.
5. Immediately after fuel starts being drained from the drain hose (4), tighten the drain valve (3) to stop the drainage.



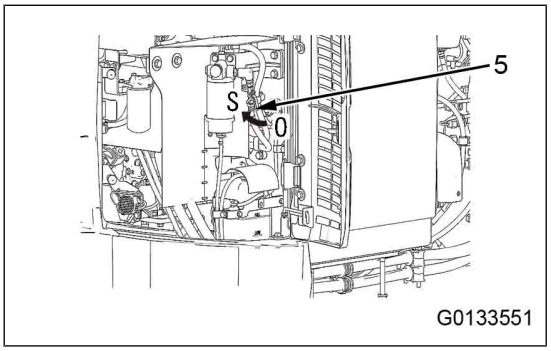
ADJUST THE DRAIN VALVE

If the drain valve (3) does not move easily, apply grease to the O-ring of the drain valve, and it will move smoothly.

1. Open the fuel filter inspection cover on the right side of the machine.

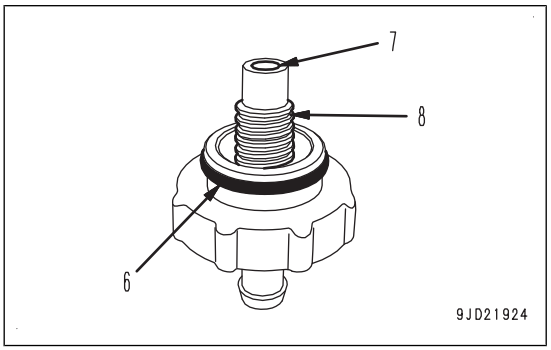


2. Set the valve (5) to the CLOSE position (S).
3. Put a container to collect fuel below the fuel prefilter cartridge.
4. Loosen the drain valve (3) and drain water and sediment from the transparent cup (2), and also drain all the fuel accumulated in the fuel prefilter cartridge (1).
5. Check that nothing comes out from the drain hose (4), then remove the drain valve (3).



6. Apply correct quantity of grease to the O-ring (6).

   When you apply grease, be careful not to let grease attach to the drain port (7) and the threaded part (8) of the drain valve.
7. Tighten the drain valve (3) by hand until it touches the transparent cup (2).
8. Remove the container to receive the fuel.
9. Set the valve (5) to the OPEN position (O).



CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

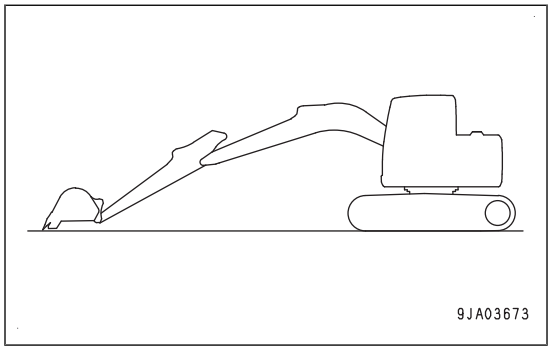
⚠ WARNING

- **Wait for the temperature of the machine to go down, and then start the work. Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury.**
- **Loosen the cap of the oil filler port slowly to release the internal pressure, and then remove it carefully. Oil can spurt out.**

1. Set the work equipment in the posture shown in the figure.

   If the work equipment is not set as shown in the figure, set it in the posture as follows.

   1) Start the engine, and run the engine at low speed.
   2) Retract the cylinder rods for the arm and bucket fully.
   3) Lower the boom, and lower the bucket tooth to the ground.
   4) Stop the engine.



2. Turn the starting switch to the ON position in 15 seconds after the engine is stopped, and operate each control lever (work equipment, travel) fully in each direction.

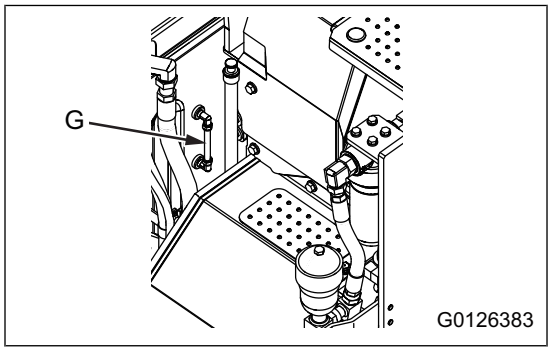
   The internal pressure is released by this operation.

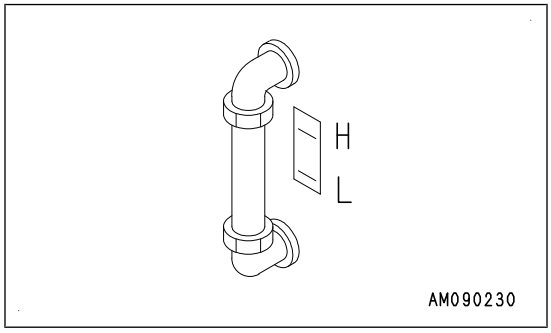
3. Stop the engine.

4. Check the sight gauge (G) at the left side of the hydraulic tank from the operator's cab.

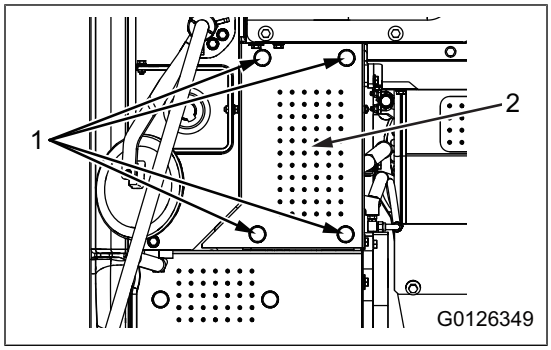
   When the oil level is between the lines H and L, it is correct.

   If the oil level is below the L level, the hydraulic oil level is not sufficient. Do the procedure as follows.

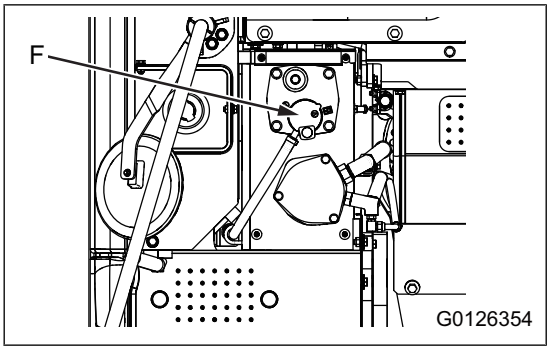




5. Remove the 4 bolts (1), and remove the hydraulic tank top cover (2).

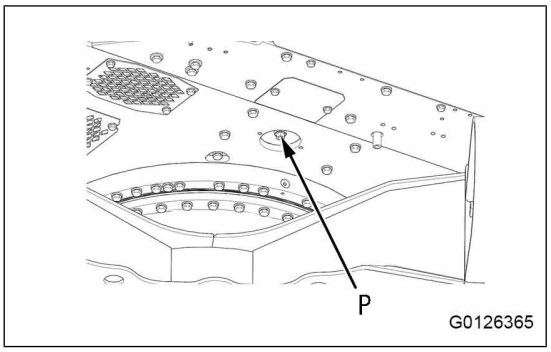


6. Add oil through the oil filler port (F) of the hydraulic tank until the oil level comes between the H and L levels of the sight gauge (G).



NOTICE

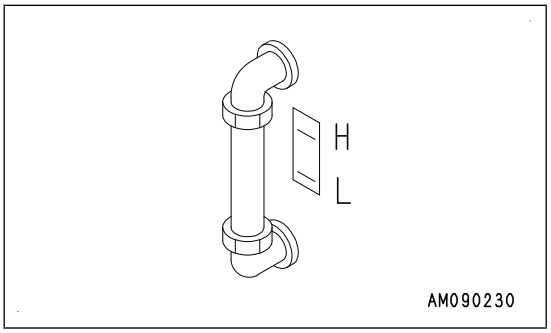
Do not add oil more than the H level. The hydraulic circuit can be damaged, or oil will spurt out. If the refilled oil exceeds H level, swing the upper structure until the drain plug (P) beneath the hydraulic tank comes between the right and left tracks and stop the engine. Wait for the oil to cool down sufficiently, then drain the excessive oil through the drain plug (P) into an oil container.



REMARK

The oil level will change in response to the oil temperature. Check the oil level with the guidelines that follow.

- Between H and L levels before you start operation (Oil temperature at 10 to 30℃)
- Around H Level during normal operation (Oil temperature at 50 to 80℃)



INSTALL HYDRAULIC TANK OIL FILLER CAP

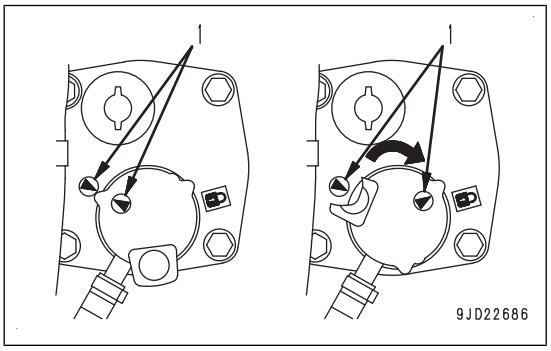
⚠ CAUTION

If the oil filler cap is inserted in reverse, it only rotates by approximately 1/4 turns and cannot be locked.

Install the oil filler cap according to the following procedure.

1. Match the ▲ marks (1) on both of the oil filler cap and the tank, and insert it.
2. Rotate the oil filler cap clockwise, and lock it with the key.

   The ▲ mark (1) on the oil filler cap matches with the key mark on the tank.



CHECK COOLANT LEVEL, ADD COOLANT

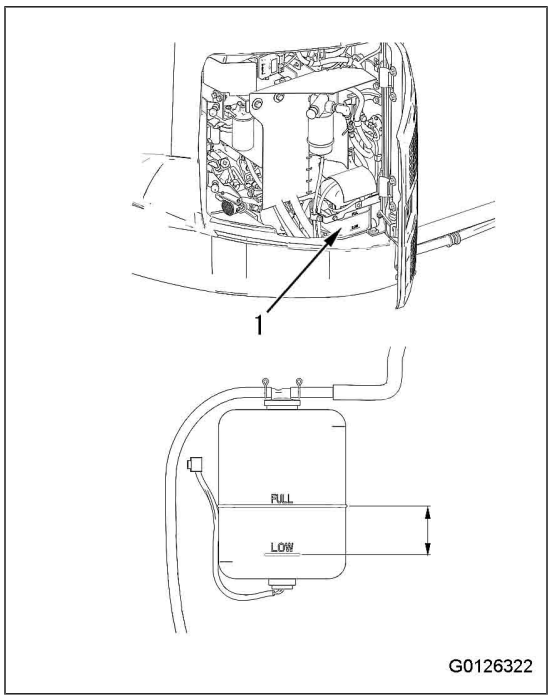
⚠ WARNING

- **Do not open the expansion tank unless necessary. Check the coolant with the fluid level gauge when the engine is cold.**
- **Wait for the temperature to go down, and turn the cap of the expansion tank slowly to release the pressure, and remove the cap carefully. Immediately after the engine is stopped, the coolant is very hot and the pressure is accumulated in the expansion tank. If you remove the cap in this state, it can cause burn injury.**

NOTICE

If the expansion tank (1) is empty, the coolant can be leaked. If a problem is found after inspection, do the repair immediately.

Prepare a step.



1. Open the fuel filter inspection cover at the right side of the machine.
2. Check that the coolant level is in the range between FULL and LOW marks of the expansion tank level gauge.

   If the coolant level is in the range between FULL and LOW, the level is correct.

   If the coolant level is below LOW, the coolant is insufficient.
3. Add coolant to FULL level through the filler port of expansion tank (1).
4. After you add it, tighten the cap securely.

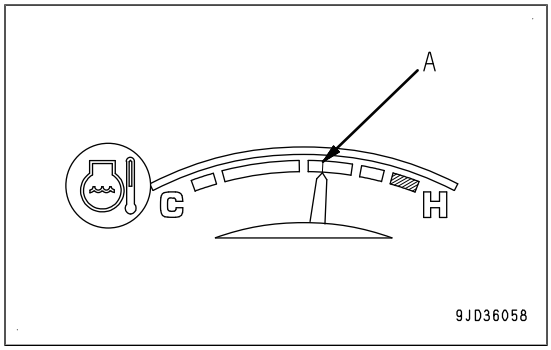
   NOTICE

   If the expansion tank is empty, there can be coolant leakage. If a problem is found after inspection, repair it immediately.
5. If no problem is found, check the coolant level in the radiator.

   If it is low, add coolant of the same density in radiator by the coolant density table in “CLEAN INSIDE OF COOLING SYSTEM (4-25)”, and then add coolant to the expansion tank.

   After you add it, make sure that there is no problem.
6. If inside of the expansion tank (1) is too dirty to check the coolant level, see “CLEAN INSIDE OF COOLING SYSTEM (4-25)”.
7. If the coolant level is 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.



8. Start the engine to bleed air, increase the coolant temperature to the position (A) on the gauge, and then stop the engine.
9. After the coolant temperature is decreased, check the coolant level in the radiator and expansion tank.

   If the coolant level is low, add Non-Amine Engine Coolant (AF-NAC) of the same density as the one in the radiator.

CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

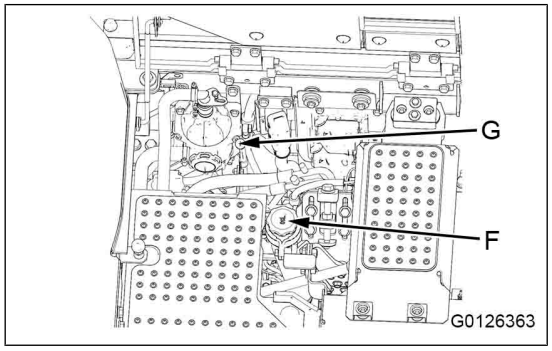
⚠ WARNING

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

To check the oil level after the engine is started, stop the engine, and wait for 15 minutes or more.

If the machine is at an angle, set the machine horizontal before you do the inspection.

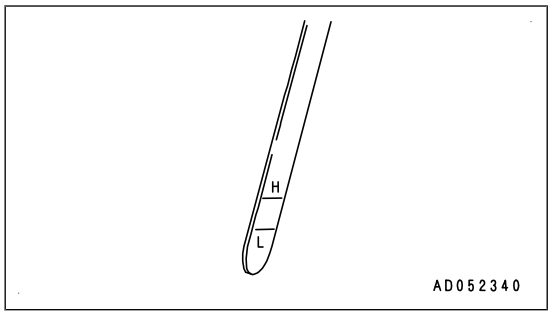
1. Open the engine hood.
2. Pull out the dipstick (G) and wipe the oil off with a cloth.
3. Fully insert the dipstick (G) into the dipstick pipe again, and then pull it out.



4. Make sure that the oil is attached up to between marks H and L on the dipstick (G).

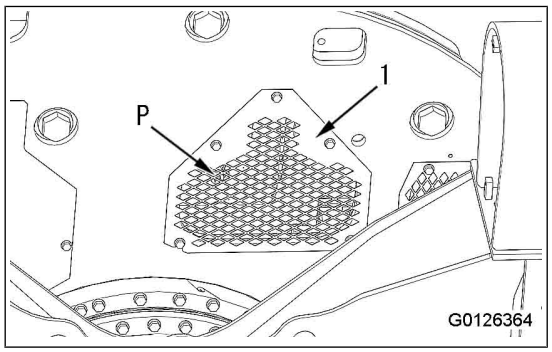
   The oil level is correct if it is between marks H and L.

   If the oil level is below the mark L, add oil through oil filler port (F).



5. If the oil level is above the mark H, decrease it to the applicable level as follows.
   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 you drain oil, put the oil container below the drain plug.
   3) Check the oil level again.
6. If the oil is at the correct level, tighten the filler cap securely, and close the engine hood.



CHECK ELECTRIC WIRING

⚠ CAUTION

- **If the fuse is blown frequently or if a short circuit seems to have occurred in the electric wiring, immediately consult your Komatsu distributor to investigate the cause and repair it.**
- **Keep the battery top surface clean. Check the vent of battery cap. If it is clogged with dirt or such, wash the battery cap with water to remove the clogging.**

NOTICE

Be careful about the wiring of “battery”, “starting motor”, “alternator”, and do checks.

- Check that the fuse is not damaged, and check that the fuse of specified capacity is used.

- Check that there is no wire breakage or sign of short-circuit in the electric wiring and no damage to the coating.
- Check that the terminal is not loose. Retighten it if it is loose.
- Check that no flammable material is accumulated around the battery. Remove it if it is accumulated.

CHECK FUEL LEVEL, ADD FUEL

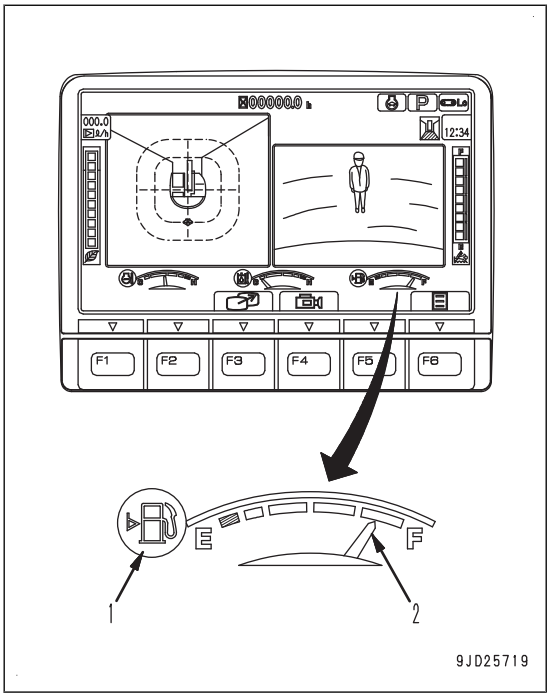
⚠ WARNING

When you add fuel, do not let it overflow. It can cause a fire.
Wipe up all the spilled fuel fully. If it spills over soil or sand, remove that soil or sand.
Fuel is flammable and dangerous. Do not let an open flame be near.

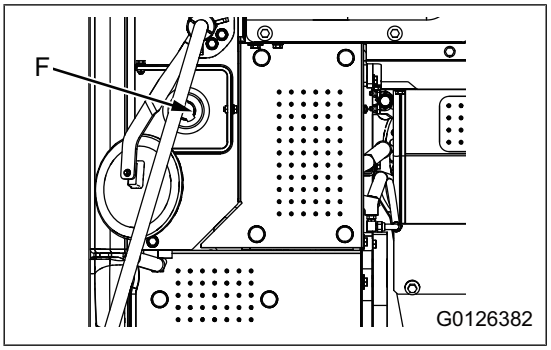
1. Turn the starting switch to the ON position.
2. When the fuel level caution lamp (1) lights up in red, check the fuel level with the fuel gauge (2) on the monitor.

   Even if the fuel level caution lamp (1) is not lit in red, when the fuel gauge pointer is in the red range, the fuel quantity is 52ℓ or below.

   The fuel level is low. Add fuel.
3. After you check, turn the starting switch back to the OFF position.



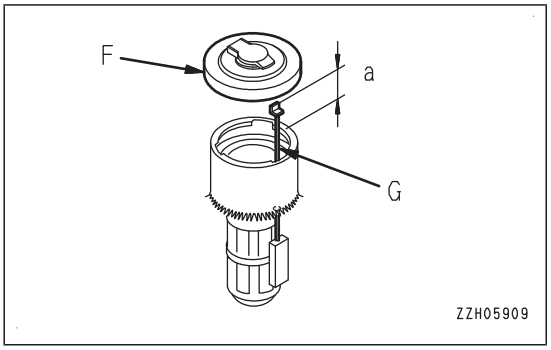
4. Open the filler cap (F) of the fuel tank.



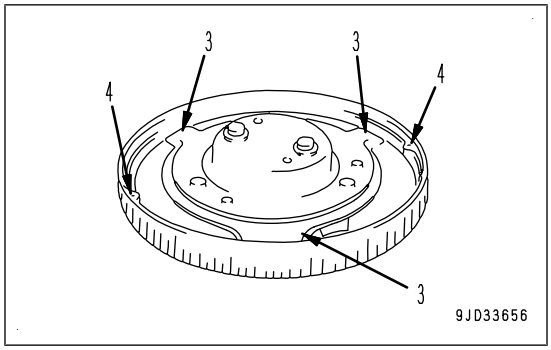
5. Add fuel through the filler port until the float gauge (G) rises to the maximum position.

   Fuel tank capacity: 200ℓ

   The tip end position (a) of the float gauge (G) when fuel tank is full: Approximately 50mm from the top surface of fuel tank



6. After it is added, push the float gauge (G) straight down with the filler cap (F), and tighten the filler cap (F).



NOTICE

- **Be careful that the float gauge (G) does not get caught by a nail of filler cap (3) when you tighten the filler cap (F).**
- **When the breather hole (4) of the cap is clogged, the pressure in the tank decreases, and the fuel sometimes does not flow. Clean it from time to time.**

ADD FUEL WITH REFUEL PUMP

⚠ WARNING

When you add fuel, do not let it overflow. It can cause a fire.
Wipe up all the spilled fuel fully. If it spills over soil or sand, remove that soil or sand.
Fuel is flammable and dangerous. Do not let an open flame be near.

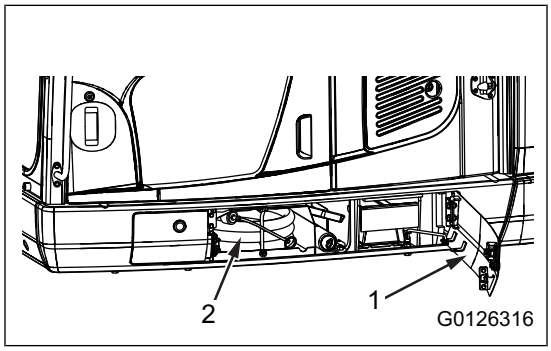
⚠ CAUTION

- **When you add fuel, be sure to stop the machine on a level ground.**
- **Stay near the machine and check the state while you add fuel.**
- **If fuel flows out or is spilled, check the machine, and make sure that there is no fuel near the electric devices or high-temperature components.**
- **If the pump is operated while the cap of the strainer valve is closed, the parts in the refuel pump can be damaged. Make sure that the cap of the strainer valve is open, and operate the pump.**
- **If the pump is operated while the strainer valve is not wet with fuel, air can be sucked in and it can cause failure. Make sure that the strainer valve is wet with fuel, and operate the pump.**
- **The fuel pump is protected by the in-line blade fuse (15A). If the pump does not operate correctly, check the fuse.**
- **Make sure that the strainer at the hose end is clean.**
- **When you do not use the refuel pump, close the strainer valve cap (H) of the hose to prevent the leakage and spill of fuel.**
- **There is a danger that high pressurized water damages the pump. Be careful that high pressurized water does not get on it directly.**
- **If a problem is found in the refuel automatic stop system, consult your Komatsu distributor, and do not use the system until the problem is repaired.**

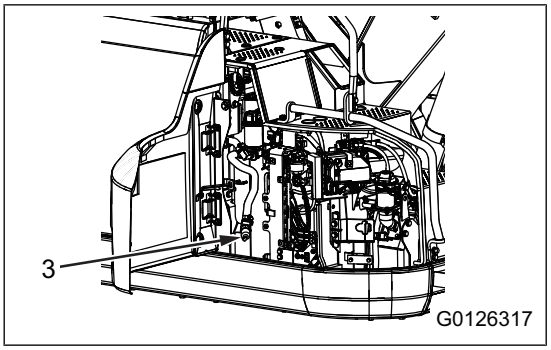
When you operate the machine at the jobsite where a fuel container and pump are not available, you can add fuel with the refuel pump from the fuel barrel.

The refuel pump is installed in the front right cover of the machine.

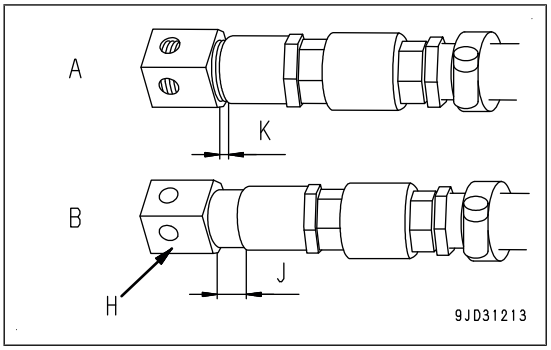
1. Remove the fuel supply hose (2) inside the cover (1) at the left side of the machine.



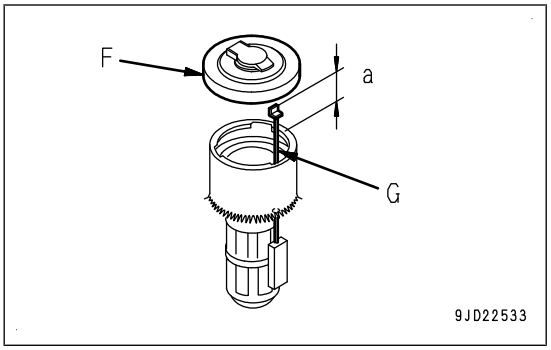
2. Connect the fuel supply hose (2) to the quick coupler (3) of the refuel pump.



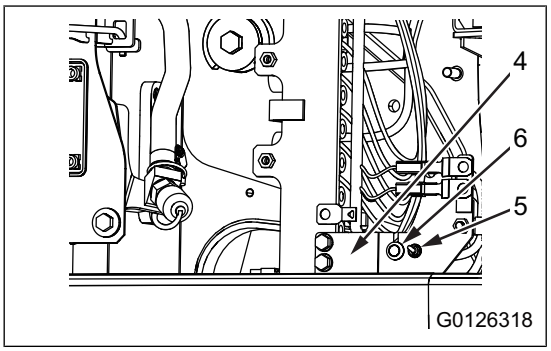
3. Loosen the strainer valve cap (H), and set it to the open position (J).
   (A) Closed position
   (B) Open position
4. Put the fuel hose (2) into the barrel set near the machine.

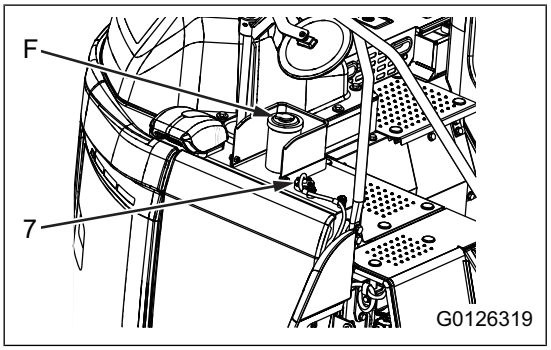


5. Remove the filler cap (F).



6. Set the master switch (5) of the refuel system in the refuel switch bracket (4) to the ON position.
   The refuel switch bracket (4) is installed inside the front right cover.
7. When you use refuel pump of refuel automatic stop system
   1) Push the switch (6) 1 time to start the refuel operation.
      The refuel operation continues automatically until the tank is filled up. (The pump stops when the float switch (7) reaches the upper limit.)
      Stop the machine on a level ground, and check the refuel operation to prevent the leakage and spill of fuel.
      You can stop the refuel operation as desired when the master switch (5) is set to the OFF position.
      After the pump is stopped by the float switch, if you need to add fuel to the fuel tank, keep the switch (5) pushed.
      The refuel pump fully fills the tank with fuel when the switch (6) is kept pushed.
      When your hand is released from the switch (6), the refuel pump stops by the automatic control cancel function.





When you use the automatic control cancel function, you must check the fuel level in the tank to prevent the leakage and spill of fuel.

When fuel flows out, set the master switch (5) to the OFF position immediately to stop the refuel operation.

2) After the refuel operation is completed, make sure that the master switch (5) goes back to the OFF position.

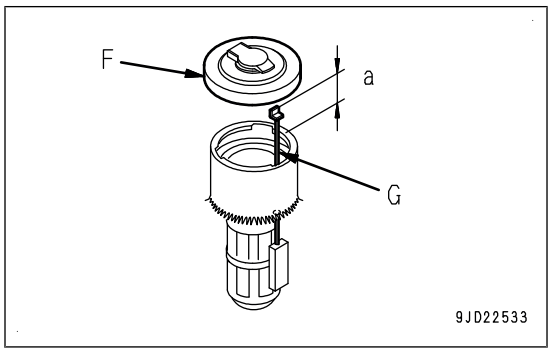
8. After the refuel operation is completed, do the procedure as follows.

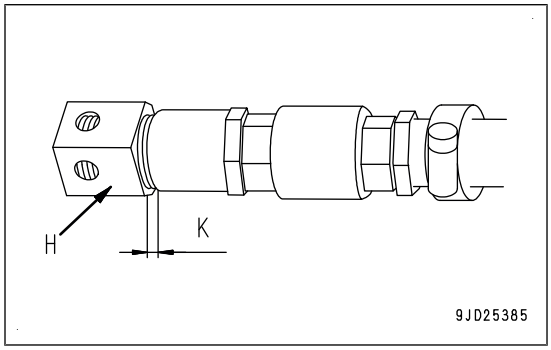
1) Push the float gauge (G) straight down with the fuel filler cap (F). Be careful not to get the float gauge (G) caught in the tab of fuel filler cap (F), and tighten the fuel filler cap (F).

2) Tighten the strainer valve cap (H), and set it to the closed position (K).

Prevent the leakage of remaining fuel in the hose.

3) Put the fuel supply hose inside the cover (1) at the left side of the machine.





CHECK DEF LEVEL, ADD DEF

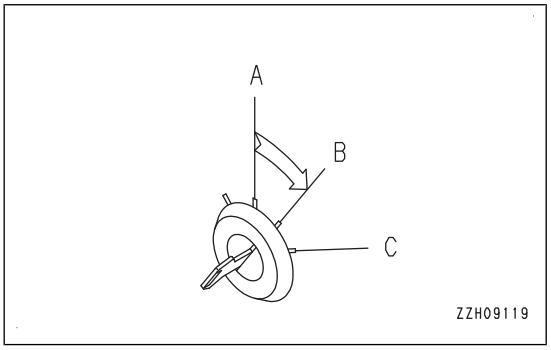
⚠ WARNING

- **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.**

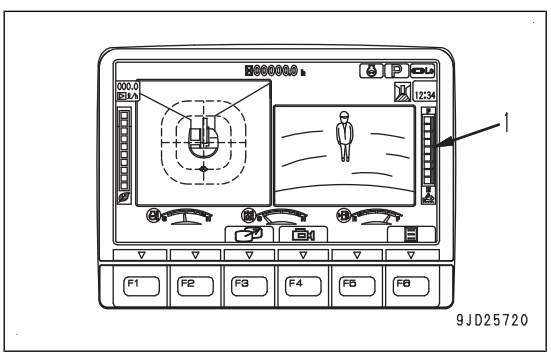
NOTICE

- **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.**

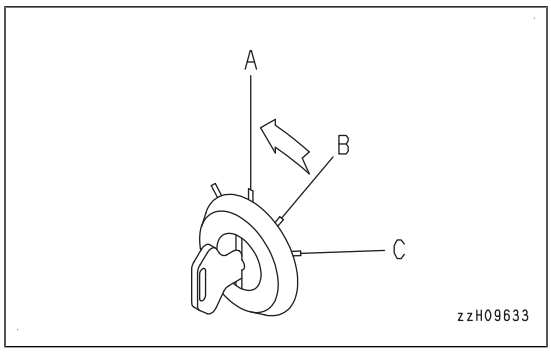
1. Turn the starting switch to ON position (B).



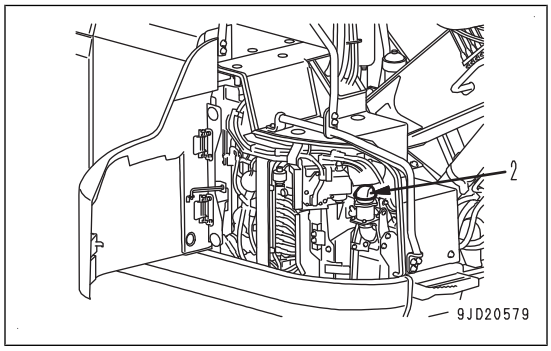
2. Check the DEF level gauge (1) on the machine monitor.

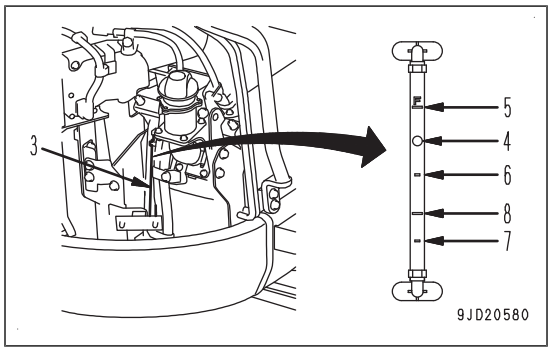


3. After checking, turn the starting switch back to OFF position (A).

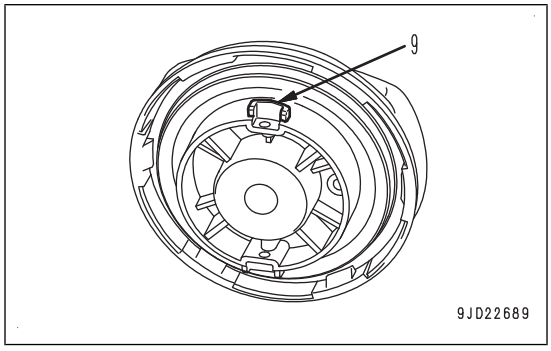


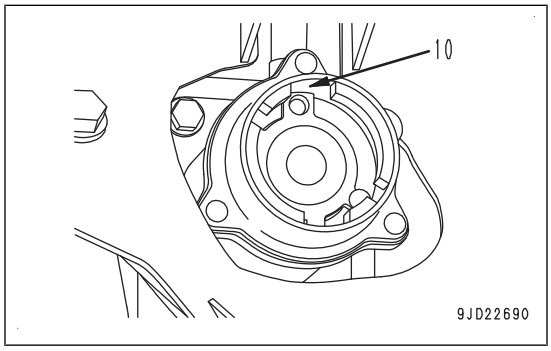
4. If DEF is insufficient, add it.
   1) Open the cover at the right front side of the machine and clean the DEF tank cap and the area around.
   2) Turn the cap of oil filler port (2) counterclockwise.
      The oil filler cap is opened.
   3) By sight gauge (3), add DEF through the filler port until float (4) reaches line F (5).
      Line (6) in the sight gauge indicates approximately 5ℓ below the line F, and the line (7) indicates approximately 10ℓ below the line F.
      The line (8) is the adding line when DEF may freeze in cold weather.





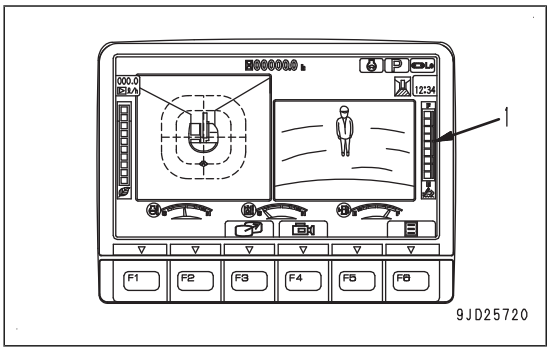
5. After adding, align claw (9) of the cap with groove (10) of the filler port and close the cap securely by turning it clockwise by 90°.





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.

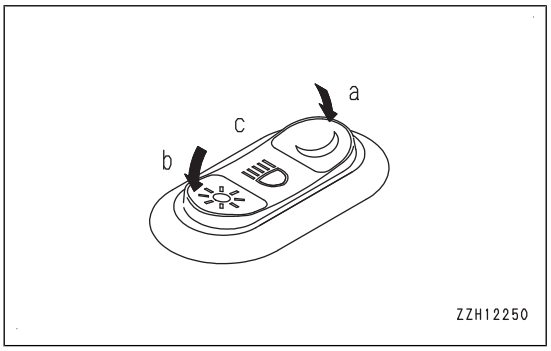


- Add only DEF in clearly marked DEF tanks that have the blue cap.
- If the starting switch is turned to ON position immediately after adding DEF, DEF level gauge (1) on machine monitor will be delayed.

CHECK WORKING LAMP

Check that the working lamp and the lamp in the instrument light up normally, and that there is no stain or damage.

1. Turn the starting switch to the ON position.
2. Turn the lamp switch in the night mode (a) position or the day mode position (b), and check that the working lamp lights up.
3. After the inspection is completed, turn the lamp switch to the OFF (c) position, and turn off the working lamp.
4. After the check, set the starting switch to the OFF position.

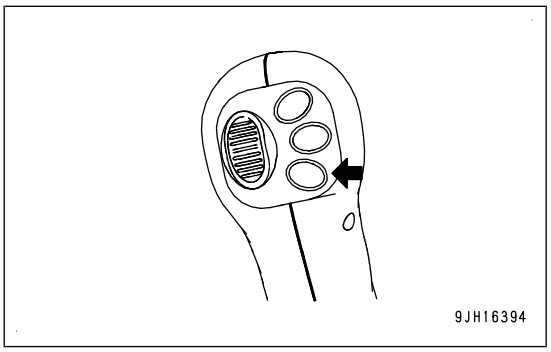


If the lamp does not light up, a burned-out bulb and open circuit are the possible causes. Consult your Komatsu distributor for repair.

CHECK HORN

1. Turn the starting switch to the ON position.
2. Check that the horn operates immediately when the horn switch is pushed.

   If the horn does not operate, consult your Komatsu distributor for repair.
3. Turn the starting switch to the OFF position.



ADJUSTMENT

ADJUST OPERATOR SEAT

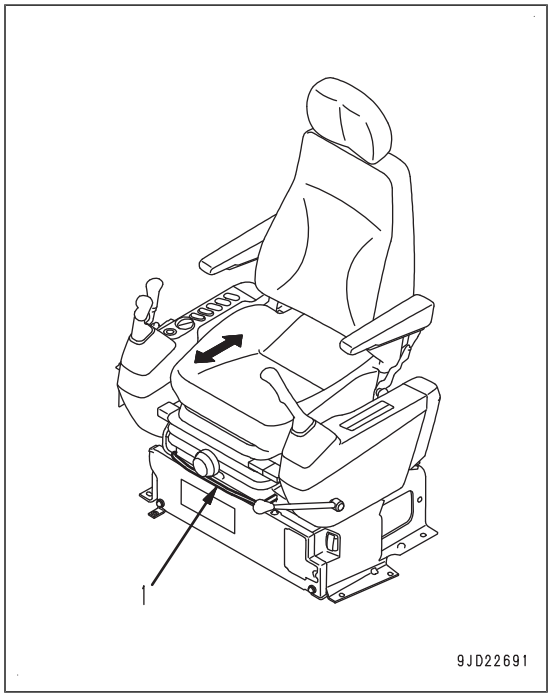
⚠ WARNING

When you adjust the position of the operator's seat, be sure to set the lock lever to the LOCK position to prevent contact with the control levers accidentally.

- Be sure to adjust the operator's seat before you start each operation or when the operators change shift.
- Make sure to adjust the seat to let the operator operate the control levers and switches freely with the back against the backrest of operator's seat.

ADJUST SEAT IN FORE-AND-AFT DIRECTION

Pull up the lever (1), set the seat to the desired position, then release the lever (1).
Fore-and-aft adjustment 50mm (5 stages)

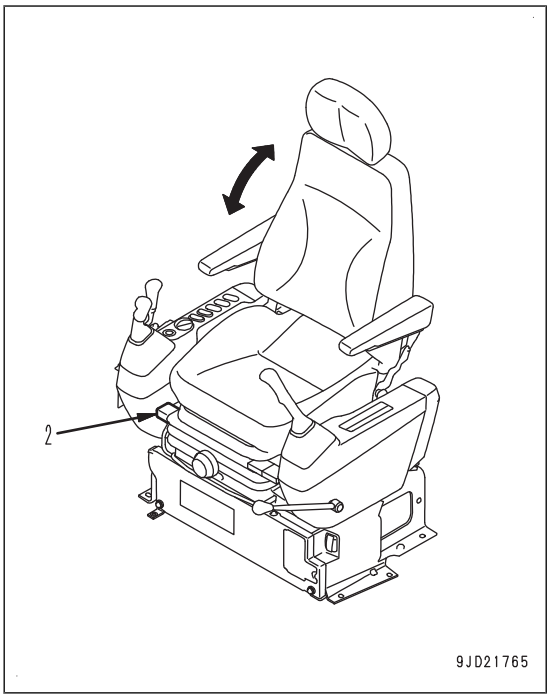


RECLINE SEAT

Pull up the lever (2) and set the seat back to a position which is comfortable for operation, then release the lever (2).

REMARK

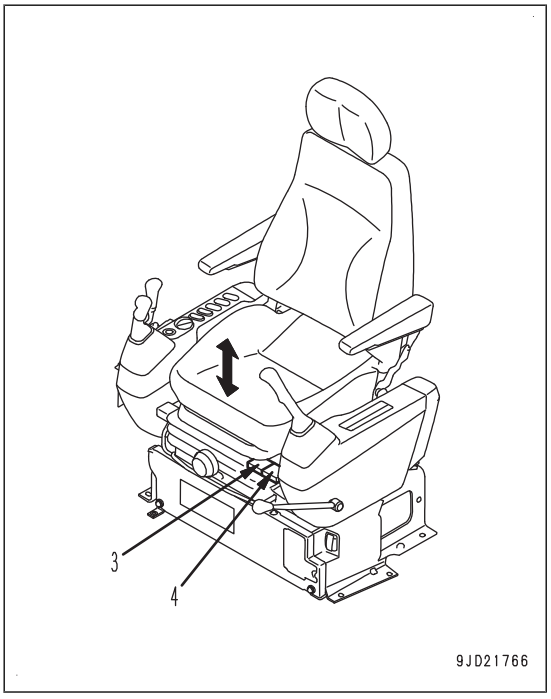
- The seat can be reclined more when the seat is pushed to the front. The amount of reclining decreases as the seat is pushed back, so when moving the seat back, return the backrest to the original position.
- Sit with your back against the backrest when adjusting. If your back is not touching the backrest, it may suddenly move forward.



TILT SEAT

- Forward tilt
  Push down lever (3) to adjust the forward tilt angle of the seat. (3 stages)
  - To raise the forward tilt angle of the seat, keep the lever (3) pushed down and apply your weight to the rear of the seat.
  - To lower the forward tilt angle of the seat, keep the lever (3) pushed down and apply your weight to the front of the seat.
- Backward tilt
  Pull up lever (4) to adjust the backward tilt angle of the seat. (4 stages)
  - To raise the backward tilt angle of the seat, keep lever (4) pulled up and stand up slightly to remove your weight from the seat.
  - To lower the backward tilt angle of the seat, keep lever (4) pulled up and apply your weight to the rear of the seat.

  Tilt adjustment: Up 13°, down 13°



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 60mm

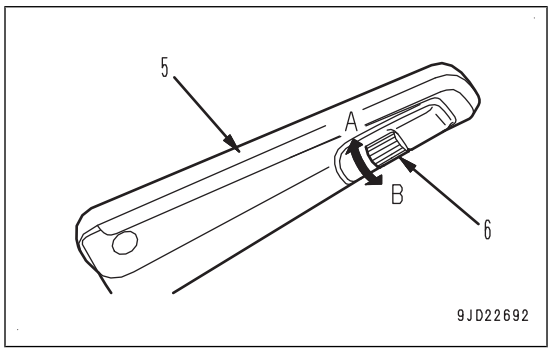
REMARK

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.

ADJUST ARMREST ANGLE

Armrest (5) can be moved up to 90° by hand.

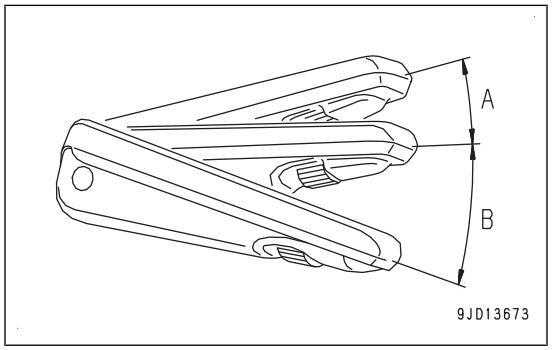
- By turning the dial (6) at the bottom of the armrest (5) by hand, it is possible to make vertical angle adjustment finely.
  If the dial is turned clockwise (counterclockwise), the armrest is raised (lowered).



- When it is raised or lowered to the maximum position, adjustment dial (6) cannot be turned any more. In such case, turn adjustment dial (6) counterclockwise (clockwise) when the armrest is at the maximum raised (lowered) position.
  Amount of angle adjustment: 25° ((A): 5°, (B): 20°)

  REMARK

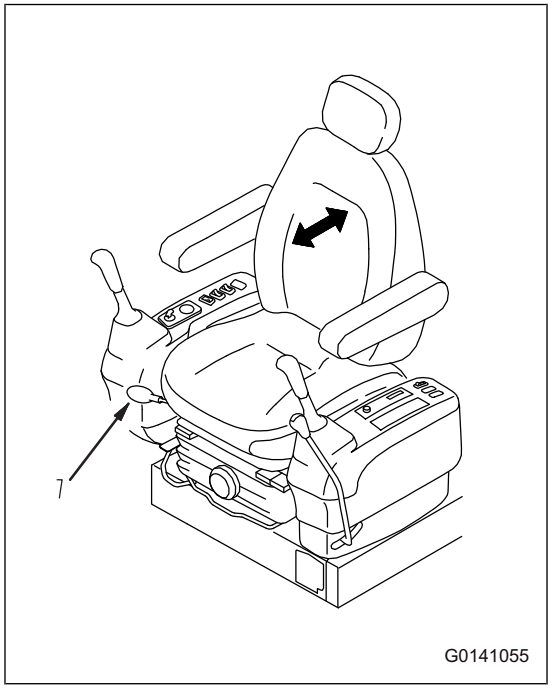
  If the seat back is tipped to the front without raising armrest (5), armrest (5) rises automatically.



ADJUST LUMBAR SUPPORT

Adjust the seat back face in an optimum swelling.
When the pump is pressed, seat back face centre swells up.

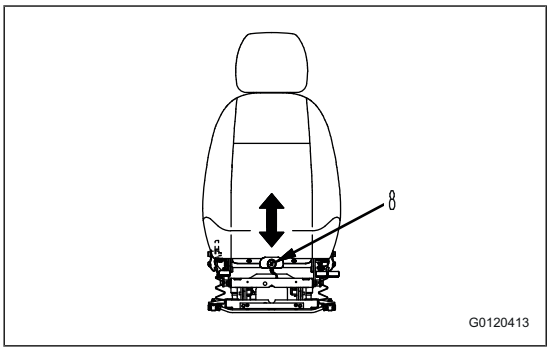
When the button (7) at pump root is pressed, seat back face centre deflates.



ADJUST SUSPENSION SEAT HARDNESS

If you press the suspension switch (8), the suspension becomes hard.
If you pull the suspension switch (8), the suspension becomes soft. (Air hissing sound will be heard.)

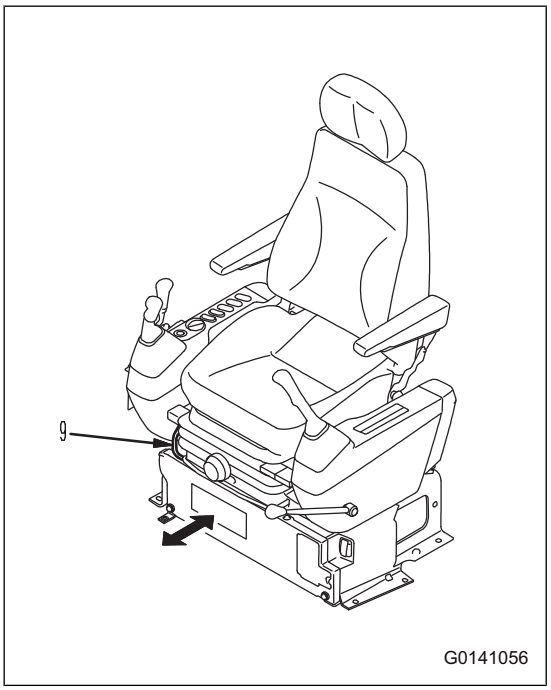
Adjustment range by the weight 60kg to 150kg



ADJUST SEAT UNIT IN FORE-AND-AFT DIRECTION

Pull fore-aft adjustment lever (9) to the right, adjust the seat to the desired position, then release fore-aft adjustment lever (7). The operator's seat, right and left control levers, and lock lever all slide (move) together.

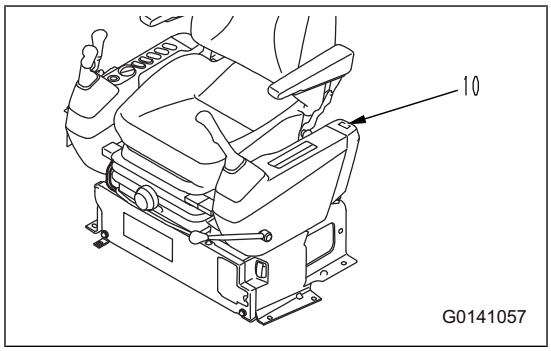
Fore-and-aft adjustment 120mm (12 stages)

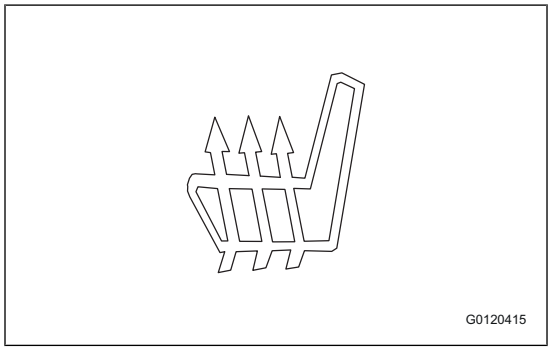


HEAT SEAT

⚠ 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.**





Turn the seat heater switch ON.
(a): OFF position

(b): ON position

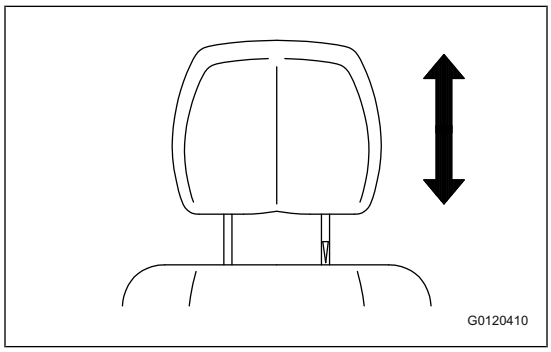
The seat cushion and backrest become warm.

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.



REMOVE AND INSTALL HEADREST

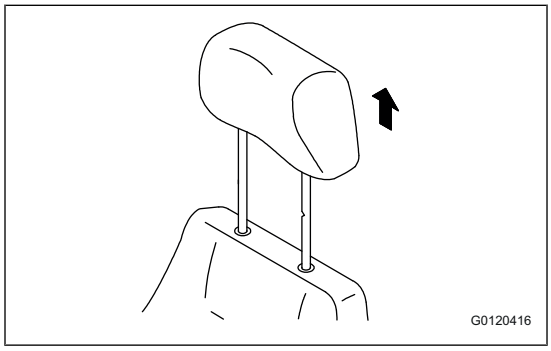
When the headrest is not necessary, remove it according to the following procedure.

Removal

1. Pull up the headrest 80mm or more.
2. The headrest is pulled out.

   NOTICE

   When removing the headrest, operate it so that the shaft of the headrest becomes straight. If it is forcibly twisted, the installation part may be broken.



Install

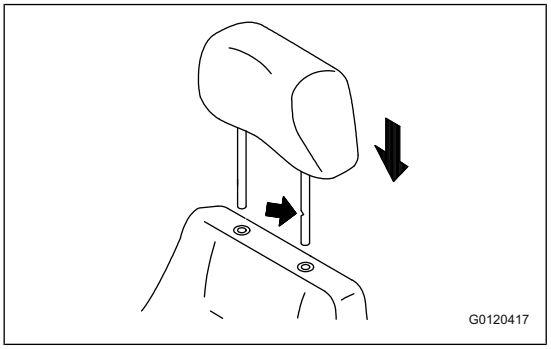
3. Insert the headrest into the hole at the seat back.

   When installing, turn the notch of the shaft toward the front of the machine.

4. 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.



ADJUST MIRRORS

⚠ WARNING

Be sure to adjust the mirrors before the work. If the mirrors are not correctly adjusted, you cannot keep the visibility. There is a danger that you will suffer from injury or that a serious personal injury or death is caused.

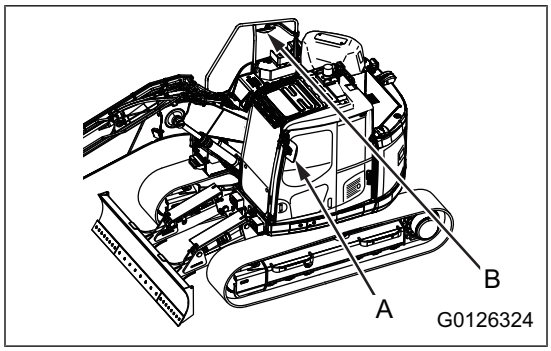
⚠ CAUTION

To prevent the machine movement during the work, make sure that the machine is in the conditions that follow before you start the work.

- **The machine is parked on a level ground.**
- **The work equipment is lowered to the ground in a stable posture.**
- **The lock lever is in LOCK position.**
- **The engine is stopped.**

Mirror (A): Left front mirror of machine

Mirror (B): Rear mirror of machine



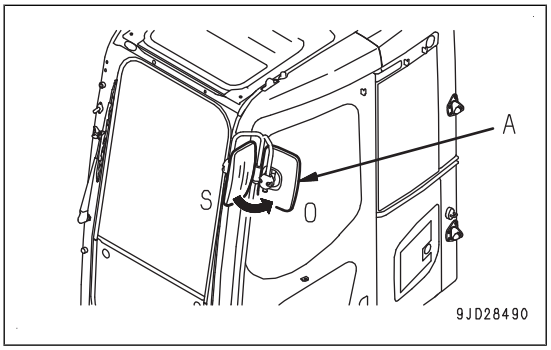
ADJUST LEFT FRONT MIRROR (A)

⚠ CAUTION

To prevent the machine movement during the work, make sure that the machine is in the conditions that follow before you start the work.

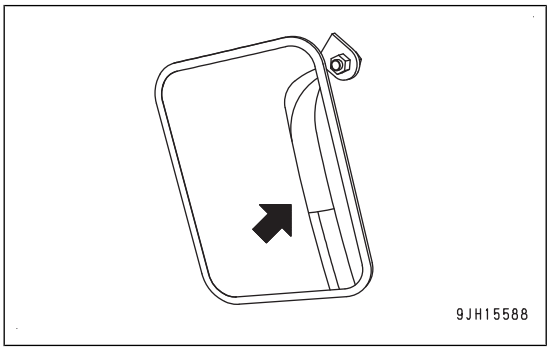
- **The machine is parked on a level ground.**
- **The work equipment is lowered to the ground in a stable posture.**
- **The lock lever is in LOCK position.**
- **The engine is stopped.**

If the mirror (A) is in the store position (S), put it to the extend position (O) to adjust.

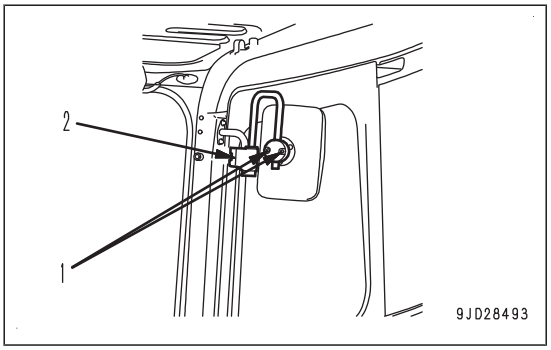


Adjust the mirror to let you see a person at the rear left end of the machine.

1. Adjust the mirror with your hand to let the side of the machine show in it as in the figure.
2. Make sure that you can see a person at the rear left end of the machine.



3. If you cannot see a person, loosen the mounting bolts (1) and (2) for the mirror and stay, and adjust the angle.



When you loosened the mounting bolts to adjust the angle, be sure to adjust the mirror to the specified position.

4. Adjust the bracket (1).

   Mounting position (2): 35mm

   Mounting angle (3): 30°

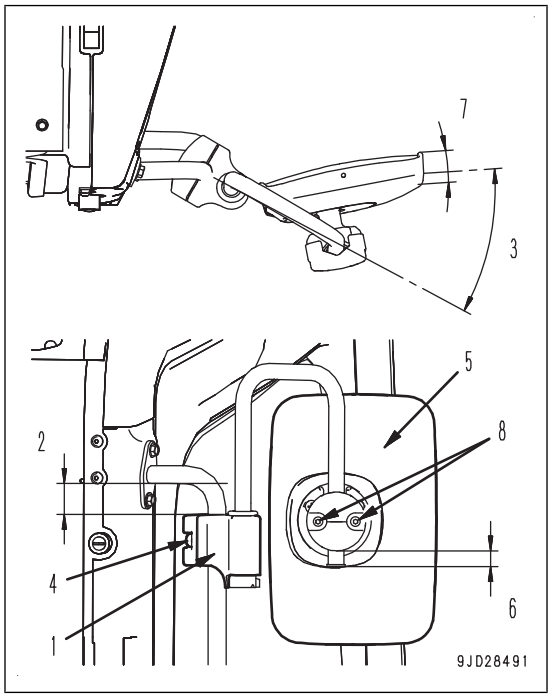
   Tightening torque of mounting bolt (4): 15.0 to 19.6Nm {1.53 to 2.00kgfm}

5. Adjust the mirror (5).

   Mounting position (6): 15mm

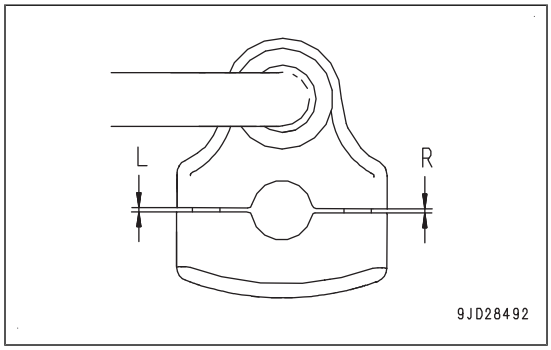
   Mounting angle (7): 10°

   Tightening torque of mounting bolt (8): 6.0 to 7.0Nm {0.61 to 0.71kgfm}



NOTICE

- **Tighten the bolts of each bracket on the right and left sides alternately to let the clearance on the right and left sides (L), (R) be equal.**
- **If the mounting bolts for the mirror and stay are tightened too much, the bracket can be damaged. Be sure to tighten it to the specified torque.**



ADJUST REAR MIRROR (B)

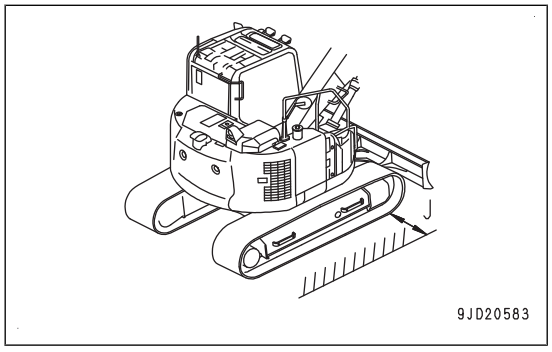
⚠ CAUTION

To prevent the machine movement during the work, make sure that the machine is in the conditions that follow before you start the work.

- **The machine is parked on a level ground.**
- **The work equipment is lowered to the ground in a stable posture.**
- **The lock lever is in LOCK position.**
- **The engine is stopped.**

Adjust the mirrors to let the operator see a person around 1m around the machine from the operator's seat.

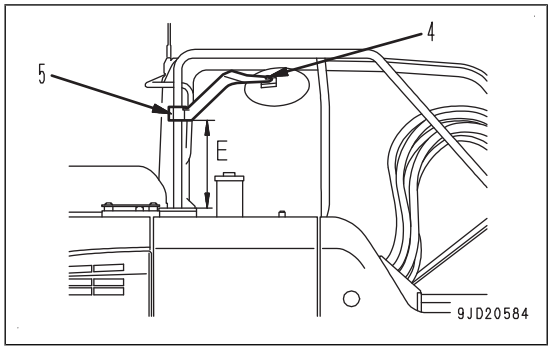
(J):1m

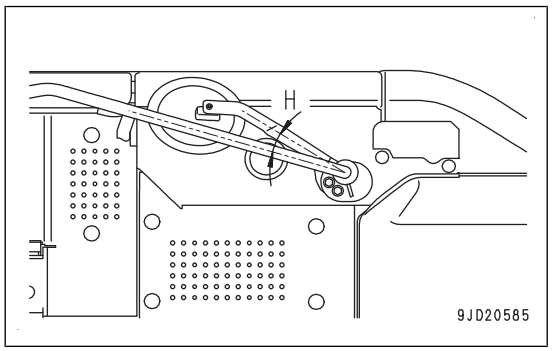


1. If the mirror is removed, install it at the position shown in the figure.

   (E): 360mm

   (H): 15°

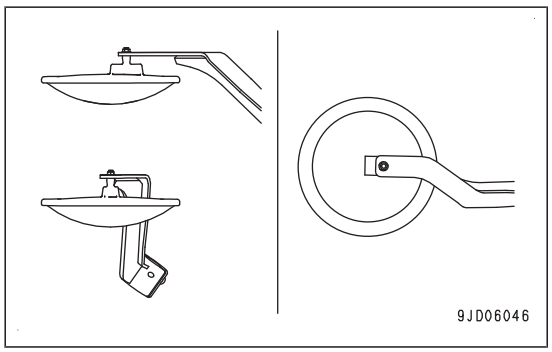




   If the mirror does not move smoothly during the adjustment, loosen the mirror fixing screw (4) and mirror fixing bolt (5) to adjust it.

   Tightening torque of screw (4): 3.0 to 3.5Nm {0.31 to 0.35kgfm

2. Make sure that you can see a person 1m around the machine.



FASTEN AND UNFASTEN SEAT BELT

⚠ WARNING

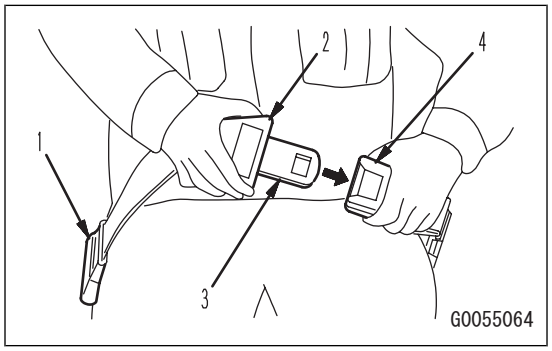
- **Before you fasten the seat belt, make sure that there is no abnormality in the belt mounting bracket or mounting belt. If it is worn or damaged, replace it.**
- **Even if no problem can be seen on the appearance of the seat belt, replace it every 3 years from starting usage or 5 years after manufacture that comes first.**
- **Be sure to use the seat belt during the operation.**
- **Do not twist the seat belt when you use it.**

REMARK

- The date of manufacture of the belt is shown on the back of the belt.
- The date shown on the seat belt is the manufactured date. This date is the start of the 5-year period from the production. It is not the start of the 3-year period of actual usage.
- No length adjustment is required because this seat belt has a retractable device.

FASTEN SEAT BELT

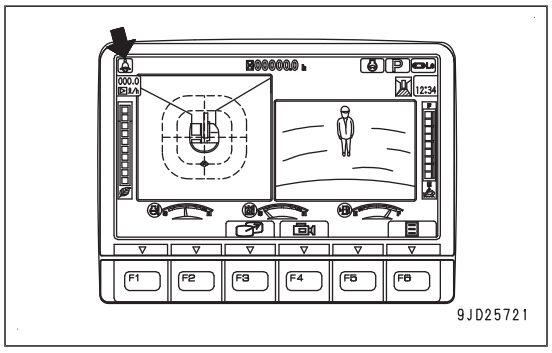
1. Hold the grip (2) and pull out the belt from the retractable device (1).
2. Make sure that the belt is not twisted. Insert the tongue (3) into the buckle (4) securely.



3. Pull the belt lightly to make sure that it is locked correctly.

   REMARK

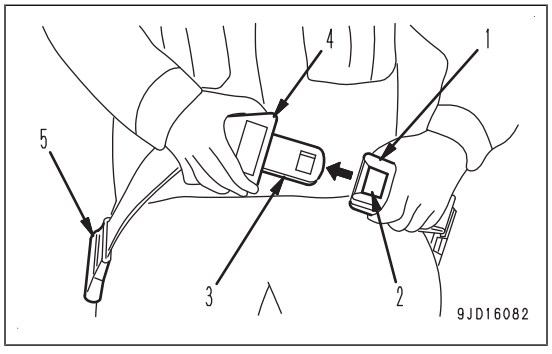
   If the tongue of the seat belt is not inserted in the buckle, the seatbelt caution lamp is shown on the upper left on the monitor screen. Be sure to fasten the seat belt.



UNFASTEN SEAT BELT

1. Push the button (2) on the buckle (1), and remove the tongue (3) from the buckle (1).
2. Hold the grip (4) and put back the belt to the winder (5) slowly.

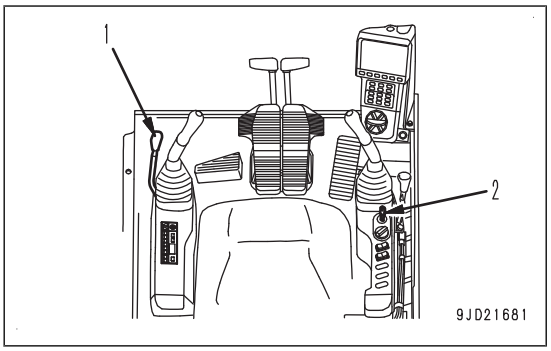
   The belt retracts automatically.



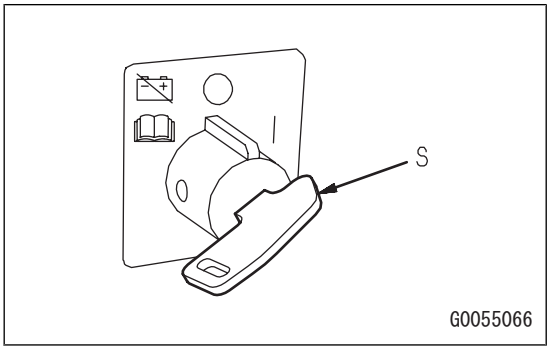
OPERATIONS AND CHECKS BEFORE YOU START ENGINE

⚠ WARNING

Before you start the engine, make sure that the lock lever is securely in the LOCK position.
At the same time when you start the engine, if you touch the control lever and control pedal by mistake, the machine will move unexpectedly, and serious personal injury or death can be caused.

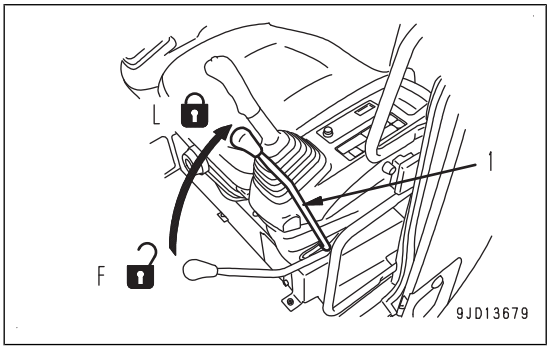


1. Check that the battery disconnect switch (S) is in the ON position (I).

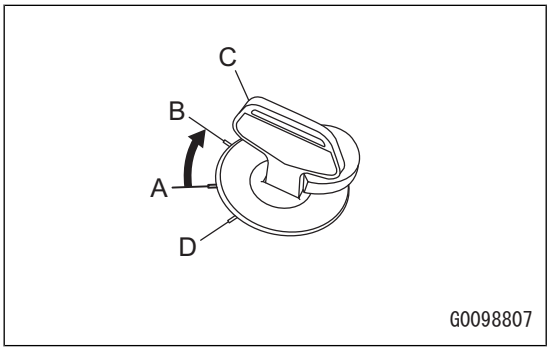


2. Make sure that the lock lever (1) is in the LOCK position (L).
3. Make sure that each control lever and control pedal are in the NEUTRAL position.

   If all the control levers and control pedals are not touched, they go back to the NEUTRAL position.



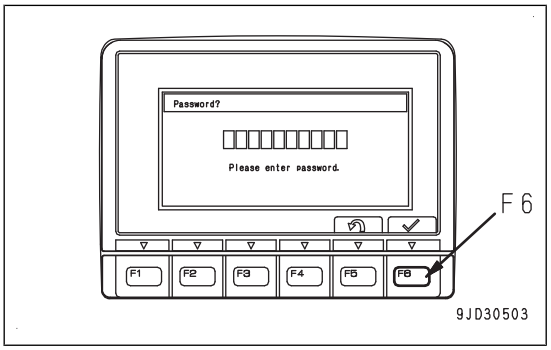
4. Insert the key in the starting switch (2) and turn the key to the ON position (B).



   - If a password is set, the input display screen will be shown on the monitor screen. When the input display screen is shown on the monitor screen, input the password and push the switch F6.

     REMARK

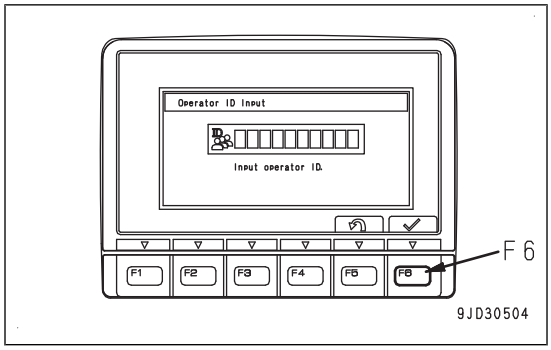
     To set, change, or cancel the password, consult your Komatsu distributor.



- When ID number input for operator identification function is set, “Operator ID Input” is shown on the monitor screen. When “Operator ID Input” screen is shown on the monitor screen, input the operator ID and push the switch F6.

  REMARK

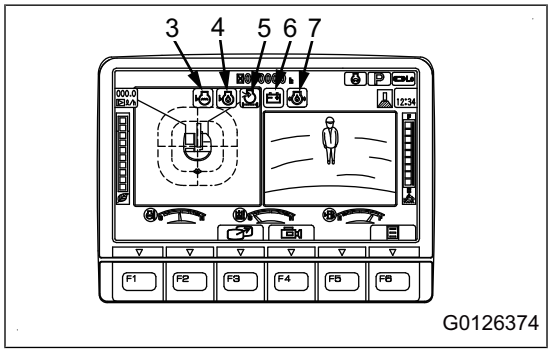
  Consult your Komatsu distributor for setting, change, or cancel of the operator identification function.



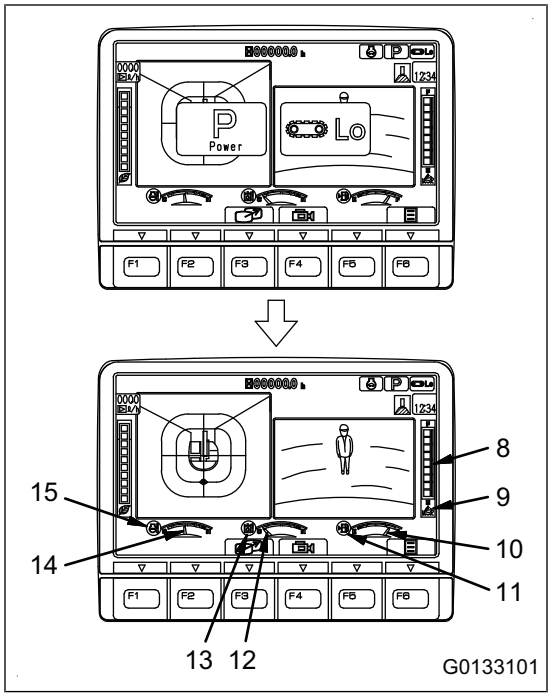
5. Do the checks that follow on the machine monitor.

   1) The buzzer operates for approximately 2 seconds and the caution lamps that follow 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)

      If the caution lamp does not light up or the buzzer does not operate, the monitor possibly has a failure. Consult your Komatsu distributor for repair.

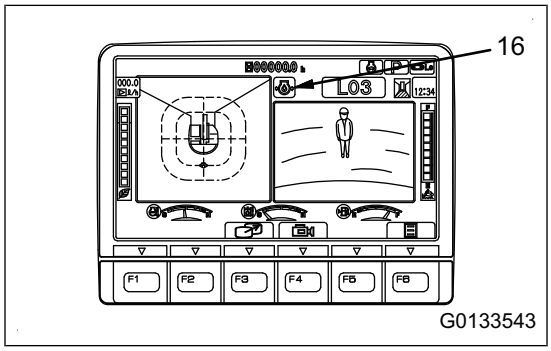


   2) The screen changes to the working mode/travel speed display in approximately 2 seconds, and it changes to the standard screen.
      - DEF level gauge (8)
      - DEF level caution lamp (9)
      - Fuel gauge (10)
      - Fuel level caution lamp (11)
      - Hydraulic oil temperature gauge (12)
      - Hydraulic oil temperature caution lamp (13)
      - Engine coolant temperature gauge (14)
      - Engine coolant temperature caution lamp (15)



   3) If the caution lamp (16) stays lit in red, immediately inspect the items the lamps are lit in red.

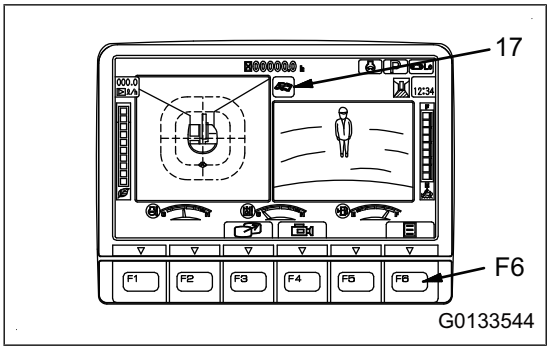
      For the contents and check methods for caution lamp, see “CAUTION LAMP LIST (3-20)”.



4) If there is an item for which the maintenance time has expired, the maintenance time caution lamp (17) lights up in red for 30 seconds.

5) Push the switch F6 to check the items that the maintenance due time has expired, and immediately do the maintenance.

   For the check method of the maintenance time, see EXPLANATION OF COMPONENTS, “MAINTENANCE (3-77)”.



START ENGINE

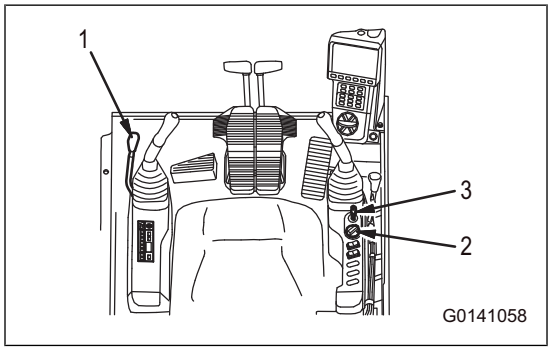
START ENGINE IN NORMAL WEATHER

⚠ WARNING

- **When you start the engine, be sure to sit on the operator's seat.**
- **Do not start the engine by short circuit of the engine starting circuit. Serious personal injury or death or fire can be caused.**
- **Make sure that there is no person or obstacle in the area around the machine, operate the horn, and then start the engine.**
- **The exhaust gas is poisonous. When you start the engine in confined spaces, be careful to have good ventilation.**
- **Close the covers when you operate the machine always other than when you do checks.**

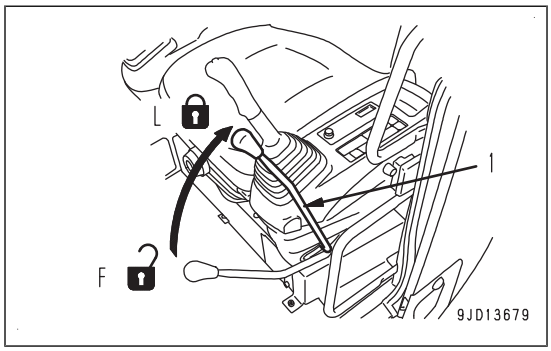
NOTICE

- **Do not start the engine when the fuel control dial (2) is at the High idle (MAX) position. It can cause damage to the engine parts.**
- **Do not keep the starting switch (3) key at the START position continuously for 20 seconds or more. If the engine does not start, wait for approximately 2 minutes, and then try to start the engine again.**

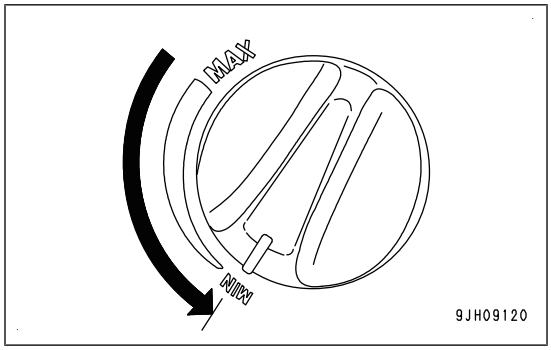


1. Make sure that the lock lever (1) is in the LOCK position (L).

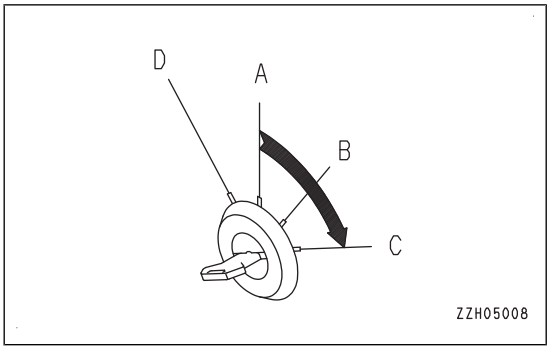
   If the lock lever (1) is in the FREE position (F), the engine does not start.



2. Set the fuel control dial (2) to the Low idle (MIN) position.



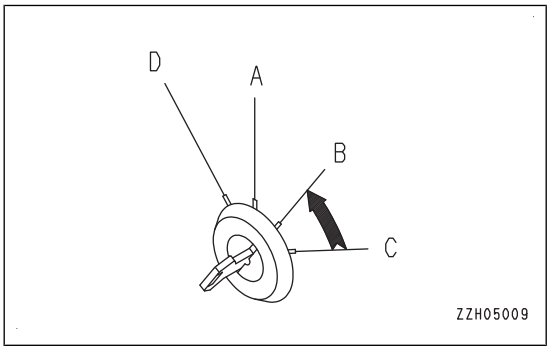
3. Turn the starting switch (3) key to the START position (C).
   The engine starts.



4. After the engine starts, let go of the starting switch (3) key.
   The key automatically goes back to the ON position (B).

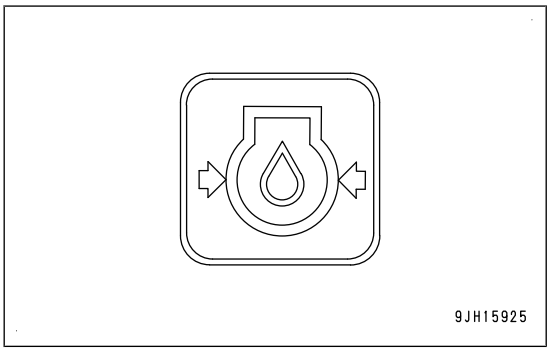
   REMARK

   When the engine is started, the battery voltage can decrease suddenly by the temperature and the battery condition. In such case, the machine monitor can go off temporarily and light up again. It is not a problem.



NOTICE

- **Do not touch the control lever and the control pedal while the engine oil pressure caution lamp is lit even when the engine is started.**
- **If the engine oil pressure caution lamp does not go off after 4 to 5 seconds, stop the engine immediately. Check the items for the engine oil pressure such as oil level and oil leakage, and take necessary measures.**



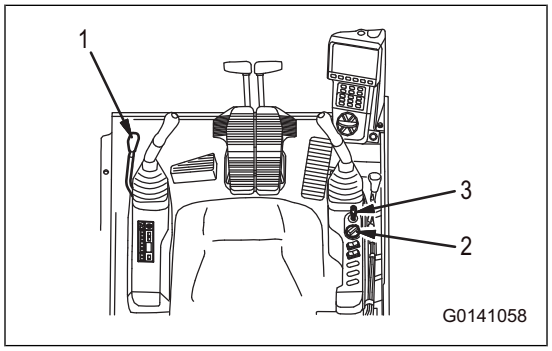
START ENGINE IN COLD WEATHER

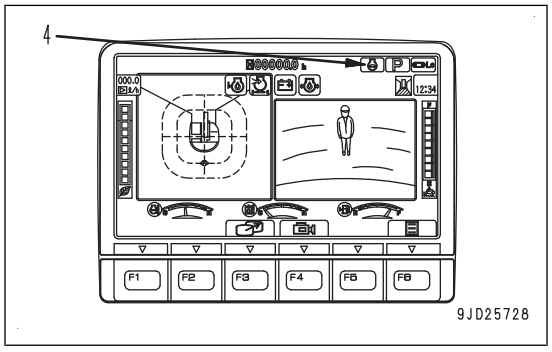
⚠ WARNING

- **When you start the engine, be sure to sit on the operator's seat.**
- **Do not start the engine by short circuit of the engine starting circuit. Serious personal injury or death or fire can be caused.**
- **Make sure that there is no person or obstacle in the area around the machine, operate the horn, and then start the engine.**
- **The exhaust gas is poisonous. When you start the engine in confined spaces, be careful to have good ventilation.**
- **Close the covers when you operate the machine always other than when you do checks.**

NOTICE

- **Do not start the engine when the fuel control dial (2) is at the High idle (MAX) position. It can cause damage to the engine parts.**
- **Do not keep the starting switch (3) key at the START position continuously for 20 seconds or more. If the engine does not start, wait for approximately 2 minutes, and then try to start the engine again.**

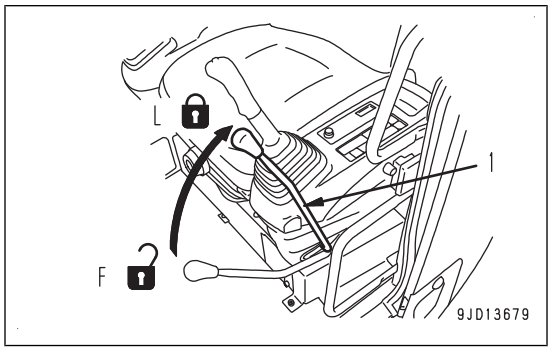




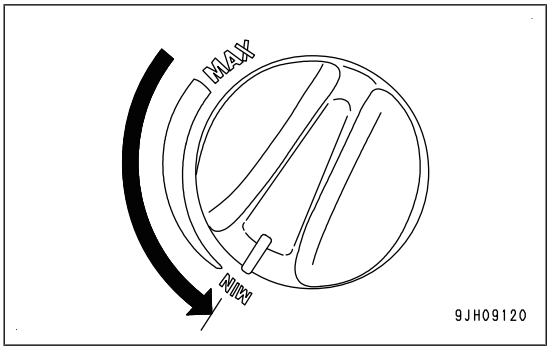
When the ambient temperature is low, start the engine in the procedure that follows.

1. Make sure that the lock lever (1) is in the LOCK position (L).

   If the lock lever (1) is in the FREE position (F), the engine does not start.

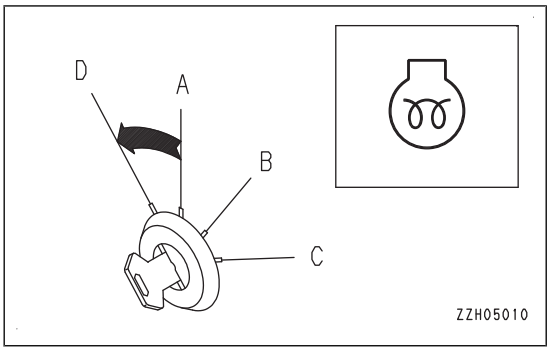


2. Set the fuel control dial (2) to the Low idle (MIN) position.



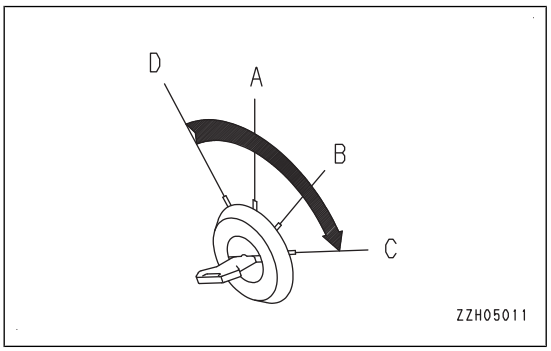
3. Hold the key in the starting switch (3) to the HEAT position (D).

   The preheating pilot lamp (4) lights up, and approximately after 30 seconds, the preheating pilot lamp (4) flashes for 10 seconds to show that the preheating is completed.



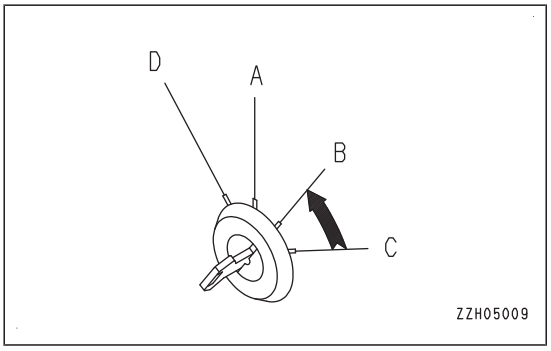
4. When the preheating pilot lamp (4) goes off, turn the key in the starting switch (3) to the START position (C).

   The engine starts.



5. After the engine starts, let go of the starting switch (3) key.

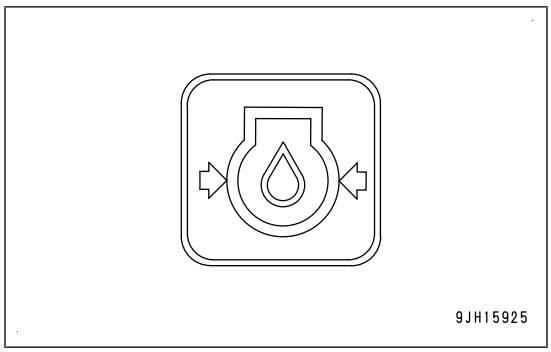
   The key automatically goes back to the ON position (B).



NOTICE

- **Run the engine at idle for 15 seconds immediately after the engine is started. Do not operate the control levers or the fuel control dial during this time.**

- **Do not touch the control lever and the control pedal while the engine oil pressure caution lamp is lit even when the engine is started.**
- **If the engine oil pressure caution lamp does not go off after 4 to 5 seconds, stop the engine immediately. Check the items for the engine oil pressure such as oil level and oil leakage, and take necessary measures.**



TURBO PROTECT FUNCTION

The turbo protect function controls the engine speed at low idle or below immediately after the engine is started to protect the turbo.

- When the turbo protect function is activated, the engine speed is held at low idle or below, regardless of the position of the fuel control dial.
- When the turbo protect function is activated, the engine speed is held at low idle or below, even if the fuel control dial is operated.
- When the turbo protect function is canceled, the engine speed is set to the speed for the position of the fuel control dial.
- The activation time of the turbo protect function is limited to 20 seconds.

OPERATIONS AND CHECKS AFTER YOU START ENGINE

⚠ WARNING

- **If there are failures such as emergency stop or abnormal operation, turn the key in the starting switch to the OFF position.**
- **Do not work or operate the lever or pedal suddenly when the hydraulic oil temperature is low. Make sure to do warm-up operation for the hydraulic equipment until the hydraulic oil temperature caution lamp shows the correct temperature.**
- **Be sure to do the warm-up operation for the hydraulic components. Especially in cold weather, do the warm-up operation sufficiently for the hydraulic components. If the work equipment is operated without sufficient warm-up operation for the hydraulic component, there is a possibility that the response of the machine is slow and the machine does not move as control levers and control pedals intended.**
- **Keep away from the exhaust pipe of the engine while the engine runs or immediately after the engine stops. Do not let the flammable materials come near the exhaust pipe outlet.**

Warm-up operation has 2 types, one is warm-up operation for engine and the other is for hydraulic component. Also, how to operate the warm-up operation will be different by environment and conditions. Follow the description for each operation to do the engine warm-up operation.

The hydraulic component is not warmed only by the engine warm-up operation. Make sure to do warm-up operation for the hydraulic component separately from the warm-up operation for the engine. The hydraulic oil is warmed by the warm-up operation of the hydraulic components. The warm hydraulic oil is supplied to all the control circuits.

CHECK STARTING CONDITION AND UNUSUAL NOISE OF ENGINE

1. When the engine is started, make sure that the engine causes no abnormal noise and starts up easily and smoothly.
2. Make sure that there is no abnormal noise when the engine is at low idle or when the engine speed is increased.

If there is an abnormal noise, immediately consult your Komatsu distributor for inspection. When there is an abnormal noise and if the engine is kept operated, the engine can be damaged.

CHECK LOW-SPEED RUN AND ACCELERATION OF ENGINE

- Make sure that the engine does not hunt or stop suddenly when the machine is stopped during the normal travel operation.
- Make sure that the engine speed increases smoothly when the fuel control dial is turned to the High idle (MAX) position.
  - Be very careful around the machine to do the inspection in a safe area.
  - If low-speed run and acceleration state is very bad, immediately consult your Komatsu distributor for inspection. If low-speed run and acceleration state continues to be very bad, there is a danger of an unexpected accident because it can damage the engine, confuse the operator's sense of driving, or lower the braking efficiency.

  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 can be released for a short time immediately after the engine is started or during the aftertreatment devices regeneration in cold weather. It is not a problem.

OPERATE ENGINE IN BREAK IN PERIOD

NOTICE

This machine has been fully inspected and parts have been adjusted at the factory before shipment, but if you apply a full load before the parts are fitted in, it will have a bad effect to the performance and service life of the machine.
Do the break-in operation of the machine for approximately initial 100 hours (as shown on the service meter).

Make sure that you fully understand the descriptions in this Operation and Maintenance Manual, and then do the break-in operation. Be careful of the precautions that follow.

- Run the engine at idle for 15 seconds immediately after the engine is started. Do not operate the control levers or the fuel control dial during this time.
- Do the warm-up operation for 5 minutes after the engine starts.
- Do not operate the machine with heavy loads or at high speed.
- Immediately after the engine starts, do not do the sudden start, sudden acceleration, sudden stop unnecessarily, or sudden change in direction of the machine.

ENGINE WARM-UP OPERATION

NOTICE

- **Do not suddenly accelerate the engine before the warm-up operation is completed.**
- **Do not run the engine at low idle or high idle with no load for 20 minutes or more. This will have a bad 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 it at a medium speed.**

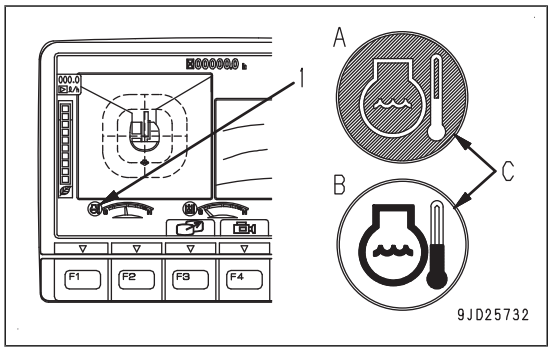
The automatic engine warm-up system is installed to the machine. If the engine coolant temperature is 30℃ or below after the engine is started, the engine warm-up operation starts automatically. When the engine automatic warm-up operation starts, the engine speed is held higher than the normal speed at low idle. If the engine coolant temperature becomes 30℃ or more, or if the warm-up operation time exceeds 10 minutes, the automatic warm-up operation is canceled and the engine speed decreases to the normal speed at low idle.

Do not move the machine immediately. Do the operations and checks as follows.

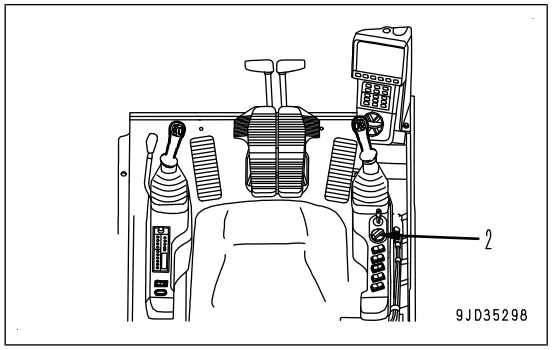
1. Make sure that the engine coolant temperature caution lamp (1) shows the correct temperature.

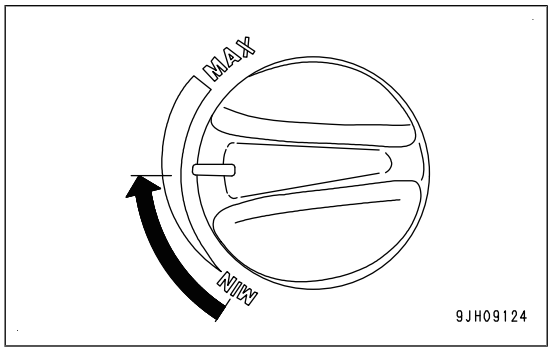
   If it shows the low temperature range, obey the step 2 to do the additional warm-up operation until it shows the correct temperature.

   - Display (A) when temperature is correct: The caution lamp background (C) is blue
   - Display (B) when temperature is low: The caution lamp background (C) is white



2. Turn the fuel control dial (2) to a middle position between the Low idle (MIN) and High idle (MAX), and run the engine at a medium speed with no load.





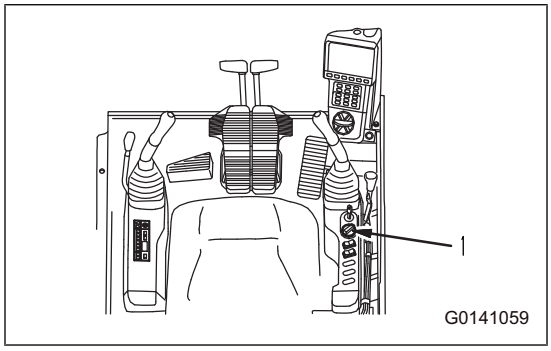
When the engine coolant temperature gauge shows the correct temperature, the engine warm-up operation is completed.

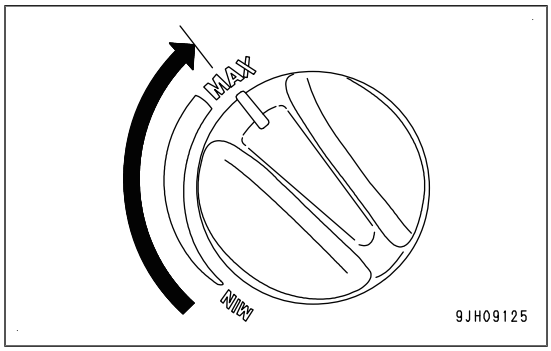
And then, do the warm-up operation for the hydraulic components.

CANCEL AUTOMATIC WARM-UP OPERATION

If you need to cancel the automatic warm-up operation in an emergency and change the engine speed to low idle, do as follows.

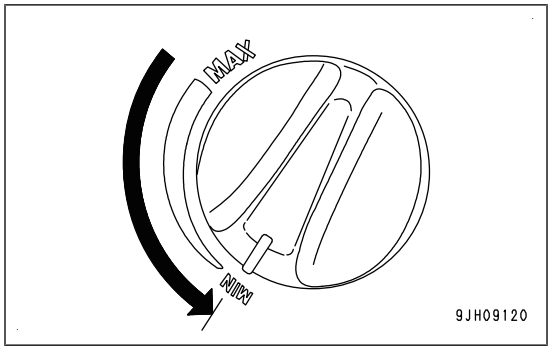
1. Set the fuel control dial (1) to the High idle (MAX) position, and hold it for 3 seconds or more.





2. Set the fuel control dial (1) to the Low idle (MIN) position.

   The automatic warm-up operation is canceled, and the engine speed decreases.



REMARK

The priority is set to the turbo protect function over the engine automatic warm-up operation.
When the turbo protect function activates, the engine runs at low idle even when the engine coolant temperature at startup is 30℃ or below. And then, the automatic warm-up operation starts to increase the engine speed.

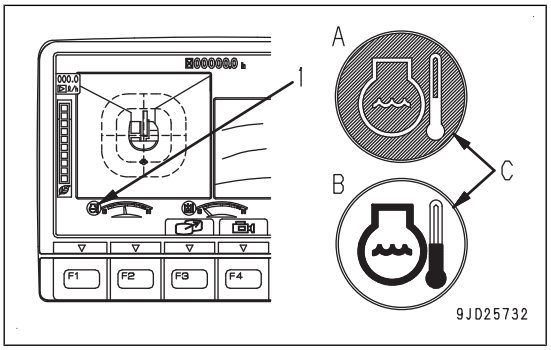
HYDRAULIC SYSTEM WARM-UP OPERATION

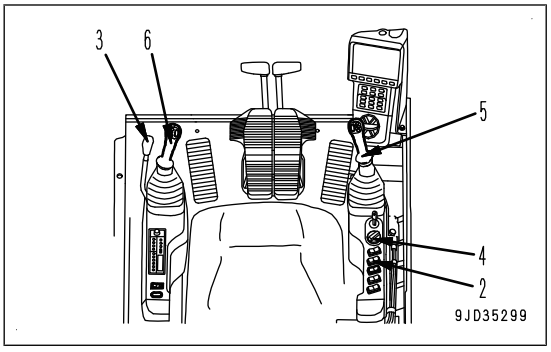
⚠ WARNING

- **Before you do the hydraulic component warm-up operation, make sure that there is no person or obstacle in the area around the machine, operate the horn, and then start the operation.**
- **Be sure to do the hydraulic component warm-up operation until the hydraulic oil temperature caution lamp shows the correct temperature display.**
- **The hydraulic component warm-up operation is necessary not only for the circuit between the pump and cylinders, and the circuit between the pump and motor, but also for the control circuits. Do the operation in all directions for all the work equipment (boom, arm, and bucket), swing, travel, and attachment (if installed). It is not sufficient if the operation is done just for one cylinder or motor, or the operation just in one direction.**
- **Check the direction of the track frame before you operate the travel lever.**
- **For control patterns other than the standard control method (ISO pattern), see the ATTACHMENTS AND OPTIONS.**

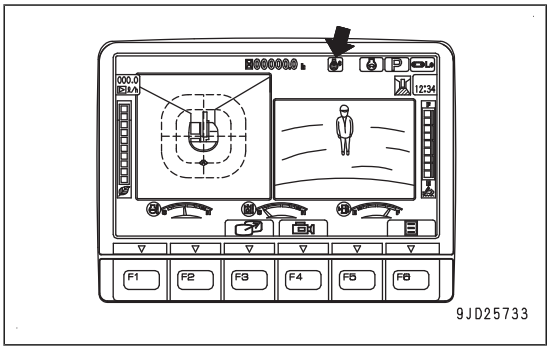
1. Make sure that the engine coolant temperature caution lamp (1) shows the correct temperature.
   - Display (A) when temperature is correct: Caution lamp background (C) is blue
   - Display (B) when temperature is low: Caution lamp background (C) is white

   If it shows the low temperature, do additional warm-up operation of the engine until the engine coolant temperature caution lamp (1) shows the correct temperature. For details, see “ENGINE WARM-UP OPERATION (3-188)”.





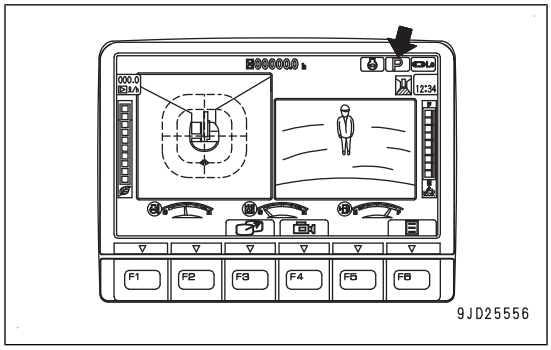
2. Set the swing lock switch (2) to the ON position, and make sure that the swing lock pilot lamp is lit.



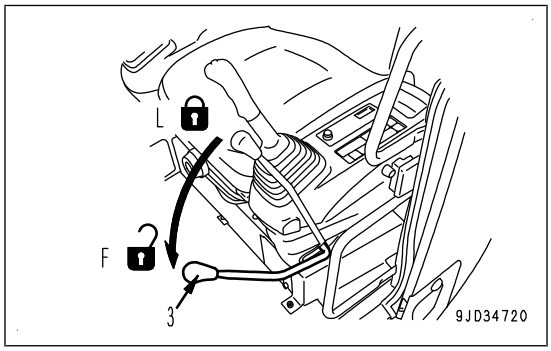
3. Set the working mode to the P mode (heavy-duty operation mode).

   It quickens the warm-up of the hydraulic component.

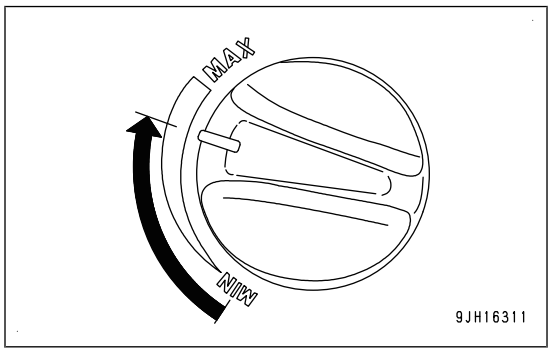
   For the working mode setting, see “WORKING MODE SELECTOR SWITCH (3-53)”.



4. Hold the red part at the top of the lock lever (3), and then slowly and securely set it to the FREE position (F).
5. Raise the bucket off from the ground.



6. Turn the fuel control dial (4) to a point of 2/3 between the Low idle (MIN) position and the High idle (MAX) position.

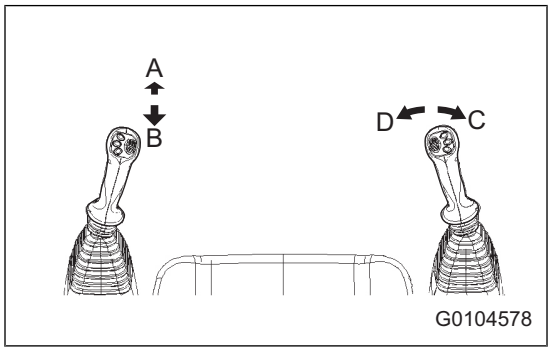


7. Operate the work equipment to warm up the hydraulic components.

   NOTICE

   When you operate the work equipment, be careful not to let it interfere with the machine or ground.

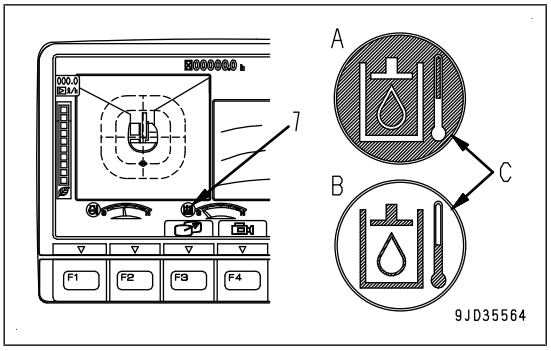
   1) Move the R.H. work equipment control lever (5) slowly in the direction of the bucket CURL position (D). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.



   2) Move the R.H. work equipment control lever (5) slowly in the direction of the 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 the 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 to the arm OUT position (A). Operate the lever to the end of its stroke and hold it in the position for 30 seconds.
8. Continue the operation of step 6 for 5 minutes.

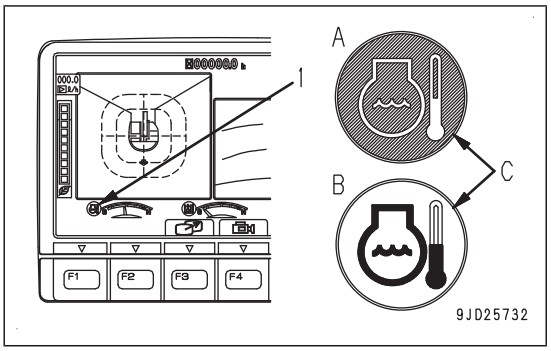
9. Make sure that the hydraulic oil temperature caution lamp (7) shows the correct temperature.
   - Display (A) when temperature is correct: Caution lamp background (C) is blue
   - Display (B) when temperature is low: Caution lamp background (C) is white

   If the hydraulic oil temperature caution lamp (7) shows low temperature, do the step 6 again and again until the lamp shows the correct temperature.

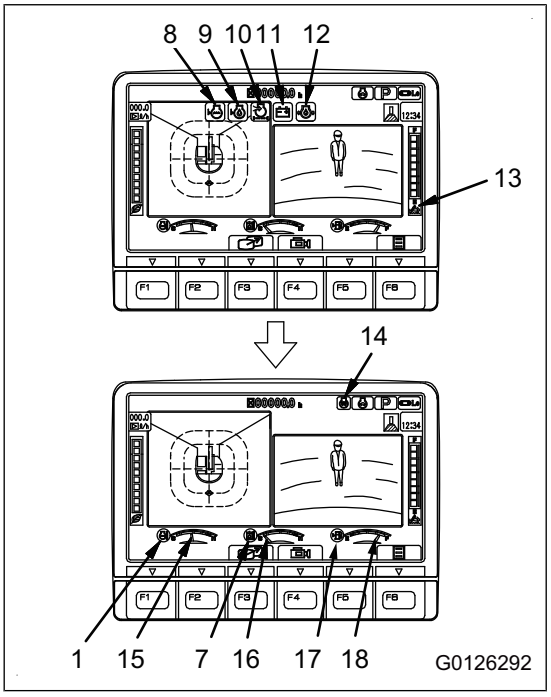


10. Make sure that the engine coolant temperature caution lamp (1) shows the correct temperature.
   - Display (A) when temperature is correct: Caution lamp background (C) is blue
   - Display (B) when temperature is low: Caution lamp background (C) is white

   If the engine coolant temperature caution lamp (1) shows the low temperature, do the engine warm-up operation until the correct temperature is shown. For details, see “ENGINE WARM-UP OPERATION (3-188)”.



11. Check that the hydraulic oil temperature caution lamp (7) and the engine coolant temperature caution lamp (1) show the correct temperature, and then check that all the caution lamps, pilot lamps, and gauges on the machine monitor are in the conditions that follow.
   - Radiator coolant level caution lamp (8): Not lit
   - Engine oil level caution lamp (9): Not lit
   - Air cleaner clogging caution lamp (10): Not lit
   - Charge level caution lamp (11): Not lit
   - Engine oil pressure caution lamp (12): Not lit
   - DEF level caution lamp (13): Not lit
   - Preheating pilot lamp (14): Not lit
   - Engine coolant temperature gauge (15): Pointer is in green range.
   - Engine coolant temperature caution lamp (1): Shows correct temperature.
   - Hydraulic oil temperature gauge (16): Pointer is in green range.
   - Hydraulic oil temperature caution lamp (7): Shows correct temperature.
   - Fuel level caution lamp (17): Shows correct level.
   - Fuel gauge (18): Pointer is in green range.



12. Make sure that there is no abnormal exhaust gas color, noise, or vibration.

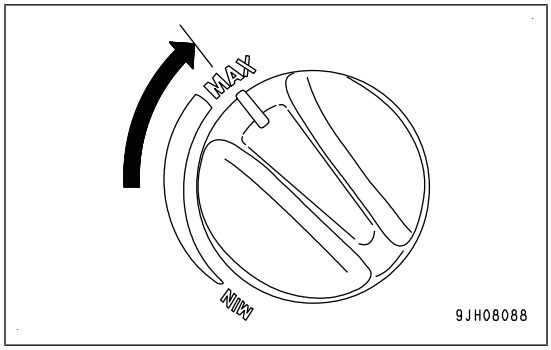
    If a problem is found, consult your Komatsu distributor.

13. In cold weather (ambient temperature is lower than 0℃), do the operation that follows.

    NOTICE

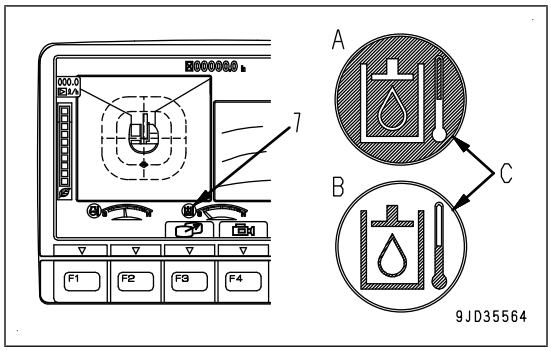
    Do this operation to warm-up all the hydraulic component in cold weather (ambient temperature below 0℃) even when the hydraulic oil temperature caution lamp shows the correct temperature.

1) Turn the fuel control dial (4) to the High idle (MAX) position.



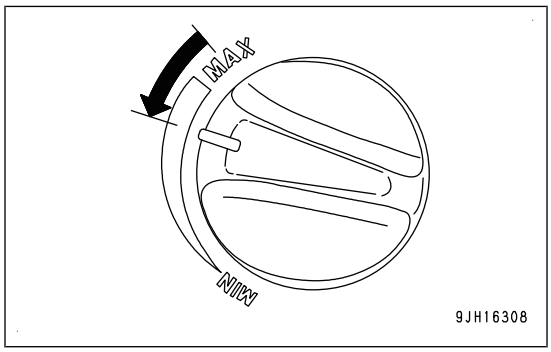
2) Continue the work equipment operation of step 6 for 3 to 5 minutes.
3) Make sure that the hydraulic oil temperature caution lamp (7) shows the correct temperature.
   - Display (A) when temperature is correct: Caution lamp background (C) is blue
   - Display (B) when temperature is low: Caution lamp background (C) is white

   If the hydraulic oil temperature caution lamp (7) shows low temperature, continue the work equipment operation in the step 6 until the lamp shows the correct temperature.



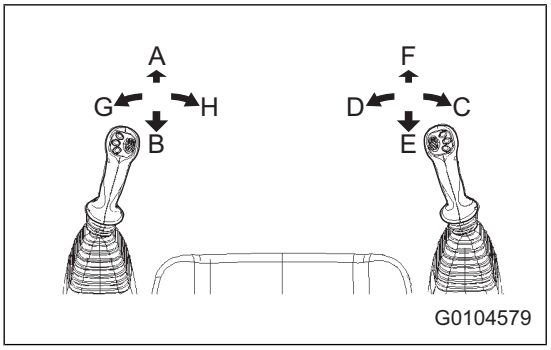
14. Before you start the work, make sure that the fuel control dial (4) is at a point of 2/3 between the Low idle (MIN) position and the High idle (MAX) position.

    If it is not at the 2/3 position, set it at the 2/3 position, and do the operation.

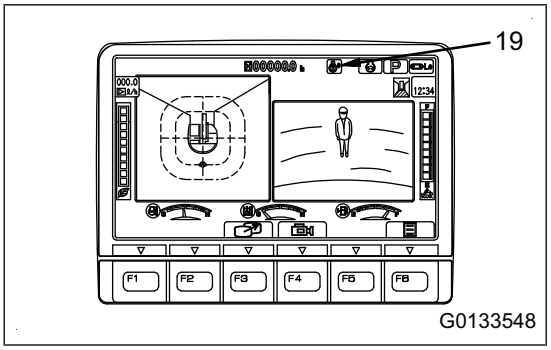


15. Before you start the actual operations, do the operations that follow slowly 3 to 5 times to circulate warm oil through the all control circuits.

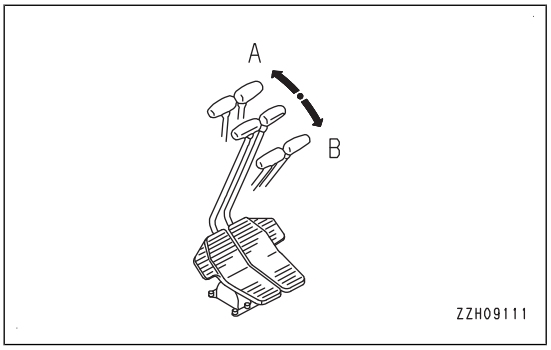
Boom operation	RAISE (E) ←→ LOWER (F)
Arm operation	IN (B) ←→ OUT (A)
Bucket operation	CURL (D) ←→ DUMP (C)
Swing operation	LEFT (G) ←→ RIGHT (H)



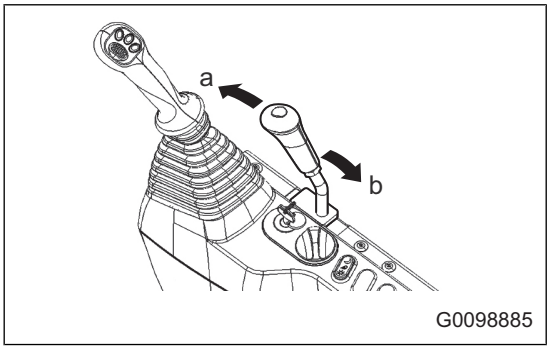
Release the swing lock switch (2), make sure that the swing lock pilot lamp (19) is not lit, and do the swing operation.



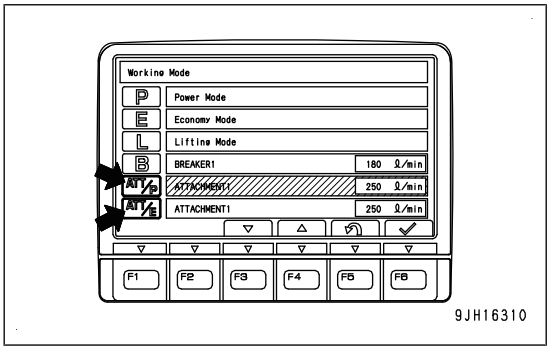
Travel (Lo) operation FORWARD (A) ←→ REVERSE (B)



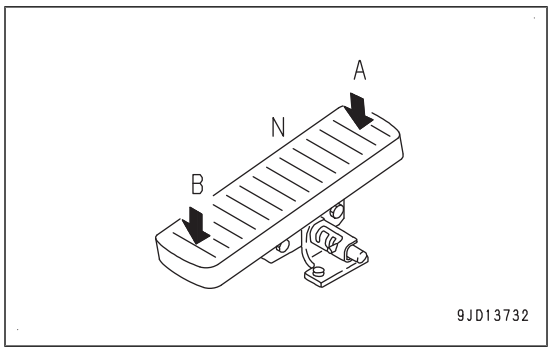
Blade operation LOWER (a) ←→ RAISE (b)



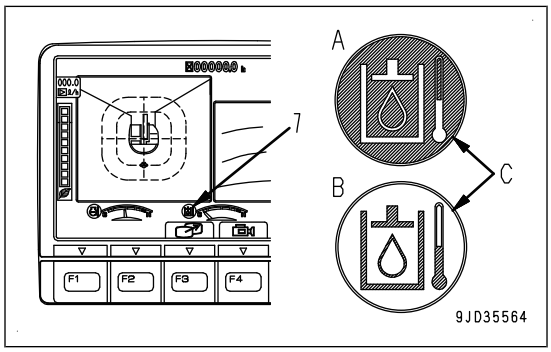
For attachment operations (option), change the working mode to the attachment mode.



Attachment operation	One way (A) ←→ Other way (B)



16. Make sure that the hydraulic oil temperature caution lamp (7) shows 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 (7) does not show the correct temperature, operate the work equipment as shown in the step 6 again and again until the lamp shows the correct temperature.



    - When the hydraulic oil temperature caution lamp (7) shows the correct temperature, the hydraulic equipment warm-up operation is completed.

Check that the hydraulic oil temperature caution lamp (7) shows the correct temperature, and then conduct the operation to be done after the warm-up operation is completed.

AIR CONDITIONER WARM-UP OPERATION

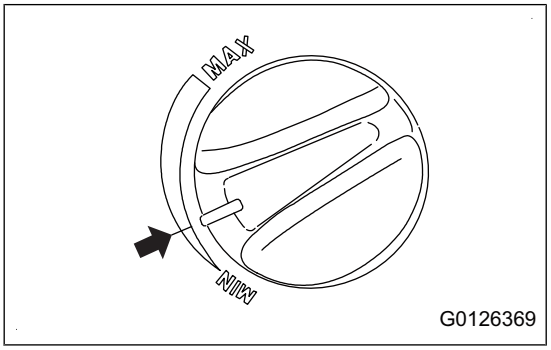
NOTICE

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.

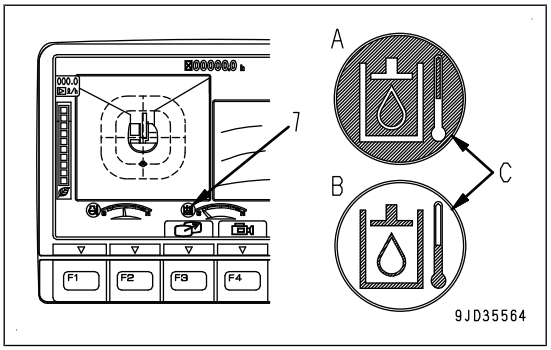


OPERATE MACHINE AFTER COMPLETION OF WARM-UP OPERATION

1. Make sure that the hydraulic oil temperature caution lamp (7) shows the correct temperature.

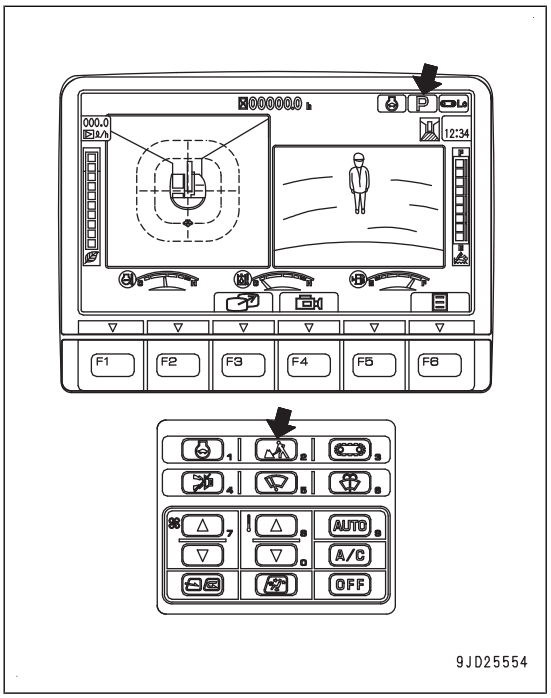
   Display (A) when temperature is correct: The caution lamp background (C) is blue

   Display (B) when temperature is low: The caution lamp background (C) is white

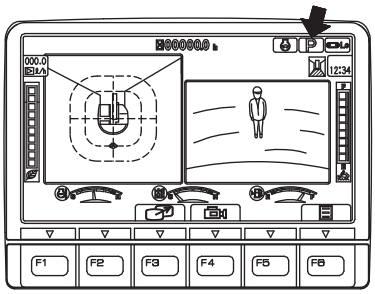
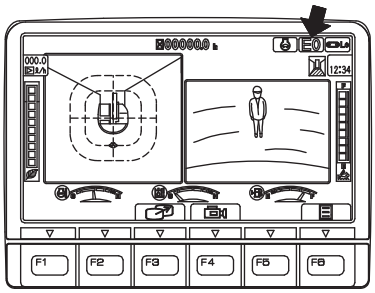
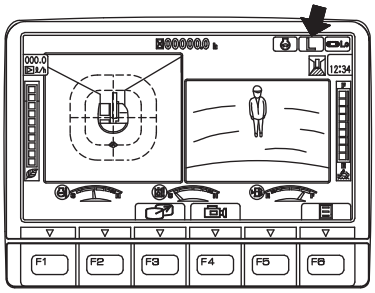
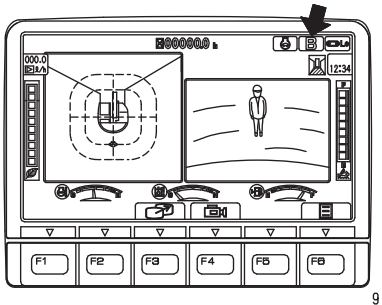


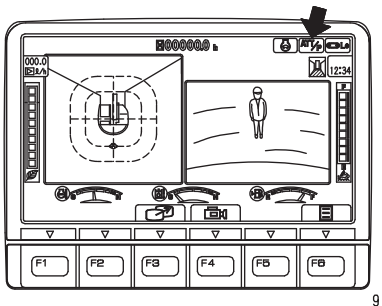
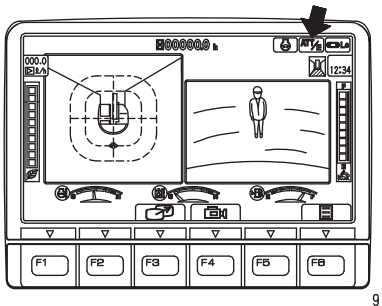
2. Push the working mode selector switch on the machine monitor to change to the working mode to be used.

   To change the working mode, see “WORKING MODE SELECTOR SWITCH (3-53)”.



Working mode display

Working mode	Monitor display	Use
P mode	 9JD25556	For heavy-duty operations
E mode	 9JD25738	For operations with emphasis on fuel consumption
L mode	 9JD25739	For operations with fine control
B mode	 9JD25740	For breaker operations

Working mode	Monitor display	Use
ATT/P mode	 9JD25741	For operations of 2-way attachment such as crusher
ATT/E mode	 9JD25742	For 2-way attachment work such as crusher (when fuel efficiency is important)

STOP ENGINE

⚠ WARNING

Keep away from the exhaust pipe immediately after the engine stops.

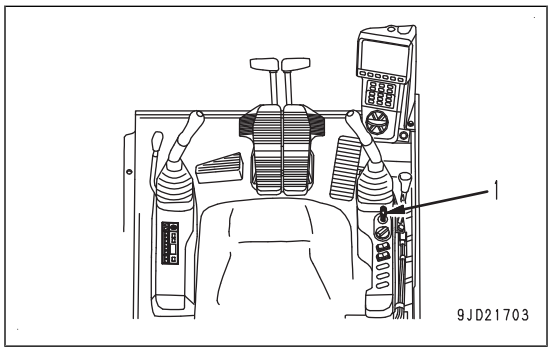
NOTICE

Sudden stop of engine is done only in emergency. If the engine is suddenly stopped, the service life of the engine parts can be decreased.
If the engine is overheated, do not try to stop it suddenly but run it at medium speed to allow it to cool down gradually, and then stop it.

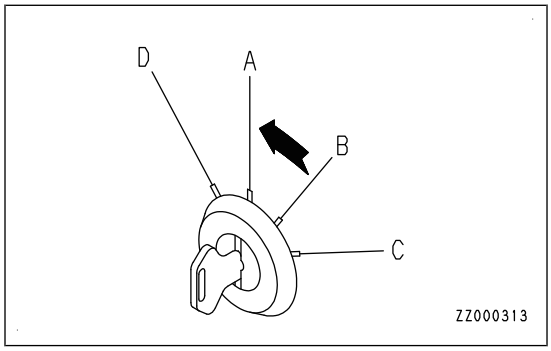
If the engine is stopped during the aftertreatment devices regeneration, the components may be damaged.

When stopping the engine, stop the aftertreatment devices regeneration first according to “HANDLE Komatsu Diesel Particulate Filter (KDPF) (3-124)”, then stop the engine after running it at low idle for approximately 5 minutes. Then stop the engine.

Stop the engine as follows.



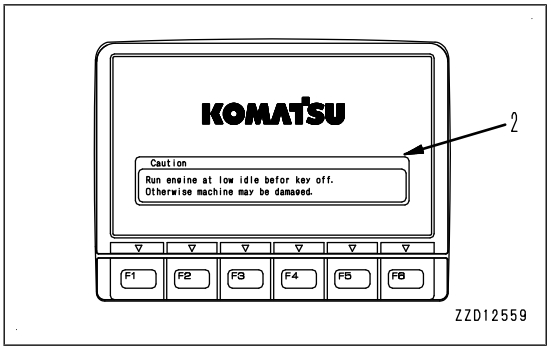
1. Run the engine at low idle for approximately 5 minutes.
   Engine cools down slowly.
2. Turn the starting switch (1) key to the OFF position (A).
   The engine stops.



3. Remove the key from the starting switch (1).
   When you stop the engine, the regeneration disable setting is canceled. If necessary, disable the regeneration again after you start the engine.

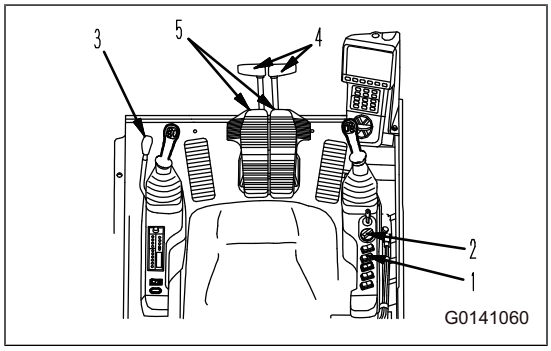
REMARK

- When the key in starting switch (1) is turned to OFF position (A), the engine stops but the power supply to the machine is not turned off immediately.
  During this period, the power is supplied to the controller to save the operating condition and then finish the system. The time to keep supplying the power depends on the operating condition.
- If the starting switch (1) key is turned to OFF position (A) while the engine is still hot, guidance (2) may be displayed on the machine monitor. To cool down the engine before stopping, run it at low idle for approximately 5 minutes, because it may cause damage to the devices.
- After the engine is stopped, DEF in DEF injector and pump is automatically purged and returned to the tank to prevent malfunction of the devices caused by freezing of DEF or deposition of urea.
  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 the battery disconnect switch OFF, while the devices are operating to return DEF. After finishing the drawing operation, the devices stop automatically.



START MACHINE (TRAVEL FORWARD AND REVERSE) AND STOP MACHINE

⚠ WARNING



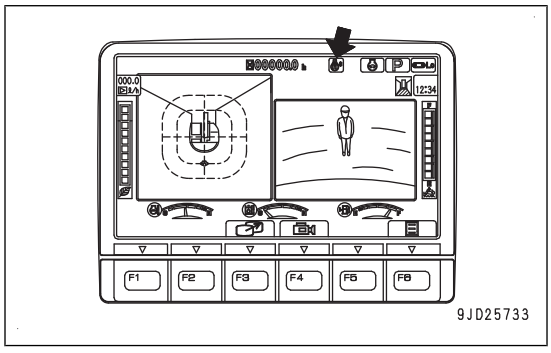
- **Before you operate the travel levers or travel pedals, check the travel direction of the track frame. When the track frame is set toward the rear side (sprocket is at the front), the operation direction of the travel levers or travel pedals are the opposite to the travel direction of the machine (forward/reverse, right/left turn).**
- **Make sure that the area around the machine is safe and operate the horn before you move off the machine.**
- **Keep persons away from around the machine.**
- **Clear the obstacles from the travel path.**
- **If the auto-deceleration is activated, operate carefully the travel lever and the travel pedal. If you operate the travel lever and the travel pedal when the engine speed decreases by the auto-deceleration function, the engine speed will suddenly increase.**
- **Make sure that the travel alarm operates normally during travel.**
- **If it is the machine with rearview camera, check the camera image on the monitor before you travel reverse.**

Screen on the machine monitor is automatically switched to the bird's eye view display of KomVision when traveling.

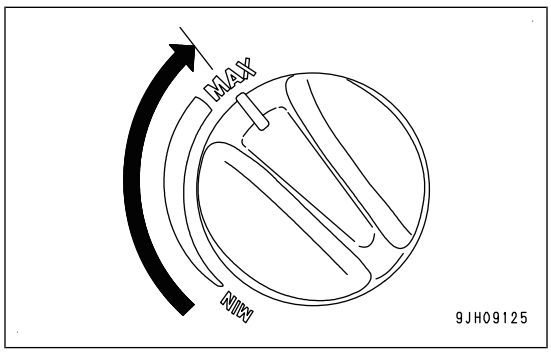
PREPARE TO MOVE MACHINE

Follow the procedure that follows and do preparation to move the machine.

- Set swing lock switch (1) to ON (actuated) position and check that the swing lock pilot lamp is lit.
  (a): ON position
  (b): OFF position



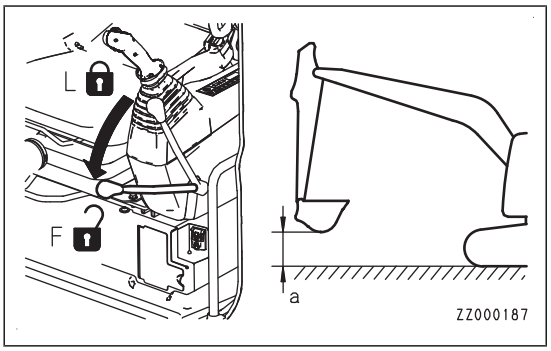
- Turn the fuel control dial (2) to the High idle (MAX) position
  The engine speed increases.



TRAVEL FORWARD

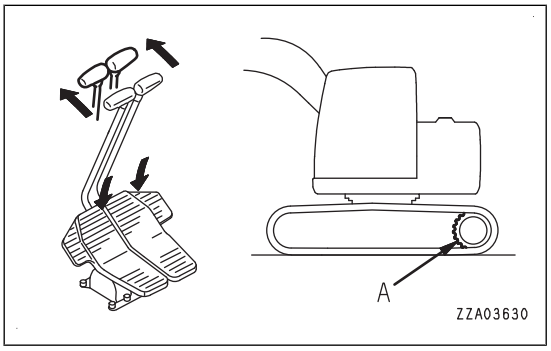
1. Hold the red part on the top of the lock lever (3), and then operate it to the FREE position (F).
2. Set the work equipment in the travel posture and raise it to the height (a).

   (a):40 to 50cm
3. Raise the blade.



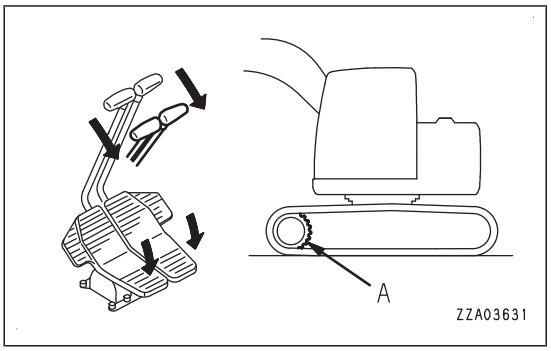
4. Operate the R.H. and L.H. travel levers (4) or the travel pedal (5) as follows.
   - When the sprocket (A) is at the rear of the machine

     Push the R.H. and L.H. travel levers (4) forward slowly or push the front part of the travel pedal (5) slowly to move the machine.



   - When the sprocket (A) is at the front of the machine

     Pull the R.H. and L.H. travel levers (4) toward you slowly or push the rear part of the travel pedal (5) slowly to move the machine.



5. When you drive the machine, check that the travel alarm operates normally.

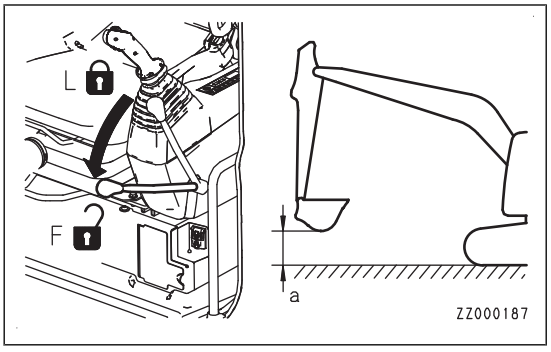
   If the travel alarm does not operate, consult your Komatsu distributor for repair.

   REMARK
   - At low temperature, if the machine travel speed is not normal, do the warm-up operation fully.
   - If the undercarriage is packed with mud and the machine travel speed is not normal, remove the soil and mud from the undercarriage.

TRAVEL REVERSE

1. Hold the red part on the top of the lock lever (3), and then operate it to the FREE position (F).
2. Set the work equipment in the travel posture and raise it to the height (a).

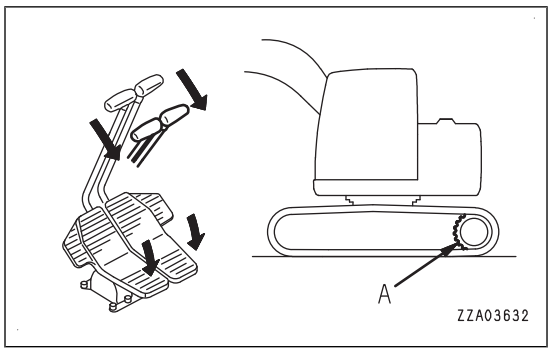
   (a):40 to 50cm
3. Raise the blade.



4. Operate the R.H. and L.H. travel levers (4) or the travel pedal (5) as follows.

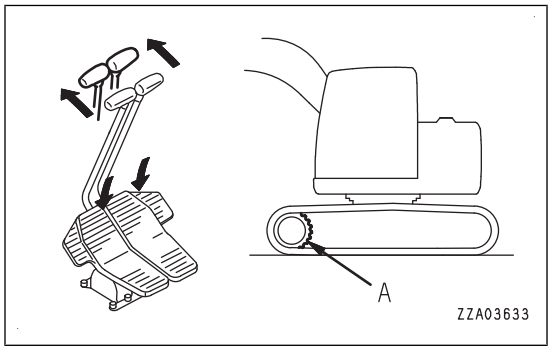
- When the sprocket (A) is at the rear of the machine

  Pull the R.H. and L.H. travel levers (4) toward you slowly or push the rear part of the travel pedal (5) slowly to move the machine.



- When the sprocket (A) is at the front of the machine

  Push the R.H. and L.H. travel levers (4) forward slowly or push the front part of the travel pedal (5) slowly to move the machine.



5. When you drive the machine, check that the travel alarm operates normally.

   If the travel alarm does not operate, consult your Komatsu distributor for repair.

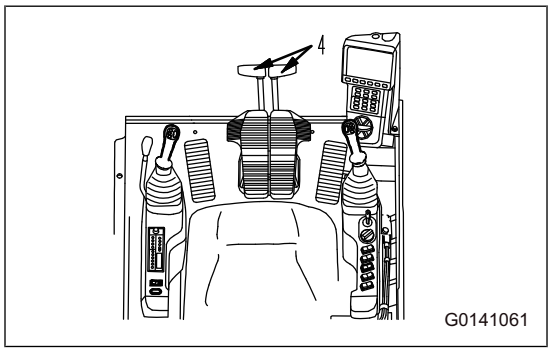
   REMARK

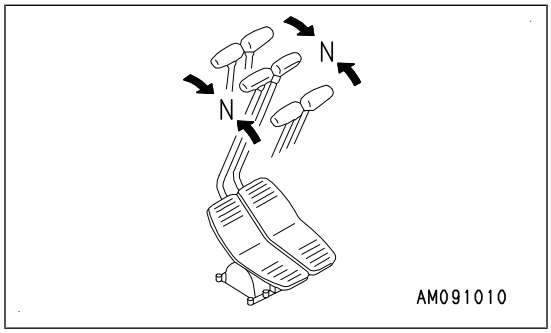
   - At low temperature, if the machine travel speed is not normal, do the warm-up operation fully.
   - If the undercarriage is packed with mud and the machine travel speed is not normal, remove the soil and mud from the undercarriage.

STOP MACHINE

Avoid a sudden stop. Stop the machine gradually.

Set the R.H. and L.H. travel levers (4) in the NEUTRAL (N) position.
The machine stops.





STEER MACHINE

STEER MACHINE (CHANGE DIRECTION)

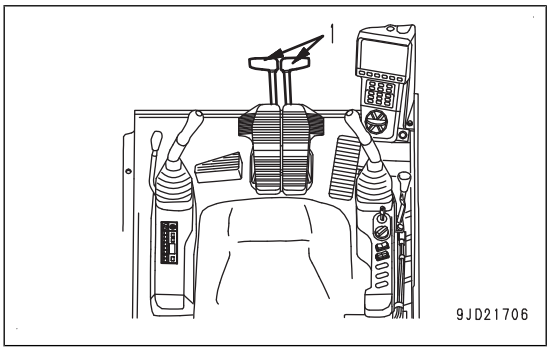
⚠ WARNING

Before you operate the travel levers or travel pedals, check the travel direction of the track frame. When the track frame is set toward the rear side (sprocket is at the front), the operation direction of the travel levers or travel pedals are the opposite to the travel direction of the machine (forward/reverse, right/left turn).

Use the travel levers to change direction.

Avoid sudden changes of direction to travel as much as possible. When you do the counter-rotation turn (spin turn), stop the machine before the turn.

Operate the 2 travel levers (1) as follows.



When you change the direction while the machine is stopped

To turn left in forward travel, push the right travel lever forward.

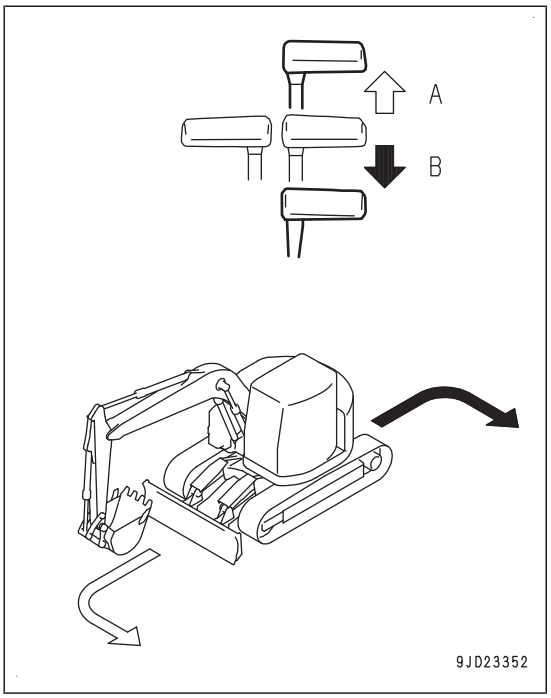
To turn left in reverse travel, push the right travel lever rearward.

(A): FORWARD left turn

(B): REVERSE left turn

REMARK

To turn right, operate the left travel lever in the same manner.



To change the direction of machine to the right or left in FORWARD travel

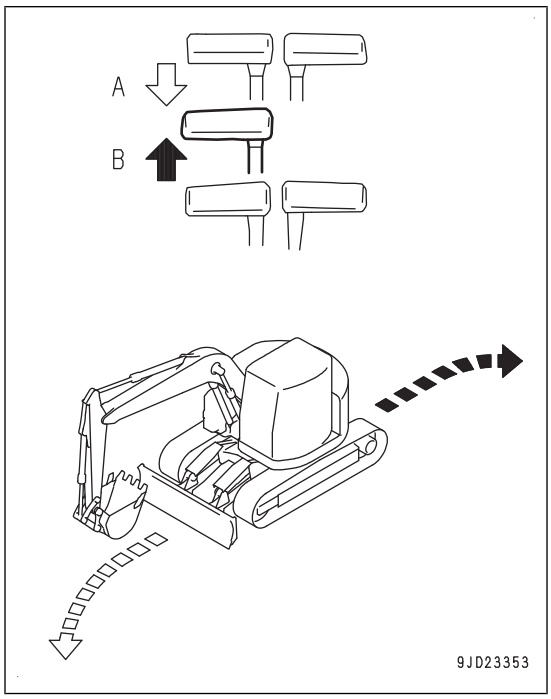
To turn left, move the left travel lever back to the NEUTRAL position.

(A): FORWARD left turn

(B): REVERSE left turn

REMARK

To turn right, operate the right travel lever in the same manner.

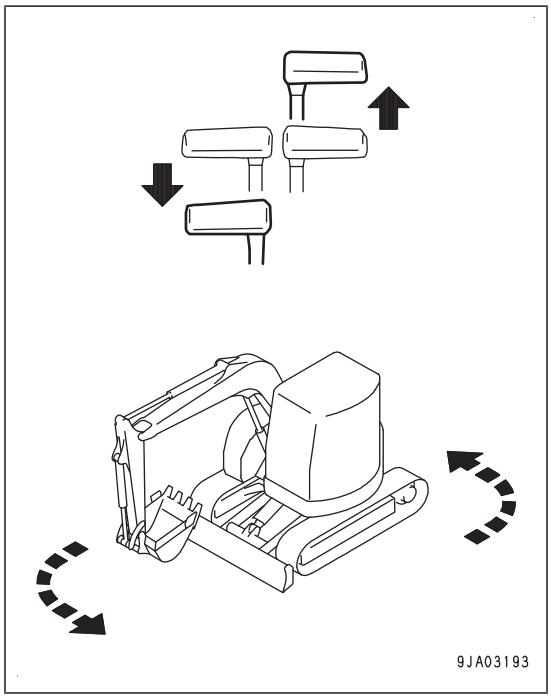


To do the counter-rotation turn (spin turn)

To do the counter-rotation turn to the left, pull the left travel lever to your side, and push the right travel lever forward.

REMARK

To do the counter-rotation turn to the right, pull the right travel lever to your side, and push the left travel lever forward.

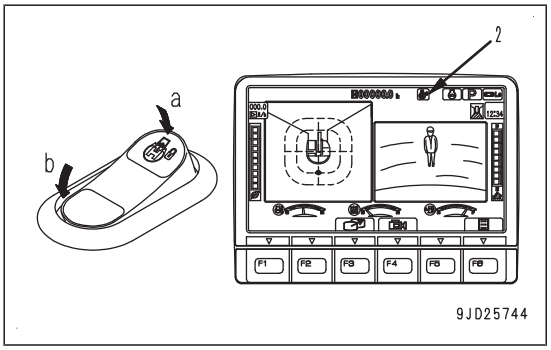


SWING MACHINE

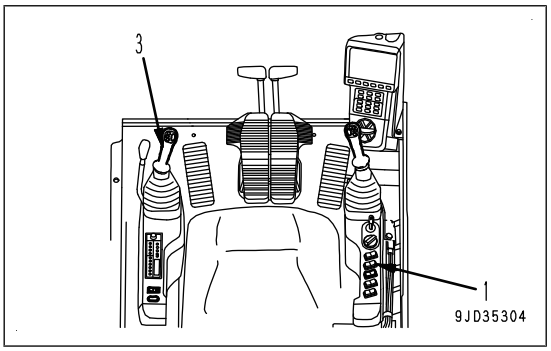
⚠ WARNING

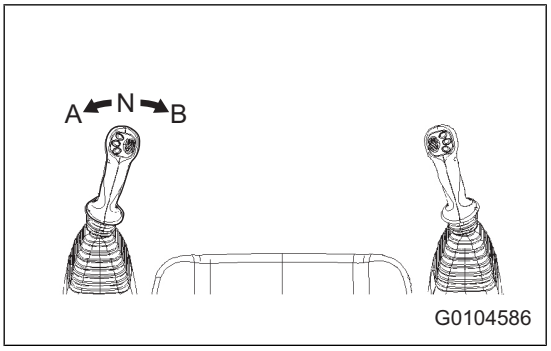
- **The tail of the machine extends outside the tracks. Before swing operation, make sure that the area around the machine is safe by visual check or mirror.**
- **For control patterns other than the standard control method (ISO pattern), see the ATTACHMENTS AND OPTIONS.**
- **If the auto-deceleration is activated, operate carefully the travel lever and the travel pedal. If you operate the travel lever and the travel pedal when the engine speed decreases by the auto-deceleration function, the engine speed will suddenly increase.**

- Before swinging, turn the swing lock switch (1) to OFF position (cancel).
  (a): ON position
  (b): OFF position
- Check that the swing lock pilot lamp (2) is not lit.

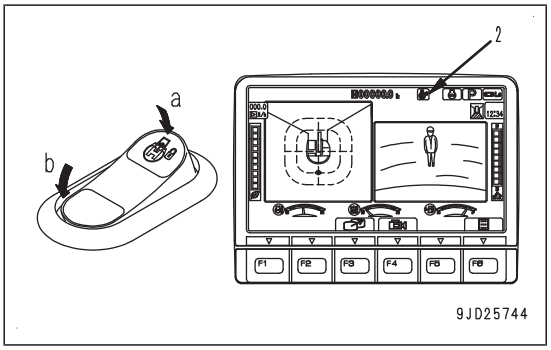


- Operate the L.H. work equipment control lever (3) to do the swing.
  (A): Swing LEFT
  (B): Swing RIGHT





- When you do not do swing operation, turn the swing lock switch (1) to ON position (actuate).
  (a): ON position
  (b): OFF position
- Check that the swing lock pilot lamp (2) is lit.
- When you do not do swing operation, set the left work equipment control lever (3) to the N (NEUTRAL) position. The swing brake is applied.



OPERATE WORK EQUIPMENT

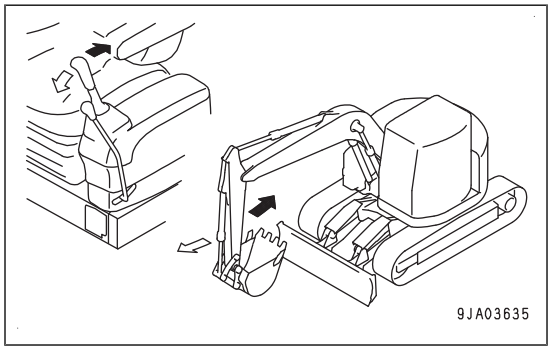
⚠ WARNING

- **For control patterns other than the standard control method (ISO pattern), see the ATTACHMENTS AND OPTIONS.**
- **If the auto-deceleration is enabled, operate the travel lever and travel pedal carefully. If you operate the travel lever and travel pedal when the engine speed decreases by the auto-deceleration function, the engine speed will suddenly increase.**

Operate the work equipment control lever on the right and left as follows.
When you let go of the work equipment control levers, they go back to the NEUTRAL position and the work equipment is held in that position.

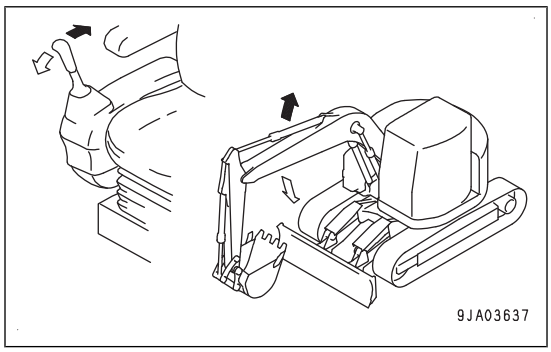
- When you operate the arm

  Move the L.H. work equipment control lever back and forth.



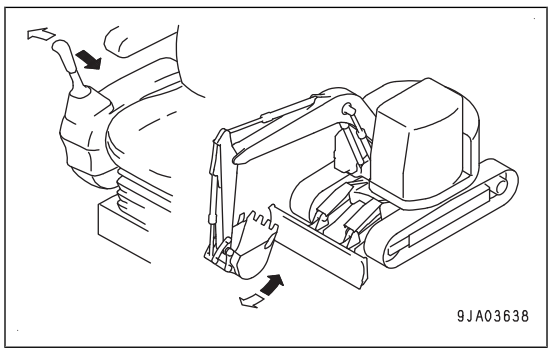
- When you operate the boom

  Move the R.H. work equipment control lever back and forth.



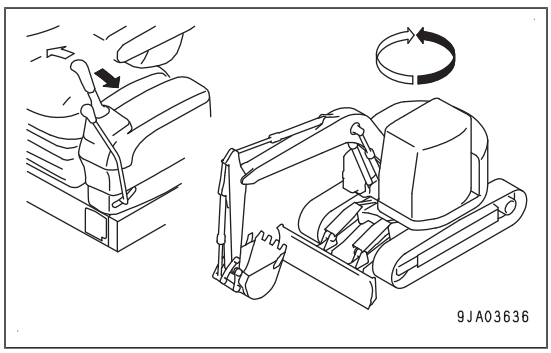
- When you operate the bucket

  Move the R.H. work equipment control lever to the right and left.

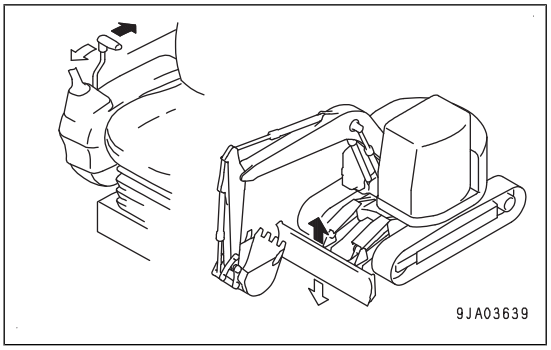


- When you operate the swing

  Move the L.H. work equipment control lever to the right and left.
  The upper structure swings.



- When you operate the blade (Machines with blade)
  Operate the blade control lever back and forth.



If the auto deceleration is enabled, when the work equipment control lever is set to the NEUTRAL position while the machine is stopped, the engine speed is low even if the fuel control dial is at the High idle (MAX) position.

REMARK

The accumulator is installed to the control circuit of this machine. You can lower the work equipment to the ground by the operation below within 15 seconds after the engine is stopped.

1. Turn the starting switch to the ON position.
2. Set the lock lever to the FREE position.
3. Operate the work equipment control lever in the LOWER direction for the work equipment.

You can use this procedure to release the remaining pressure in the hydraulic cylinder circuits or to lower the boom after you load the machine onto a trailer.

HANDLE WORKING MODE

SELECT WORKING MODE

NOTICE

Set the machine in breaker mode when you do breaker work. Do not do the breaker operation in a mode other than the breaker mode. There is a danger that it damages the hydraulic component.

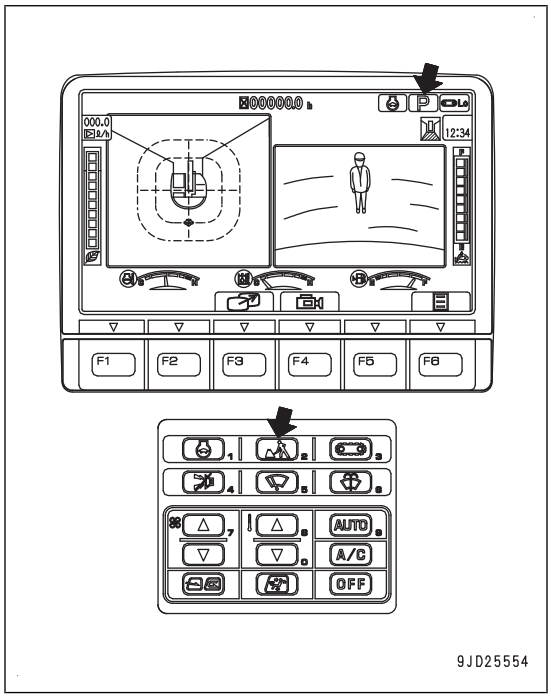
Select the working mode that matches the work conditions or purpose. This will make it possible to do the operations efficiently.

Obey the procedures that follow to change the working mode.

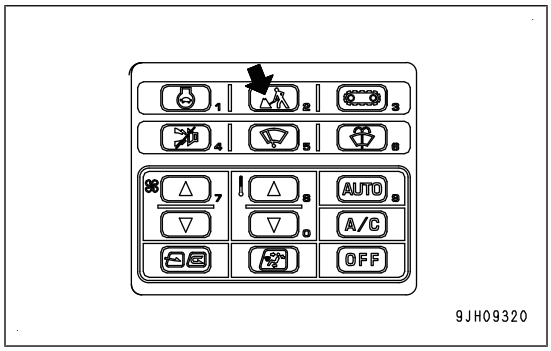
When the starting switch is turned to the ON position, the working mode is set to the mode when the key was last turned off.

Set the mode to the most applicable mode for the work.

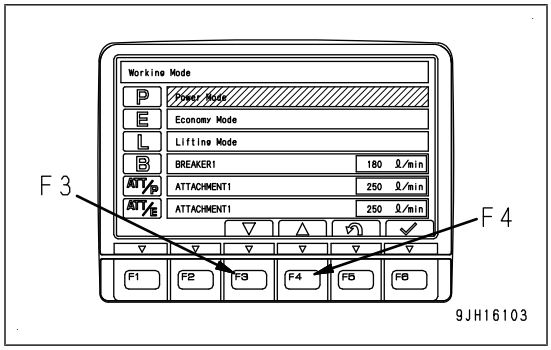
Working mode	Applicable operations
P mode	Normal digging, loading work (production conscious operation)
E mode	Normal digging, loading work (fuel consumption conscious operation)
L mode	Aligning positions or such (fine operation)
B mode	Breaker operation
ATT/P mode	For operations of 2-way attachment such as crusher (production conscious operation)
ATT/E mode	For operations of 2-way attachment such as crusher (fuel consumption conscious operation)



1. Push the working mode selector switch.
   The screen changes to “Working Mode” screen.



2. Push the working mode selector switch, or push the switch F3 or F4 to select the appropriate working mode.



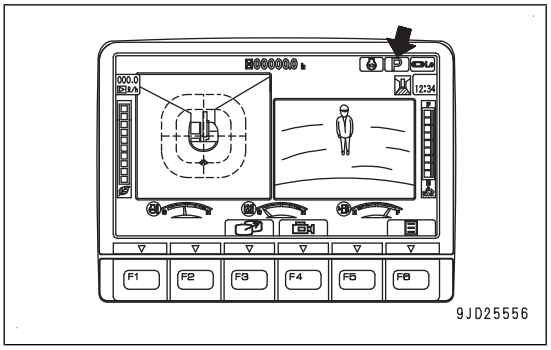
3. Select a working mode that you want to set, and push the switch F6.

   The setting is applied and the screen goes back to the standard screen.

   When the switch F5 is pushed, the mode does not change and the screen goes back to the standard screen.

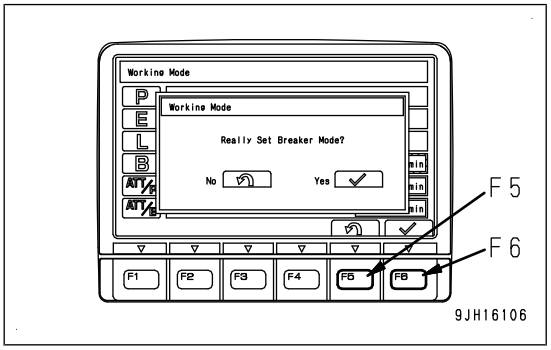
   REMARK

   - If nothing is done for 5 seconds after the working mode is selected, the selected working mode is automatically applied and the screen goes back to the standard screen.
   - If the working mode switch is pushed and held with the working mode selected, the selected mode is applied and the screen goes back to the standard screen.



4. If you select the breaker mode, push the switch F6 on the check screen of “Really set breaker mode?”.

   When you push the switch F5, the screen goes back to the working mode selection screen.



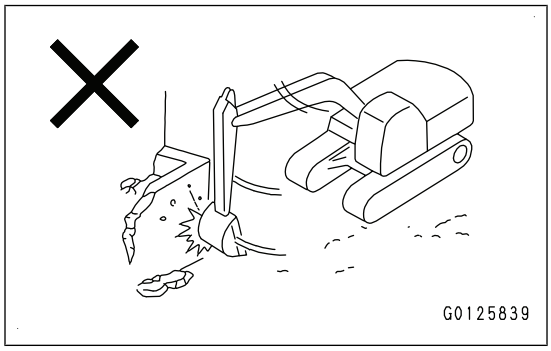
PROHIBITED OPERATIONS

⚠ WARNING

- **Do not operate the work equipment control lever while the machine travels.**
- **If the auto-deceleration is activated, operate carefully the travel lever and the travel pedal. If you operate the travel lever and the travel pedal when the engine speed decreases by the auto-deceleration function, the engine speed will suddenly increase.**

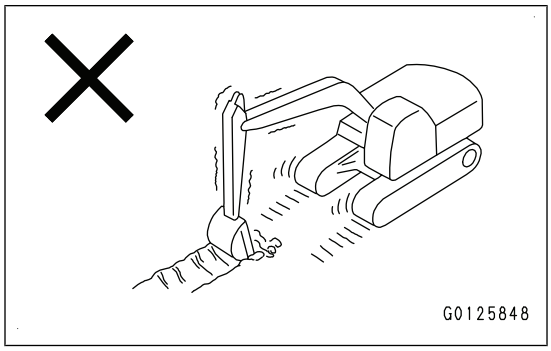
PROHIBITION OF OPERATIONS BY SWING FORCE

Destruction of the object by shock or levelling by hitting with swing force significantly shortens the service life of the machine and there is a danger.



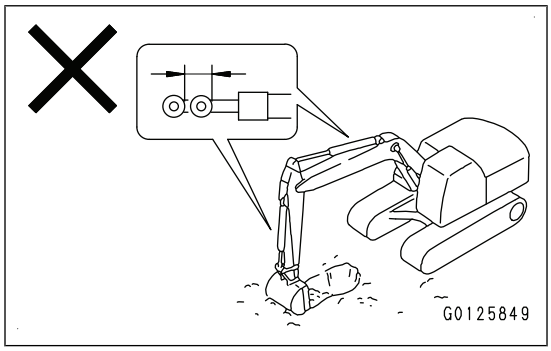
PROHIBITION OF OPERATIONS BY TRAVEL FORCE

Do not do digging work while the machine travels with the bucket thrusted into the ground. Digging with the travel force can cause damage to the machine.



PROHIBITION OF OPERATIONS AT STROKE END OF HYDRAULIC CYLINDER

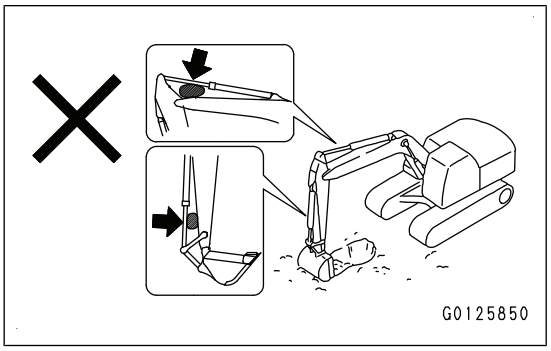
Do not do the work with the hydraulic cylinder at stroke end (fully extended or fully retracted). When external force impact is applied to the work equipment at the stroke end, it can cause damage to the hydraulic cylinder, which can cause serious personal injury or death.



DO NOT PERFORM THE WORK IF FOREIGN MATERIAL IS ACCUMULATED AROUND HYDRAULIC CYLINDER

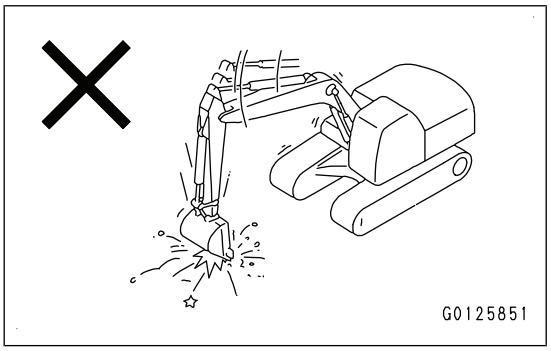
If operation is continued while something sticks between the hydraulic cylinder and work equipment, the cylinder rod may bend and break.

Do not perform the work while something sticks between the hydraulic cylinder and work equipment.



PROHIBITION OF OPERATIONS BY BUCKET DROP FORCE

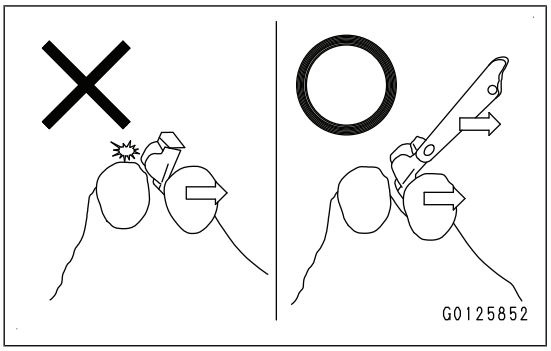
Do not use the drop force of the main body to dig. Do not use bucket as the mattock. Do not use bucket to impact digging or pile driving. These usage will significantly shorten the service life of the machine.



PROHIBITION OF OPERATIONS WHICH YOU USE BUCKET AS LEVER

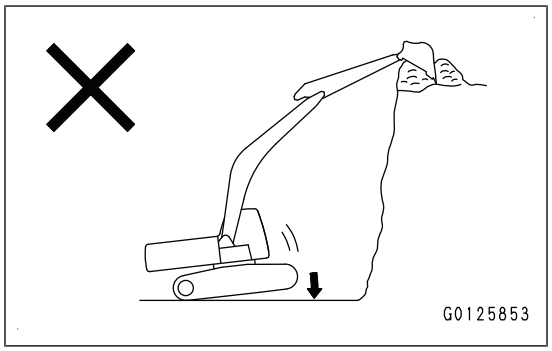
Do not put the bucket back to a rock and use it as a lever to dig. This can apply an excessive force to the chassis and bucket, and the machine may break.

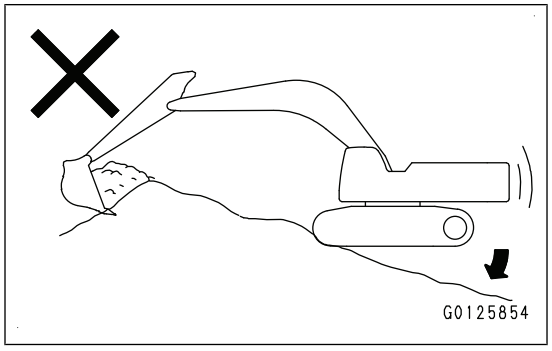
In this case, dig by using only the force of the arm or bucket. If an excessive force is applied, the safety valve of the hydraulic system controls it into a proper range to prevent breakage of the machine.



PROHIBITION OF OPERATIONS BY MACHINE DROP FORCE

Do not use the dropping force of the machine to excavate.

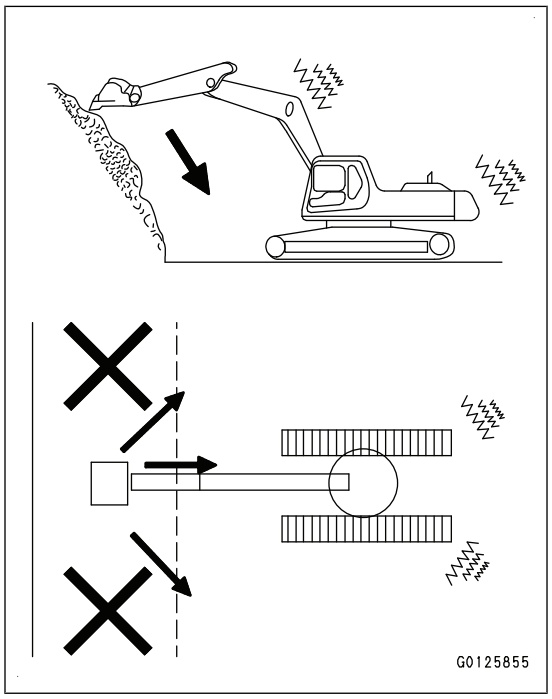




PROHIBITION OF DIGGING OPERATION AT AN ANGLE WHEN TEETH DO NOT ENGAGE

When the bucket teeth do not engage a hard rock in digging upper side, do not do the digging work while the machine swings. A large vibration occurs on the machine because the teeth slip down on the rock surface, which can cause cracks on the work equipment and the frame part.

If the bucket tooth slides and collides with a rock, an excessive load occurs in the work equipment and frame, which can shorten the service life of the machine.

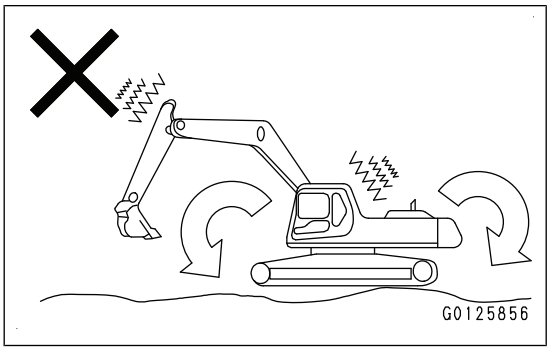


PROHIBITION OF DIGGING OPERATION ON HARD ROCKY GROUND

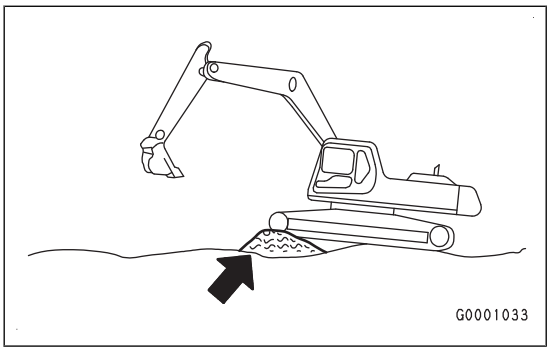
Do not attempt to directly excavate hard rocky ground with the work equipment. It is better to dig it after you break it up by some other means. This will not only save the machine from damage but will make for better economy.

PROHIBITION OF OPERATIONS WHEN MACHINE IS NOT IN STABLE CONDITION

If the undercarriage is not stable during the work, torsional load occurs at the frames, which makes the machine's service life shorter.



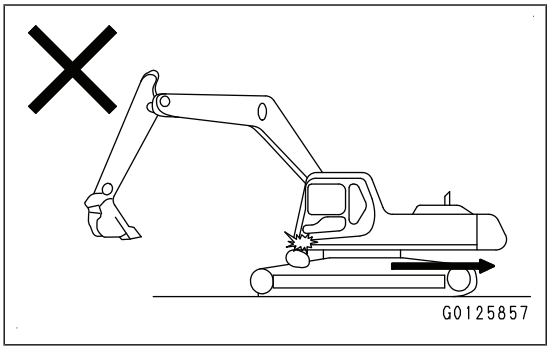
When the undercarriage is not stable, make a pile of soil under the front of the tracks to make the machine stable. Then, start the work.



PROHIBITION OF SWING OR TRAVEL WHEN ROCKS AND SOILS ARE ON TOP OF TRACK ASSEMBLY

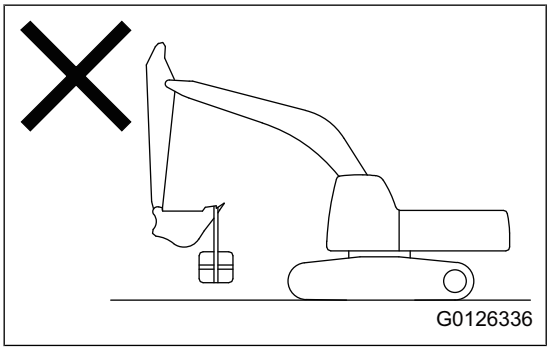
Before the travel or the swing operation, make sure that there is no rock or soil on the tracks.

If you travel or swing the machine with rocks and soils on the tracks, it can cause damage to the undercover and the frames. Furthermore, damage to the hydraulic component can cause serious personal injury or death.



PROHIBITION OF LIFTING OPERATION

Lifting operation by this machine is not allowed, but it is allowed only when the exclusive lifting hook is installed.

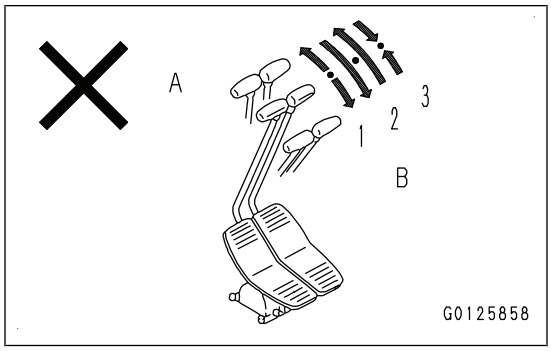


PROHIBITION OF SUDDEN LEVER OR PEDAL SHIFT DURING HIGH SPEED TRAVEL

(1) Do not operate the levers and pedals suddenly nor take any other action to move the machine quickly.

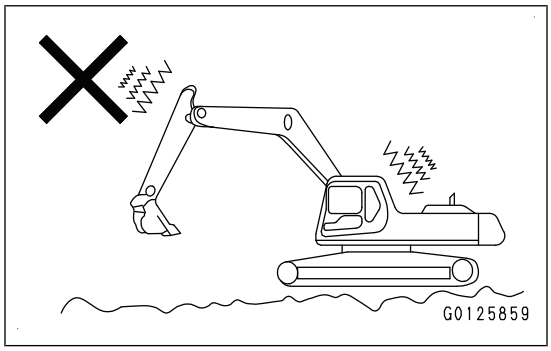
(2) Do not operate the levers or pedals suddenly from FORWARD (A) to REVERSE (B) (or from REVERSE (B) to FORWARD (A)).

(3) Do not operate the levers or pedals suddenly (do not release them suddenly) to stop the machine when driving it at high speed.

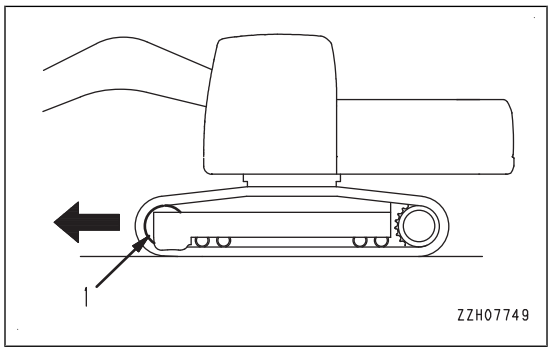


PROHIBITION OF HIGH-SPEED TRAVEL OPERATION ON ROUGH GROUND

If you drive the machine on rough ground such as rock-bed, etc. at high speed, large push-up loads are applied to the machine each time it rides over uneven road surface, which shortens the service life of the machine body.

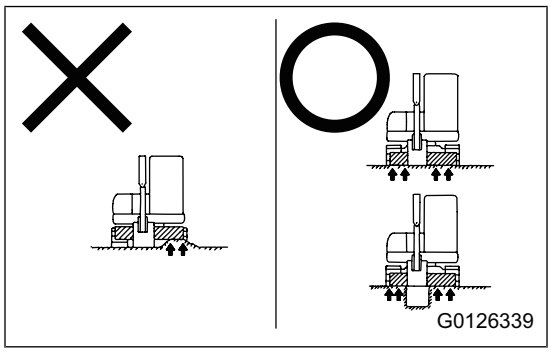


If you drive the machine on rough ground such as rock-bed, set the idler (1) toward the direction of travel and drive it at low speed.

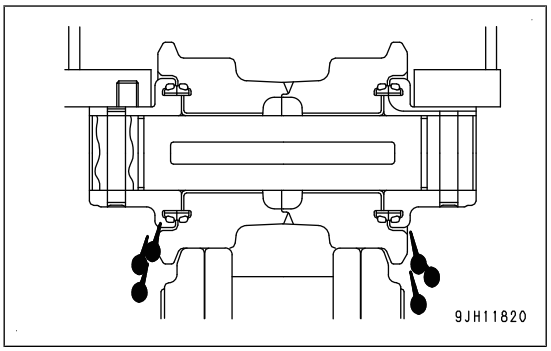


SUPPORT MACHINE WITH TWO SIDES OF BLADE

When you use the blade as an outrigger, do not support the machine with only one side of the blade.



PROHIBITION OF LONG-TIME CONTINUOUS TRAVEL OPERATIONS



When you drive the machine at high speed for 1.5 hours or more, the temperature of the lubrication oil in the track rollers and final drive rises to a high temperature. There is a danger that this high temperature lubrication oil damages the oil seal and causes oil leakage.

When you drive the machine for a long time, stop for 30 minutes every 1.5 hours of travel to reduce the temperature of the lubrication oil in the track rollers and final drive.

If the machine travels with the tracks loosened for a long time, damage can be caused to the undercarriage parts in a short period.

When you drive the machine for a long time, check the tension of the track every 1.5 hours of travel, and adjust the tension if it is loose.

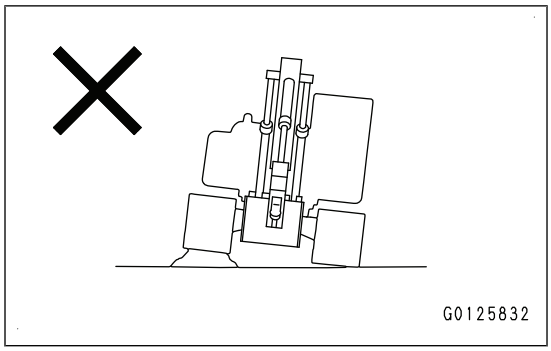
For the adjustment, see the MAINTENANCE, “CHECK AND ADJUST TRACK TENSION (4-31)”.

WORK PRECAUTIONS

PRECAUTIONS WHEN MACHINE TRAVELS

Obstacles such as large boulders and stubs must be avoided or removed in advance. Do not ride over them as long as possible. If the machine travels over an obstacle, a large impact can occur and cause damage to the machine (especially the undercarriage).

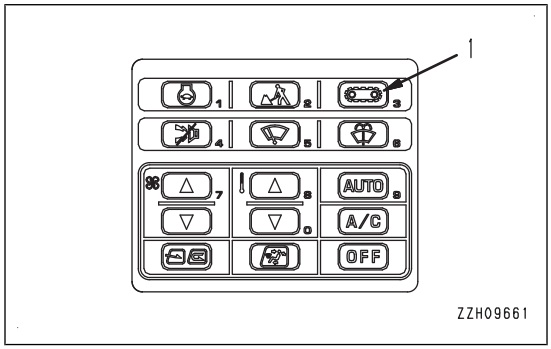
If there is no way to avoid it, reduce the travel speed, keep the work equipment close to the ground. Also, drive the machine with the center of the track over the obstacle.

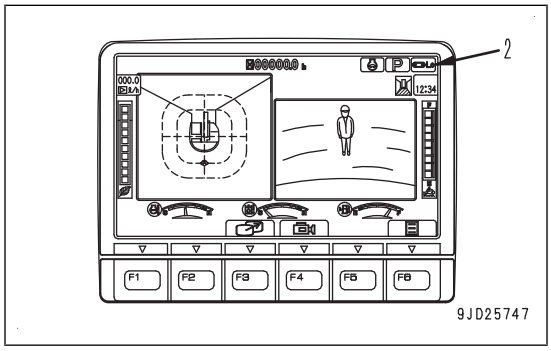


PRECAUTIONS FOR HIGH SPEED TRAVEL

When you drive the machine on a rock-bed with a lot of unevenness or on a bumpy road with a lot of boulders, reduce the travel speed to “Lo”. Also, when you drive the machine in “Hi” speed, set the idler to the driving direction.

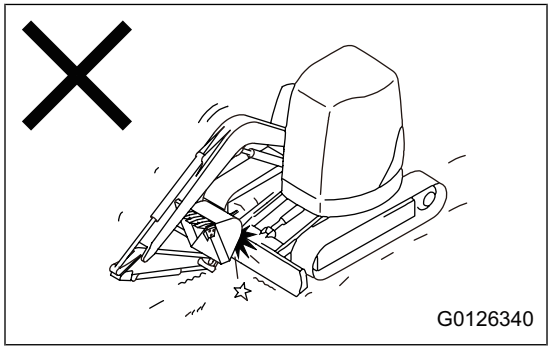
Push the travel speed selector switch (1) to change the travel speed. The travel speed (“Lo”, “Hi”) is shown on the travel speed display (2).





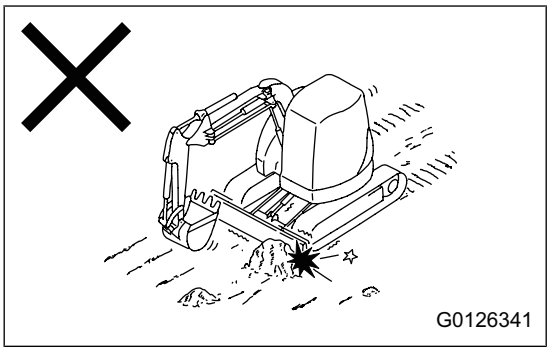
PRECAUTIONS WHEN YOU RETRACT WORK EQUIPMENT

When you fold the work equipment in the travel or transportation posture, be careful not to let the bucket hit the blade.



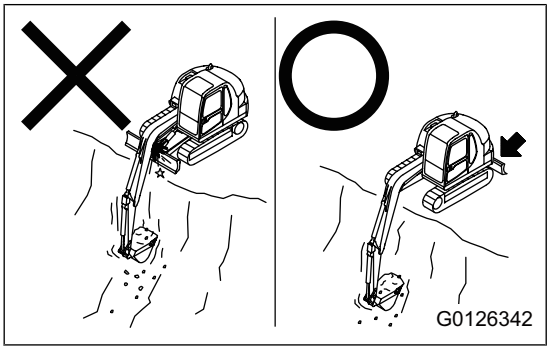
PRECAUTIONS WHEN YOU USE BLADE

Do not hit the blade against an object such as a rock mass that can put a heavy load on the blade. It makes the lives of the blades and cylinders shorter.



PRECAUTIONS FOR BLADE POSITION DURING BACKHOE OPERATION

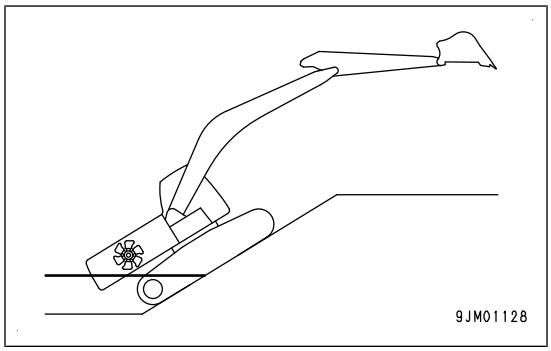
If you operate the backhoe operation when the blade is on the front of the machine, be careful not to allow the boom cylinder to touch the blade. Keep the blade always on the rear of the machine unless it is needed.



ALLOWABLE DEPTH OF WATER OR SOIL

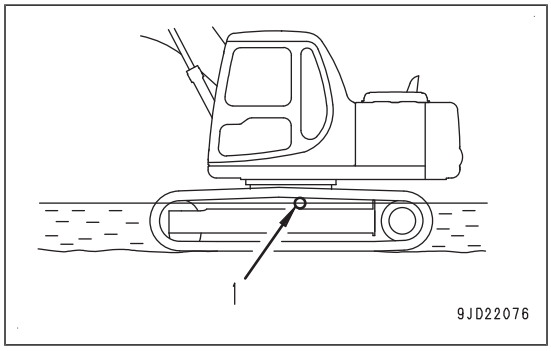
NOTICE

When the machine goes out of water, if you set the machine to climbing posture with a steep angle of 15° or more, it is possible that the rear part of the upper structure stays in the water, which can cause damage to the radiator fan because water is screwed by the fan. Be very careful when the machine goes out of the water.



Use the machine in the depth of the carrier roller (1) center if it is in water or in the earth and sand.

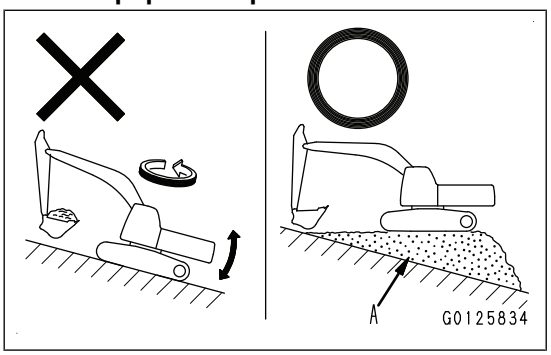
After the work, be sure to supply grease to the parts which have been under water for a long time until the used grease is projected. (Around the bucket pin, in particular)



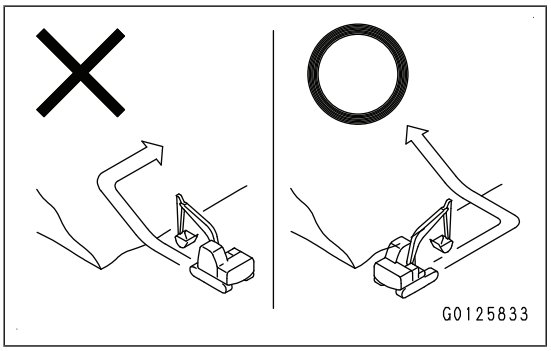
PRECAUTIONS WHEN YOU WORK ON SLOPE

⚠ WARNING

- **Avoid the work on a slope as much as possible. There is a danger that the machine loses the balance and tips over when you operate swing operation and work equipment operation.**
  It is very dangerous to swing downhill when the bucket is loaded. If it is inevitable to do such operations, prepare an embankment to make a platform (A) on the slope to make the machine level.



- **Do not drive the machine or do operation on the slope where the steel plates or such are laid. Even a slight slope is slippery and it is very dangerous.**
- **Do not climb up and travel down on the steep slope. There is a danger that the machine tips over.**
- **When you drive the machine, raise the bucket by approximately 20 to 30cm above the ground. Do not drive down in reverse on a slope.**
- **Do not steer the machine or travel across on the slope. Go down to a level area, and the use a safer way such as a detour.**
- **While you operate or travel, be ready to stop safely when the machine slips or becomes not stable.**
- **Do not pull the arm to use the force of the work equipment to help the machine travel uphill when the tracks slip and the machine cannot travel uphill with only the force of the tracks. There is a danger that the machine tips over.**



- **On a slope, even if the engine is stopped, the machine can swing with its own weight when the swing operation is done with the L.H. work equipment control lever.**
  Be sure not to do this swing operation by its own weight. This operation cannot be controlled with lever, and there is a danger that serious personal injury or death occur by the movement that the operator does not intend.

⚠ CAUTION

- **On a slope, do not open or close the slide door when you drive or operate the machine. Also, on a slope, lock the slide door. The slide door can be open or closed suddenly when you drive or operate the machine.**
- **Be very careful when you open or close the slide door if the machine is stopped on a slope. There is a danger that door opens and closes suddenly by its own weight.**

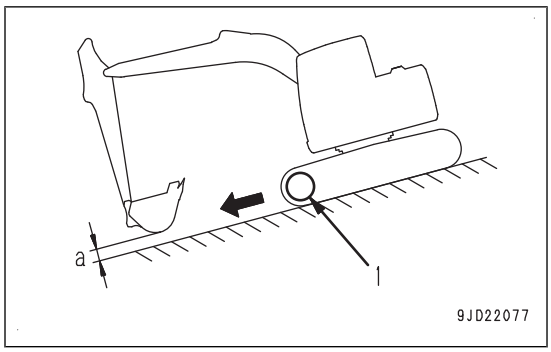
NOTICE

Set the sprocket (1) toward down side when you drive the machine downhill.
If you drive the machine downhill with sprocket (1) set toward up side, the tracks is likely to be loosened and can cause jump teeth.

- When the machine travels down the steep slope, use the travel lever and fuel control dial to keep the travel speed low.

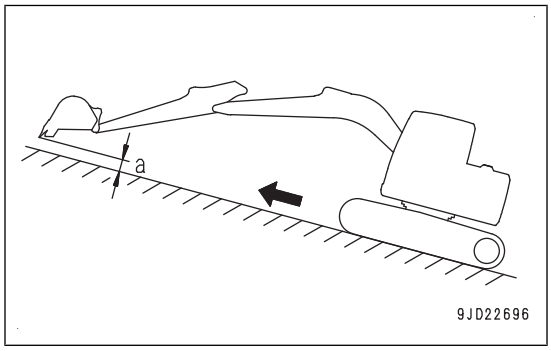
  When the machine travels down the steep slope with an angle of 15° or more, set it to the posture shown in the figure with the sprocket (1) downward and lower the engine speed.

  (a):20 to 30cm



- When you drive the machine on a steep uphill of 15° or more, set the machine to the posture shown in the figure.

  (a):20 to 30cm



Braking on downhill slope

Set the travel lever to the NEUTRAL position to apply the brake automatically.

If engine stops

If the engine stops while the machine travels up the slope, set the travel lever to the NEUTRAL position, lower the bucket to the ground, stop the machine, and then start the engine again.

DEF level

Before you work on a slope or drive on a rough ground, check the DEF tank and add sufficient quantity of DEF as necessary. If the remaining DEF level becomes low, sudden drop of its level or problem in the urea SCR system can be sensed. If the DEF level caution lamp or DEF system caution lamp lights up in red, move the machine to a level area immediately and add DEF.

ESCAPE FROM SOFT GROUND

When you operate the machine, be careful not to get stuck in mud. If the machine gets stuck in mud, do as follows to get the machine out.

ESCAPE WHEN TRACK ON ONE SIDE IS STUCK

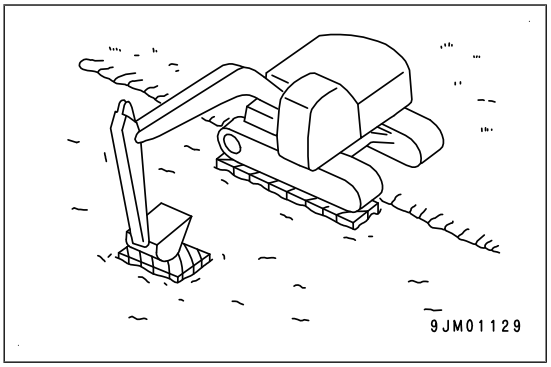
NOTICE

When the boom or arm is used to lift the machine, push the ground with the bucket bottom. (Do not push with the tooth)
At this time, set the angle between the boom and arm to 90 to 110°.
Do the same when inverted bucket is used.

When the track on one side gets stuck, get the machine out according to the procedure that follows.

1. Put the bucket on the ground on the stuck side, and push the ground.

   The track is raised.
2. Put a log or wooden blocks under the track to make footing.
3. Raise the bucket and escape.

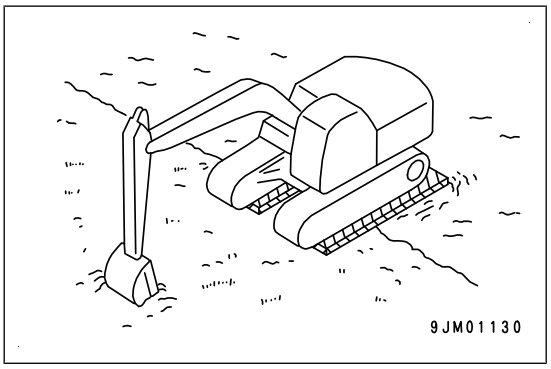


ESCAPE WHEN TRACKS ON TWO SIDES ARE STUCK

When the two tracks get stuck, get the machine out according to the procedure that follows.

1. Put items to make footing for the tracks on the two sides.
   1) Place the bucket along the side of the machine to push the ground.

      The track is raised.
   2) Put a log or wooden blocks under the raised track as footing.
2. Thrust the bucket into the front ground.
3. Move the arm IN as in digging work and set the travel lever to FORWARD to get the machine out.



RECOMMENDED APPLICATIONS

In addition to the following, it is possible to further increase the range of applications by using various attachments.

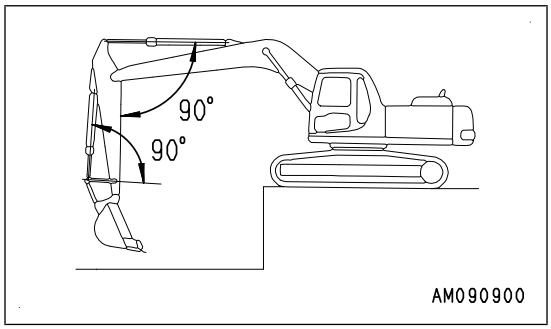
DIGGING WORK

BACKHOE WORK

It is suitable for excavation of the areas that are lower than the machine.

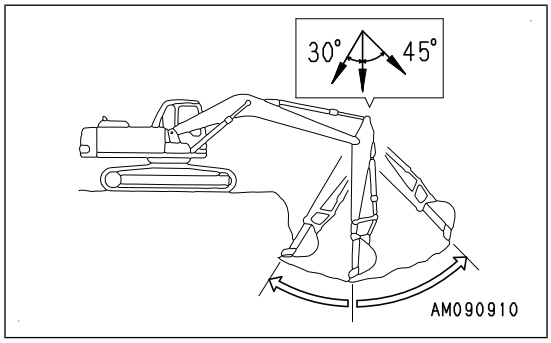
When the state of the work equipment is as shown in the figure (angle between the bucket cylinder and the link, and angle between the arm cylinder and the arm are 90°), the digging force from the pushing out of each cylinder is maximized.

Operation efficiency can be optimized if you use this angle effectively during the digging work.



When you do digging with arm, make sure that arm angle is in the range between 45° forward and 30° toward you.

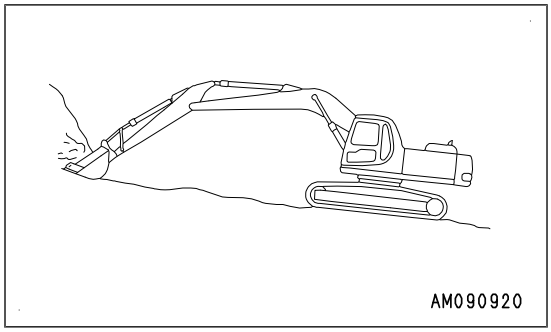
Do not do digging at the stroke end of the cylinder, and make sure that you do the arm operation in the range described above, there will be a little difference in response to the digging depth though.



SHOVEL WORK

It is suitable for excavation of the areas that are higher than the machine.

For this work, invert the bucket and install.



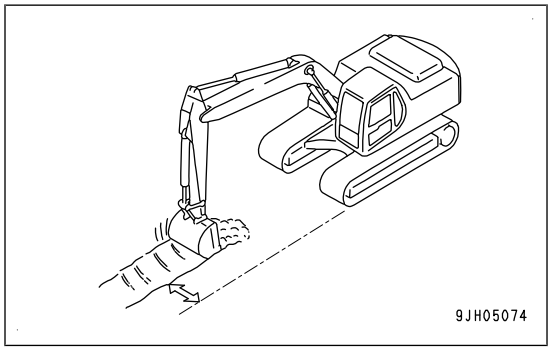
DITCHING WORK

The machine can do ditching work.

The basic procedure to excavate a wide ditch is to dig the two sides first and finally remove the center.

The efficiency of ditching work increases with the steps that follow.

- Install the bucket that is appropriate for ditching work.
- Make the tracks parallel to the groove which is ditched.

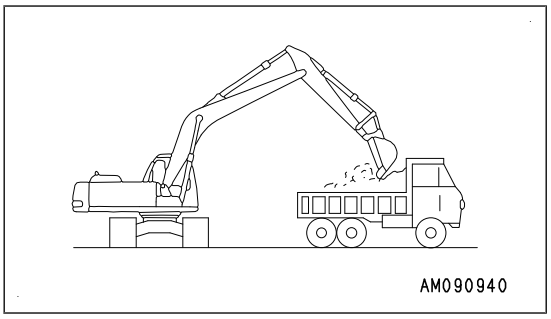


LOADING WORK

The machine can load rocks and soils, etc. to a dump truck.

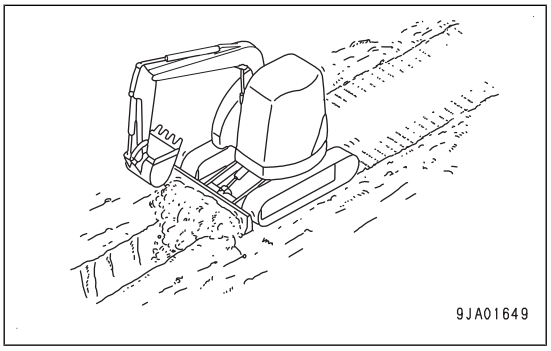
You can put the dump truck in an area which provides a small swing angle and good visibility for better efficiency in loading.

The loading will be easier when the machine is at the rear of the dump track. More rocks and soils can be loaded than when the machine is lateral to the track.



LEVELING WORK

Backfill after digging and leveling work is possible with the blade.



LIFT OBJECTS WITH LIFTING DEVICE

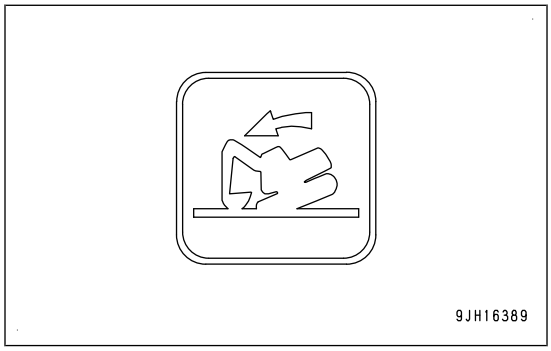
⚠ WARNING

- **The excavator used in handling operations must conform with current local regulations and be equipped with safety valves and an overload alarm in compliance with EN 474-5.**
- **The owner and operators must be familiar with all legal guidelines and regulations that govern the use of the equipment both as an earth moving machine and as a load handling machine. Ask your Komatsu distributor for further information.**
- **The machine must be equipped with an appropriate lifting hook, otherwise it cannot be used for handling loads.**
  In the absence of such a device, the machine can only be used as an earth moving machine.
  If the machine is not equipped with the appropriate hook, contact the Komatsu distributor.
  Fitting a lifting hook must be monitored and certified by the competent Authorised Body.
- **Only the hook situated on the rod of the bucket should be used as a coupling point for the purpose of lifting objects. Do not use other coupling points.**
- **It is forbidden to weld hooks or ears to the bottom of the bucket.**
- **It is absolutely forbidden to move the machine with the load suspended as the load may oscillate and pose a risk to objects and persons, as well as to the machine itself.**

- Position the machine on a solid and flat terrain.
- Ensure that the work area is free from obstacles and that there are no persons in the operational range of the machine and signal the beginning of the working operation by sounding the acoustic alarm.
- Select work mode L.
- Ensure that the lifting hook and the load handling cables are of sufficient dimensions to handle the load to be lifted, and that they are equipped with an effective anti-release device.
- Use the commands gently and progressively in order to maneuvre the load movement with precision.
- Always maintain the load as close as possible to the ground so as to be able to lay it down quickly in the event that the slightest instability of the load or of the machine is detected.
- After having positioned the load, uncouple it.

NOTICE

- **When the machine reach its load limit the acoustic alarm and the overload alarm light will indicate this fact.**
- **For detail about overload diagram see:**
  - **“EXPLANATION OF LIFT CAPACITY CHART (5-4)” (Standard specification)**
  - **“EXPLANATION OF LIFT CAPACITY CHART (6-15)” (2-piece boom specification)**
  - **“EXPLANATION OF LIFT CAPACITY CHART (6-25)” (Super Long Front specification)**



REPLACE AND INVERT BUCKET

⚠ WARNING

- **When you do the work, wear the protective equipment such as goggles, hard hat, and gloves. When you hit the pins with a hammer, pieces of metal could fly and cause serious injury.**
- **When you put the removed bucket, keep it in a stable condition.**
- **Because the pins are hit with a strong force, they can fly out and cause injury to people around the bucket. Make sure that there is no one around the bucket.**
- **When you pull out the pins, do not stand behind the bucket. Be very careful not to put your foot from the side to do the work.**
- **Be very careful not to get your fingers caught when you remove or insert the pins.**
- **When you align the holes, you must not insert your hands into the pin holes.**

Do the work on a level ground in good condition. Also, when multiple workers work together, assign a person who will direct the work and follow the person's instructions.

REPLACE BUCKET

NOTICE

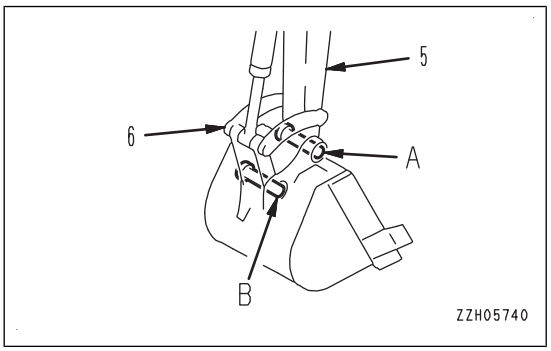
- **After the pins are removed, make sure that mud or sand does not get on them.**
- **Dust seals are installed in the two ends of bushings. Be careful not to cause damage to them. If damage is caused to the dust seal, replace it with a new one. If it is used without replacement, sand and dirt can enter the inside and cause abnormal wear of the pin.**

1. Lower the bucket on the level ground.

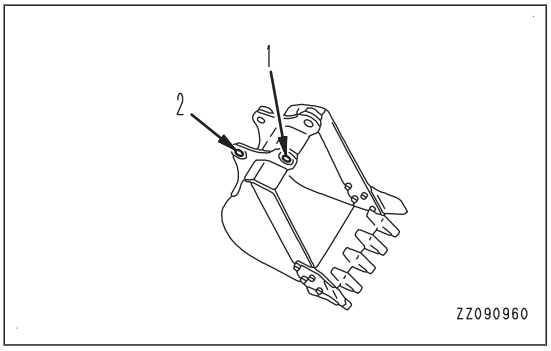
   REMARK

   If you pull out the pins, place the bucket with the feeling as if you lower it on the ground lightly.
   If the bucket hits strongly on the ground, the resistance will be increased and it will be difficult to remove the pins.

2. Remove the double nut of stopper bolt at the arm pin (A) and the link pin (B), and then pull out the bolts.
3. Pull out the arm pin (A) and the link pin (B) to remove the bucket.



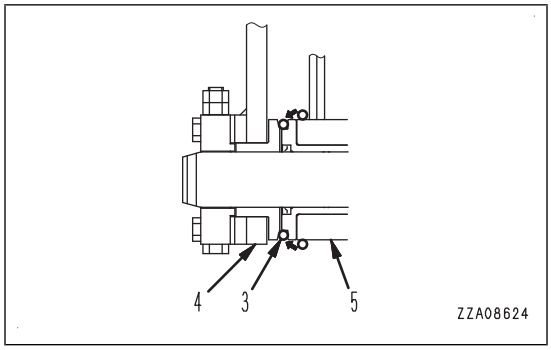
4. Align the arm (5) with the hole (1) of the replacement bucket.
5. Align the link (6) with the hole (2) of the replacement bucket.



6. Install the greased pins (A) and (B) into the holes (1) and (2) of the bucket.

Because the O-ring (3) is easily damaged, when you install the bucket (4), do the operations as follows.

1) Put the O-ring (3) to the position on the arm (5) shown in the figure.
2) After you insert the pins, put the O-ring (3) into the regular groove.



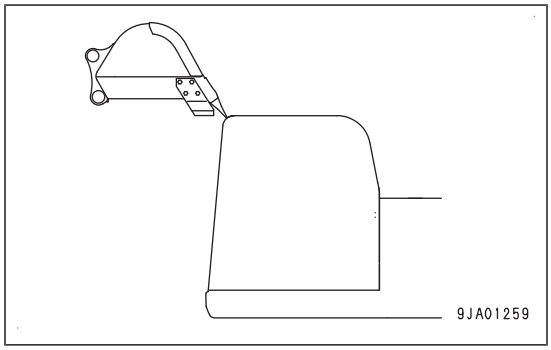
7. Install the stopper bolt and nut of each pin.
8. Supply grease to each pin.

   Supply grease sufficiently until grease protrudes from the shaft end.

INVERT BUCKET

⚠ WARNING

When you invert the bucket, do the work very carefully that the bucket does not interfere with the cab. When you invert the bucket, the trail of the bucket blade sticks out and interferes with the cab, and there is a danger that serious accident occurs.



NOTICE

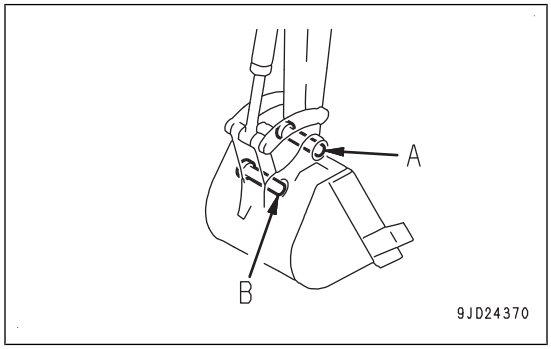
- **After the pins are removed, make sure that mud or sand does not get on them.**
- **Dust seals are installed in the two ends of bushings. Be careful not to cause damage to them. If damage is caused to the dust seal, replace it with a new one. If it is used without replacement, sand and dirt can enter the inside and cause abnormal wear of the pin.**

1. Lower the bucket on the level ground.

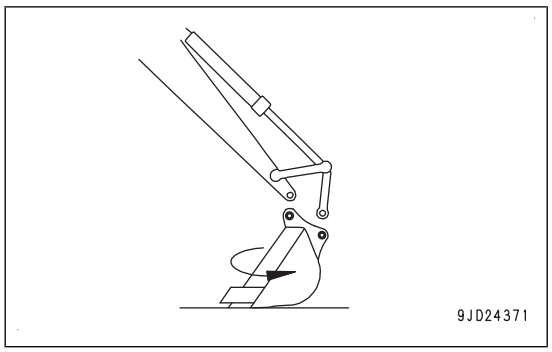
   REMARK

   If you pull out the pins, place the bucket with the feeling as if you lower it on the ground lightly.
   If the bucket hits strongly on the ground, the resistance will be increased and it will be difficult to remove the pins.

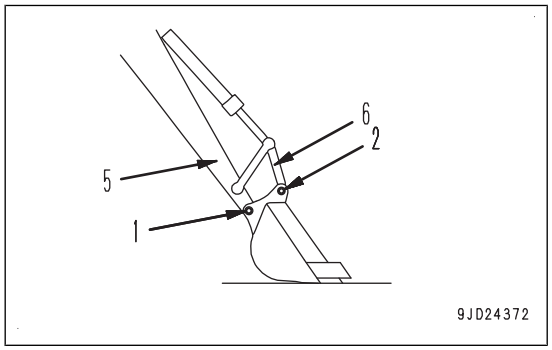
2. Remove the double nut of stopper bolt at the arm pin (A) and the link pin (B), and then pull out the bolts.
3. Pull out the arm pin (A) and the link pin (B) to remove the bucket.



4. Invert the removed bucket.



5. Align the arm (5) to the mounting part (1).
6. Align the link (6) to the mounting part (2).

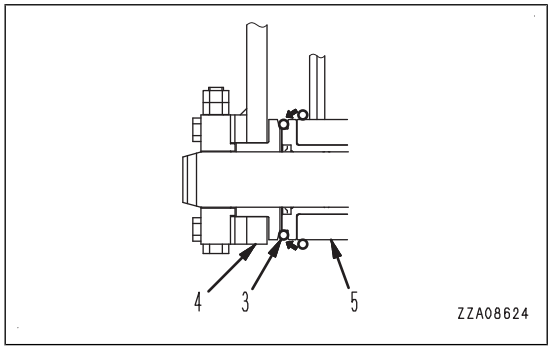


7. Install the grease applied pin (A) to the mounting part (1). Install the pin (B) to the mounting part (2).

   Attach the O-ring (3) to the mounting part (1) of the arm (5) and the bucket (4).

   Because the O-ring (3) is easily damaged, when you install the bucket (4), do the operations as follows.

   1) Put the O-ring (3) to the position on the arm (5) shown in the figure.
   2) After you insert the pins, put the O-ring (3) into the regular groove.



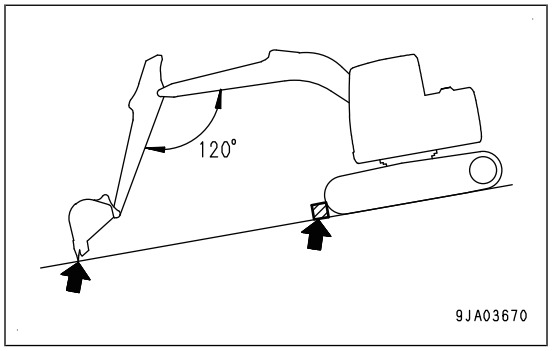
8. Install the stopper bolt and nut of each pin.
9. Supply grease to each pin.

   Supply grease sufficiently until grease protrudes from the shaft end.

PARK MACHINE

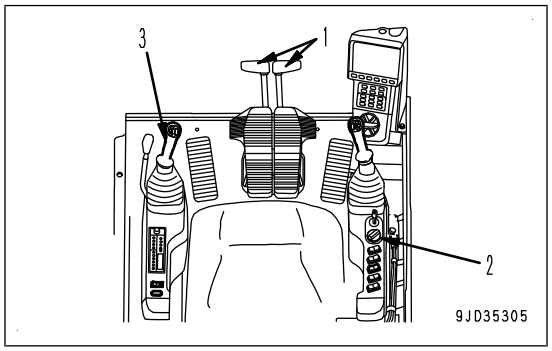
⚠ WARNING

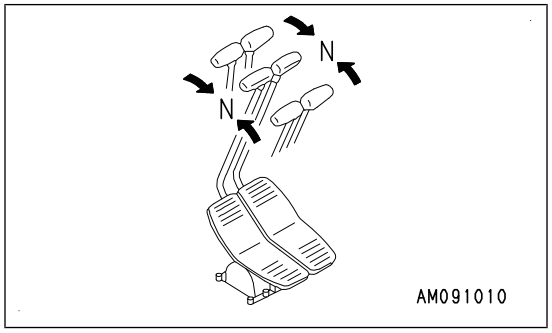
- **Park the machine on a firm, level ground. If you need to park the machine on a slope, lock the machine with safeguard to prevent the machine movement, and thrust the work equipment into the ground. This time, set the blade to the ground toward root side.**
- **Before you stand up from the operator's seat, be sure to set the lock lever to the LOCK position. If you touch the control levers by mistake when the lock lever is in the FREE position, there is a danger that the machine suddenly moves and causes serious personal injury or death.**



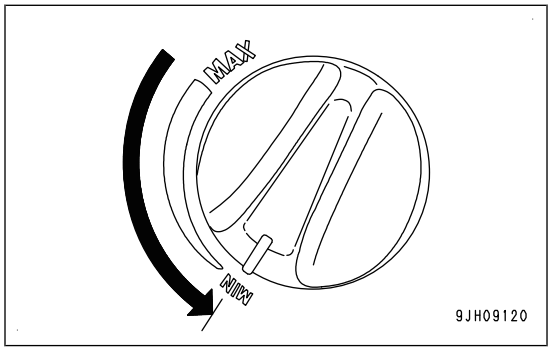
1. Set the R.H. and L.H. travel levers (1) in the NEUTRAL position.

   The machine stops.

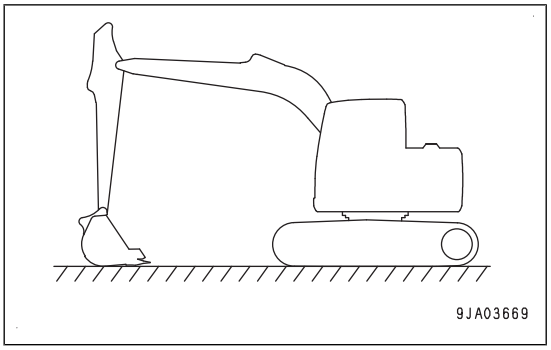




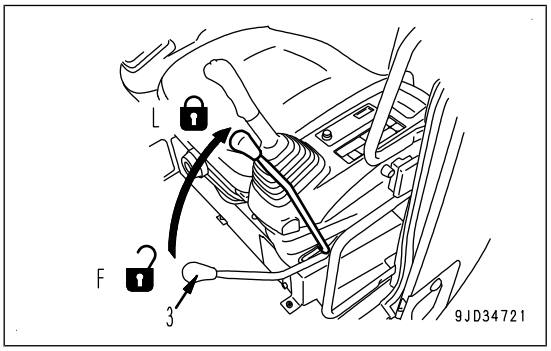
2. Turn the fuel control dial (2) to the Low idle (MIN) position to decrease the engine speed.



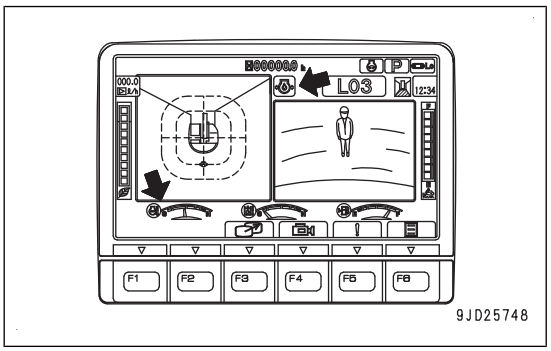
3. Align the directions of undercarriage and upper structure so that the bottom of the bucket is horizontal and grounded.
4. Lower the blade to the ground.



5. Hold the red part at the tip of the lock lever (3) to operate it, and set it to the LOCK position (L).



6. Measure 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 goes in the green range, and stop the engine. Then see “TROUBLES AND ACTIONS (3-286)” to do the inspection and remedy.
   - If the engine oil pressure caution lamp is lit, stop the engine immediately. And see “TROUBLES AND ACTIONS (3-286)” to do the inspection and remedy.



7. Stop the engine.

If the operator's seat and console are in front position, move them rearward to keep a sufficient space to get off the machine.

CHECK AFTER YOU FINISH WORK

After the work is completed and the engine stopped, check and clean the machine.

1. Do the walk-around check to make sure of the items that follow.
   - No leakage of oil or water is found.
   - No abnormality is found on the work equipment, exterior parts, and undercarriage.
   - No collection of dust or flammable material is found.

   For details, see OPERATION, “WALK-AROUND CHECK (3-151)”.

   If a problem is found, repair it.
2. Fill up the fuel tank.
3. Remove dirt around the undercarriage.

LOCK

Position to be locked

Be sure to lock the parts that follow. Use the starting switch key to lock and unlock all these places.

(1) Fuel tank filler cap

(2) Hydraulic tank oil filler cap

(3) Operator's cab door

(4) Toolbox and grease pump storage cover

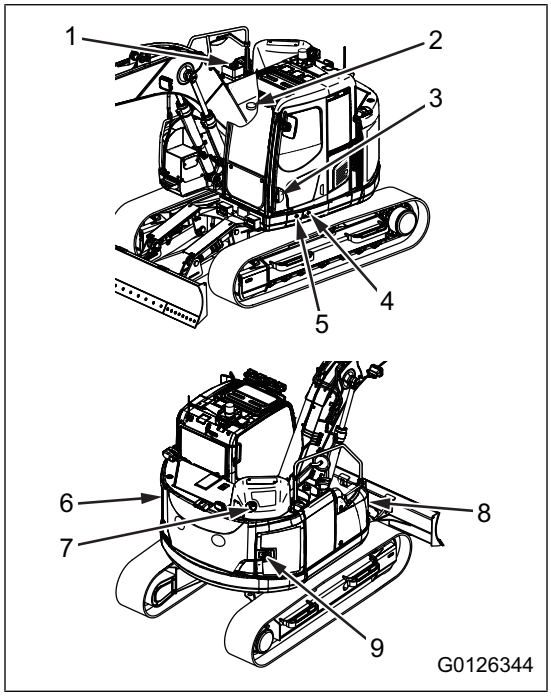
(5) Left front cover of the machine

(6) Battery inspection cover

(7) Engine hood

(8) Machine right front cover

(9) Fuel filter inspection cover



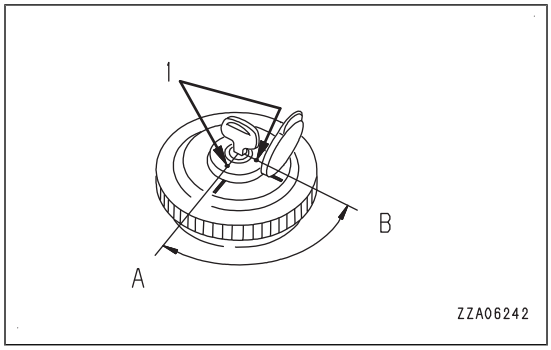
OPEN AND CLOSE CAP WITH LOCK

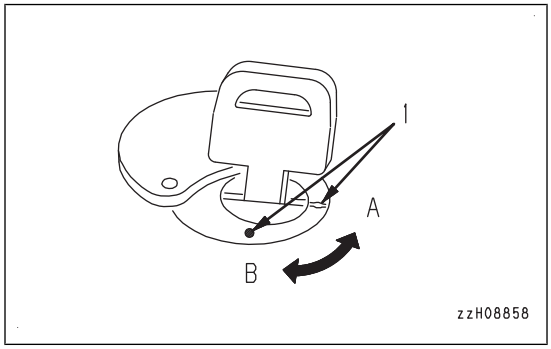
OPEN CAP WITH LOCK

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)





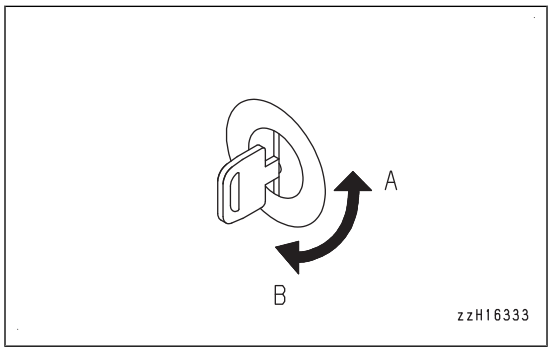
CLOSE CAP WITH LOCK

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.

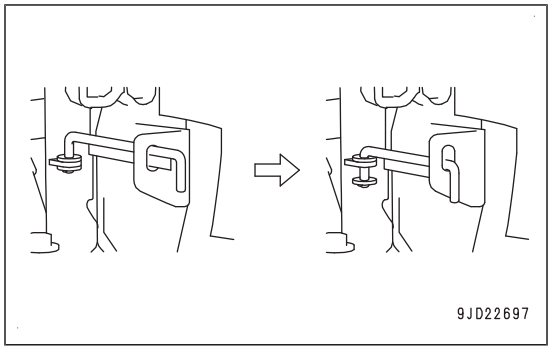
OPEN AND CLOSE COVER WITH LOCK

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 (UNLOCK)
   Position (B): CLOSE (LOCK)

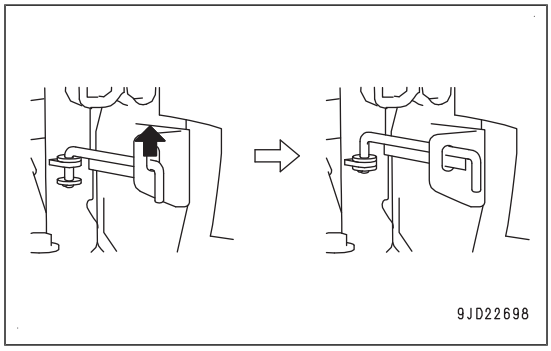


3. If there is a stay to support the cover, open the cover until the stay is put in the LOCK position.



CLOSE COVER WITH LOCK

1. If a stay for cover support is available, lift 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.



OPEN AND CLOSE ENGINE HOOD

⚠ CAUTION

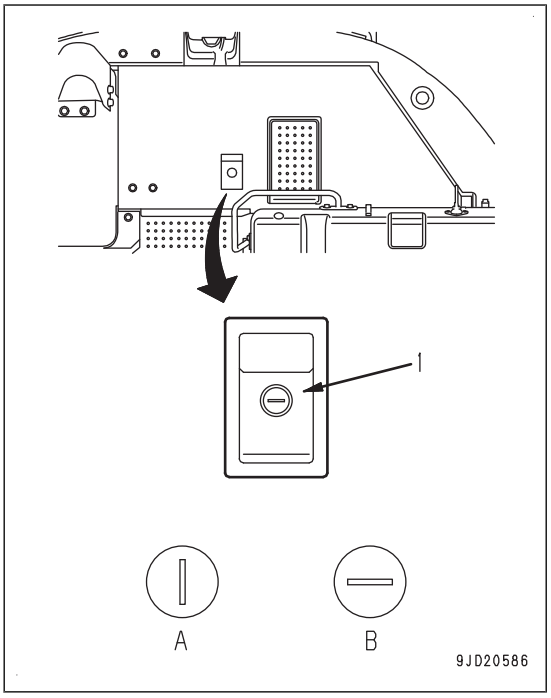
- **Before you open or close the engine hood, stop the machine on a level ground, lower the work equipment to the ground, and stop the engine.**
- **When you open it, hold the grip with your hand until the hood support stay is securely set to the lock position.**
- **When you close the engine hood, it can fall by its own weight. Close it while you hold the grip securely.**
  If it is not locked, it can be closed suddenly by wind or such.
- **Immediately after the engine is stopped, the engine hood and aftertreatment devices are very hot. Wait for the temperature to go down, and then start the work.**

NOTICE

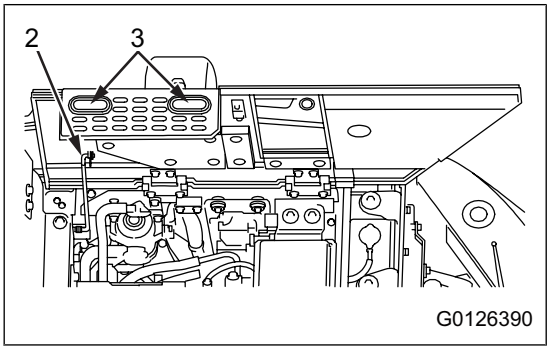
Be sure to keep the engine hood locked unless you need to open it.

OPEN ENGINE HOOD

1. Lower the work equipment to the level ground, and stop the engine.
2. Insert the key into the key slot.
3. Turn the key counterclockwise (A) and remove it.
   Position (A): OPEN
   Position (B): CLOSE (LOCK)
4. Unlock the lock by pulling the engine hood open lever (1) to your side.
5. Hold the engine hood grip (3), and open the engine hood.

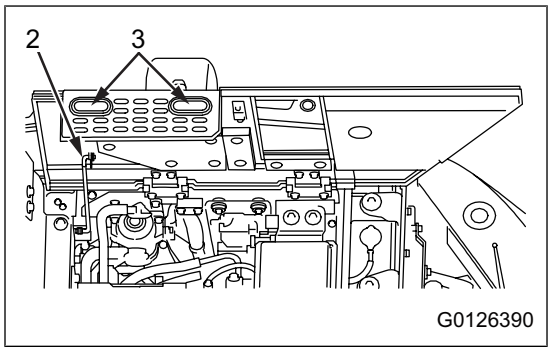


6. Set the hood support stay (2) to the hood fixing position.

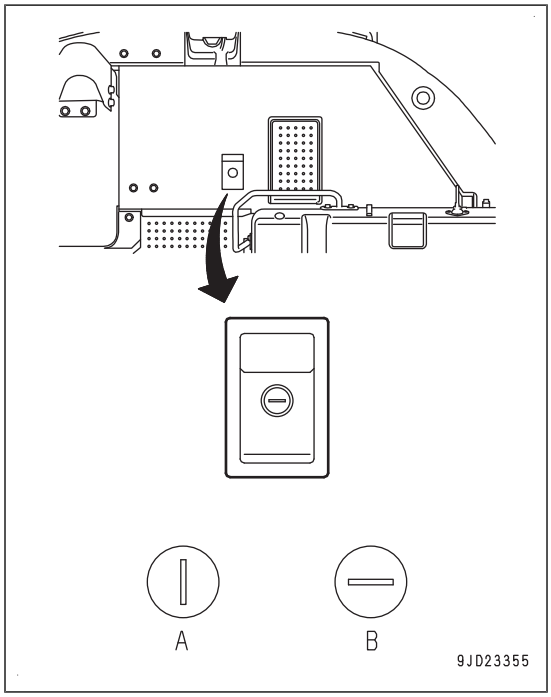


LOCK ENGINE HOOD

1. Hold the grip (3) of engine hood , and remove the hood support stay (2) from the hood fixing position.
2. Check that stay (2) is set in sliding position, and then close the engine hood.
3. Close the hood slowly and push it to lock it securely.
4. Insert the key into the key slot.



5. Turn the key clockwise (B) and remove it.
   (A): OPEN
   (B): CLOSE



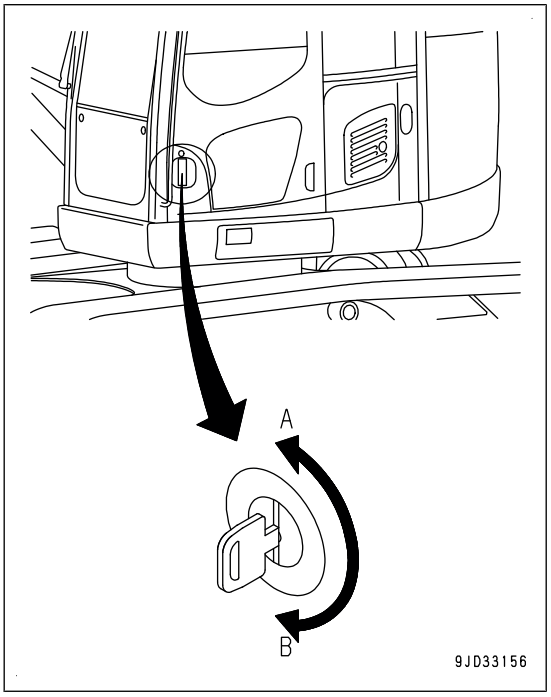
OPEN AND CLOSE OPERATOR CAB DOOR

⚠ CAUTION

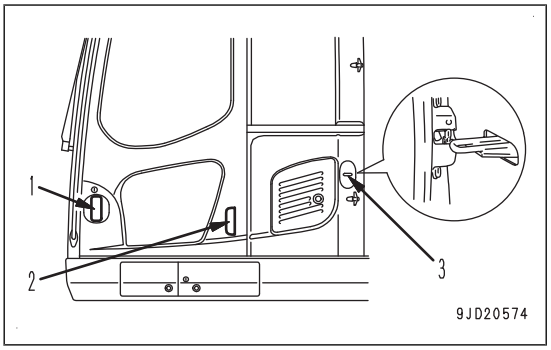
- **Park the machine on a flat ground when you open or close the door. Be very careful when you open or close the slide door if the machine is stopped on a slope. There is a danger that door opens and closes suddenly by its own weight.**
- **When you open or close the door, be sure to hold the door handle (1) and the knob (2).**
- **Be careful not to pinch your hand with the front pillar or the center pillar.**
- **Call out a warning before you open or close the door when there is anyone in the cab.**

OPEN OPERATOR CAB DOOR

1. Insert the key into the key slot.
2. Turn the key counterclockwise (A), and remove it.
   Position (A): OPEN (UNLOCK)
   Position (B): CLOSE (LOCK)

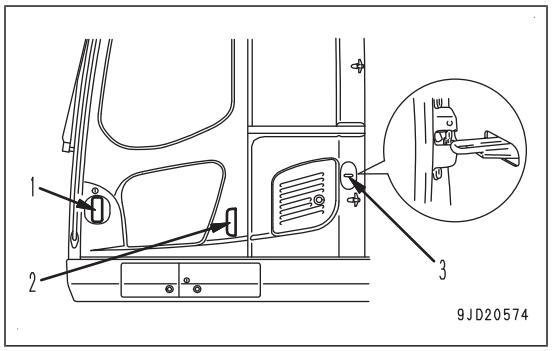


3. Hold the door handle (1) and the grip (2) to open the cab door.
4. Push the cab door against the door lock (3) and fix it securely.

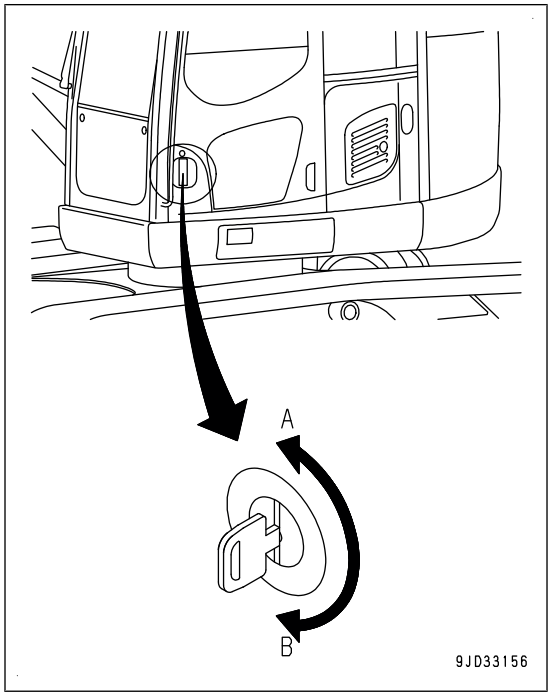


LOCK OPERATOR CAB DOOR

1. Pull the door handle (1) rearward, and cancel the lock (3).
2. Hold the door handle (1) and the grip (2) to close the cab door.



3. Insert the key into the key slot.
4. Turn the key clockwise (B) and remove it.
   Position (A): OPEN (UNLOCK)
   Position (B): CLOSE (LOCK)



AIR CONDITIONER

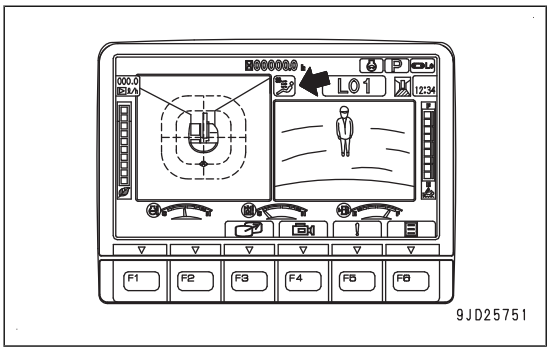
⚠ WARNING

Do not let open flame be near them.

NOTICE

- **When you do the air conditioner running-in operation, start it while the engine is at low idle. Do not start the air conditioner while the engine runs at high speed. It can cause a failure on the air conditioner.**
- **If water goes into the control panel or sunlight sensor, it can cause a failure. Do not let water touch them.**
- **For the auto function of the air conditioner to work correctly, be sure to keep the sunlight sensor clean. Do not put things around the sunlight sensor that can prevent its sensor function.**
- Be sure to lubricate each part of components.
  When the air conditioner is not used regularly, operate the air conditioner while the engine is at low speed from time to time and do cooling or dry heating for some minutes.
- When the temperature in the cab is low, it is possible that the air conditioner cannot operate. Supply the recirculation air to warm the cab, and then push the air conditioner switch.
- If a problem is sensed in the equipment or sensor in the air conditioner, the air conditioner system caution lamp lights up on the monitor screen.

  If the caution lamp lights up, consult your Komatsu distributor for inspection and maintenance.



Ventilation while cooling

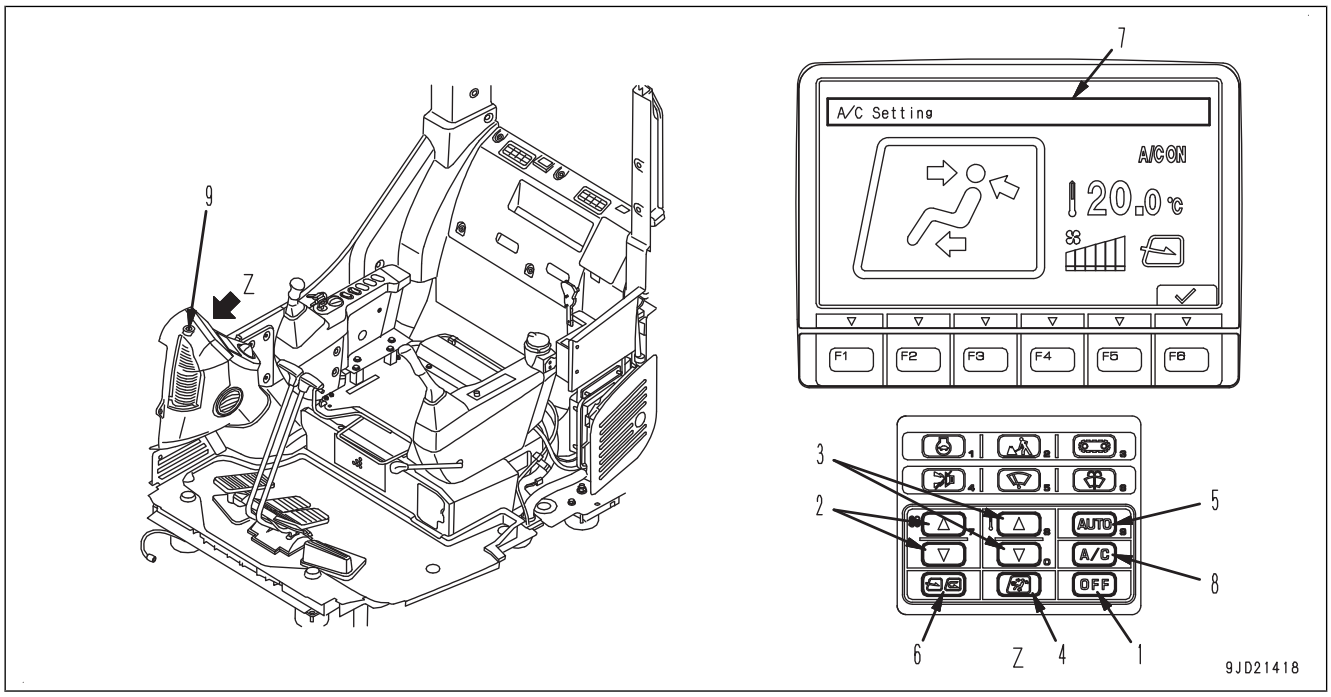
- When you operate the air conditioner for a long time, do ventilation and cooling approximately one time an hour.
- If you smoke while the air conditioner is on, the smoke can damage your eyes. Open the window and do ventilation and cooling to let smoke out.

Temperature control

The cooling temperature is optimum for health when you feel moderately cool (5 to 6℃ lower than the ambient temperature) as you go into the cab.

Be careful to select the correct temperature.

AIR CONDITIONER EQUIPMENT



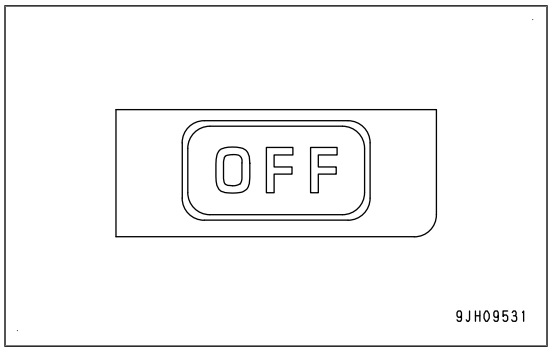
(1) OFF switch
(2) Fan switch
(3) Temperature control switch
(4) Vent selector switch
(5) Auto switch
(6) FRESH/RECIRC air selector switch
(7) Monitor
(8) Air conditioner switch
(9) Sunlight sensor

OFF SWITCH

The OFF switch is used to stop the fan and air conditioner.

REMARK

When the OFF switch is pushed, the monitor screen does not change to the air conditioner adjustment screen.

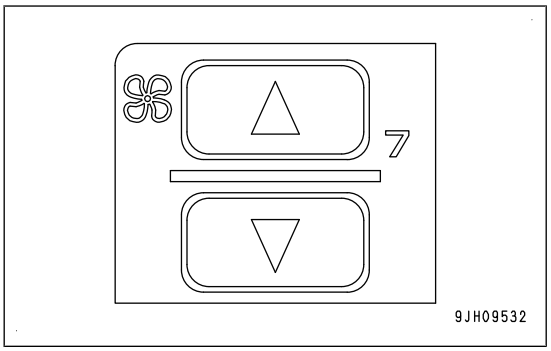


FAN SWITCH

The fan switch is used to adjust the air flow.

You can adjust the air flow to 6 levels.

- Push the △ switch to increase the air flow.
- Push the ▽ switch to decrease the air flow.
- During automatic operation, the air flow is automatically adjusted.



Air conditioner display and air flow rate

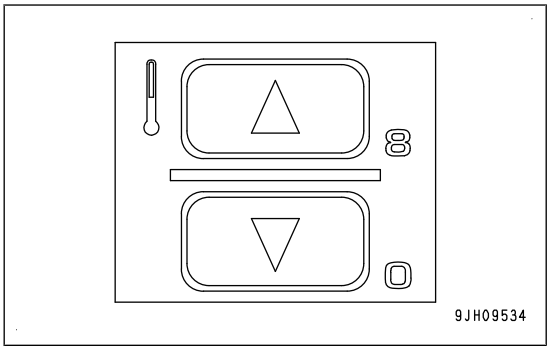
Monitor display	Air flow rate
	Air flow “Low”
	Air flow “Medium 1”
	Air flow “Medium 2”
	Air flow “Medium 3”
	Air flow “Medium 4”
	Air flow “High”

TEMPERATURE CONTROL SWITCH

Use the temperature control switch to adjust the temperature in the cab.

You can set the temperature between 18 to 32 °C.

- Push the △ switch to increase the set temperature.
  Push the ▽ switch to decrease the set temperature.
  The set temperature is shown on the display monitor.
- Set 25 °C normally.
- The temperature can be set in the stages of 0.5 °C.



Air conditioner display and function

Air conditioner display	Set temperature
18 °C	Max. cooling
18.5 to 31.5 °C	Adjusts the temperature in the cab to the set temperature.
32 °C	Max. heating

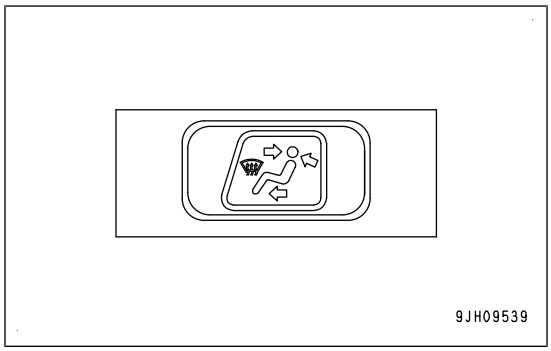
If the mode is set to automatic operation and the temperature is set to max. cooling or max. heating, the air flow from the fan is always set to “High”.

On this state, even when the temperature is at the set temperature, the air flow rate does not change.

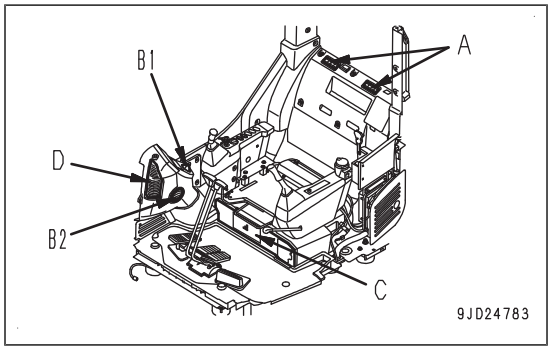
VENT SELECTOR SWITCH

The vent selector switch is used to select the vents.

- When the vent selector switch is pushed, the liquid crystal display (LCD) on the monitor display changes and air blows out from the vents shown.
- During automatic operation, the vents are automatically selected.



(A) Rear vents (2 places)
(B1) Face vent (1 place)
(B2) Foot vent (1 place)
(C) Foot vent (1 place)
(D) Front window glass vents (2 places)



Monitor display	Air vent mode	VENT				Remarks
		(A)	(B)	(C)	(D)	
	Front and rear vents	○	○			-
	Front, rear and foot vents	○	○	○		-
	Foot vent			○		-
	Foot vent Defroster vent	○		○	○	Not selected during automatic operation
	Defroster vent	○			○	Not selected during automatic operation

Air blows out from the vents marked with ○.

AUTO SWITCH

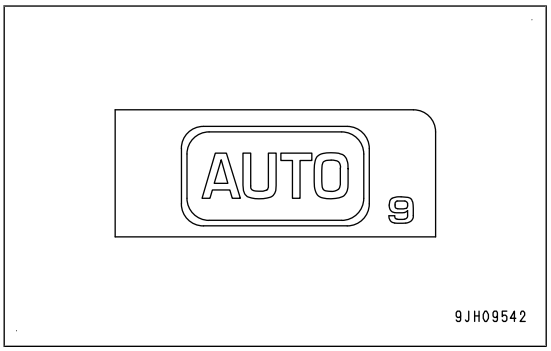
The auto switch is used to change the operation to the automatic operation.

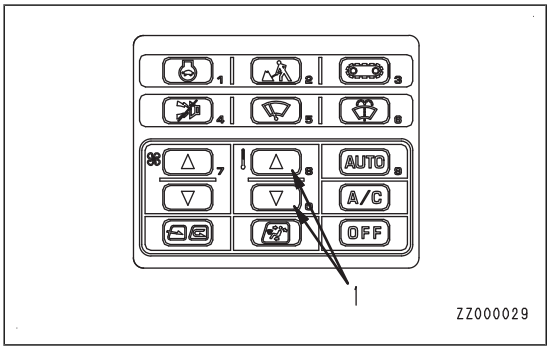
It changes the air flow, vents, recirculated air, and fresh air automatically in accordance with the set temperature and the ambient environment.

- Normally, push this switch, and use the temperature control switch (1) to set the temperature. The air conditioner operates in automatic mode.
- When you change the operation mode from automatic to manual, operate each switch to select the air flow rate, vents, and air source (FRESH/RECIRC).

REMARK

If the temperature is set to 18.0℃ or 32.0℃ during automatic operation, the air flow is set to “HIGH” all the time, but this is not a problem.





FRESH/RECIRC AIR SELECTOR SWITCH

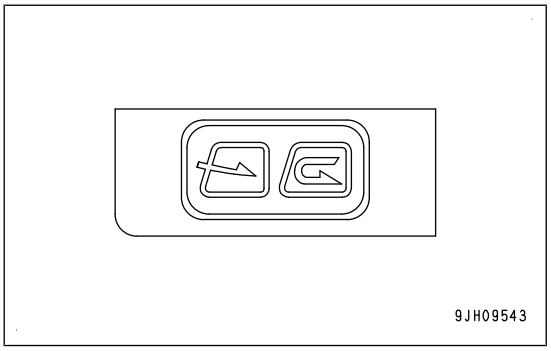
Use the FRESH/RECIRC air selector switch to change the air source between recirculation of the air in the cab and intake of fresh air.

The air source automatically changes between recirculation of the air in the cab and intake of fresh air during the automatic operation.

RECIRC

Fresh air is blocked. Air in the cab is recirculated.

Use RECIRC when you cool down the cab quickly or when fresh air is contaminated.



FRESH

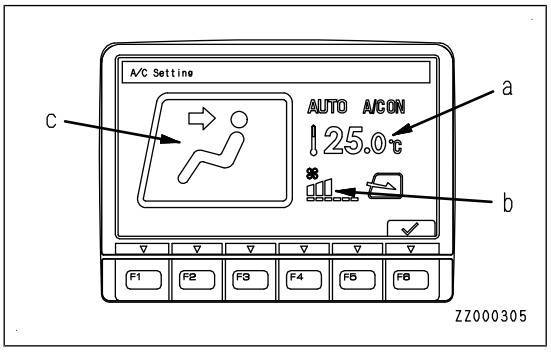
Outside air is taken into the cab.

Use FRESH when you take fresh air into the cab or remove fog from the windshield.

DISPLAY MONITOR

“A/C Setting” screen on the monitor shows the state of the temperature setting (a), the air flow rate (b), and the vents (c).

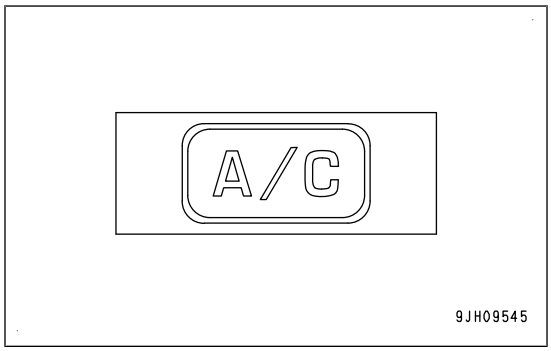
When the OFF switch is pushed, the display of the set temperature (a) and the air flow rate (b) goes off, and the operation stops.



AIR CONDITIONER SWITCH

Use the air conditioner switch to turn on or off the cooling/dry heating function.

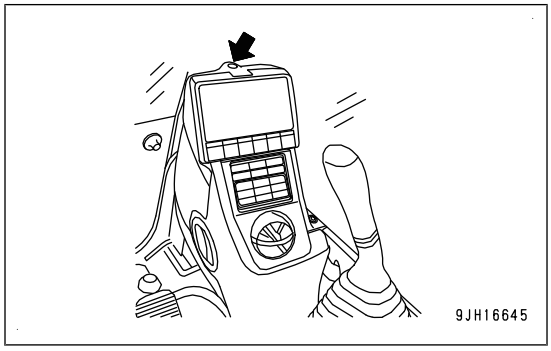
- When the fan is in operation (air flow level is shown on the air conditioner display), the air conditioner turns on or off each time the air conditioner switch is pushed.
- While the fan stops, the air conditioner does not operate.



SUNLIGHT SENSOR

The sunlight sensor senses the strength of the sunlight during automatic operation of the air conditioner . The sunlight sensor adjusts the air flow from the vents automatically against the strength of the sunlight.

It senses the changes in the temperature inside the cab caused by the sudden changes in the strength of the sunlight in advance, and automatically adjusts the air temperature from the vents.

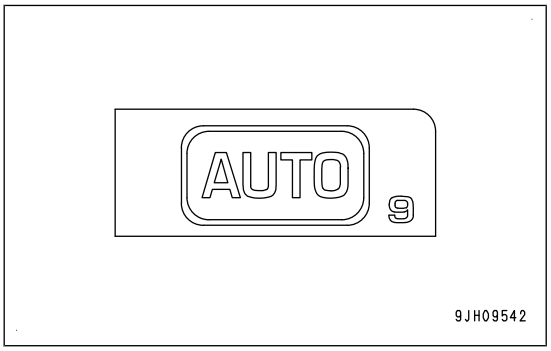


OPERATE AIR CONDITIONER

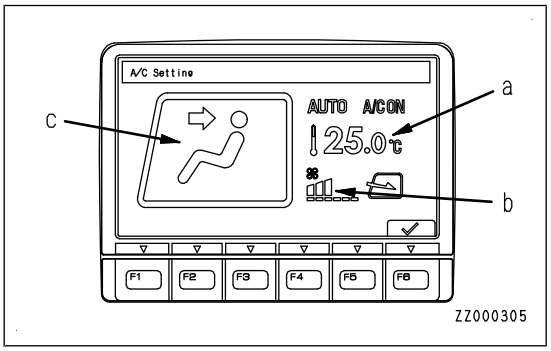
The air conditioner can be operated automatically or manually. Select the method of operation as you like.

USE AUTOMATIC OPERATION

1. Push the Auto switch.

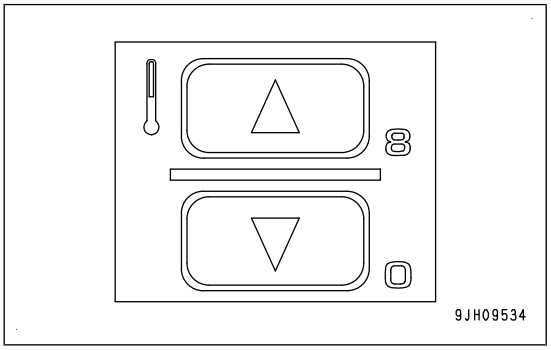


The set temperature (a) and the air flow rate (b) are shown on “A/C Setting” screen.



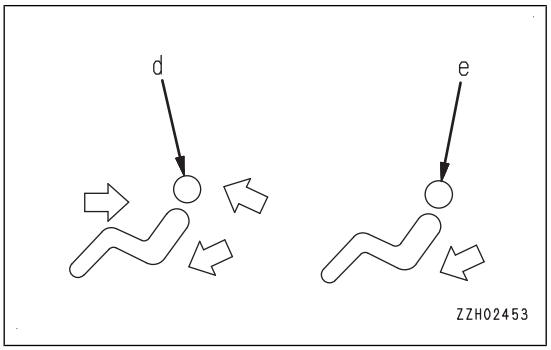
2. Push △ or ▽ on the temperature control switch to set to the desired temperature.

   The air flow rate, vents, and FRESH/RECIRC air are automatically selected in accordance with the set temperature and ambient environment, and the air conditioner operates automatically to provide the set temperature.



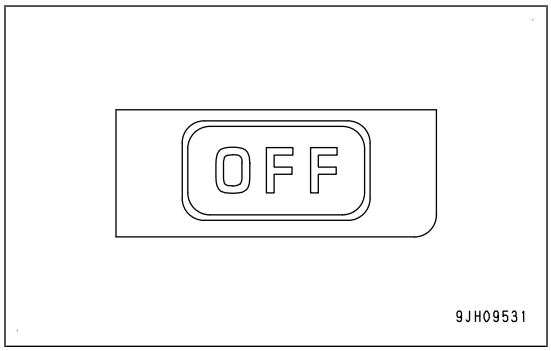
REMARK

When the vent (c) display shows (d) or (e), and engine coolant temperature is low, the air flow rate is automatically controlled not to blow out cold air.



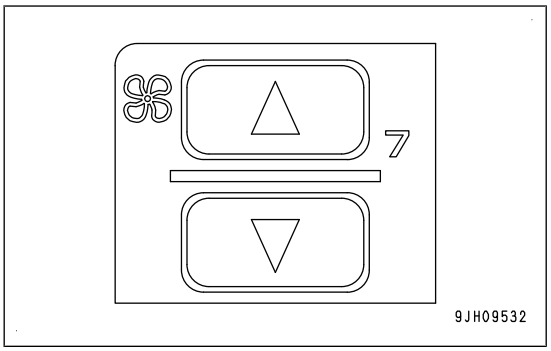
STOP AUTOMATIC OPERATION

Push the OFF switch.
The air conditioner stops.

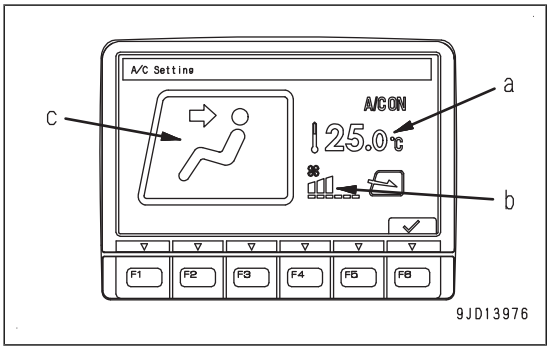


USE MANUAL OPERATION

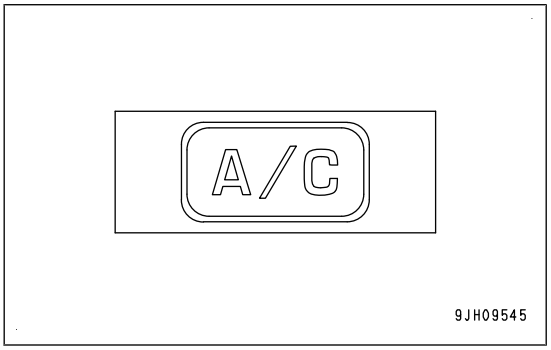
1. Push △ or ▽ on the fan switch to adjust the air flow.



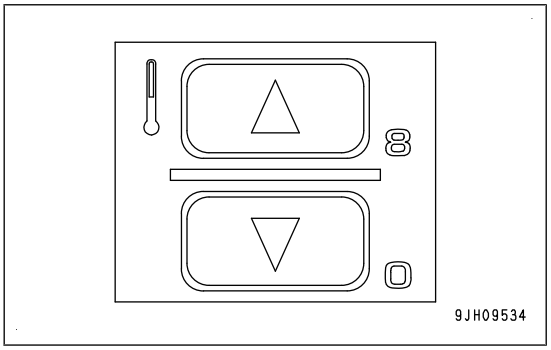
2. Check that the set temperature (a) and the air flow rate (b) are shown on “A/C Setting” screen of the monitor.



3. Push the air conditioner switch.

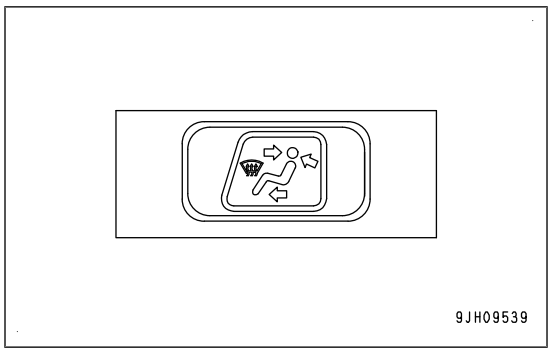


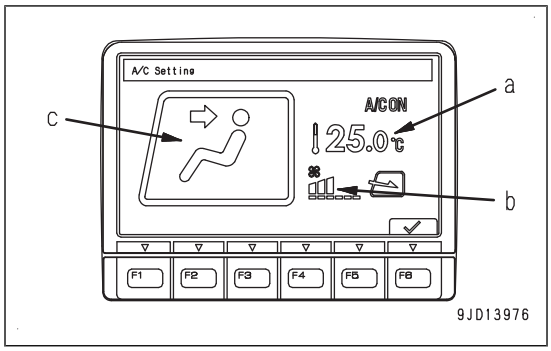
4. Push △ or ▽ on the temperature control switch to set to the desired temperature.



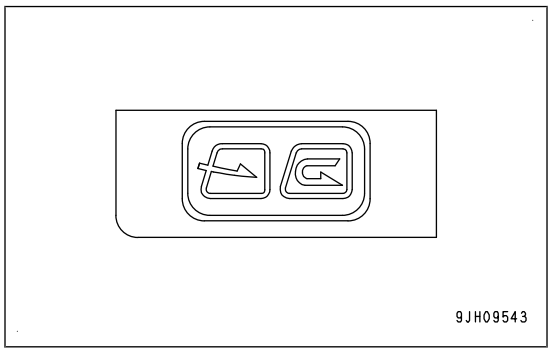
5. Push the vent selector switch to select the vent.

   The display for the vent (c) of the “A/C Setting” screen on the monitor changes by the selection.



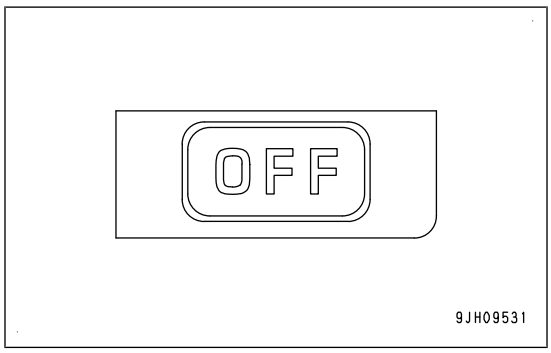


6. Push the FRESH/RECIRC air selector switch to select the recirculation of the air in the cab (RECIRC) or the intake of fresh air (FRESH).



STOP MANUAL OPERATION

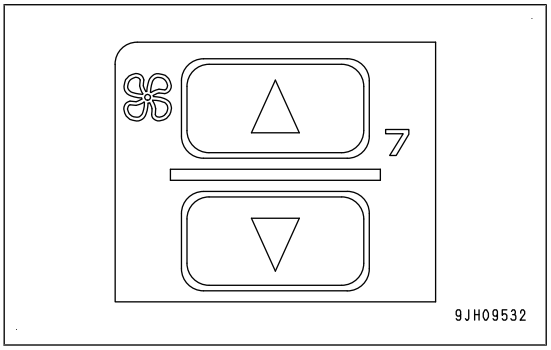
Push the OFF switch.
The air conditioner stops.



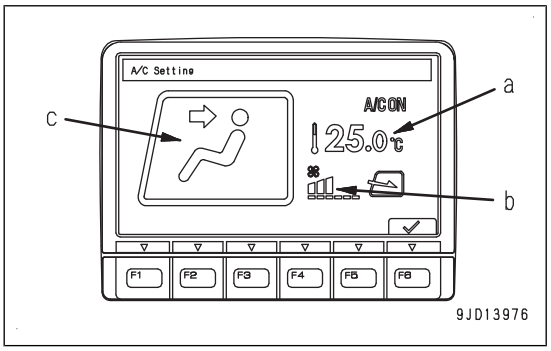
COLD AIR TO FACE AND WARM AIR TO FEET

To blow cold air to the face and warm air to the feet, operate the air conditioner as follows.

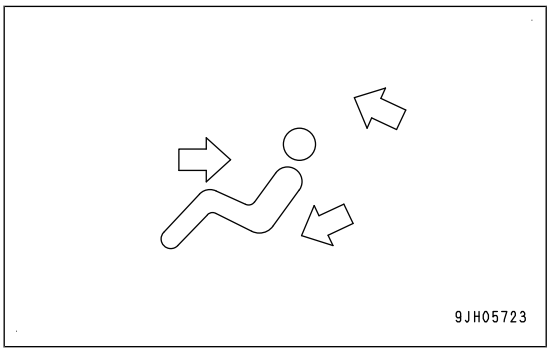
1. Adjust the air flow with the fan switch.



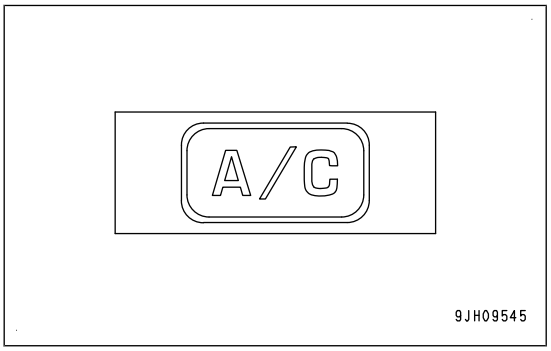
2. Check that the set temperature (a) and the air flow rate (b) are shown on “A/C Setting” screen of the monitor.



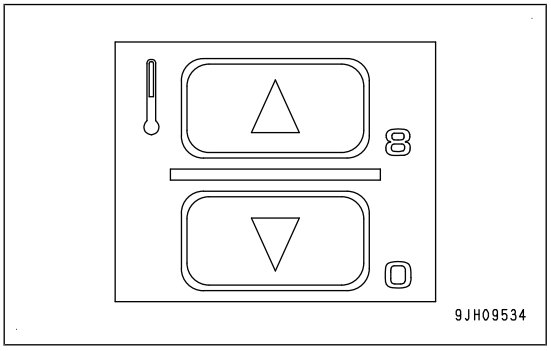
3. Push the vent selector switch to set the display of the vent (c) as shown in the figure.



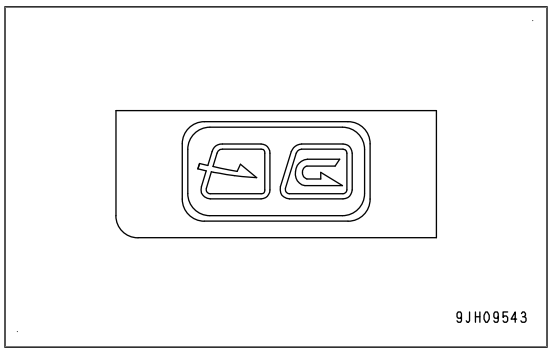
4. Push the air conditioner switch to activate the dry heating function.



5. Adjust the temperature with the temperature control switch.

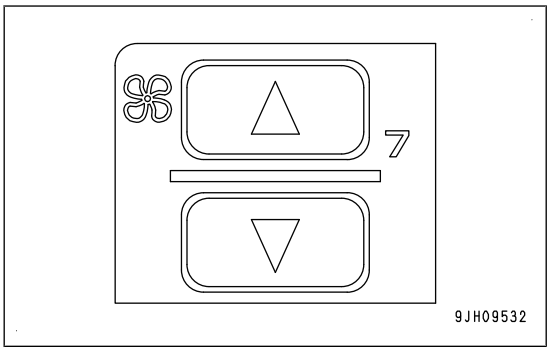


6. Use the FRESH/RECIRC air selector switch to select the recirculation of the air in the cab (RECIRC) or the intake of fresh air (FRESH).

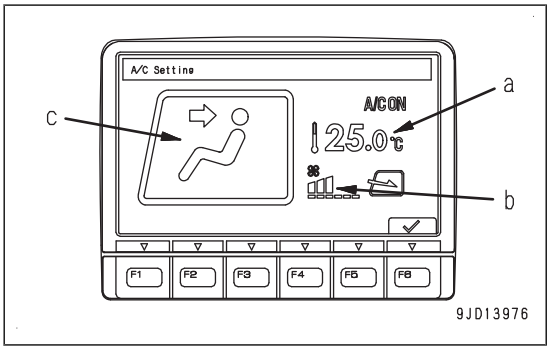


USE DEFROSTER

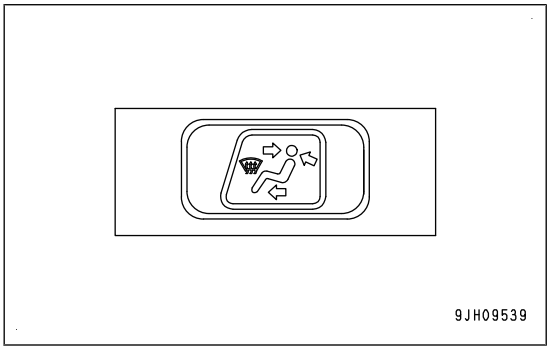
1. Adjust the air flow with the fan switch.

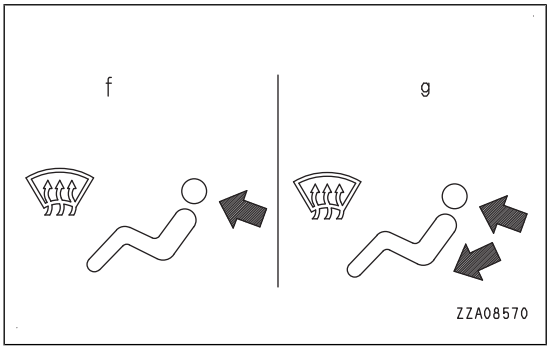


2. Check that the set temperature (a) and the air flow rate (b) are shown on “A/C Setting” screen of the monitor.

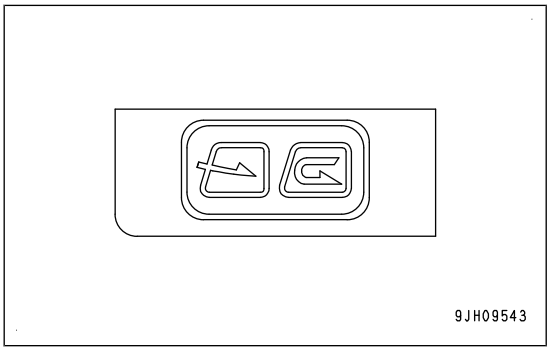


3. Push the vent selector switch, and set the display of the vent (c) as shown in the figure (f) or (g).

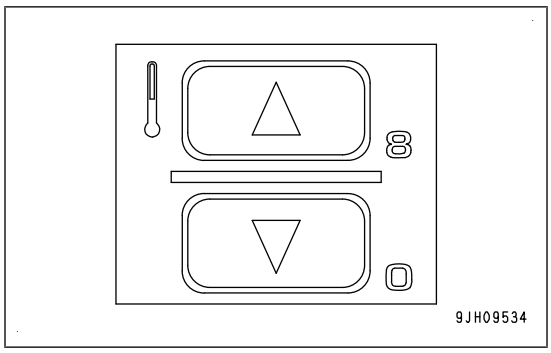




4. Push the FRESH/RECIRC air selector switch and set the mode to FRESH.



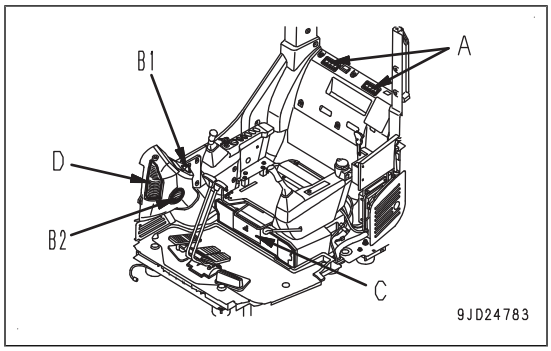
5. Push the temperature control switch to set the temperature to max. heating.



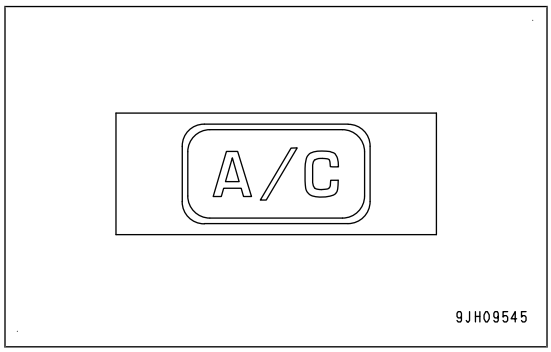
6. Adjust the vents (A), (B1), (B2) to let the air blow come to the window glass.

REMARK

The vents (C), (D) are fixed type.



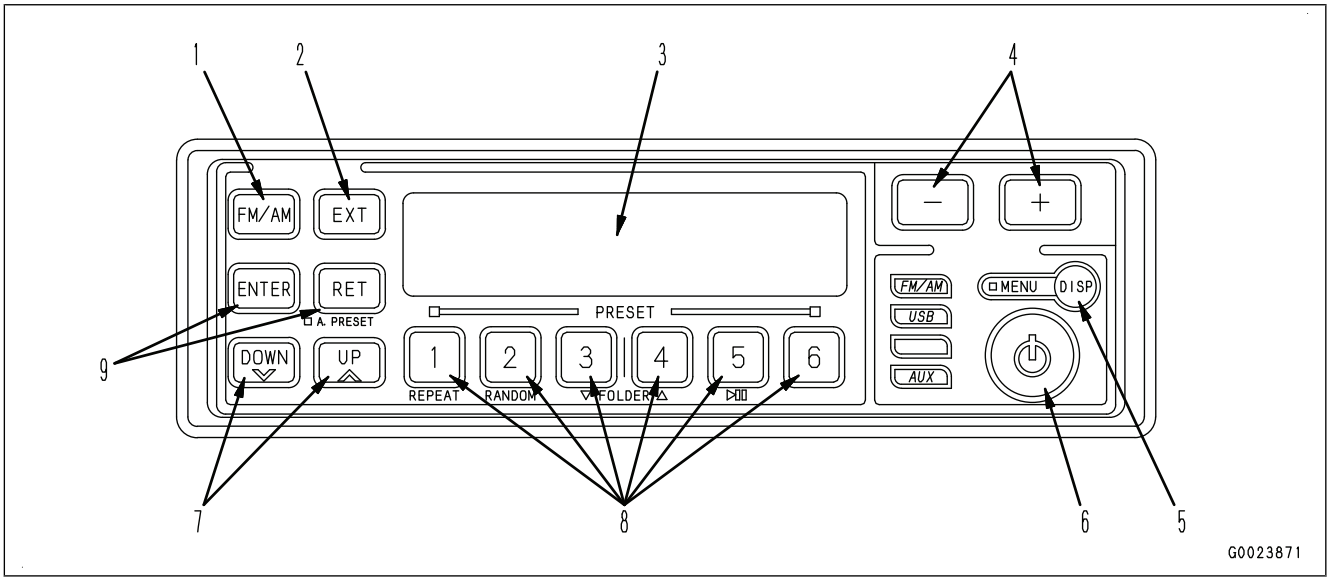
7. When you get the window clear or dehumidify it, push the air conditioner switch to activate cooling or dry heating.



RADIO

- To keep the safety, adjust the sound volume to a level where you can hear the external sounds.
- Do not splash the water on the speaker or radio. If water goes into them, it can cause a failure.
- Do not wipe the display or switches with solvent such as benzene or thinner. When you clean the display, use clean, dry, and soft cloth. Use a moderate cleaner if necessary.
- When the battery disconnect switch is set to the OFF position or the power for the machine is turned off for the work such as replacement of the battery, the clock can be initialized. In such case, set the clock again.

RADIO EQUIPMENT



(1) Radio band selector switch
(2) AUX selector switch
(3) Display
(4) Volume control switch
(5) Display selector switch
(6) Power switch
(7) Tuning/time setting switch
(8) Preset/audio switch
(9) Menu switch

RADIO BAND SELECTOR SWITCH

You can select the desired band with the radio band selector switch.

The display changes in the order of FM1, FM2, and AM each time the radio band selector switch is pushed.

AUX SELECTOR SWITCH

You can select the desired external source with the AUX selector switch.

The display changes in the order of USB, Bluetooth®, and AUX each time the AUX selector switch is pushed.

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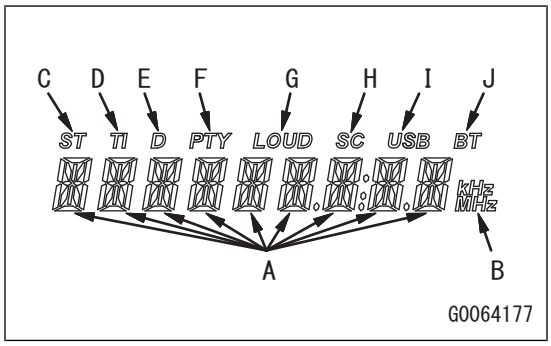
DISPLAY



You can check the information that follow on the display.

(A) Source name, frequency, and other character/numeric information are shown.

(B) Unit of frequency is shown.

(C) Lights up when a stereo signal is received while FM1 or FM2 is selected.

(D) Not used

(E) Not used

(F) Not used

(G) Lights up when the loudness is set to ON.

(H) Not used

(I) Lights up when the USB flash drive or USB device is connected.

(J) Lights up when the Bluetooth® connection is active.

VOLUME CONTROL SWITCH

You can adjust the volume with the volume control switch.

The range of the volume is 0 to 32.

Push the (+) switch to increase the volume. Push the (-) switch to decrease the volume.

Hold down the volume control switch to change the volume continuously.

If the volume control switch is not operated for 5 seconds, the screen returns to the previous screen.

DISPLAY SELECTOR SWITCH

You can change the contents of display with the display selector switch.

The display items changes by the selected source.

When FM1, FM2, or AM is selected

The display changes in the order of the source name, frequency, and clock each time the display selector switch is pushed.

When USB connection is selected

Each time you push the display selector switch, the display changes in the order of the Source Name, Folder Name, Artist Name, Album Name, Title Name, Track Number/Time, and Clock.

When Bluetooth® connection is selected

The display changes in the order of the Source Name and Clock each time the display selector switch is pushed.

When AUX connection is selected

The display changes in the order of the Source Name and Clock each time the display selector switch is pushed.

POWER SWITCH

Use the power switch to turn on or off the radio.

The radio turns on or off each time the power switch is pushed.

When the radio is turned on, the selected source is shown on the display.

When the radio is turned off, the clock is shown.

TUNING/TIME SETTING SWITCH

Use the tuning/time setting switch to do operations as follows.

- Selection of radio frequency
- Clock setting
- Sound adjustment
- Selection of each setting menu

PRESET/AUDIO SWITCH

When the radio source is selected

You can preset and select the radio station by the preset/audio switch.

It is possible to preset 6 stations each for AM, FM1, and FM2.

If you preset the desired radio stations, you can easily select each station with the switch.

When the external source is selected

You can control the audio device with the preset/audio switch.

MENU SWITCH

With the menu switch, you can enter each setting and go back to the menu selection.

USB

NOTICE

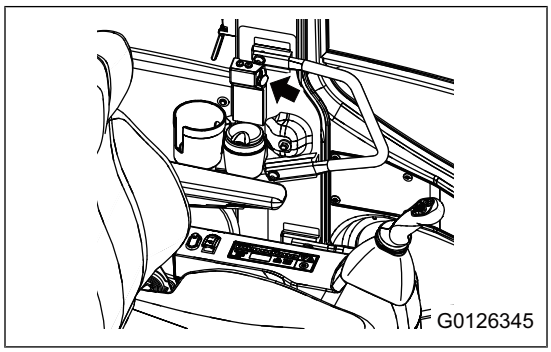
In the cases that follow, there is a possibility that you hear the noise.

- **When the input plug is pulled out while USB is selected**
- **When the plug of the equipment to connect is pulled out or pushed in**

Connect the external device to the USB port to play back the music file.

The A type USB connector can be connected.

Open the cap shown in the figure and connect the device.



When USB flash drive is connected

You can play back the files that are saved in the USB flash drive as follows.

Supported formats for USB audio

Item	MP3	WMA	AAC
Applicable format	MPEG 1/2, 2.5 Applicable for the Layer 1, 2, 3	Compliant with Windows Media Audio (Not applicable for DRM)	Applicable for MPEG4 AAC-LC (Not applicable for DRM)
Extension	mp3	asf, wma	m4a, 3gp, mp4

It does not guarantee the operation in all of the formats listed in the table. There is a possibility that the file is protected or in some conversion method, it cannot be played.

Even if the audio files are listed in the table, in some types and states of the medium or equipment, it cannot be played.

When you connect a smartphone or a portable music player

You can play back the music files that are saved in a smartphone or a portable music player.

Some operating systems do not support the playback of music files.

Bluetooth®

By the pairing of the Bluetooth® audio player, you can connect the radio and play the music files.

For details, see “PAIRING (3-262)”.

The Bluetooth® profiles below are supported.

- A2DP
- AVRCP

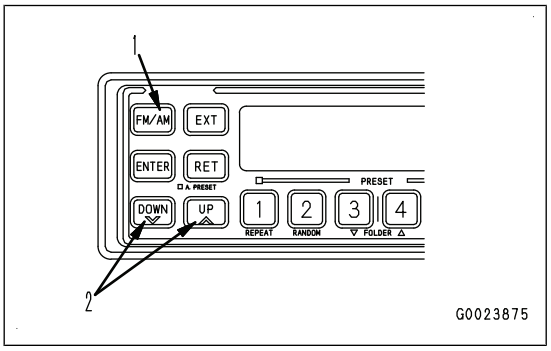
In some versions of the Bluetooth®, connection cannot be done.

Even if the Bluetooth® profile of the equipment is supported, the Bluetooth® connection cannot be done, or the display and actuation could be different by the characteristics and specifications of the destination equipment.

OPERATE RADIO

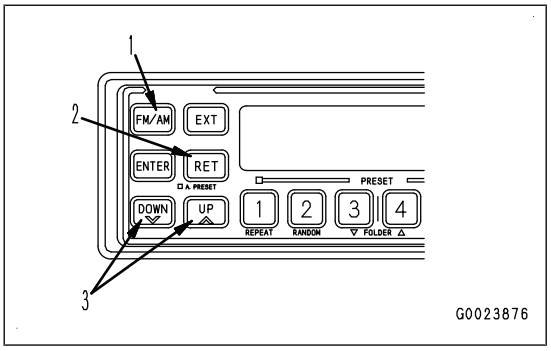
OPERATE RADIO WHEN YOU LISTEN

ADJUST FREQUENCY



1. Push the radio band selector switch (1) and select FM1, FM2, or AM.
2. Push the tuning/time adjustment switch (2) to adjust the frequency.
   - Push the UP switch to increase the frequency.
   - Hold down the UP switch to increase the frequency continuously.
     When the UP switch is released at this state, the tuning stops automatically at the frequency in good reception.
   - Push the DOWN switch to decrease the frequency.
   - Hold down the DOWN switch to decrease the frequency continuously.
     When the DOWN switch is released at this state, the tuning stops automatically at the frequency in good reception.

AUTO PRESET SETTING

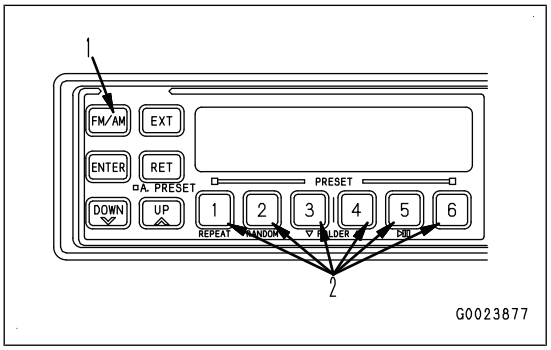


1. Push the radio band selector switch (1) and select FM1, FM2, or AM.
2. Hold down the RET switch (2) on the menu switch.

   Push the tuning/time setting switch (3) to cancel the sensing.

   When a frequency in good reception is sensed, it is automatically registered to preset memories 1 to 6.

LOAD PRESET



1. Push the radio band selector switch (1) and select FM1, FM2, or AM.
2. Push one of the 1 to 6 switches of the preset/audio switch (2).

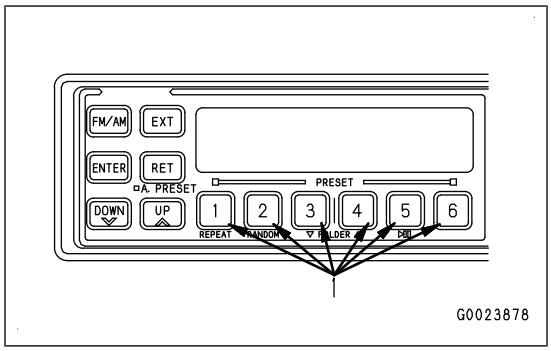
   The frequency registered in the preset number is called up and received.

   The preset number which is received and the frequency are shown on the display.

PRESET STATION

Hold down one of 1 to 6 of the preset/audio switches (1) during radio reception.
The preset number flashes 3 times, then the currently received frequency is shown.

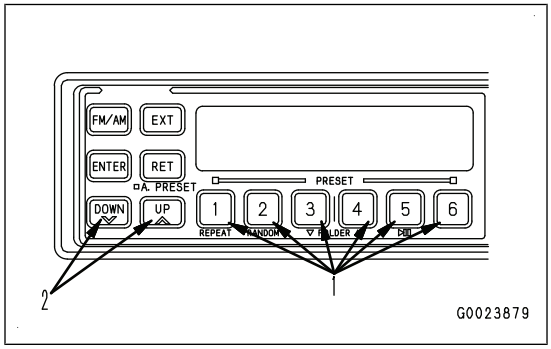
The currently received frequency is registered to the selected preset number.



PLAY MUSIC WITH USB CONNECTED

OPERATE WITH USB FLASH DRIVE CONNECTED

When you connect the USB flash drive to the USB port, operate it as follows.



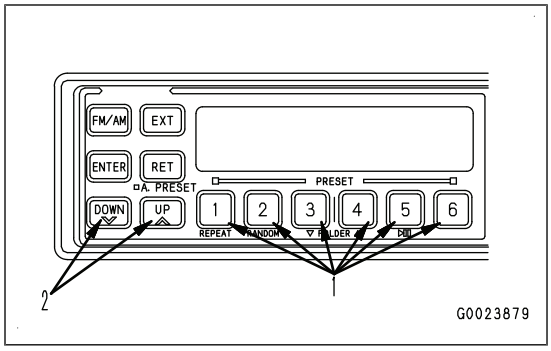
- Push the 5 of the preset/audio switch (1) to play back or pause.
  The current track is played back or paused.
- Push the tuning/time setting switch (2) to move the track.
  The track moves.
- Push the 3 or 4 of the preset/audio switch (1) to move the folder.
  The folder moves.
- Push the 1 of the preset/audio switch (1) for the repeat playback.
  The playback mode changes in the order of File Repeat, Folder Repeat, and Repeat OFF each time the1 of the preset/audio switch (1) is pushed.
- Push the 2 of the preset/audio switch (1) for random playback.
  The playback mode changes in the order of Random Playback and Random Stop, each time 2 of the preset/audio switch (1) is pushed.

CONNECT SMART PHONE OR MOBILE MUSIC PLAYER WITH USB

The situations that follow can occur by the device to connect or by the version.

- Operation method is different.
- Action is different.
- Music cannot be played.

When you connect a smartphone or a portable music player to the USB port, operate it as follows.



- Push the 5 of the preset/audio switch (1) to play back or pause.
  The current track is played back or paused.
- Push the tuning/time setting switch (2) to move the track.
  The track moves.
- Push the 3 or 4 of the preset/audio switch (1) to move the folder.
  The folder moves.
- Push the 1 of the preset/audio switch (1) for the repeat playback.
  The playback mode changes in the order of File Repeat, Folder Repeat, and Repeat OFF each time the1 of the preset/audio switch (1) is pushed.
- Push the 2 of the preset/audio switch (1) for shuffle playback.

The playback mode changes in the order of Shuffle Playback, Shuffle Playback by Album, and Shuffle Stop each time the 2 of the preset/audio switch (1) is pushed.

The Shuffle Playback by Album is not available for some models of device.

PLAY MUSIC WITH Bluetooth® CONNECTED

The situations that follow can occur by the device to connect or by the version of the Bluetooth®.

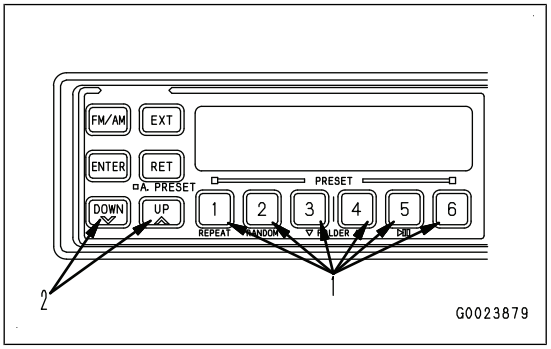
- Operation method is different.
- Action is different.
- Music cannot be played.

Do the pairing (Bluetooth® device authentication) to do the Bluetooth® connection.

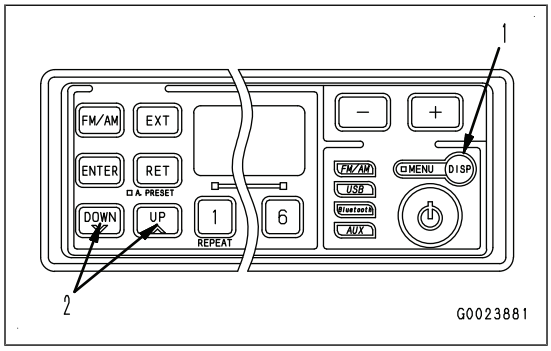
For details, see “PAIRING (3-262)”.

When you do the Bluetooth® connection, operate it as follows.

- Push the 5 of the preset/audio switch (1) to play back or pause.
  The current track is played back or paused.
- Push the tuning/time setting switch (2) to move the track.
  The track moves.
- When you do the operations that follow, operate from the connected playback device.
  - Move folder
  - Change playback mode (Repeat or Random)



RADIO SETTING



1. Hold down the display selector switch (1) to move to the menu screen of the setting mode.
2. Push the tuning/time setting switch (2) to select the setting items.

   The setting items are different when the power supply is turned ON or OFF.

   - When the power supply is turned ON, the display changes in the order of Sound Balance adjustment, Treble adjustment, Bass adjustment, Loudness adjustment, Clock adjustment, Pairing (Bluetooth® device authentication), Charge Mode, Destination display, and Version display.
   - When the power supply is turned OFF, the display changes in the order of Clock adjustment, and Pairing (Bluetooth® device authentication).

SOUND BALANCE SETTING

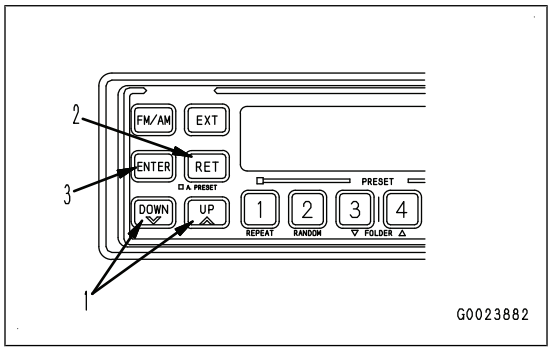
You can set it only when the power is turned on.

You can adjust the ratio of the right and left sound which is outputted from the speaker.

The default value is 0.

1. Change the screen to the menu screen of setting mode.

   For details, see “RADIO SETTING (3-259)”.



2. Push the tuning/time setting switch (1) and select “BALANCE”.
3. Push the ENTER (3) on the menu switch while “BALANCE” is shown.

   You can adjust the sound balance.
4. Push the tuning/time setting switch (1) to adjust the sound balance.
   - When the UP switch is pushed, the speaker output on the R side increases by 1.
     You can select from R1 to R10.
   - When the DOWN switch is pushed, the speaker output on the L side increases by 1.
     You can select from L1 to L10.
   - Push the RET (2) on the menu switch to return to the previous step.
5. Push the ENTER (3) on the menu switch to validate the adjusted value.

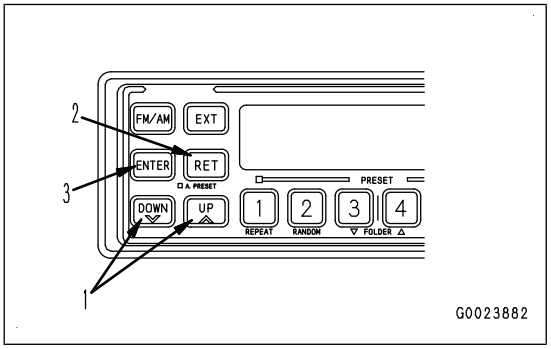
HIGH REGISTER RANGE (TREBLE) SETTING

You can set it only when the power is turned on.

You can adjust the sound quality of the treble part which is outputted from the speaker.

The default value is 0.

1. Change the screen to the menu screen of setting mode.
   For details, see “RADIO SETTING (3-259)”.
2. Push the tuning/time setting switch (1) and select “TREBLE”.
3. Push the ENTER (3) on the menu switch while “TREBLE” is shown.
   You can adjust the level of high register range.
4. Push the tuning/time setting switch (1) to adjust the level of high register range.
   - When the UP switch is pushed, the treble level increases by 1.
     The maximum value is +10.
   - When the DOWN switch is pushed, the treble level decreases by 1.
     The minimum value is -10.
   - Push the RET (2) on the menu switch to return to the previous step.
5. Push the ENTER (3) on the menu switch to validate the adjusted value.



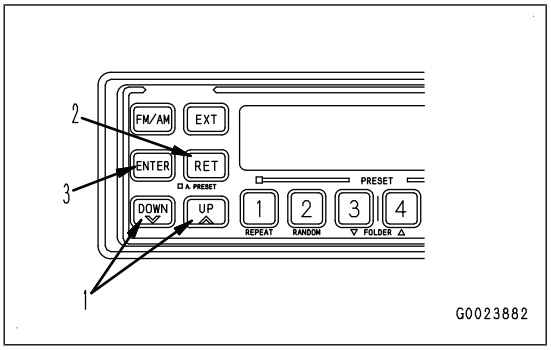
LOW REGISTER RANGE (BASS) SETTING

You can set it only when the power is turned on.

You can adjust the sound quality of the bass part which is outputted from the speaker.

The default value is 0.

1. Change the screen to the menu screen of setting mode.
   For details, see “RADIO SETTING (3-259)”.
2. Push the tuning/time setting switch (1) and select “BASS”.
3. Push the ENTER (3) on the menu switch while the “BASS” is shown.
   You can adjust the level of low register range.
4. Push the tuning/time setting switch (1) to adjust the level of low register range.
   - When the UP switch is pushed, the bass level increases by 1.
     The maximum value is +10.
   - When the DOWN switch is pushed, the bass level decreases by 1.
     The minimum value is -10.
   - Push the RET (2) on the menu switch to return to the previous step.
5. Push the ENTER (3) on the menu switch to validate the adjusted value.



LOUDNESS SETTING

You can set it only when the power is turned on.

You can increase the low register range and high register range when the sound volume is low.

The default value is the OFF.

1. Change the screen to the menu screen of setting mode.

   For details, see “RADIO SETTING (3-259)”.

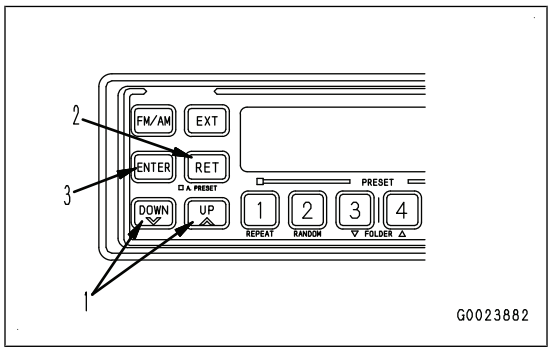
2. Push the tuning/time setting switch (1) and select “LOUDNESS”.

3. Push the ENTER (3) on the menu switch while “LOUDNESS” is shown.

   The loudness setting is available.

4. Push the tuning/time setting switch (1), and change the ON and OFF of the loudness setting.

   - When the loudness setting is the ON, the low register range and high register range are increased.
   - When the loudness setting is the OFF, the low register range and high register range are not increased.
   - Push the RET (2) on the menu switch to return to the previous step.



5. Push the ENTER (3) on the menu switch to validate the adjusted value.

CLOCK SETTING

You can set it regardless of ON/OFF of power supply.

1. Change the screen to the menu screen of setting mode.

   For details, see “RADIO SETTING (3-259)”.

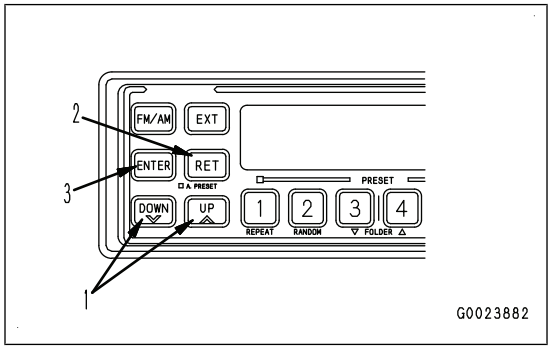
2. Push the tuning/time setting switch (1) and select “CLOCK”.

3. Push the ENTER (3) on the menu switch while “CLOCK” is shown.

4. Select 12-hour mode or 24-hour mode with the tuning/time setting switch (1), and push the ENTER (3) on the menu switch.

   Push the RET (2) on the menu switch to return to the previous step.

   The clock setting is available.



5. Push the tuning/time setting switch (1) to adjust the hour.

   - When the UP switch is pushed, “HOUR” display increases by 1.
   - When the DOWN switch is pushed, “HOUR” display decreases by 1.
   - Push the RET (2) on the menu switch to return to the previous step.

6. Push the ENTER (3) on the menu switch.

   You can adjust the minute display.

7. Push the tuning/time setting switch (1) to adjust the minute.

   - When the UP switch is pushed, “MINUTE” display increases by 1.
   - When the DOWN switch is pushed, “MINUTE” display decreases by 1.
   - Push the RET (2) on the menu switch to return to the previous step.

8. Push the ENTER (3) on the menu switch to validate the time.

PAIRING

You can set it regardless of ON/OFF of power supply.

It is an authentication of the Bluetooth® device which is used on this machine.

The maximum registration of the pairing is 16. From the 17th and after, the oldest information is overwritten by the newest one. If the information was overwritten and you cannot connect it, do the pairing again.

1. Change the screen to the menu screen of setting mode.

   For details, see “RADIO SETTING (3-259)”.

2. Push the tuning/time setting switch (1) and select “PAIRING”.

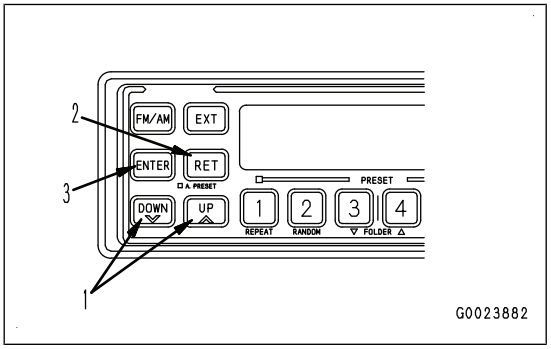
3. Push the ENTER (3) on the menu switch while “PAIRING” is shown.

   “PUSH ENT” is shown.

4. Push the ENTER (3) on the menu switch.

   “WAIT” is shown.

   When the preparation is completed, the pass key (4 digits) and the serial number (4 digits) of the Bluetooth® on radio side are shown alternately.



5. Do the pairing on the side of the device to connect, in this state.

   For the operation, obey the instruction manual of the device to connect.

   In some cases, a pass key can be required by the device to be connected. At this time, input the pass key which is shown on the radio.

   - When the pairing is done successfully, “PAIR OK” is shown.
   - If there is no response for 180 seconds, “TIMEOUT” is shown.

6. Push the RET (2) on the menu switch and go back to the menu screen.

   If “TIMEOUT” is shown, do the procedure from the start again.

BATTERY CHARGE MODE SETTING

You can set it only when the power is turned on.

If the device cannot be charged by the standard mode of USB connection, change to the battery charge mode.

The default value is the OFF.

The battery charge mode allows the charging only. The data communication such as playback of the music file cannot be done.

1. Change the screen to the menu screen of setting mode.

   For details, see “RADIO SETTING (3-259)”.

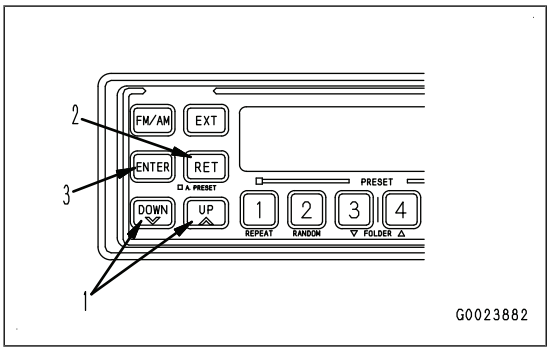
2. Push the tuning/time setting switch (1) and select “CHG MODE”.

3. Push the ENTER (3) on the menu switch while “CHG MODE” is shown.

   The charge mode can be changed.

4. Push the tuning/time setting switch (1), and change the ON and OFF of the charge mode.

   - When it is ON, the mode becomes the charge mode. It is only for charging. Data communication cannot be done.
   - When it is OFF, the mode becomes the normal mode. Charging and data communication are available.
   - Push the RET (2) on the menu switch to return to the previous step.



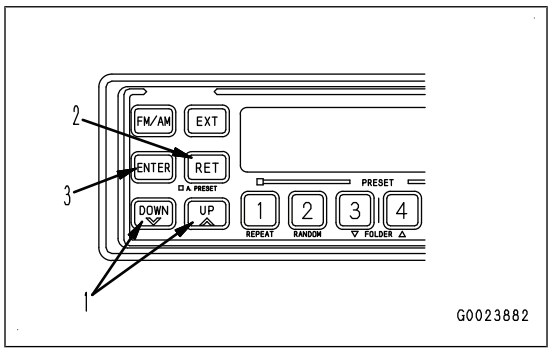
5. Push the ENTER (3) on the menu switch to validate the mode.

CHECK PRESET REGION OF RADIO

You can set it only when the power is turned on.

You can check the region of the radio frequency band.

1. Change the screen to the menu screen of setting mode.
   For details, see “RADIO SETTING (3-259)”.
2. Push the tuning/time setting switch (1) and select “REGION”.
3. Push the ENTER (3) on the menu switch while “REGION” is shown.
   The set value of the region is shown.
   The main regions are as follows.
   - JP: For Japan
   - AE: For Europe, Asia, Oceania
   - US: For North America
   - SA: For Central and South America
4. Push the RET (2) on the menu switch and go back to the menu screen.

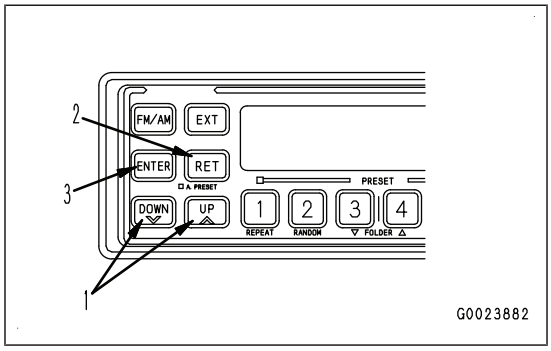


CHECK VERSION OF RADIO

You can set it only when the power is turned on.

You can check the version of radio.

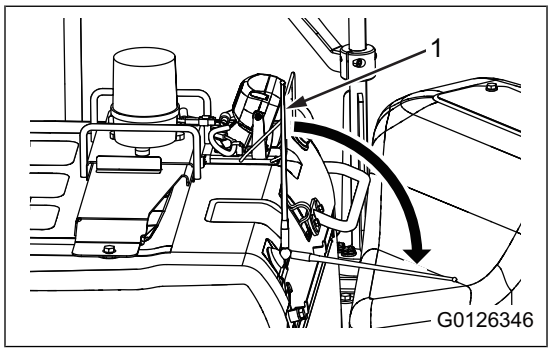
1. Change the screen to the menu screen of setting mode.
   For details, see “RADIO SETTING (3-259)”.
2. Push the tuning/time setting switch (1) and select “VERSION”.
3. Push the ENTER (3) on the menu switch while “VERSION” is shown.
   The version is shown.
4. Push the RET (2) on the menu switch and go back to the menu screen.



STOW ANTENNA

Before the transportation of the machine or storage in a building, stow the antenna to prevent interference.

1. Loosen the bolt of the antenna (1), and stow it to the bottom part.
2. Tighten the bolt to fix the antenna (1).



KomVision

⚠ WARNING

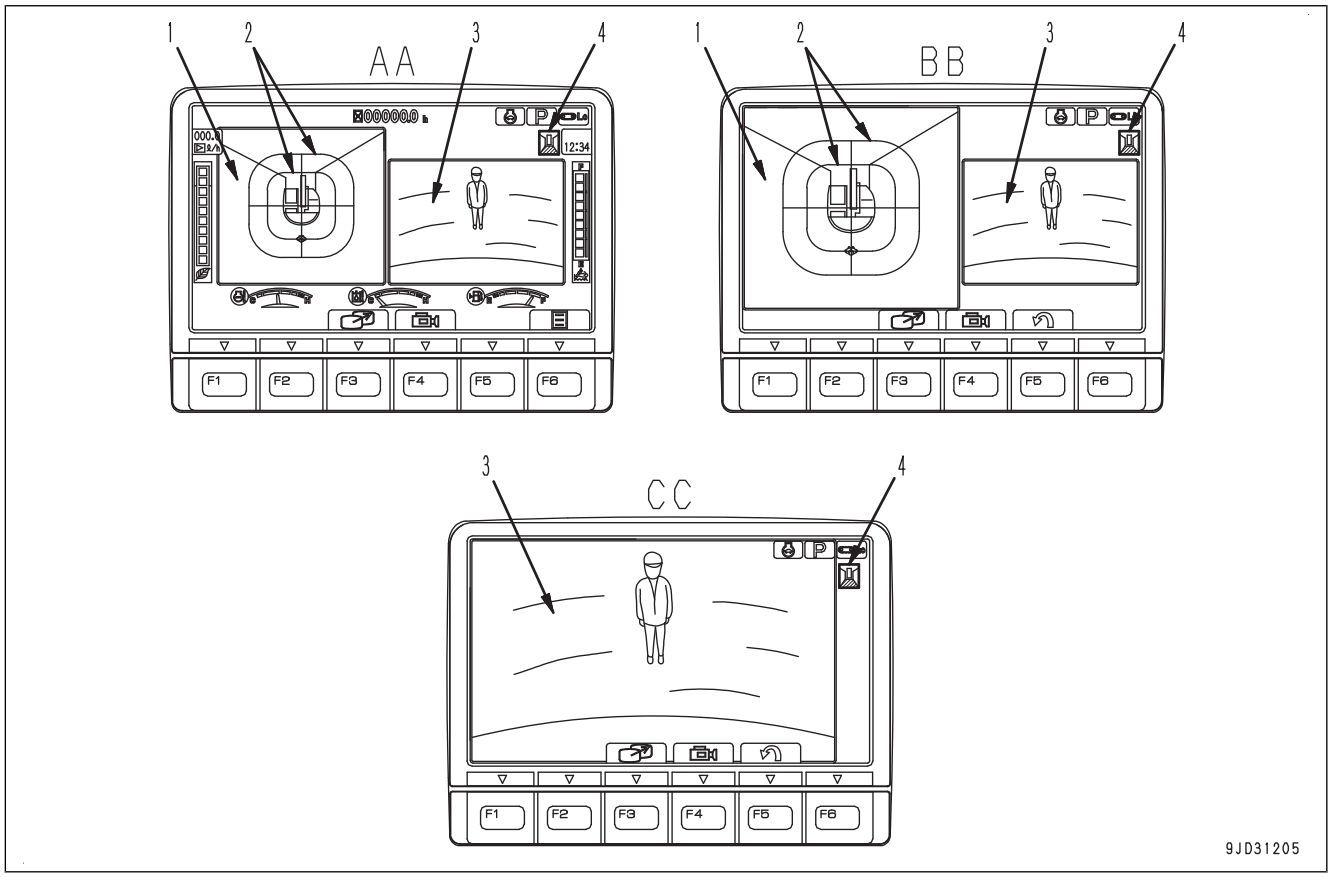
- **Physically make sure the adjacent safety around the machine. Do not make sure with just the monitor images.**
- **The work equipment will always show on the top of the monitor screen, regardless of the direction of the sprocket. Be aware of the direction of the machine.**

KomVision is the CCTV system for Komatsu machines.

PRECAUTIONS WHEN USING KomVision

- In these cases, it is necessary for a Komatsu distributor to adjust the monitor screen.
  - When you cannot confirm the normal range of the camera visibility
  - When the blade type or the overall length of the track is changed
- The monitor image may not be visible because of snow, fog, rain, dust, or insufficient light.
- Cameras do not display any obstacles at high position than camera. Do not hit any obstacles at high position than cameras, for example, working equipment of larger machine, or tree branches.
- The reference line is calibrated for flat ground. The distance of the reference line is not correct on slopes or rough ground.

MONITOR DISPLAY



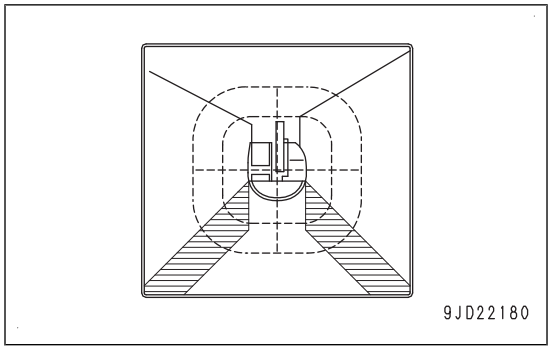
AA: Standard screen, BB: Enlarged bird's eye view display, CC: Camera image screen

(1) Bird's eye view display
(2) Reference line
(3) Camera image
(4) Camera image selection display

The KomVision synthesizes images of 3 or more cameras installed on the machine. It shows the bird's eye view of 270 degrees of area around the machine.

Because this image is electronically synthesized, the objects in the image can be shown double, or distortions or misalignment can occur in the shaded areas of the rear part of machine.

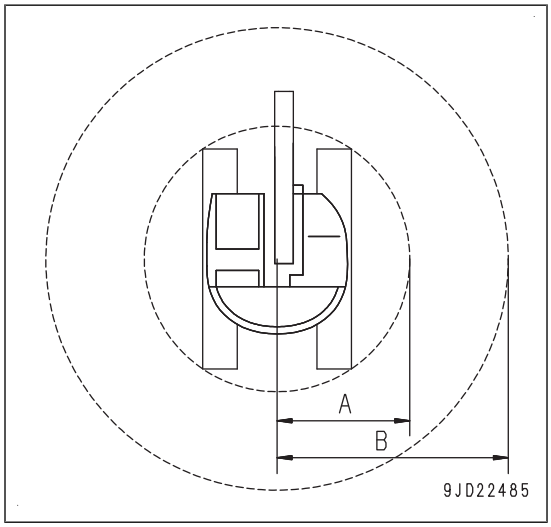
For the camera image, the image shot by each of the installed cameras is shown.



The reference line is shown as follows:

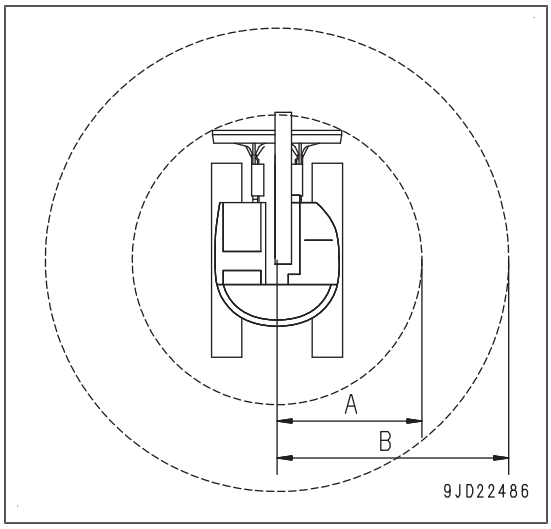
Display area of reference line for machines without blade

Display area	Display color
Swing radius of the track end when the machine swings (A)	Red
Swing radius of the track end when the machine swings +2m (B)	Yellow



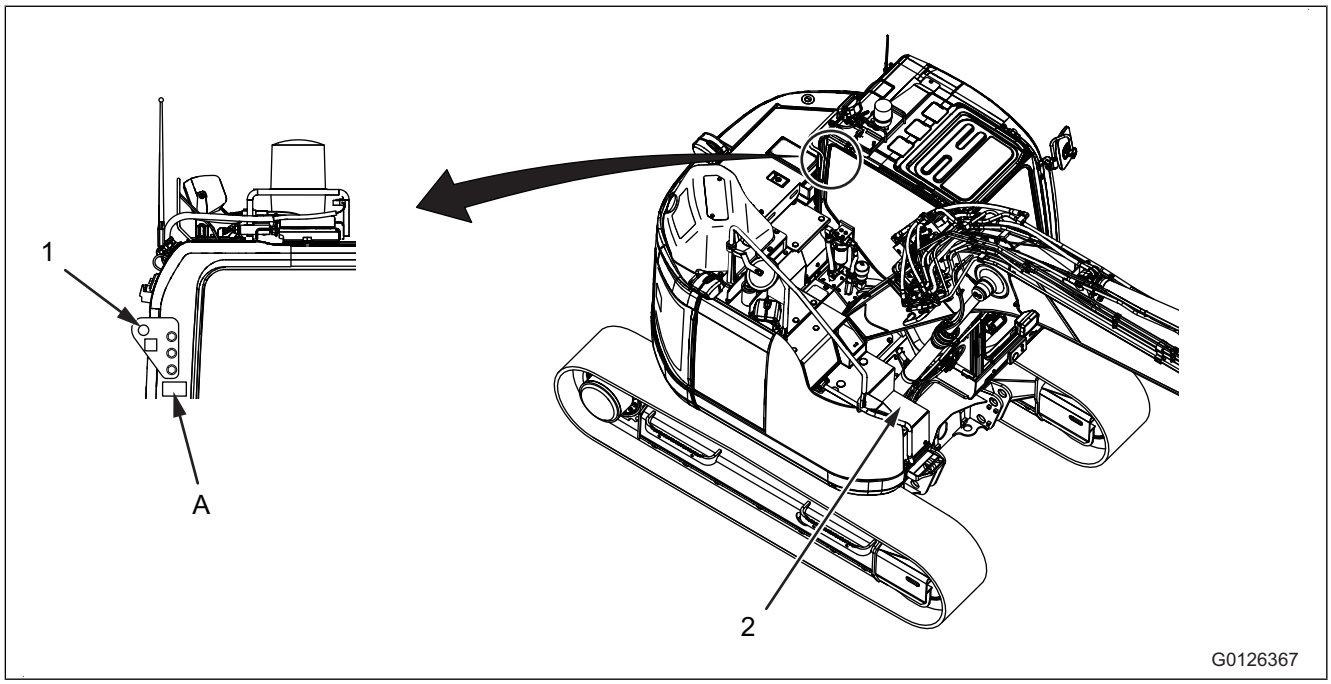
Display area of reference line for machines with blade

Display area	Display color
Swing radius of the right and left ends of the blade when the machine swings (A)	Red
Swing radius of the right and left ends of the blade when the machine swings +2m (B)	Yellow



If the blade is replaced or the track overall length is changed, consult your Komatsu distributor to adjust the camera image.

HANDLE ANCHOR POINT FOR TIE-OFF



You can install the personal fall-arrest equipment to the anchor point for tie-off (1).

Use it when you do the work on the step (2) and on the position higher than that as a foothold.

Do not set other ones than the hook of the personal fall-arrest equipment to the anchor point for tie-off.

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

HANDLE ROAD LINERS

(Road liner specification)

RECOMMENDED USE OF ROAD LINERS

The road liners have good features the steel shoes do not have. However, if they are used in the same manner as the steel shoes are, the features are not used fully.

Perform the optimum operation according to the condition of the site and contents of work.

COMPARISON OF ROAD LINERS AND STEEL SHOES

	Road liner	Steel shoe
Less vibration	◎	△
Smooth travel (No creak)	○	○
Small sound	◎	△
No risk of damaging pavement	◎	△
Resistant to damage	○	◎
Large traction force	◎	◎

◎: Very good

○: Good

△: Fair

The road liners have many advantages for the performance unique to their material, but the weak point is the strength. Accordingly, you can extend the service life of the road liner and use their advantages fully by understanding their features and observing the prohibited matter and precautions for handling.

Before using, be sure to read “PRECAUTIONS WHEN USING ROAD LINERS”.

WARRANTY OF ROAD LINERS

The warranty does not cover any damage caused by a customer's mistake, including neglect of check and maintenance of the track tension, disregard of prohibited matter such as “operation on the corners of a steel plate, a U-bend trap, a concrete block, reinforcing bars, scrap steel, etc. which can cut the road liner” and precautions.

PRECAUTIONS WHEN USING ROAD LINERS

Prohibited operations

Do not perform the following work.

- If the machine is operated or swung on crushed stones, very irregular hard rock-bed, reinforcing bars, scrap steel, edges of steel plates, the road liner can be damaged.
- In a riverbed, etc. where there are many large boulders, the road liner may be damaged by stones caught in them and may come off the rollers. If the machine is used to doze forcibly while the shoes slip, the service lives of the road are shortened.
- Take care that oil, fuel, or chemical solvent does not stick to the road liner. If any of them sticks, wipe it off immediately. Do not travel on a road where oil, etc. is accumulated.
- When storing the machine for a long period (3 months or more), store it indoors to avoid direct sunlight and rain.
- Do not drive the machine into a high temperature place such as a bonfire, steel plate exposed to the hot sun, newly spread asphalt, etc.
- If the rubber parts of the road liner are worn and damaged and the mounting bolt heads are damaged, replace the shoes with new ones immediately. If the head of a bolt is crushed, that bolt cannot be removed.

- Install to all the links of the right and left tracks always when installing the road liner. If it is installed partially or to only one portion, its service life is shortened remarkably.

Precautions during operation

When operating, observe the following.

- Do not make a pivot turn on a concrete road since rubber marks are made on the road surface.
- Avoid turning sharply whenever possible, since that can cause early wear and chipping of the road liner.
- Avoid turning on a large level difference. When riding over a level difference, travel perpendicularly to it to prevent the shoes from coming off.
- Once you raise the machine by using the work equipment, lower it slowly.
- Avoid handling crushed and oily material (cakes of soybean, corn, rapeseed, etc.) or wash the machine with water after the work.
- Avoid handling salt, ammonium sulfate, potassium chloride, potassium sulfate, and triple superphosphate or wash the machine with water after the operation since they corrode the adhesive of the core metal.
- Do not use the rubber shoes and road liners on seashore since the adhesive of the core metal is corroded by the salt.
- When the road liners are used to handle salt, sugar, wheat, soybeans, etc., if it has a deep cut, rubber chips may be mixed in the handled material. To prevent this, repair any cut before using.
- Do not rub the road liner against concrete ridges, walls, etc. during operation.
- The road liners are very slippery on wet steel plates, snow-covered or frozen road surfaces, or clay soil. Beware of slipping and skidding when traveling or working on a slope.
- If the road liners are used in an extremely cold district, their characteristics change and their service lives are shortened accordingly.
- Use the road liner in a temperature range from -25 to +65 °C.
- Take care not to damage the road liner with the bucket during operation.

TRANSPORTATION

Obey the related laws and regulations, and transport the machine safely.

Transportation

When you transport the machine, select the transportation method in reference to the weight and dimensions shown in “SPECIFICATIONS: PC138US-11E0 (5-2)”.

Be careful that the weight and dimension can be different by the type of track or arm, etc.

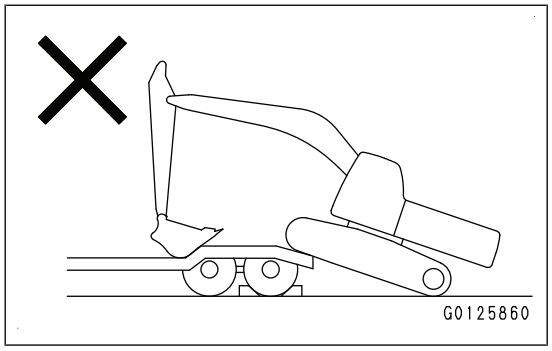
LOAD AND UNLOAD A TRAILER

Precautions when you load and unload

⚠ WARNING

Always obey the items below when you do loading or unloading operation.

- **Do the work on a firm and level area.**
- **Keep a sufficient distance from the road shoulder.**
- **Be sure to turn off (cancel) the auto-deceleration switch. If the auto-deceleration switch is ON and you operate the machine, the machine starts suddenly in some cases.**
- **Before you load or unload the machine, let the machine be in the state that follows.**
  - **Set the travel speed to low speed (Lo) and set the engine speed to low idle.**
  - **Do the warm-up operation until the engine's revolution becomes stable.**
- **Travel with low speed when you load or unload the machine.**
- **Always use ramps. It is dangerous to use the work equipment for loading and unloading operations.**
- **Do not change the direction on the ramps. If you change the direction, the machine can fall over. Go back to the ground from the ramps, or go back onto the trailer platform and correct the direction.**
- **On the ramps, do not operate the levers other than the travel lever.**
- **Slowly travel over the border of the ramps and the trailer. The gravity center of the machine can suddenly move to cause the machine to fall over.**



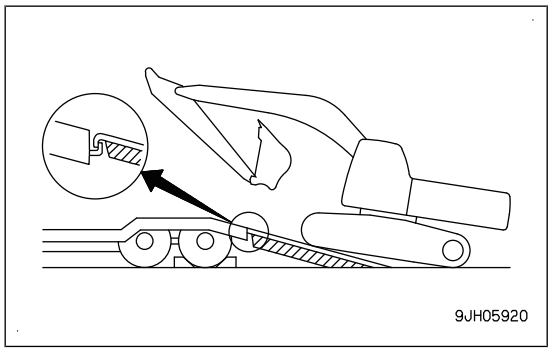
- **If it is necessary to swing the upper structure on the trailer platform, because the footing is not stable, be careful not to let the machine fall over. When the work equipment is installed, the machine is not stable. Slowly swing the upper structure with the work equipment pulled in.**
- **Allocate a signalman to give guidance not to let the machine come off the ramps. Be careful of the safety.**
- **Be sure to keep the cab door fixed at the opened state or closed state.**

Precautions for ramps and platform

⚠ WARNING

Always obey the items below for the ramps and platform.

- **Select ramps with allowable width, length, thickness, and strength. Be sure to fix the ramps to the trailer to keep its slope at 15° or less.**
- **When piled soil is used for the platform, compact the piled soil fully to prevent breakage of slope face.**
- **Before the loading or unloading, clean the machine's undercarriage and the ramps to prevent a sideways slip. Oil, mud, ice, or snow around the machine's undercarriage or on the ramps is dangerous because it causes slippage.**



- **Do not open or close the cab door on the ramps or platform. There is a danger that door opens and closes suddenly by its own weight.**

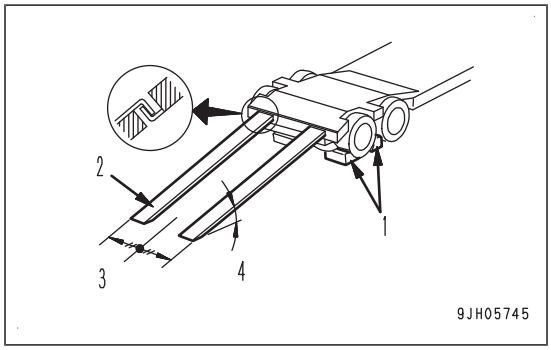
PROCEDURES TO LOAD MACHINE

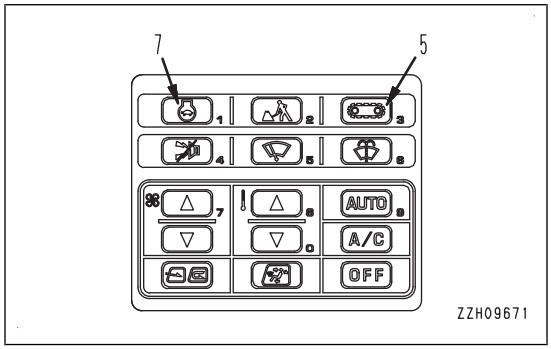
1. Park a trailer on a flat and firm ground.

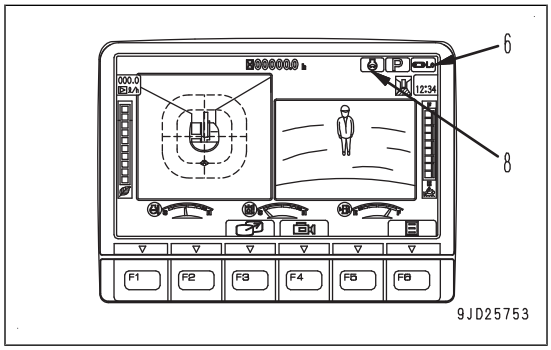
   Keep a sufficient distance from the road shoulder.
2. Apply the brake of the trailer.
3. Put the chocks (1) on the tires to fix the trailer not to move.
4. Fix the ramps (2) to the trailer as follows.
   - Set the ramps parallel and equally distant from the center of the trailer (3).
   - Keep the installation angle (4) at 15° or below. Do not allow the ramps to come off during the work.
5. If the ramps (2) bend largely by the weight of the machine, put the block such as wooden block under the ramps.

   It prevents the deflection of the ramps (2).
6. Set the travel speed to the low speed (“Lo” is lit).

   Push the travel speed selector switch (5) to set the travel speed. The travel speed (“Lo”, “Hi”) is shown on the travel speed display (6).
7. Set the auto-deceleration switch (7) to the OFF position, and turn the fuel control dial to reduce the engine speed.
   - Each time you push the auto-deceleration switch (7), it changes from OFF to ON, from ON to OFF in turn.
   - When you set the auto-deceleration switch (7) to the OFF position, the auto-deceleration pilot lamp (8) goes off.





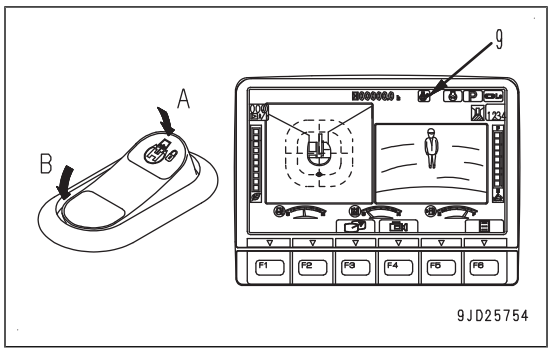


8. Turn the swing lock switch ON to apply the swing lock.

   When the swing lock switch is turned to ON position, swing lock pilot lamp (9) lights up.

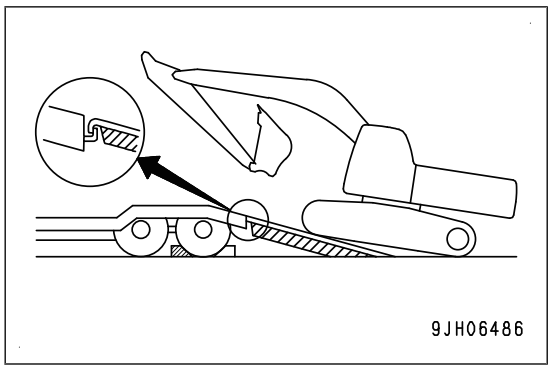
   (A): ON position

   (B): OFF position



9. If the machine is equipped with work equipment, set the work equipment at the front, and travel forward to load it; if it has no work equipment, travel in reverse to load it.

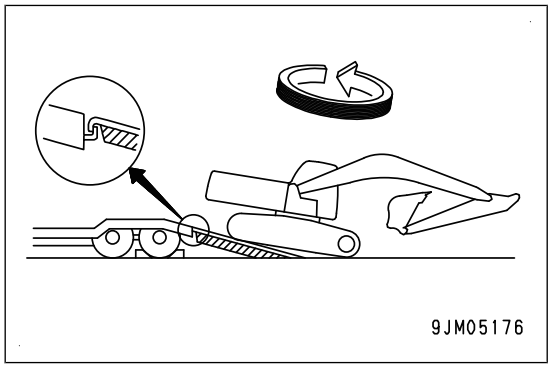
   Follow instructions and signals of a conductor particularly when traveling in reverse.



10. 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.
11. 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.
12. For the machine equipped with the work equipment, swing the upper structure 180° according to the following procedure.
    1) While the tracks are on both the ramps and the ground surface, turn off the swing lock switch.
    2) Swing the upper structure slowly 180°.

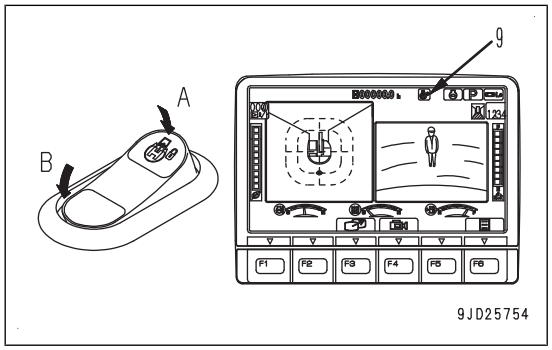


    3) Turn the swing lock switch ON to apply the swing lock.

       When the swing lock switch is turned to ON position, swing lock pilot lamp (9) lights up.

       (A): ON position

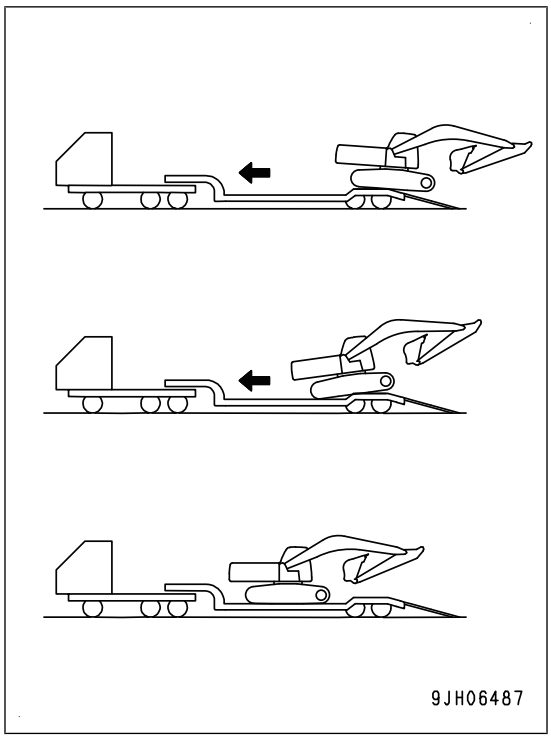
       (B): OFF position



13. Drive the machine slowly in reverse to load it onto the trailer.

    When the machine travels over the rear wheels of the trailer, it becomes unstable. Drive the machine carefully and slowly. (Never operate the steering.)

    When the machine passes over the rear wheels, it inclines backward. Carefully travel in reverse to the specified point, and then stop.



SECURE MACHINE

NOTICE

Put a wooden block below the tip of the bucket link to prevent contact of the bucket cylinder with the floor. If the bucket cylinder gets in contact with the floor during transportation, damage can occur.

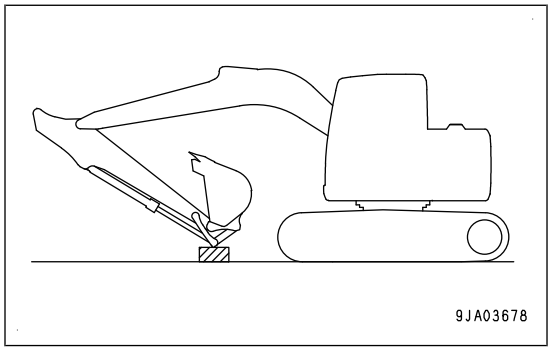
After the machine is loaded onto the trailer, secure the machine as follows.

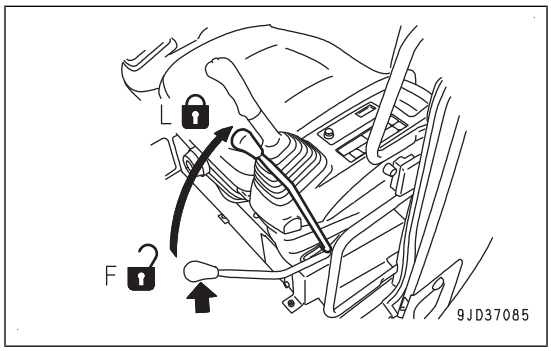
1. Set the machine in the posture shown in the figure.
   1) Operate the blade control lever to lower the blade to the ground.
   2) Operate the work equipment control lever to fully extend the bucket cylinder and the arm cylinder.
   3) Operate the work equipment control lever to lower the boom carefully.
   4) Put a wooden block below the tip of the bucket link.

      Prevent contact of the bucket cylinder with the floor.
   5) Set the lock lever to the LOCK position (L).

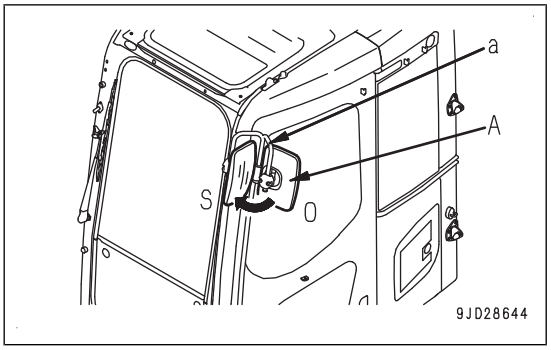
      Be sure to operate the lock lever by the operating part on the top.
   6) Stop the engine.
   7) Remove the starting switch key.
2. Stow the antenna.

   For the procedure to stow the antenna, see “STOW ANTENNA (3-263)”.

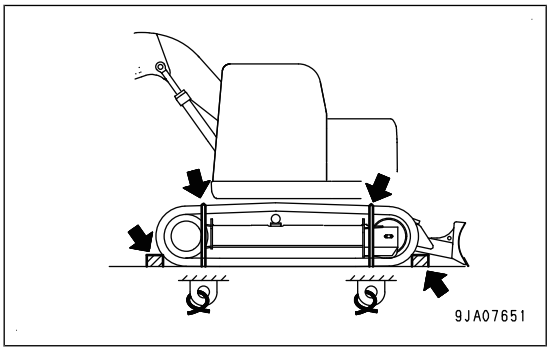




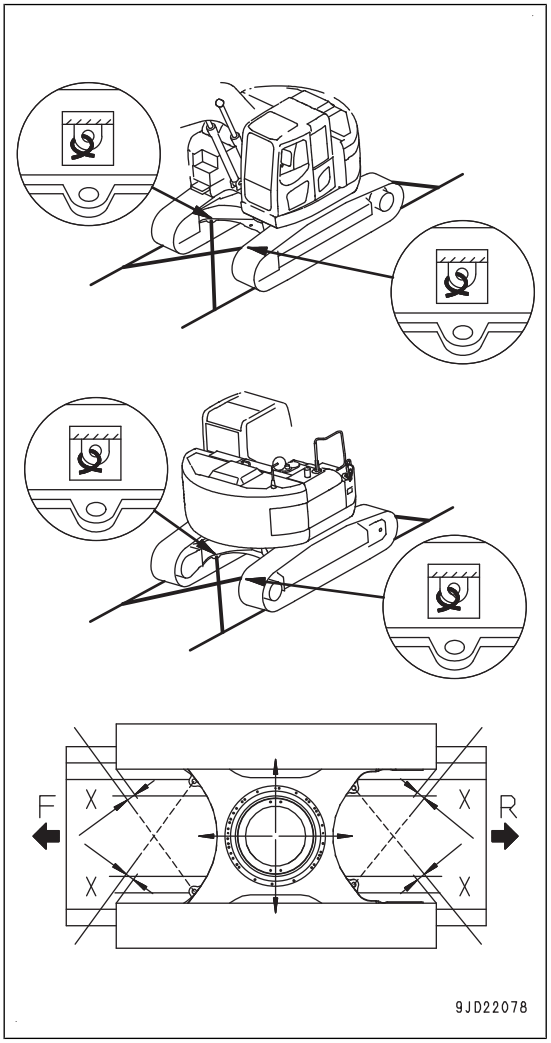
3. Turn the mirror (A) to the stored position (S).
   Hold the point (a) of the mirror stay, and turn it 90°.
4. Lock all the doors, covers and caps that have locks.
5. Secure the machine.
   Select the way to secure the machine according to the local transportation form.



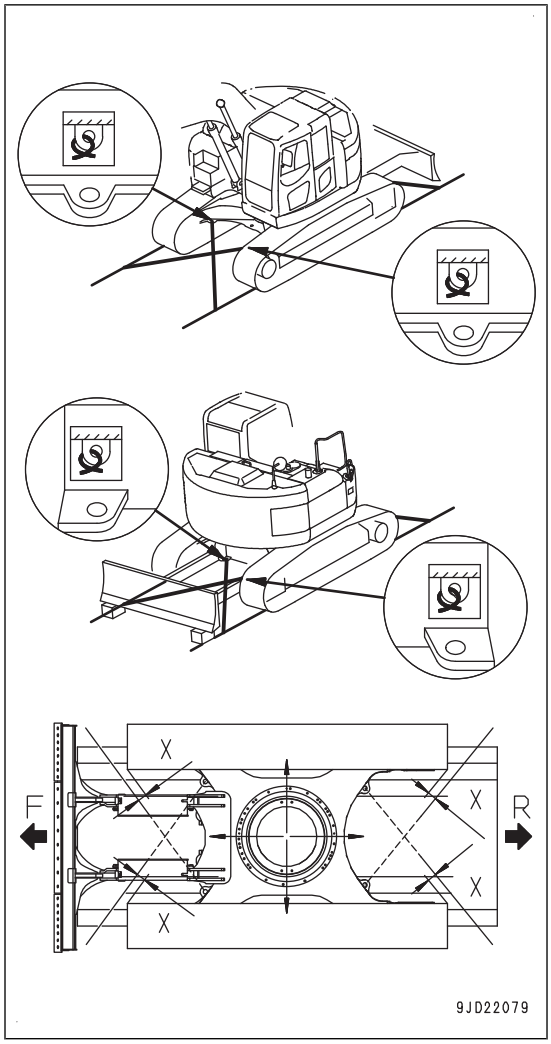
- Method to secure the machine without tie-down point
  1) Put wooden blocks on the front and rear sides of the tracks to prevent movement of the machine during transportation.
  2) Fix the machine securely with chains or wire ropes of correct strength to prevent side slip.
     At this time, put pieces of wood between the wire ropes and the machine to prevent damage.



- Method to secure the machine with tie-down point
  1) Use the tie-down holes to securely fix the machine with chain or wire rope with correct strength.
     Keep the chains off the track frame. Make the distance (X) between the track frame and the chain or the wire rope 50 to 100mm.



- Method to secure the machine with tie-down point (Machine with blade)
  1) Use the tie-down holes to securely fix the machine with chain or wire rope with correct strength.
     Let the chains and wire ropes in front of machine go through below the blade.
     At this time, keep the chains off the track frame. Make the distance (X) between the track frame and the chain or the wire rope 50 to 100mm.
  2) Put a cloth on the blade.
     Prevent direct contact of the chain or the wire rope with the blade.

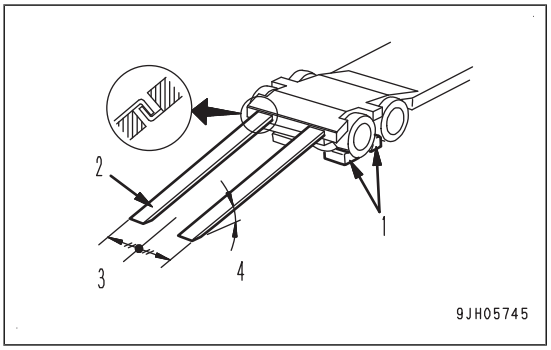


PROCEDURES TO UNLOAD MACHINE

1. Park a trailer on a flat and firm ground.

   Keep a sufficient distance from the road shoulder.
2. Apply the brake of the trailer.
3. Put the chocks (1) on the tires to fix the trailer not to move.
4. Fix the ramps (2) to the trailer as follows.
   - Set the ramps parallel and equally distant from the center of the trailer (3).
   - Keep the installation angle (4) at 15° or below. Do not allow the ramps to come off during the work.
5. If the ramps (2) bend largely by the weight of the machine, put the block such as wooden block under the ramps.

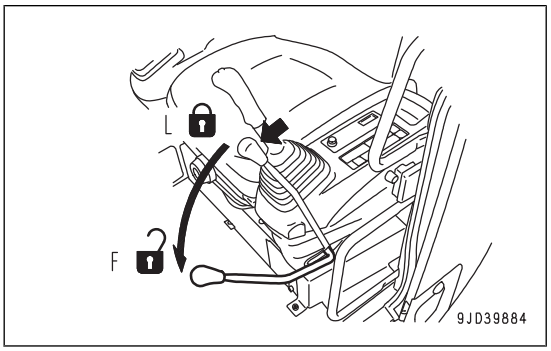
   It prevents the deflection of the ramps (2).



6. Assemble the mirror again to the original state.
7. Remove the chains or the wire ropes which are used to fix the machine.
8. Start the engine.

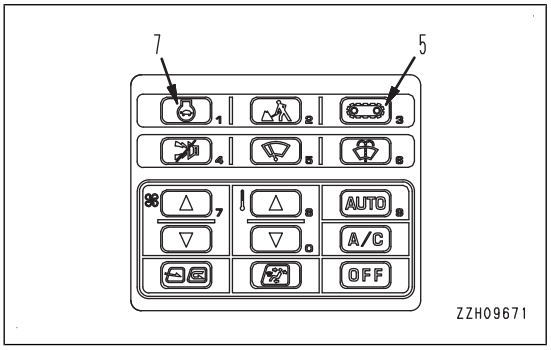
   In cold weather, make sure to do the engine warm-up operation.

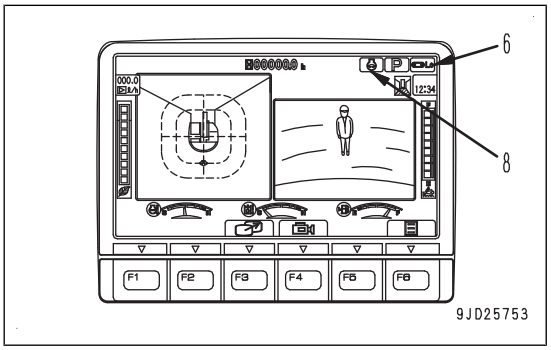
   For the method of engine warm-up operation, see “ENGINE WARM-UP OPERATION (3-188)”.
9. Operate the lock lever by red portion on the top, then securely set it in FREE position (F).



10. Set the travel speed to the low speed (“Lo” is lit).

    Push the travel speed selector switch (5) to set the travel speed. The travel speed (“Lo”, “Hi”) is shown on the travel speed display (6).
11. Set the auto-deceleration switch (7) to the OFF position, and turn the fuel control dial to reduce the engine speed.
    - Each time you push the auto-deceleration switch (7), it changes from OFF to ON, from ON to OFF in turn.
    - When you set the auto-deceleration switch (7) to the OFF position, the auto-deceleration pilot lamp (8) goes off.

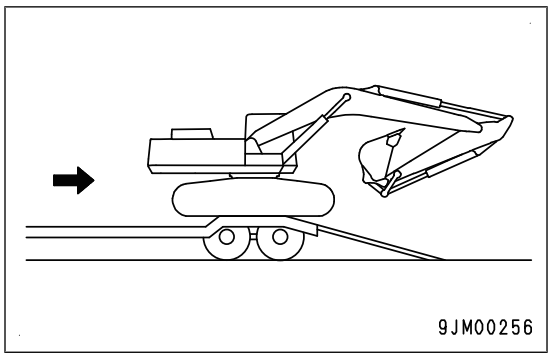




12. Raise the work equipment, curl the arm below the boom, and move the machine slowly.

⚠ CAUTION

Check the position of the sprocket, and operate the travel lever.

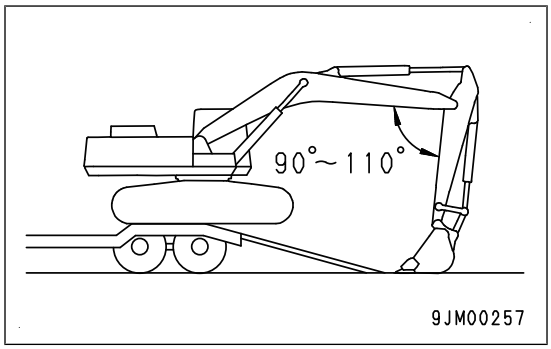


13. Make the machine to be horizontal on the top of the rear end of the trailer, and stop the machine.

14. Set the angle between the arm and boom to be 90° to 110°.

NOTICE

Keep the angle between the arm and boom to be 90° to 110° at all time while you unload the machine.
If the machine is unloaded while the arm is curled, it can cause damage to the machine.

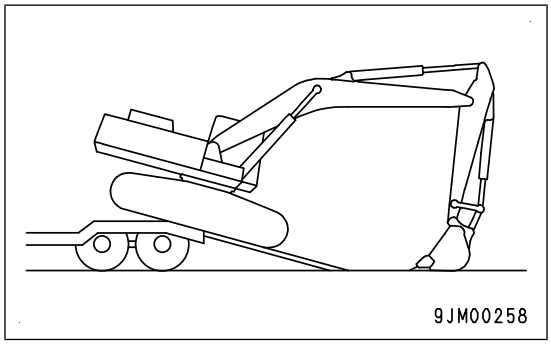


15. Lower the bucket to the ground.

NOTICE

Do not hit the bucket to the ground. The hydraulic cylinder can be damaged.

16. With the bucket lowered to the ground, move the machine to the ramps slowly from the rear end of the trailer.
17. Operate the boom and the arm slowly and unload the machine carefully until it is off the ramps fully.



REMOVE AND INSTALL REVOLVING LAMP

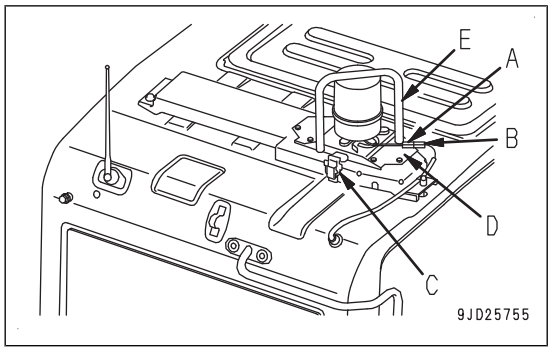
REMOVE REVOLVING LAMP

1. Remove the connector (A) of the revolving lamp from wiring connector (B).

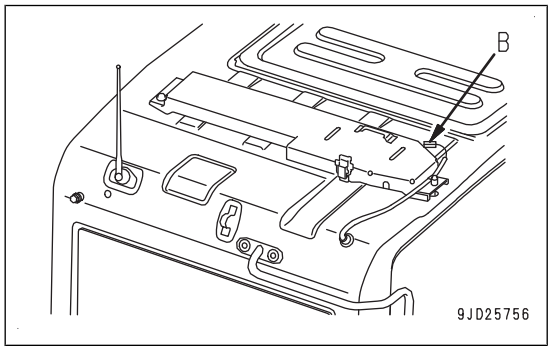
   When you remove the connector (A), pull it out while you hold the protrusion at the center of the connector.
2. Remove the lock (C).
3. Remove the revolving lamp bracket (D).

   NOTICE

   Hold the grip (E) when you remove the revolving lamp bracket (D). If you hold the revolving lamp itself, it can be damaged.

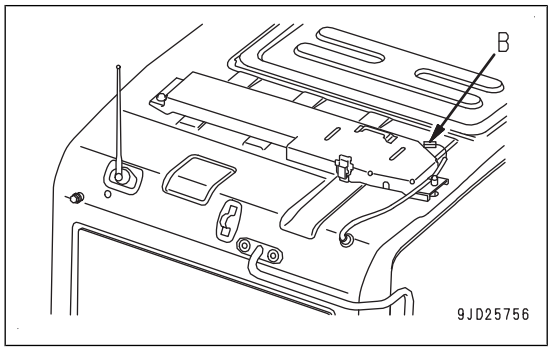


4. To prevent water spray on the wiring connector (B) during the transportation, put the wiring connector (B) into a clean plastic bag, and fix the bag to the operator cab with tapes.



INSTALL REVOLVING LAMP

1. Take out the wiring connector (B) from the plastic bag.

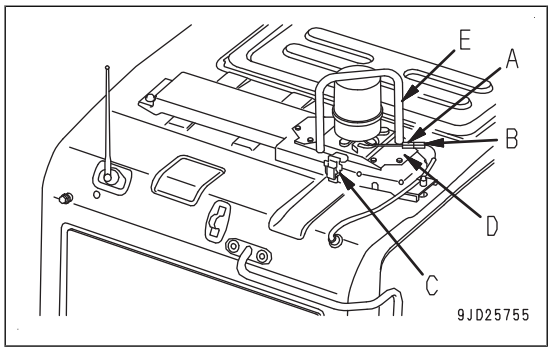


2. Install the revolving lamp bracket (D) to the mounting stand.

   NOTICE

   Hold the grip (E) when you install the revolving lamp bracket (D). If you hold the revolving lamp itself, it can be damaged.
3. Insert the connector (A) of the revolving lamp into the wiring connector (B).

   Securely insert the connector until it clicks.
4. Fix the lock (C).



After you fix it, hold the grip (E) and make sure that the bracket (D) is securely fixed.

LIFT MACHINE

⚠ WARNING

- **The person who does the lifting work must be qualified to operate the crane.**
- **Do not lift the machine with a person on it.**
- **Use a wire rope for lifting that has sufficient strength for the weight of the machine.**
- **Keep the machine horizontal when you do the lifting work.**
- **Before you do the lifting work, do the operations that follow to prevent sudden movement of the machine.**
  - **Operate the lock lever to the LOCK position.**
  - **Set the swing lock cover in the LOCK state.**
- **Do not go in the area below or around the lifted machine.**
- **Do not lift the machine in a posture other than that shown below. Do not lift the machine with lifting tools other than those shown below. There is a danger that the machine loses its balance.**

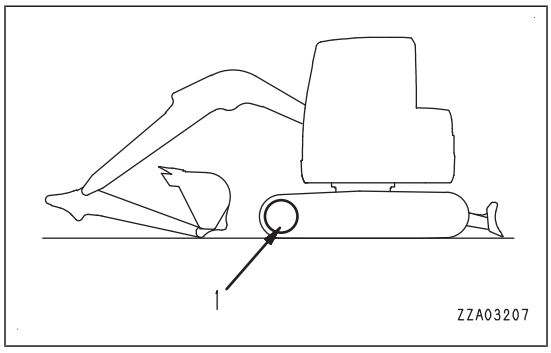
NOTICE

- **The lifting method below applies to the standard specification machine.**
  The lifting method is different by the attachments and options installed.
  For the lifting method of machines other than the standard specification, consult your Komatsu distributor.
- **When you lift the machine, do not install the wire ropes to the machine fixing brackets. If the fixing brackets are used to lift the machine, the machine will be damaged.**
- **Put pieces of wood between the wire ropes and the machine to prevent damage to the ropes and the machine.**

For the weight, see “SPECIFICATIONS: PC138US-11E0 (5-2)”.

Before you start the work, let the machine be in the posture shown in the figure on a hard and level ground.

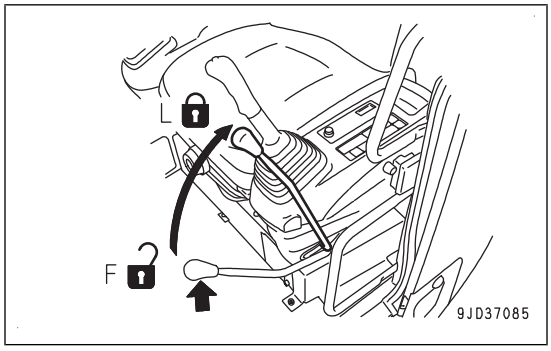
- Set the work equipment direction to the sprocket side (1). Make the undercarriage parallel with the upper structure.
- Lower the blade to the ground.
- Extend the bucket cylinder and the arm cylinder fully, and lower the boom to lower the work equipment to the ground.
- Close all of the doors and windows.



Set the lock lever to the LOCK position (L) and stop the engine.

When you operate the lock lever, hold the red part on the top and operate it.

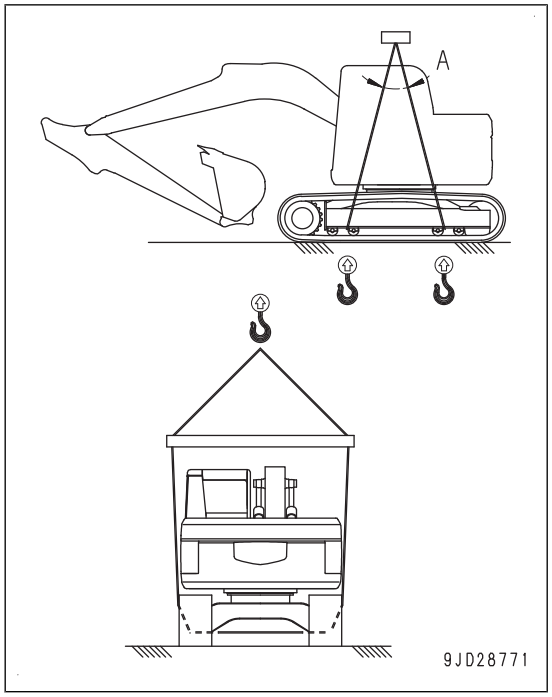
Check that there is nothing in the operator's compartment when you get off the machine.



1. From the front of the machine, run the wire rope between the 1st track roller and the 2nd track roller.
2. From the rear of the machine, run the wire rope between the 1st track roller and the 2nd track roller.
3. Set the lifting angle (A) of the wire rope to 10 to 20°. Then lift the machine slowly.
4. After the machine comes off the ground, check the hook condition and the lifting posture.

   NOTICE

   Do not allow the wire rope to touch the machine.
5. Lift the machine slowly.



COLD WEATHER OPERATION

COLD WEATHER INFORMATION

If the ambient temperature becomes low, there is a possibility that the engine can not be easy to start or the coolant can freeze.

Obey the precautions that follow.

FUEL AND LUBRICANTS

Change the fuel and oil with ones of low viscosity.

For the specified viscosity, see REPLACEMENT PARTS, “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-8)”.

COOLANT

⚠ WARNING

- **The coolant is poisonous. Be careful not to allow the coolant to contact your eyes or your skin. If the coolant gets on you, immediately wash the part by a lot of clean water and consult a doctor.**
- **Consult your Komatsu distributor or a qualified company for disposal of the discharged coolant. The coolant is poisonous. Do not put it into drainage ditches or drain it onto the ground surface.**

NOTICE

Komatsu recommends the use of Non-Amine Engine Coolant (AF-NAC).

For the coolant change interval and the density of Non-Amine Engine Coolant (AF-NAC), see REPLACEMENT PARTS, “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-8)”.

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

- **Battery discharges flammable gas.**
  There is a danger of explosion. Do not let an open flame be near.
- **Battery electrolyte is dangerous object. Be careful not to allow the battery electrolyte to contact your eyes, skin or clothes.**
  If the battery electrolyte gets into your eyes, immediately wash your eyes with a large quantity of clean water and consult a doctor.
  If the battery electrolyte gets on your clothes or skin, immediately wash the part by a lot of clean water.
- **Battery electrolyte peels off the painting. If battery electrolyte is spilled, immediately wash it off.**
- **Do not charge the frozen battery or start the engine with a different power source. Explosion can occur.**
- **Battery electrolyte is poisonous. Do not pour it into drainage ditches or drain it onto the ground surface.**

- Keep the battery warm, as the capacity of the battery decreases significantly when the ambient temperature is low.
- When the battery charge level is low, battery electrolyte can freeze.
  Keep the battery charge level as close as possible to 100 %.

Measure the gravity of the electrolyte and calculate the battery charge level from the table that follows.

Battery charge level conversion table

Fluid temperature (°C) Battery charge level (%)	20	0	-10	-20
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

PRECAUTIONS AFTER DAILY WORK COMPLETION IN COLD WEATHER

If mud and water become frozen around the undercarriage of the machine, there is a possibility that the machine cannot move in the next morning. Obey the precautions that follow to prevent the freezing of the machine.

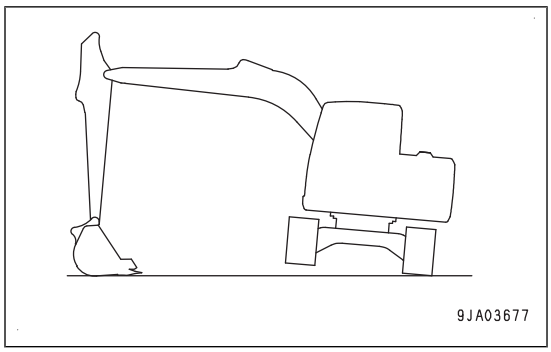
- Remove mud or water stuck to the machine.
  Especially, clean the hydraulic cylinder rod. Prevent entry of mud or dirt together with drops of water on the rod into the seal.
- Fill up the fuel tank. If you make the space of the tank small, you can prevent the water drop generation because of changes in temperature.
- After operation in water or mud, remove water according to the procedure that follow to extend the service life of the undercarriage.

⚠ WARNING

Make sure that the area around the machine is safe before you let the tracks rotate off the ground. Do not allow anyone to come near the track because it is dangerous.

1. Run the engine at low idle.

2. Make the machine be the posture shown in the figure.
   1) Swing the upper structure by 90° to make the work equipment sideway.
   2) Operate the work equipment control lever to lower the bottom part of the bucket to the ground.
   3) Operate the work equipment control levers slowly. Push the ground with the bucket bottom to raise the track slightly.
3. Operate the travel lever to rotate the track off the ground.
4. Rotate the right and left tracks off the ground in the same manner again and again.



- Park the machine on a firm, dry ground.
  If there is no solid and dry ground, put boards on the ground and park the machine on them.
- Open the drain valve to drain the water accumulated in the fuel system.
- 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.
- When the ambient temperature is low, the capacity of the battery decreases significantly.
  Cover it or remove it from the machine, and put it in the warm area. Then install it in the next morning.
- If the electrolyte level is low, add purified water in the next morning before the work.
  Do not add purified water after the day's work to prevent freezing of the battery electrolyte during the night.

AFTER COLD WEATHER SEASON

Change the fuel and oil in components with ones which have correct viscosity for the ambient temperature.

For the specified viscosity, see REPLACEMENT PARTS, “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-8)”.

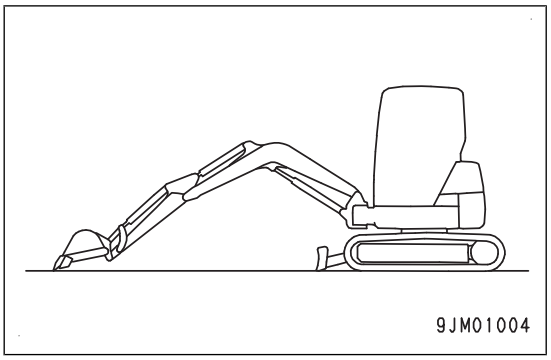
If the machine is parked for long time in the cold weather condition, quality of DEF may be affected by repeated freeze, ask your Komatsu distributor to inspect.

LONG-TERM STORAGE PRECAUTIONS

PREPARATION FOR LONG-TERM STORAGE

NOTICE

When the machine is to be stored for a long time (1 month or more), set the machine in the posture shown in the figure. If the machine is stored in a posture other than that shown in the figure, the piston rod of the hydraulic cylinder can rust.



When you store the machine for a long time (1 month or more), store it as follows.

1. Clean all the parts of the machine and store the machine indoors.

   If the machine needs to be stored outdoors, cover it with waterproof sheet and park it on a level ground.
2. Fix each lever and pedal with the lock lever and the lock cover.
3. If the machine is ready for installation of attachment, set the stop valve to the LOCK position. Install the blind plugs to the elbows.
4. Fill up the fuel tank.

   This prevents dew condensation.
5. Fill up DEF tank (Except cold weather condition). If the inside dries up, urea is deposited and it may cause failures in component operation.
6. Lubricate the parts and change oil.
7. Apply grease to the exposed part of the hydraulic cylinder piston rod.
8. Store the battery in the procedure that follows.
   1) Turn the starting switch to the OFF position, and then remove the key.
   2) Make sure that the main power is not supplied.

      Turn the starting switch to the OFF position and remove the key. If the system operating lamp is not lit, the power is not supplied.
   3) Turn the battery disconnect switch to the OFF position, and remove the key.

      For the operation of the battery disconnect switch, see “BATTERY DISCONNECT SWITCH (3-118)”.
   4) Put a cover on the battery, or remove it from the machine and store it with a cover on it.
9. To prevent rust, use the Non-Amine Engine Coolant (AF-NAC) with a density of 30% or more for the cooling system.

MAINTENANCE DURING LONG-TERM STORAGE

⚠ WARNING

If it is necessary to run the engine indoors, open the windows of the building for air ventilation.

During storage, do the monthly maintenance as follows.

1. Wipe off all the grease from the hydraulic cylinder piston rods before you operate the work equipment.
2. Operate the machine so that films of oil on lubricated parts are kept and the battery is charged.
3. Operate the cooling of air conditioner for 3 to 5 minutes while you run the engine at low idle.
   With this operation, grease of each part of the air conditioner compressor is not dried out.
   Check the refrigerant gas level two times for a year.

START MACHINE AFTER LONG-TERM STORAGE

NOTICE

If the machine is stored without monthly maintenance, consult your Komatsu distributor.

Do the procedure as follows before you operate the machine after long-term storage.

1. Wipe off all the grease from the hydraulic cylinder piston rods.
2. Add oil and grease at all lubrication points correctly.
3. Install the battery or remove the cover.
4. Insert the battery disconnect switch key and turn it to the ON position.
   For the operation of the battery disconnect switch, see “BATTERY DISCONNECT SWITCH (3-118)”.
   If the machine is stored for a long period while the battery disconnect switch is at the OFF position or the battery terminal is disconnected, it can cause the loss of the clock time information and radio tuning information. In this case, set them again. For details, see “CLOCK ADJUSTMENT (3-80)” and “RADIO (3-252)”.
5. Check all the oil and water levels before you start the engine.
   When the machine is stored for a long period, moisture in the air will mix with the oil.
   If there is water in the oil, change all the oil.
6. Start the engine.
7. Check oil at all the parts again after the engine is started.
   If there is water in the oil, change all the oil.
8. Do the warm-up operation as long as possible.
   For the method of engine warm-up operation, see “ENGINE WARM-UP OPERATION (3-188)”.

If the machine was not operated for more than 2 months in the storage, do as follows.

- Replace the DEF filter and fill up the DEF tank with DEF.
- Start the engine, and make sure that the SCR system has no problem.
  If SCR system has a problem, warning is given on the monitor screen and by the buzzer sound. If a problem is found in the SCR system, stop the engine first, and then start it again.
  If the problem continues in SCR system even if you start the engine again, consult your Komatsu distributor.
- If DEF is kept in DEF tank for more than 1 year, consult your Komatsu distributor for replacement.
  To dispose of the drained DEF, obey the local regulations and rules about the environment.
  Aged DEF can have smell of ammonia. Replace the DEF in a well-ventilated area and be careful not to smell its vapor.

TROUBLES AND ACTIONS

ACTIONS WHEN YOU RUN OUT OF FUEL

If you start the engine again after running out of fuel, fill up with fuel and bleed air from the fuel system.

Make sure to check the fuel level to prevent running out of fuel.

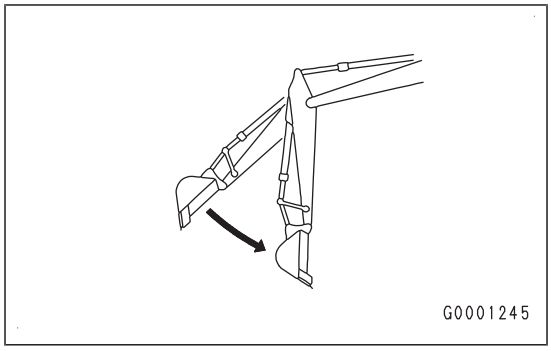
If the engine stopped because you run out of fuel, it is necessary to bleed a sufficient quantity of air from the fuel circuit.

For the procedure to bleed air, see “REPLACE FUEL PREFILTER CARTRIDGE (4-64)” and “REPLACE FUEL MAIN FILTER CARTRIDGE (4-79)”.

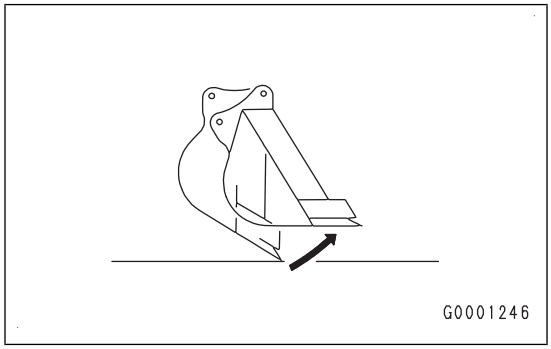
PHENOMENA THAT ARE NOT FAILURES

Note that the phenomena below are not failures.

- When you go down a steep slope at low speed, a noise comes out of the travel motor brake valve.
- When you start or stop the swing, a noise comes out of the brake valve.
- Phenomena when you do digging from a high position without load
  - When the arm is retracted toward you, it becomes slow momentarily at around its vertical position.



  - The bucket teeth becomes slow momentarily at around its horizontal position.



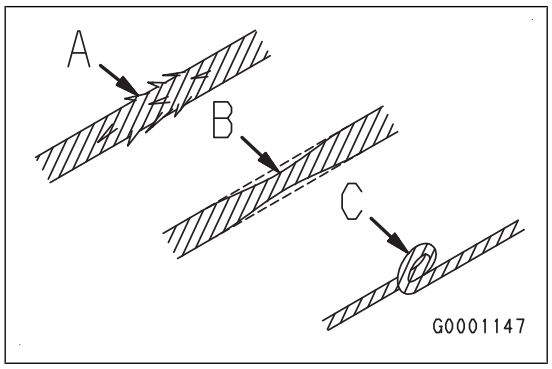
- The bucket and the arm wobble during heavy digging work.

PRECAUTIONS FOR TOWING MACHINE

⚠ WARNING

In the towing and being towed operation, a mistake in the selection of the wire rope or drawbar or procedures can lead to serious personal injury or death.

- **Make sure to confirm that the wire rope or drawbar used for towing has ample strength for the weight of the machine being towed.**
- **A wire rope which has cut strands (A), reduced diameter (B), or kinks (C) can break. Do not use it.**
- **Wear the leather gloves always when you handle the wire ropes.**
- **Do not do the towing operation on a slope.**
- **During the towing operation, do not go into the area between the towing machine and the towed machine.**
- **Move the machine slowly. Do not put a sudden load to the machine.**
- **Do not use the holes for towing light objects or tie-down holes when you tow the machine.**

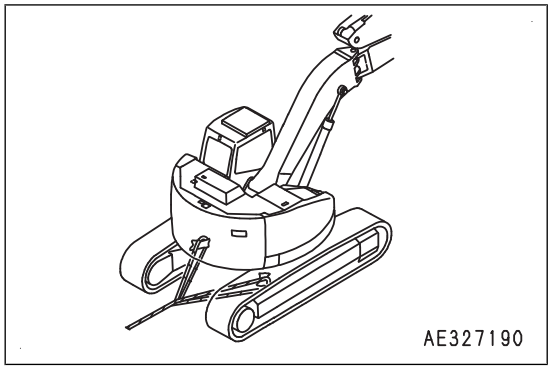


NOTICE

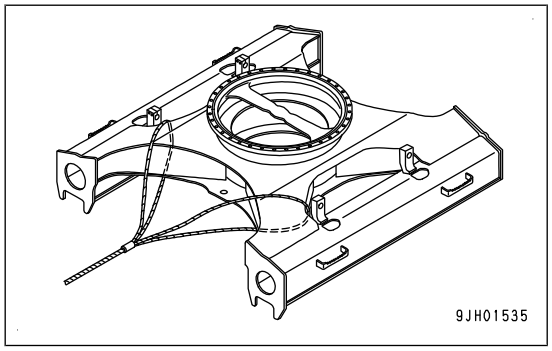
- **Do not tow the machine for a long distance.**
  When you tow a machine, tow it at a low speed of 1km/h or below, and for a distance of several meters to an area where you can do inspection and maintenance.
  If the machine must be moved a long distance, transport it.
- **The maximum towing capacity for this machine is 95200N {9710kgf}. Do not tow with load more than this.**

Do not tow the machine if it is normal. If it is necessary to tow the machine, be careful of the precautions that follow.

- If the machine sinks in mud and cannot get out by its own power, or if the machine tows a heavy object, put a wire rope as shown in the figure.



-
- Put pieces of wood between the wire ropes and the machine. It prevents damage to the wire rope and the machine.
- Hold the wire rope level and set it straight to the track frame.

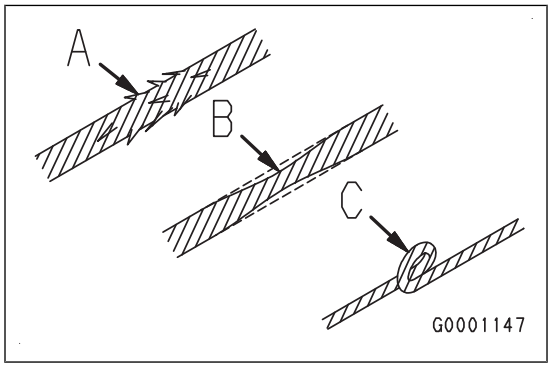


PRECAUTIONS FOR USING LIGHTWEIGHT TOWING HOLE

⚠ WARNING

In the towing and being towed operation, a mistake in the selection of the wire rope or drawbar or procedures can lead to serious personal injury or death.

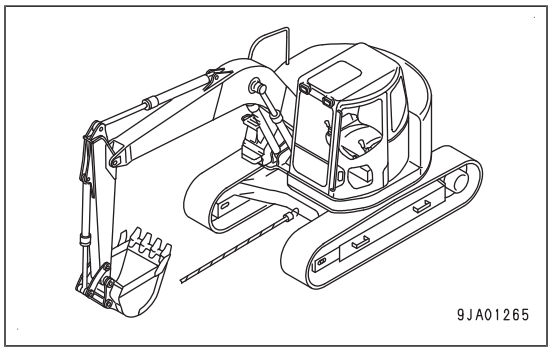
- **Make sure to confirm that the wire rope or drawbar used for towing has ample strength for the weight of the machine being towed.**
- **A wire rope which has cut strands (A), reduced diameter (B), or kinks (C) can break. Do not use it.**
- **Wear the leather gloves always when you handle the wire ropes.**
- **Always use the shackle.**
- **Hold the wire rope level and set it straight to the track frame.**
- **During the towing operation, do not go into the area between the towing machine and the towed machine.**
- **Move the machine slowly. Do not put a sudden load to the machine.**



- **Do not use the holes for towing light objects or tie-down holes when you tow the machine.**

There is a hole in the track frame to fit the shackle when towing light objects.

Permissible towing load: 65700N {6700kgf} or less



PRECAUTIONS FOR SEVERE JOB CONDITION

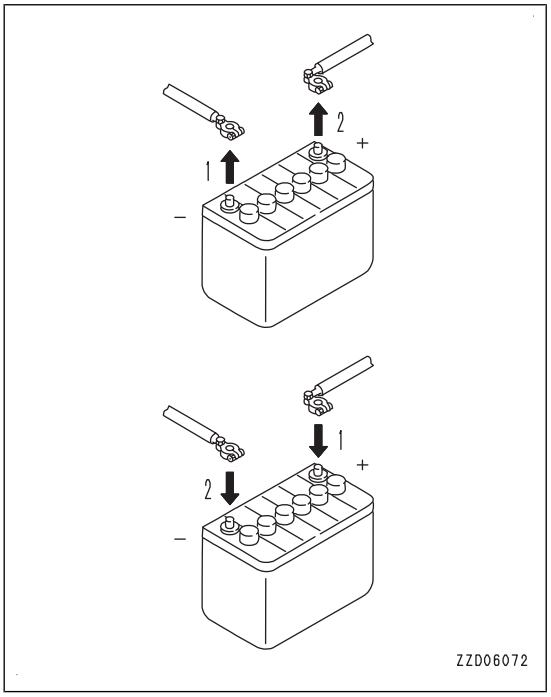
- If the mounting pins for the work equipment are soaked during the digging work in the water, grease the pins every time you do the work.
- When you do heavy or deep digging work, grease the mounting pins for the work equipment every time before the work.
  After greasing, operate the boom, arm, bucket and blade several times, and then grease again.

ACTIONS WHEN BATTERY IS DISCHARGED

⚠ WARNING

- **Before you handle the battery, stop the engine and turn the starting switch to the OFF position. Turn the battery disconnect switch to the OFF position, and remove the key.**
- **Wear the protective eyeglasses and rubber gloves.**
- **Battery discharges flammable gas. There is a danger of explosion. Do not let an open flame be near.**
- **Battery electrolyte is dangerous object. Be careful not to allow the battery electrolyte to come in contact with your eyes, skin or clothes.**
  If the battery electrolyte gets into your eyes, immediately wash your eyes with a large quantity of clean water and consult a doctor.
  If the battery electrolyte gets on your clothes or skin, immediately wash the part by a lot of clean water.
- **Before you charge the battery, be sure to remove the battery from the machine. If you charge the battery while it is installed to the machine, it is dangerous.**
- **When you remove or install, check the location of positive (+) terminal and negative (-) terminal.**

  When you remove the battery, disconnect the negative (-) terminal (ground side) first. Then, disconnect the positive (+) terminal.
  When you install the battery, connect the positive (+) terminal first. Then, connect the negative (-) terminal (ground side).
  To avoid sparks, do not allow an energizing object such as a tool to contact between the positive (+) terminal of battery and the machine.
- **Install the terminals securely.**
  If a terminal is loose, there is a danger of explosion by a spark because of a defective contact.



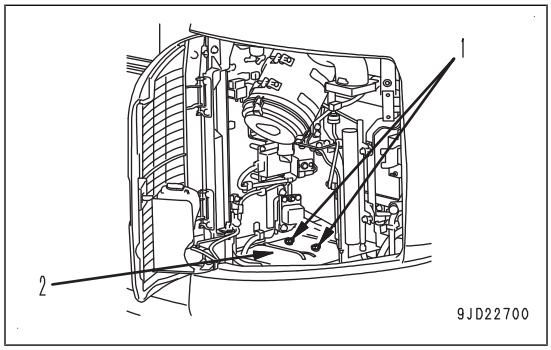
REMOVE BATTERY

⚠ CAUTION

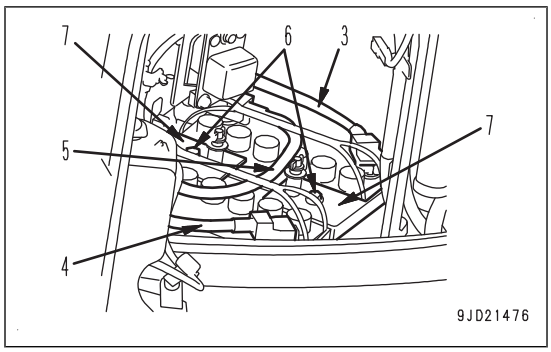
- **Before you handle the battery, stop the engine and turn the starting switch to the OFF position. Turn the battery disconnect switch to the OFF position, and remove the key.**
- **Disconnect the terminal from the negative (-) (ground) side to the positive (+) side in this order. To avoid sparks, do not allow an energizing object such as a tool to contact between the positive (+) terminal of battery and the machine.**

1. Open the battery inspection cover.

   Open the battery inspection cover wide until the stay is set in LOCK position.
2. Remove the wing nuts (1) (2 places).
3. Remove the rubber cover (2).



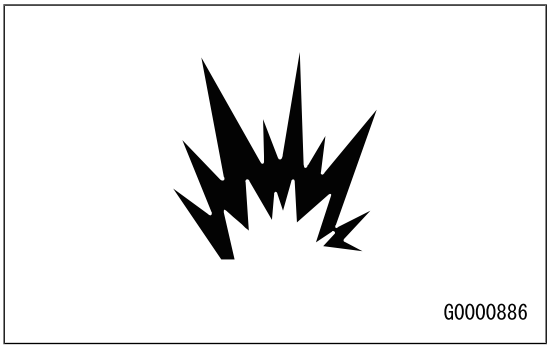
4. Remove the cable (3) on the negative (-) terminal side (ground side) first.
5. Remove the cable (4) on the positive (+) terminal side and connecting cable (5).
6. Remove the mounting bolts (6) (2 places).
7. Remove the mounting hardware (7).
8. Take the battery out of the machine.



PRECAUTIONS WHEN YOU CHARGE BATTERY

⚠ WARNING

If there is a mistake when you handle the battery, an explosion can occur. See the instruction manual of battery charger, and obey the items that follow.



- **Adjust the voltage of the battery charger by that of the battery to be charged.**
  If the voltage is not adjusted correctly, the battery charger will overheat and cause a fire and explosion.
- **Connect the terminal from the positive (+) side to the negative (-) side (ground side) in this order.**
  Fix the positive (+) charger clip of the battery charger to the positive (+) terminal of the battery.
  Fix securely the negative (-) charger clip of the battery charger to the negative (-) terminal of the battery.
- **Normally, set the current to 1/10 of the value of the rated battery capacity.**
  When you do the rapid charging, set it less than the rated battery capacity.
  If the charging current becomes excessive, there is a danger that the battery catches fire and explode because of leakage or lack of battery electrolyte.
- **Do not charge the frozen battery or start the engine with a different power source. Explosion can occur.**
- **If the battery electrolyte level is low, do not charge it to avoid an explosion.**
  Check the battery electrolyte level regularly and add the purified water (such as a commercial battery fluid).

INSTALL BATTERY

⚠ CAUTION

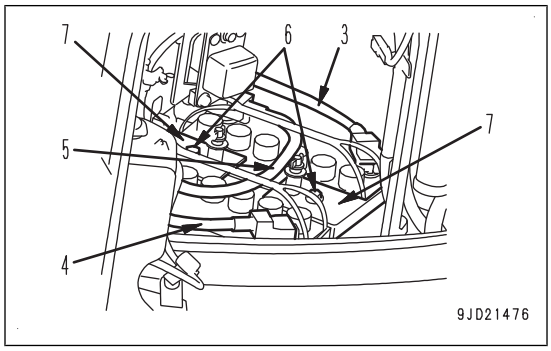
- **Connect the terminal from the positive (+) side to the negative (-) side (ground side) in this sequence.**
- **When you replace the battery, fix the battery body with the battery mounting hardware.**
- **To prevent fire, be careful that the rubber cover is not turned up when you install it. If damage is caused to the rubber cover, replace it immediately.**
- **If chloride is accumulated on the top surface of battery and around terminals, clean them with warm water of approximately 40℃. After it is cleaned, dry it fully, and then connect the cables.**

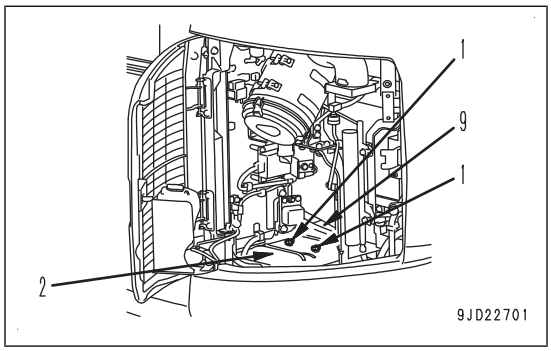
1. Place the battery in the specified position.
2. Fix the battery firmly by using mounting hardware (7) and mounting bolts (6).

   Tightening torque:9.8 to 19.6Nm {1 to 2kgfm}
3. Install cable (4) on the positive (+) terminal side.
4. Connect connecting cable (5) to the positive (+) terminal side first.
5. Connect cable (3) on the negative (-) terminal side (ground side).
6. Install rubber cover (2) with wing nuts (1).

   NOTICE

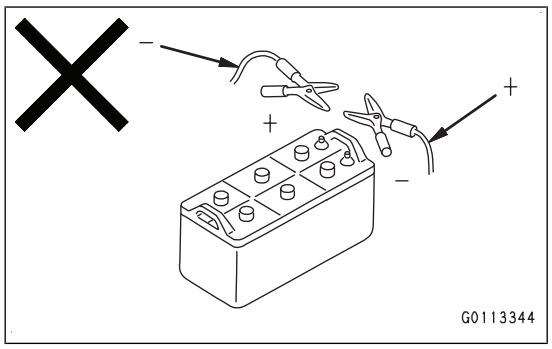
   - **For prevention of a fire, install rubber cover (2) carefully so that it will not roll up.**
   - **If rubber cover (2) rolls up and blocks the fuel cooler, the fuel may overheat. Take care to insert rubber cover (2) under fuel cooler (9).**
7. Insert rubber cover (2) under fuel cooler (9).
8. Close the battery inspection cover as holding up the stay from LOCK position.





START ENGINE WITH JUMPER CABLES

⚠ WARNING



- **Do not connect the positive (+) terminal and negative (-) terminal.**
- **Wear the protective eyeglasses and rubber gloves.**
- **Be careful not to allow the normal machine to touch the failed machine.**
  Battery emits flammable hydrogen gas and it can explode.
  Do not cause sparks near the battery.
- **Connect the jumper cables correctly.**
  When the final cable is connected to the upper structure frame of the failed machine, sparks are made. Connect it to a point as far as possible from the battery.
- **Do not make the cable clips contact with other clips or with the machine.**
- **Do not start the engine by short-circuit of the starting motor (jump start).**

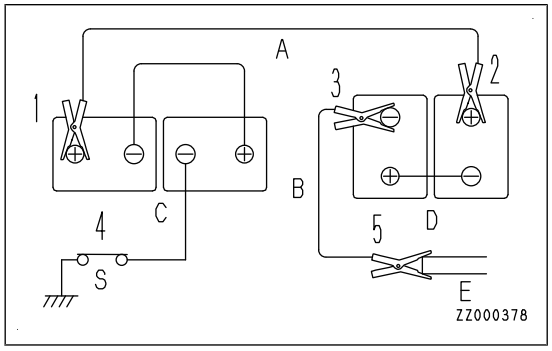
NOTICE

- **The starting system for this machine uses 24V. Use the machine that uses 24V which is the same as the failed machine.**
- **The sizes of the jumper cables and clips must 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 connected correctly.**
- **Make sure that the machines and work equipment are locked.**
- **Make sure that each lever is in the NEUTRAL position.**
- **Be sure to check that the main power of the failed machine is not supplied before you turn the battery disconnect switch key to the OFF position. This prevents damage to the electrical parts of the failed machine. Turn the starting switch to the OFF position and remove the key. If the system operating lamp is not lit, the power is not supplied. For the operation method of the battery disconnect switch, see "BATTERY DISCONNECT SWITCH (3-118)".**

CONNECT JUMPER CABLES

Be sure to check that the main power of the failed machine is not supplied before you turn the battery disconnect switch to the OFF position.

Turn the starting switch of the normal machine to the OFF position.



1. Connect the clip of the jumper cable (A) to the positive (+) terminal of the battery (C) on the failed machine.
2. Connect the clip at the other end of the jumper cable (A) to the positive (+) terminal of the battery (D) on the normal machine.
3. Connect the clip of the jumper cable (B) to the negative (-) terminal of the battery (D) on the normal machine.
4. Turn the battery disconnect switch (S) of the failed machine to the ON position.
5. Connect the clip at the other end of the jumper cable (B) to the upper structure frame (E) of the failed machine.

   Do not connect to the work equipment because the current does not easily flow through it.

START ENGINE WITH JUMPER CABLES

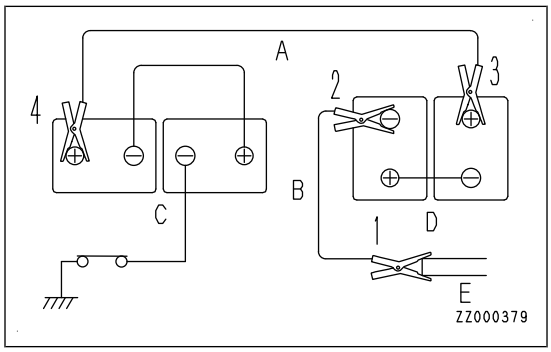
1. Make sure that the lock levers are in LOCK position for both of the normal machine and failed machine.
2. Make sure that the control levers are in NEUTRAL position for both of the normal machine and failed machine.
3. Make sure that the clip is connected correctly.
4. Start the engine of the normal machine. Operate it at high idle.
5. Start the engine of the failed machine.

   If the engine does not start, wait for approximately 2 minutes, and then do the procedure again.

DISCONNECT JUMPER CABLES

After the engine started, disconnect the jumper cables in the reverse of the order in which they were connected.

1. Disconnect the clip of the jumper cable (B) from the upper structure frame (E) of the failed machine.
2. Disconnect the clip of the jumper cable (B) from the negative (-) terminal of the battery (D) on the normal machine.
3. Disconnect the clip of the jumper cable (A) from the positive (+) terminal of the battery (D) on the normal machine.
4. Disconnect the clip of the jumper cable (A) from the positive (+) terminal of the battery (C) on the failed machine.



OTHER TROUBLE

TROUBLES AND ACTIONS ON ELECTRICAL SYSTEM

- Be sure to consult your Komatsu distributor for the actions shown with (*) in the remedy column.
- If there can be other problem or cause than the ones that follow, consult your Komatsu distributor for repair.

Problem	Main causes	Remedy
Lamp is not lit 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. (*)
	Defective starting motor	Replace. (*)
	Battery charge is not sufficient.	Charge the battery.
	Battery disconnect switch is at the OFF position.	Set it to the ON position.
	Engine shutdown secondary switch is at the “ENGINE STOP” position.	Set it to the “NORMAL” position, and put the cover.
Pinion of starting motor engages and disengages continuously (rattles).	Battery charge is not sufficient.	Charge the battery.
	Safety relay is defective.	Replace. (*)
Starting motor cannot crank engine smoothly.	Battery charge is not sufficient.	Charge the battery.
	Defective starting motor	Replace. (*)
Starting motor disengages before engine starts.	Wiring is defective, ring gear and pinion are defective.	Check, repair. (*)
	Battery charge is not sufficient.	Charge the 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 electrical intake air heater by hand immediately after it is preheated.	Defective wiring	Check, repair. (*)
	Open circuit in the electrical intake air heater	Replace. (*)
	Defective heater relay	Replace. (*)
	Blown heater fuse	Replace. (*)
Engine does not start. (“L04” lights up on machine monitor.)	Data in the controller is damaged.	Check, repair. (*)
	Other system has problems.	Check, repair. (*)
When travel lever is operated, travel alarm does not operate.	Defective wiring	Check and repair loose connector terminal or wire breakage. (*)
	Defective alarm	Replace. (*)
	Defective travel PPC pressure sensor	Replace. (*)
Camera image is not shown on the machine monitor.	Defective wiring	Check the loose or disconnected connector, or wire breakage, and repair them. (*)
	Defective camera	Replace. (*)
	Defective monitor	Replace. (*)
Engine does not start even when the starting switch key is turned to the START position and the starting motor rotates.	Defective engine controller power supply circuit	Replace. (*)
	Defective relay	Replace. (*)
	Defective connector on engine side	Check the loose or disconnected connector, or wire breakage, and repair them. (*)

TROUBLES AND ACTIONS ON CHASSIS

- Be sure to consult your Komatsu distributor for the actions shown with (*) in the remedy column.
- If there can be other problem or cause than the ones that follow, consult your Komatsu distributor for repair.

Problem	Main causes	Remedy
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.

Problem	Main causes	Remedy
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 ACTIONS ON ENGINE

- Be sure to consult your Komatsu distributor for the actions shown with (*) in the remedy column.
- If there can be other problem or cause than the ones that follow, consult your Komatsu distributor for repair.

Problem	Main causes	Remedy
Engine oil pressure caution lamp lights up.	Oil level in the oil pan is not sufficient (air is sucked).	Adjust the oil level to the specified level. See CHECKS BEFORE YOU START.
	Oil is not applicable. (Viscosity is not applicable.)	Replace oil. See USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE and RECOMMENDED FUEL, COOLANT, AND LUBRICANT.
	Oil filter cartridge is clogged.	Replace the cartridge. See EVERY 500 HOURS MAINTENANCE.
	Oil leaks because of incorrect connection or breakage of oil pipe or pipe joint.	Check, repair. (*)
	Engine oil pressure sensor is defective.	Replace sensor. (*)
	Defective monitor	Replace monitor. (*)
Steam spurts out from top of radiator (pressure valve).	Coolant is not sufficient, coolant leaks.	Check, add coolant, repair. See CHECKS BEFORE YOU START.
	Looseness of fan belt	Replace the fan belt, check the tension. (*)
	Accumulation of dirt or scale in cooling system	Change coolant, wash inside of cooling system. See WHEN REQUIRED.
	Clogged radiator fins or damaged fin	Clean or repair. See EVERY 500 HOURS MAINTENANCE.
	Defective thermostat	Replace thermostat. (*)
	Loose radiator filler cap (in high altitude operation)	Tighten cap or replace packing.
	Defective coolant level sensor	Replace sensor. (*)
	Defective monitor	Replace monitor. (*)
Radiator coolant level caution lamp lights up.	Coolant is not sufficient, coolant leaks.	Check, add coolant, repair. See CHECKS BEFORE YOU START.
	Looseness of fan belt	Replace the fan belt, check the tension. (*)
	Accumulation of dirt or scale in cooling system	Change coolant, wash inside of cooling system. See WHEN REQUIRED.
	Clogged radiator fins or damaged fin	Clean or repair. See EVERY 500 HOURS MAINTENANCE.
	Defective thermostat	Replace thermostat. (*)
	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
Starting motor operates but the engine does not start.	Fuel is not sufficient.	Add fuel. See CHECK BEFORE YOU START OPERATION.
	Air in fuel system	Repair place where air is sucked in. See EVERY 500 HOURS MAINTENANCE.
	Defective fuel injection pump or defective nozzle	Replace pump or nozzle. (*)
	Starting motor cannot crank engine smoothly.	See TROUBLES AND ACTIONS ON ELECTRICAL SYSTEM.
	Preheating pilot lamp does not light up.	See TROUBLES AND ACTIONS ON ELECTRICAL SYSTEM.
	Compression error (Incorrect valve clearance)	Adjust valve clearance. (*)
Exhaust color is white or bluish.	Water entry in the aftertreatment devices	Check, repair. (*)
	Damage of aftertreatment devices	Replace aftertreatment devices. (*)
	Too much oil in engine oil pan	Adjust the oil level to the specified level. See CHECKS BEFORE YOU START.
	Fuel is not applicable.	Replace it with specified fuel.
Exhaust color is black at times.	Damage of aftertreatment devices	Replace aftertreatment devices. (*)
	Air cleaner element is clogged.	Clean or replace. See WHEN REQUIRED.
	Defective nozzle	Replace nozzle. (*)
	Compression error	See "Compression error" above. (*)
	Defective turbocharger	Clean or replace turbocharger. (*)
Combustion makes breathing sound from time to time.	Defective nozzle	Replace nozzle. (*)
Unusual noise occurs. (Combustion or mechanical noise)	Low grade fuel is used	Replace it with specified fuel.
	Overheat	See “Indicator of engine coolant temperature gauge is in red range” above.
	Damage inside the muffler	Replace muffler. (*)
	Valve clearance is too much.	Adjust valve clearance. (*)
Engine stalls during operation.	Prefilter or main filter is clogged.	Replace filter cartridge.
	Defective engine and fuel circuit	Check, repair. (*)

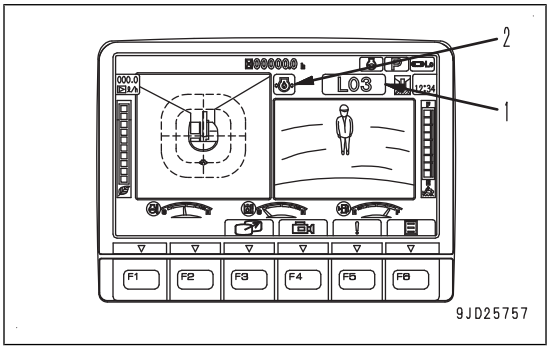
ACTIONS WHEN CAUTION IS SHOWN ON MACHINE MONITOR

When the caution lamp (1) and the action level (2) are shown on the machine monitor, do the steps that follow.

1. Push the switch F5.

   The “Current Abnormality” screen is shown.

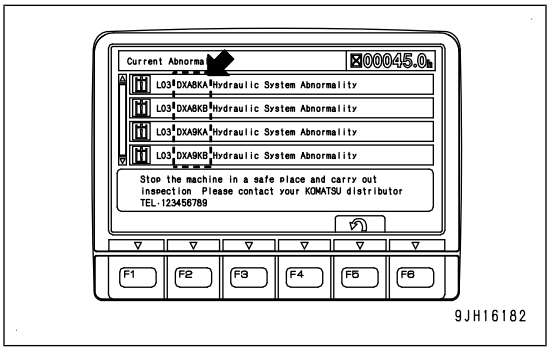
2. Do the actions by the message on the monitor display.



3. Check the failure code.

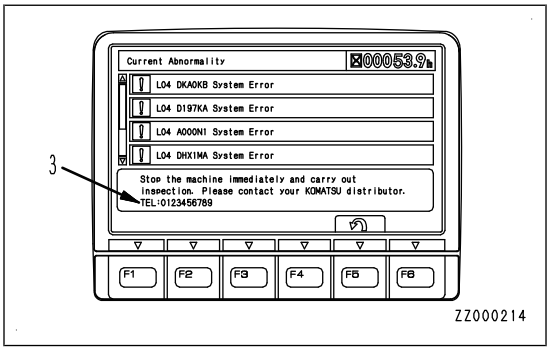
   If necessary, consult your Komatsu distributor for repair.

   - When “DXA8KA”, “DXA8KB”, “DXA9KA” or “DXA9KB” is shown on “Current Abnormality” screen, set the pump secondary drive switch to the rear (emergency) position to make the operations available temporarily. After the work, immediately consult your Komatsu distributor for inspection and repair. For details of pump secondary drive switch, see “PUMP SECONDARY DRIVE SWITCH (3-94)”.



   - If “CA2249” or “CA559” is shown on “Current Abnormality” screen while the machine has sufficient fuel, replace the fuel main filter and the fuel prefilter immediately. If an item is not cleared even after the replacement, the machine can do the normal operation, but consult your Komatsu distributor for inspection immediately. For how to replace the fuel main filter and the fuel prefilter, see “REPLACE FUEL PREFILTER CARTRIDGE (4-64)”, “REPLACE FUEL MAIN FILTER CARTRIDGE (4-79)”.

   Telephone number for the point of contact is shown in the message column (3) at the bottom of “Current Abnormality” screen when the error occurs.



REMARK

The contact telephone number is shown only when it is registered.
Consult your Komatsu distributor for the telephone number registration if necessary.

MAINTENANCE

⚠ WARNING

Before you read MAINTENANCE, read and understand SAFETY.

PRECAUTIONS FOR MAINTENANCE

Do the maintenance works given in this manual. If you do the work which is not given in this manual, it can be a cause of failure.

CHECK SERVICE METER READING

Check the service meter reading every day to see if the maintenance time has come for necessary maintenance item to be done.

KOMATSU GENUINE REPLACEMENT PARTS

Komatsu recommends to use Komatsu genuine parts specified in Parts Book as replacement parts.

KOMATSU GENUINE LUBRICANTS

For lubrication of the machine, Komatsu recommends you to use Komatsu genuine lubricants. Also, use oil and grease of the specified viscosity in response to the ambient temperature.

ALWAYS USE CLEAN WASHER FLUID

Use automobile window washer fluid, and be careful not to allow dirt to get into it.

FRESH AND CLEAN LUBRICANTS

Use the clean oil and grease.

Use clean containers to prevent entry of dirt.

CHECK DRAINED OIL AND USED FILTER

If you replaced filter when you replaced oil, inspect the drained oil and used filter. If you found a lot of foreign materials, report it to the responsible person to do corrective action.

PRECAUTIONS FOR REFILLING OIL OR FUEL

If a strainer is attached to the oil filler port, do not remove it when you add fuel.

PRECAUTIONS FOR ADDING DEF

Do not remove the strainer while adding DEF.

It is recommended to use a nozzle having a diameter and a length specified by ISO 22241-4 and an auto stop function to add DEF.

PRECAUTIONS FOR WELDING

- When you conduct weld repair, turn the starting switch to the OFF position first. Then, after you check that the system operating lamp is not lit, set the battery disconnect switch key to the OFF position and pull it out.
- Do not continuously apply a voltage 200V or more.
- Connect the ground cable at the distance of less than 1m of the welded part. If the ground cable is connected near electric devices or connectors, the device can be damaged.
- Make sure that there are no seals, bearings, or bushings between the welding part and ground.
  Sparks can cause damage to the seals.
- Do not connect the ground cable around a pin or hydraulic cylinder.
  Sparks can cause damage to the plated parts of the pin or cylinder.

DO NOT DROP THINGS INSIDE MACHINE

- When you open the inspection windows or oil filler port of the tank for inspection, be careful not to drop things into the machine. It can cause damage or failure of the machine.
  If you dropped something inside, be sure to remove it.
- 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 you work at dusty jobsites, observe the items below.

- Check frequently that air cleaner is not clogged with the air cleaner clogging caution lamp.
  If it is clogged, clean the air cleaner element immediately.
- Clean the radiator core early before it gets clogged.
- Clean and replace the fuel filter frequently.
- Clean the electrical components to prevent accumulation of dirt. Especially clean the starting motor and alternator to prevent accumulation of dirt.
- When you check oil or filters, and change oil or replace filter, prevent entry of dirt.

AVOID MIXING OIL

Do not mix different brand or grade of oil.

If it is necessary to use a different brand or grade of oil, change all the oil and replace the filter at the same time.

LOCK INSPECTION COVERS

If you do the maintenance while the inspection cover with a lock bar is opened, securely fix it into position.

If the inspection or maintenance is done while the inspection cover is not fixed securely, there is a danger that the cover suddenly shuts and causes personal injury.

BLEED AIR FROM HYDRAULIC CIRCUIT

When you repair or replace the hydraulic equipment, or disconnect the hydraulic piping, air must be bled from the circuit. For air bleeding, see MAINTENANCE, “BLEED AIR FROM HYDRAULIC CIRCUIT (4-48)”.

PRECAUTIONS WHEN INSTALLING HYDRAULIC HOSES

- When you remove the O-rings or gasket seals, clean the mounting face, and replace them with new ones.
  Be sure to install new O-rings or gaskets.
- When you install the hoses, do not twist them or bend them too much.
  It can significantly decrease the service life of the hose and be a cause of damage.

CHECKS AFTER INSPECTION AND MAINTENANCE

If you do not do the necessary checks after the inspection and maintenance, it can cause a failure and personal injury.

Make sure of the safety, check the items that follow, and strictly obey them.

Checks after operation (with engine stopped)

- All the inspection and maintenance items are completed.
- Check that there is no tool or part dropped inside the machine. (It is very dangerous if the parts are in the machine and get caught in the lever linkage mechanism.)
- No leakage of water or oil is found.
- All the nuts and bolts are fully tightened.

Checks while the engine is running

For checks while the engine is running, see SAFETY, “PRECAUTIONS BEFORE YOU START INSPECTION AND MAINTENANCE (2-44)”, “PRECUATIONS FOR MAINTENANCE WHEN ENGINE IS IN OPERATION”. Do these checks very carefully for safety.

- No leakage of fuel or oil is found while the engine speed increases.
- The inspected and serviced area is normally operated.

FUEL AND LUBRICANTS TO MATCH THE AMBIENT TEMPERATURE

Use a fuel or lubricant that agrees with the ambient temperature.

For details, see “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)”.

LOCK COVERS

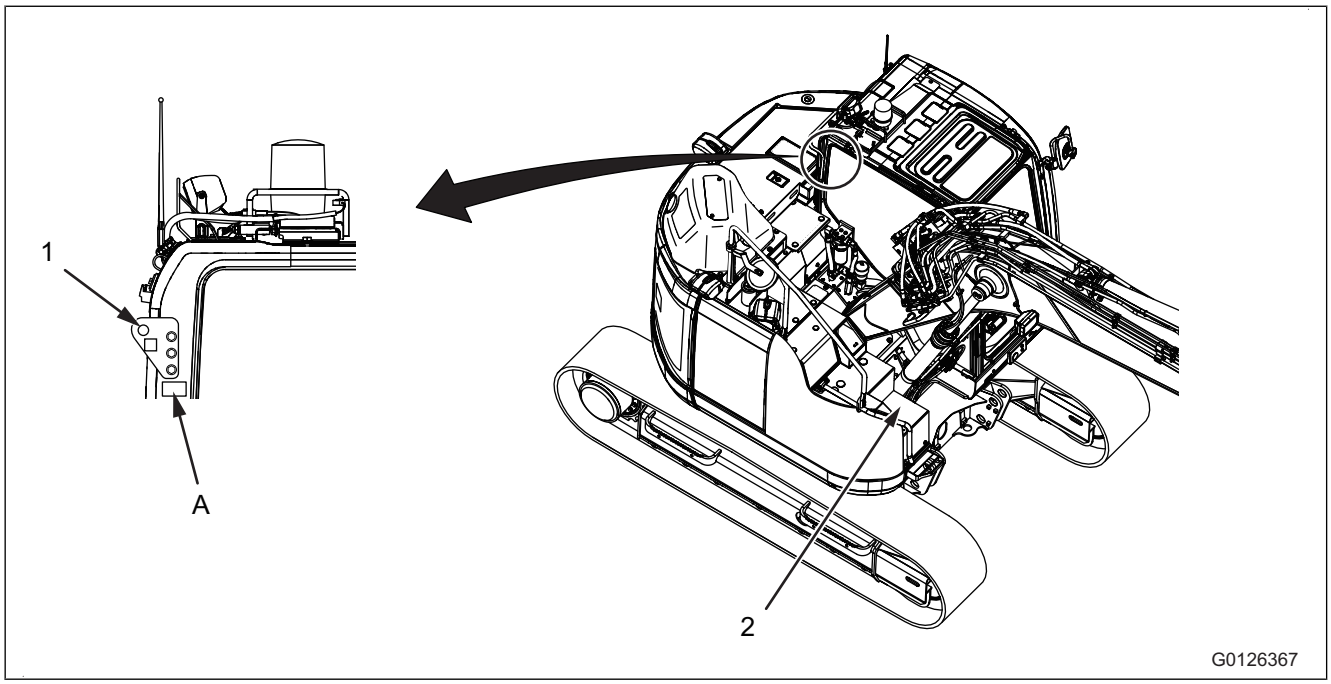
When you close the cover after inspection and maintenance, be sure to lock it with the catch.

If the machine is operated while the cover is not fixed, there is a danger that the cover opens.

PRECAUTIONS WHEN YOU CLEAN WORK EQUIPMENT CONTROL LEVER

- If oil or detergent gets onto the resin parts which are used at the knob of work equipment control lever of hydraulic excavator, they will become hard in a short time. Because of the hardening, you cannot push the switches on the tip of the lever such as horn switch. Be careful not to let oil attach to the work equipment control lever.
- If dirt gets onto the work equipment control lever, clean it with a dry cloth or a cloth wet with water or warm water. Do not use a detergent because oil or detergent can cause deterioration.

HANDLE ANCHOR POINT FOR TIE-OFF

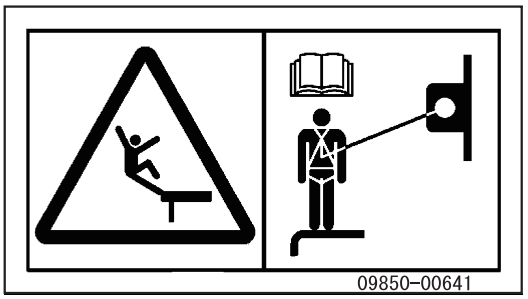


You can install the personal fall-arrest equipment to the anchor point for tie-off (1).

Use it when you do the work on the step (2) and on the position higher than that as a foothold.

Do not set other ones than the hook of the personal fall-arrest equipment to the anchor point for tie-off.

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



MAINTENANCE INFORMATION

- Komatsu recommends the use of Komatsu genuine parts for replacement parts, grease, or oil.
- Do not mix different brand or grade of oil.
  If it is necessary to use a different brand or grade of oil, change all the oil and replace the filter at the same time.
  It is not a problem to mix the remaining oil in the piping into the new oil if it is not so much.
- Unless specified differently, when the machine is shipped from the plant, it is filled with the oil and coolant listed in the table below.

Item	Type
Engine oil pan	Engine oil E015W40-LA (Komatsu genuine)
PTO gear case	Power train oil TO30 (Komatsu genuine)
Swing machinery case	
Final drive case	
Hydraulic oil system	Hydraulic oil HO46-HM (Komatsu genuine)
Radiator	Non-Amine Engine Coolant (AF-NAC) (Komatsu genuine) (density: 30% or more)

OIL, FUEL, AND COOLANT

OIL

- Oil deteriorates with time because it is used in the engine and hydraulic equipment in high temperature and pressure.
  Use oil that agrees with the grade and the ambient temperature as in the Operation and Maintenance Manual.
  Change the oil at the specified interval regardless of the condition of oil.
- Prevent entry of foreign material such as dirt or water into the new oil.
  The majority of failures of the machine are caused by the entry of foreign material.
  Prevent entry of foreign material when you store or add oil.
- Do not mix different brand or grade of oil.
- Add the specified capacity of oil to prevent failure.
- If oil in the hydraulic equipment is not clear, there can be water or air mixed in the circuit. Consult your Komatsu distributor.
- Replace the related filters at the same time when oil is changed.
- Komatsu recommends you to check the condition of the machine regularly with KOWA (Komatsu Oil Wear Analysis). For KOWA, consult your Komatsu distributor.
- The use of oil other than Komatsu genuine oil can reduce the replacement interval. Komatsu recommends you to check the condition of the machine with KOWA (Komatsu Oil Wear Analysis).

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 entry of water into the fuel, fill the fuel tank with fuel after work.
  This prevents condensation of water contained in the air in the fuel tank.
- If the fuel which contains water or dust is used, it can be a cause of malfunction of the fuel pump.
- Prevent entry of foreign material when you store or add fuel.
- 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 operating temperature (at temperatures below -15℃), the fuel will become solid.
  - If the fuel is used at temperatures higher than the operating temperature, the viscosity will decrease, and it can cause deterioration in performance.
- Before you start the engine, or wait for 10 minutes after you add fuel, drain the sediment and water from the fuel tank.
- Bleed air from the fuel circuit for the cases that follow.
  - When the fuel filter is replaced
  - When fuel is used up
  - When you start the engine for the first time after the fuel pipings or fuel system components are replaced or repaired
- If foreign material is mixed in the fuel tank, clean the tank and fuel system.

NOTICE

Be sure to use the ultra-low sulphur diesel fuel. (≤10ppm)
To get good fuel consumption properties and exhaust gas properties, the engine mounted on this machine uses an electronically controlled high-pressure fuel injection system and emission gas control system (KDPF). The high-pressure fuel injection system requires high precision parts and lubrication. If low viscosity fuel with low lubrication quality is used, its durability can decrease significantly.
The use of fuel with high sulphur content can decrease the service life of the engine or KDPF, or cause the degradation in performance.

BIO-FUEL

The biofuel is a fuel that is formed in a transesterification reaction of vegetable oil, animal fat, and edible oil.

The ASTM D975 diesel fuel can contain 5 % or less of biofuel.

Use the biofuel conforming to ASTM D7467 if its mixing ratio is between 6% to 20%.

The EN590 diesel fuel can contain 7 % or less of biofuel.

When you use 100% biofuel for mixing, it needs to conform to ASTM D6751 or EN14214.

In the United States, purchase the biofuel from the dealer certified by BQ-9000.

In the EU, purchase the biofuel from the member companies of European Biodiesel Board (EBB).

In other countries or regions, purchase the biofuel from the dealer that guarantees the same quality as BQ-9000 or EBB.

NOTICE

When you use biofuel other than the preceding diesel fuel and its mixing ratio is up to 20 %, obey the precautions that follow.

- **It is necessary to consult with the local regulatory authorities of engine exhaust gas regulation whether the biofuel can be used or not.**
- **The fuel can possibly leak because of the deterioration of rubber material of the fuel hose. Replace it with the fuel hose applicable for biofuel. Consult your Komatsu distributor for replacement of the fuel hose.**
- **Biofuel cannot be stored for a long time because it is easy to deteriorate and change in quality. Use the fuel in the storage tank or the fuel tank of the machine within 6 months. If the deteriorated and altered biofuel is used, it can cause bad effects on the engine parts. When you store the machine which uses the diesel fuel mixed with the biofuel for more than 3 months, do the procedure that follows.**
  - **Replace it with pure diesel fuel or the new diesel fuel mixed with the biofuel at the lowest possible mixing ratio.**
  - **After you change the fuel, run the engine for a minimum of 30 minutes before you store the machine.**
- **Because the biofuel dissolves the materials sticking to the fuel tank and fuel line, the fuel filter can be clogged with them. When you change the diesel fuel to the biofuel, replace the fuel main filter cartridge and fuel prefilter cartridge with new ones. When you replace the fuel main filter cartridge and fuel prefilter cartridge, make the replacement interval half the normal time until the second replacement after you change the diesel fuel to the biofuel.**
- **Because the biofuel absorbs moisture easily, it can possibly cause a growth of microorganism. When the microorganism grows in the biofuel, it can cause corrosion of the fuel system and the clogging of the fuel filter. Drain the water from the fuel tank before you start the operation. When you complete the operation, fill the fuel tank to reduce the air layer.**
- **If the biofuel is used in the conditions of the specific operation, the fuel can possibly get mixed into the engine oil. The fuel level in the engine oil must not exceed 5 %. Deteriorated engine oil can cause adverse effects on the engine parts such as a reduction of lubricating function. It is recommended to take a sample of the oil on a periodic basis.**
- **The characteristics of the biofuel change when outside air temperature is low. The fuel filter can be clogged and the fuel inside the fuel tank can be solidified. Store the biofuel in the warm building or in the storage tank.**

Ash is easy to be accumulated in KDPF when the biofuel is used. Thus, the regeneration of KDPF can possibly become more frequent if the mixing ratio of the biofuel is high.

The energy density of the biofuel becomes lower by 7 to 10% with that of the diesel fuel. Fuel consumption and output can possibly be lowered when the mixing ratio is high.

Fuel hose quality can change as time passes due to the influence of material of bio when using BDF that mixing ratio is over 20% and they are likely to wear out or deteriorate.

Strongly recommend to replace Fuel hose every 2 years or every 4000 hours, whichever comes sooner.

PARAFFIN-BASED FUEL

The paraffin-based fuel is generated by natural gas, coal, vegetable oil, and animal and plant fat, and its main constituent is paraffin.

The paraffin-based fuel has almost the same characteristics as the diesel fuel.

Vegetable oil and fat-derived fuel are called renewable diesel (RD) and hydrogenated vegetable oil (HVO).

The fuel synthesized from natural gas is called gas-to-liquid (GTL).

NOTICE

Use the paraffin-based fuel which agrees with EN15940:2016 and ASTM D975.
As long as the fuel agrees with EN15940:2016 and ASTM D975, its mixing ratio can be up to 100%.

The energy density of the paraffin-based fuel becomes lower up to 10% with that of the diesel fuel. Thus, fuel consumption and output can possibly be lowered.

COOLANT

- The coolant has the function to prevent corrosion and freeze.
  Although the machine is operated in an area where freeze is not an issue, use coolant.
- Komatsu machines are supplied with Non-Amine Engine Coolant (AF-NAC).
  Non-Amine Engine Coolant (AF-NAC) has excellent corrosion resistance, 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 the coolant that is not recommended, it can cause dangerous failure such as the corrosion of the cooling system or engine.
- When you use an antifreeze, be sure to obey the precautions in the Operation and Maintenance Manual.
- Use the coolant of the specified density that agrees with the ambient temperature.
  To prevent corrosion of the cooling system, use the Non-Amine Engine Coolant (AF-NAC) with a density of 30% or more.
  For the density of Non-Amine Engine Coolant (AF-NAC), see REPLACEMENT PARTS, “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-8)”.
- Do not mix water with the coolant.
  Coolant is supplied with Non-Amine Engine Coolant (AF-NAC) mixed with pure water.
- If the engine is overheated, wait for the engine to cool down before you add the coolant.
- If the coolant level is low, it will cause overheating, and will also cause failure with corrosion by entry of air to coolant.

DEF

- If 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 joint seizure or noise.
- The construction machinery is used in heavy-duty conditions. Be sure to obey the recommended ambient temperatures and replacement intervals as in the Operation and Maintenance Manual.
  Also, Komatsu recommends the use of grease written in the Operation and Maintenance Manual.
- Lubricate the grease fittings specified in PERIODIC MAINTENANCE.
  If the grease fitting which is not given becomes stiff or creaks after it is used for long time, add grease.
- Wipe off the grease that is pushed out from the grease fitting.
  Wipe off the grease which contains sand and dirt especially on the rotating part because it will cause wear on the rotating part.

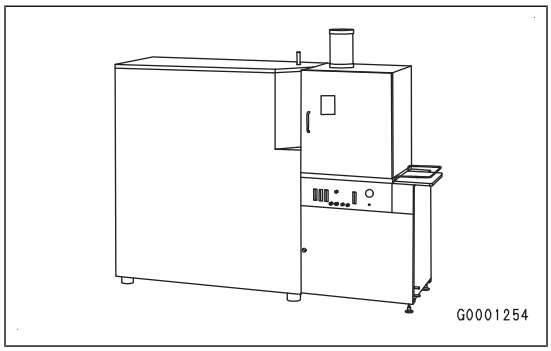
KOWA (Komatsu Oil Wear Analysis)

KOWA is a maintenance service to collect oil and analyze it regularly. It finds wear of the machine drive parts or other failures in a short period to prevent machine failure and downtime.

KOWA analysis items

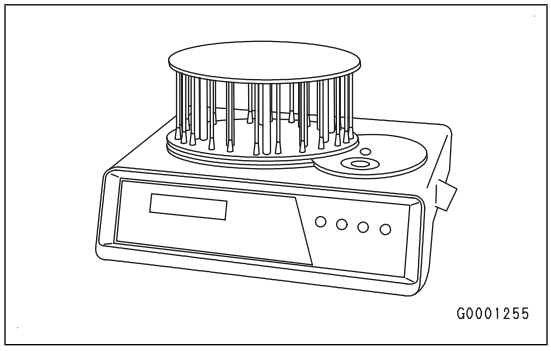
Measurement of metallic powder concentration

An ICP (Inductively Coupled Plasma) analyzer is used to measure 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 to measure the quantity of iron particles of 5 µm or more.



Others

Measure the items such as the ratio of water, coolant, fuel in the oil, and dynamic viscosity.

Oil collection interval

Every 500 hours

Precautions to collect oil

- Mix the oil sufficiently, and then collect the oil.
- Collect the oil at the specified intervals continuously.
- Do not collect the oil on rainy or windy days to prevent entry of water or dirt.

For details about KOWA, consult your Komatsu distributor.

OIL AND FUEL STORAGE

- Keep the oil and fuel indoors to prevent entry of foreign material such as water or dirt.
- When you keep the fuel or oil in drum can for a long period, put it on its side, and make sure that the filler port of the drum can comes below the liquid surface to prevent entrainment of humidity. If it is necessary to store them outdoors, cover them with waterproof sheet.
- To prevent deterioration of the quality during long-term storage, be sure to use in the order of first in - first out (use the first purchased oil or fuel first).

DEF STORAGE

- 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

- The filters remove the foreign materials in the oil, fuel, and air circuits to prevent machine failure.
  Replace all the filters regularly. For details, see Operation and Maintenance Manual.
  But if the operation environment is dangerous or if you use oil that is different from genuine Komatsu products or fuel contains high ratio of sulphur, reduce the replacement interval.
- Cartridge type filter cannot be used again even it is washed.
  Replace it in response to the maintenance procedure.
- If the oil filter has been replaced, make sure that no foreign material is found in the used filters.
  If the foreign materials are found, consult your Komatsu distributor.
- Do not open the packages of spare filters until just before they are to be used.
- Komatsu recommends the use of Komatsu genuine filters.

ELECTRICAL COMPONENTS

⚠ WARNING

- **When the battery disconnect switch key is turned to the OFF position for the maintenance work, be sure to pull out the key and keep it with you. If the key is left in the switch, it can be turned on by mistake and it can cause an electric shock.**
  For the operation of the battery disconnect switch, see “BATTERY DISCONNECT SWITCH (3-118)”.
- **Do not wash inside of the operator's compartment with water. There is a danger that the electrical leakage causes malfunction if the electrical component becomes wet and its coating is damaged. Be careful not to let water get into the electrical components when you wash the machine.**

- When it is raining or after you wash the machine, if the water drops stuck around connectors, wipe them off before you remove the connectors of the electrical components. Be careful not to allow water to enter into the connector.

- Check and maintenance items include checks for fan belt tension, fan belt damage, and battery electrolyte level.
- Install the electrical components specified by Komatsu.
- When you install the wireless devices to the machine, consult your Komatsu distributor first. There is a danger that the radio waves received and transmitted by wireless devices causes malfunction in the controller of the control system.
- When you operate the machine near the sea, clean all electrical components to prevent corrosion.
- When you install the electrical component, connect it to the specified power supply connector.
  Do not connect the optional power supply to the fuse, starting switch, or battery relay.

STANDARD TORQUE

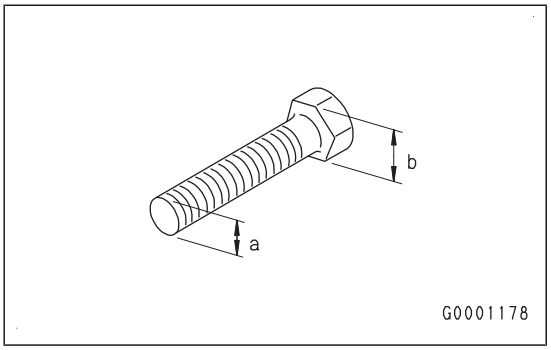
⚠ CAUTION

If you tighten the parts by other than the specified tightening torque, the parts will be damaged or loose, and the machine failures or operating problems will be caused.

Torque list for bolts and nuts

Unless otherwise specified, tighten the metric nuts and bolts to the torque shown in the table.

When you replace the bolts or nuts, Komatsu recommends the use of Komatsu genuine part of the same size as before replacement.



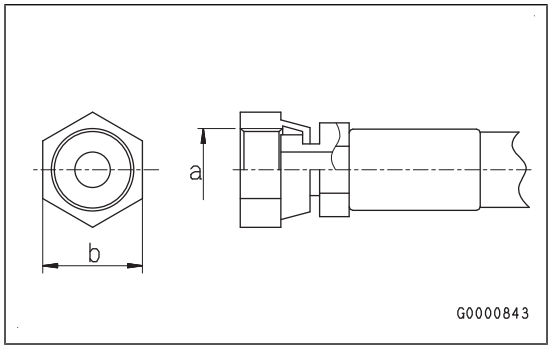
Outside diameter of the thread portion “a” (mm)	Width across flats “b” (mm)	Tightening torque (Nm {kgfm})	
		Target value	Allowable range
6	10	13.3 {1.35}	11.8 to 14.7 {1.2 to 1.5}
8	13	31 {3.2}	27 to 34 {2.8 to 3.5}
10	17	67 {6.8}	59 to 74 {6 to 7.5}
12	19	111 {11.3}	98 to 123 {10 to 12.5}
14	22	172 {17.5}	153 to 190 {15.5 to 19.5}
16	24	260 {26.5}	235 to 285 {23.5 to 29.5}
18	27	360 {37}	320 to 400 {33 to 41}
20	30	510 {52.3}	455 to 565 {46.5 to 58}
22	32	688 {70.3}	610 to 765 {62.5 to 78}
24	36	883 {90}	785 to 980 {80 to 100}
27	41	1295 {133}	1150 to 1440 {118 to 147}
30	46	1715 {175}	1520 to 1910 {155 to 195}
33	50	2205 {225}	1960 to 2450 {200 to 250}
36	55	2745 {280}	2450 to 3040 {250 to 310}
39	60	3260 {333}	2890 to 3630 {295 to 370}

Torque list for hoses

Tighten the hoses to the torque shown in the table.

Face seal

Hose nominal number	Width across flats “b” (mm)	Tightening torque (Nm {kgfm})	
		Target value	Allowable range
02	19	44 {4.5}	34 to 54 {3.5 to 5.5}
03	22	74 {7.5}	54 to 93 {5.5 to 9.5}
04	27	103 {10.5}	84 to 132 {8.5 to 13.5}
05	32	157 {16.0}	128 to 186 {13.0 to 19.0}
06	36	216 {22.0}	177 to 245 {18.0 to 25.0}



MAINTENANCE SCHEDULE

- If a hydraulic breaker is installed to the machine, the maintenance intervals for some parts are different. See “MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-18)” and check the maintenance interval.
- When you use the engine oil for cold districts, the maintenance intervals of the engine oil and filter cartridge are changed to every 250 hours. For details, see the oil part number and note in “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (7-4)”.
- Consult your Komatsu distributor to change the maintenance interval of the machine monitor.

MAINTENANCE INTERVAL TABLE

WHEN REQUIRED 4-19
CHECK, CLEAN AND REPLACE AIR CLEANER 4-19
CLEAN INSIDE OF COOLING SYSTEM 4-25
CHECK LOOSENESS OF TRACK SHOE BOLTS, RETIGHTEN BOLTS 4-30
CHECK LOOSENESS OF ROADLINER SHOE BOLTS, RETIGHTEN BOLTS 4-30
CHECK AND ADJUST TRACK TENSION 4-31
CHECK ROADLINERS 4-32
REPLACE ROADLINERS 4-32
REPLACE BUCKET TEETH (VERTICAL PIN TYPE) 4-32
REPLACE BUCKET TEETH (HORIZONTAL PIN TYPE) 4-36
ADJUST BUCKET CLEARANCE 4-37
CHECK AND ADD WINDOW WASHER FLUID 4-39
CHECK AND MAINTENANCE AIR CONDITIONER 4-40
CHECK, CLEAN AND LUBRICATE SLIDE DOOR RAIL AND ROLLER 4-42
CHECK, CLEAN AND LUBRICATE SLIDE DOOR STOPPER 4-43
CHECK CLEARANCE AT STOPPER WHEN YOU PULL UP FRONT WINDOW 4-43
REPLACE ADDITIONAL FILTER ELEMENT FOR BREAKER 4-44
CLEAN WASHABLE FLOOR 4-45
CHECK GAS SPRING 4-47
BLEED AIR FROM HYDRAULIC CIRCUIT 4-48
CHECK CAMERA VISIBILITY 4-50
CHECK BEFORE YOU START OPERATION 4-51
EVERY 100 HOURS MAINTENANCE 4-52
LUBRICATE WORK EQUIPMENT 4-52
CHECK OIL LEVEL IN SWING MACHINERY CASE, ADD OIL 4-53
EVERY 250 HOURS MAINTENANCE 4-54
CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL 4-54
CHECK OIL IN LARGE CAPACITY FINAL DRIVE CASE 4-55
CHECK BATTERY ELECTROLYTE LEVEL 4-56
CHECK AND ADJUST AIR CONDITIONER COMPRESSOR BELT TENSION 4-59
EVERY 500 HOURS MAINTENANCE 4-61
LUBRICATION 4-61
CHANGE OIL IN ENGINE OIL PAN AND ENGINE OIL FILTER CARTRIDGE 4-62
REPLACE FUEL PREFILTER CARTRIDGE 4-64
CHECK SWING PINION GREASE LEVEL, ADD GREASE 4-66
LUBRICATE SWING CIRCLE 4-67
CHECK AND CLEAN FINS 4-68
CLEAN AIR CONDITIONER FRESH/RECIRC FILTERS 4-70
EVERY 1000 HOURS MAINTENANCE 4-72
REPLACE HYDRAULIC OIL FILTER ELEMENT 4-72
REPLACE HYDRAULIC TANK BREATHER ELEMENT 4-74
CHANGE OIL IN SWING MACHINERY CASE 4-75
CHANGE OIL IN FINAL DRIVE CASE 4-76
CHANGE OIL IN LARGE CAPACITY FINAL DRIVE CASE 4-77
CHECK OIL LEVEL IN PTO GEAR CASE, ADD OIL 4-78
REPLACE FUEL MAIN FILTER CARTRIDGE 4-79
CHECK ALL TIGHTENING POINTS OF ENGINE INTAKE PIPE CLAMPS 4-80

CHECK FAN BELT TENSION AND AUTO-TENSIONER, REPLACING AUTO-TENSIONER 4-80
REPLACE DEF TANK BREATHER ELEMENT 4-81
CHECK FUNCTION OF ACCUMULATOR FOR CONTROL CIRCUIT AND RELEASE INTERNAL PRESSURE IN HYDRAULIC CIRCUIT (FOR BREAKER) 4-81
EVERY 2000 HOURS MAINTENANCE 4-82
CLEAN HYDRAULIC TANK STRAINER 4-82
CHECK FUNCTION OF ACCUMULATOR FOR CONTROL CIRCUIT AND RELEASE INTERNAL PRESSURE IN HYDRAULIC CIRCUIT 4-83
CHECK ALTERNATOR AND STARTING MOTOR 4-86
CHECK AND ADJUST ENGINE VALVE CLEARANCE 4-86
REPLACE KCCV FILTER ELEMENT 4-87
REPLACE DEF FILTER 4-90
EVERY 4000 HOURS MAINTENANCE 4-93
CHECK WATER PUMP 4-93
REPLACE ACCUMULATOR (FOR CONTROL CIRCUIT) 4-94
CHECK FOR LOOSENESS OF ENGINE HIGH-PRESSURE PIPING CLAMP, HARDENING OF RUBBER 4-94
CHECK FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER 4-95
EVERY 4500 HOURS MAINTENANCE 4-96
CLEAN KDPF 4-96
CLEAN DEF TANK 4-96
REPLACE DEF TANK FILLER PORT FILTER 4-96
EVERY 5000 HOURS MAINTENANCE 4-97
CHANGE OIL IN HYDRAULIC TANK 4-97
EVERY 8000 HOURS MAINTENANCE 4-100
REPLACE ENGINE HIGH-PRESSURE PIPING CLAMP 4-100
REPLACE FUEL SPRAY PREVENTION CAP 4-100
EVERY 9000 HOURS MAINTENANCE 4-101
REPLACE DEF HOSE 4-101

MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER

If a hydraulic breaker is installed to the machine, the hydraulic oil deteriorates faster than in the normal bucket digging operation. Set the maintenance interval as shown below in response to the operation ratio of the breaker.

Replace hydraulic oil filter element

For the first time of a new machine, replace the element after 100 to 150 hours. Replace the element in response to the maintenance interval by the table thereafter.

Change oil in hydraulic tank

Change the hydraulic oil in response to the maintenance interval by the table.

Replace additional filter element for breaker (option)

Replace the element in response to the maintenance interval by the table. 250 hours is a guide for when the breaker is used (if operation ratio of the breaker is 50% or more).

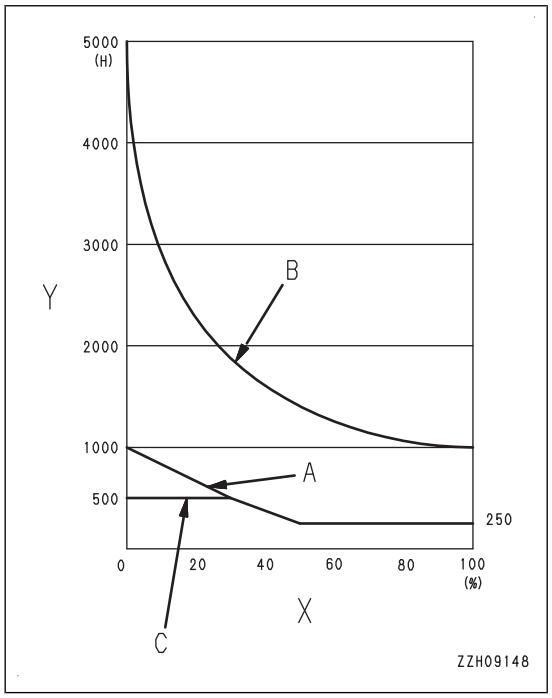
X: Operating ratio of breaker (%)

Y: Replacement interval (H)

(A): Element of hydraulic tank

(B): Hydraulic oil

(C): Element of additional filter



REMARK

Operation ratio of breaker 100%: Only breaker is used
Operation ratio of breaker 0%: Breaker is not used at all.

Lubricate

Lubricate every 100 hours when hydraulic breaker is installed. For details, see “LUBRICATION (4-61)”.

MAINTENANCE PROCEDURE

WHEN REQUIRED

CHECK, CLEAN AND REPLACE AIR CLEANER

⚠ WARNING

When you use the compressed air, use the protective equipment such as protective eyeglasses and dust mask. There is a danger of personal injury when dirt is scattered.

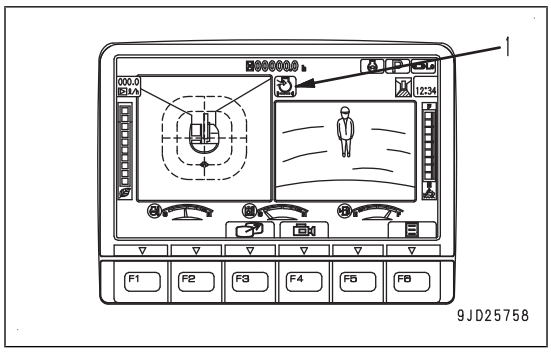
NOTICE

- **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 lights up, air cleaner cannot show its original performance and the cleaning effect decreases.**
  Also, if the element is cleaned frequently, dirt attached to the element can fall into the inner element more frequently.
- **Before you check, clean or replace the air cleaner, stop the engine. If you do the inspection, cleaning or maintenance while the engine is running, dirt enters into the fuel tank and causes damage to the engine.**
- **Store the unused element in a dry place. Do not open the package until just before you use it.**

CHECK CLOGGING OF AIR CLEANER

Make sure that the air cleaner clogging caution lamp (1) is lit.

Clean the air cleaner element when the air cleaner clogging caution lamp lights up.



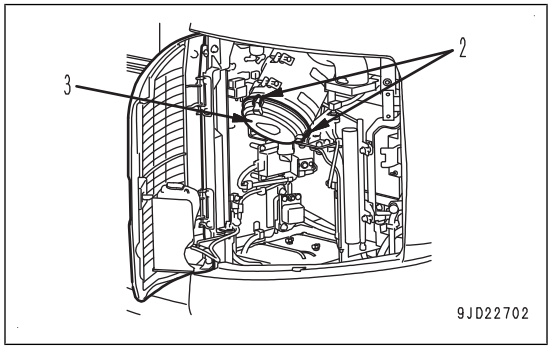
CLEAN AIR CLEANER OUTER ELEMENT

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.**

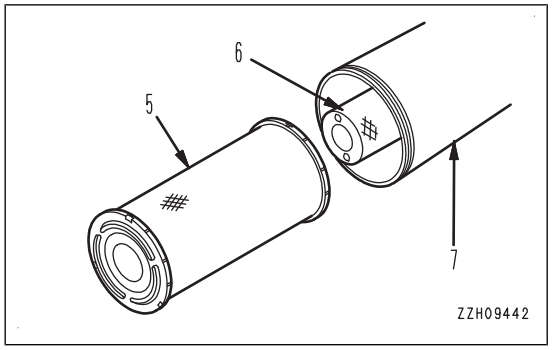
Clean the outer element in the following procedure.

1. Open the battery inspection cover on the left side of the machine, remove the hooks (2) (3 places), and remove the cover (3).

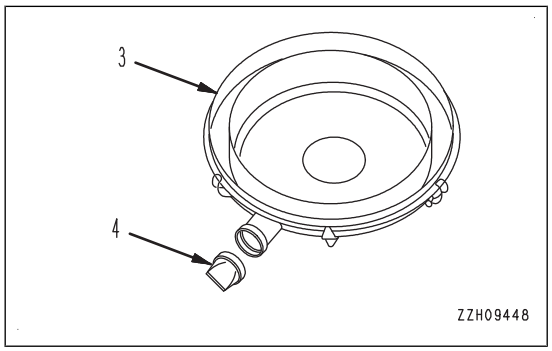


2. Hold the outer element (5), rock it lightly up and down and to the right and left, and pull it out while turning it to the right or left.
3. When outer element (5) is removed, check that the inner element does not come out of position and is not at an angle.

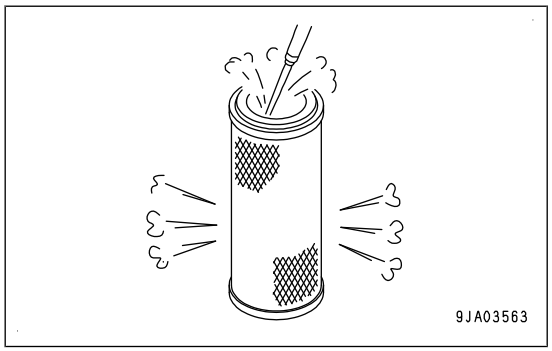
   If it is at an angle, push it straight to the bottom with your hand.
4. After removing outer element (5), cover the inner element (6) with a clean cloth or tape to prevent dirt or dust from entering.



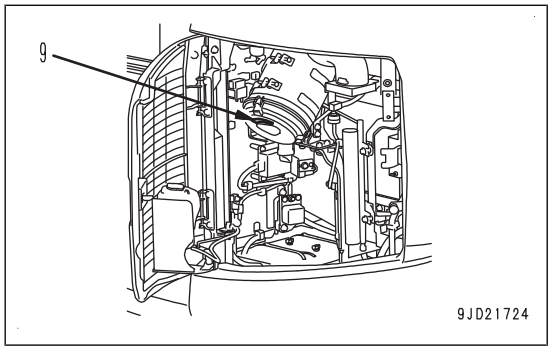
5. Clean dust sticking inside air cleaner body (7) and on cover (3) by using a clean cloth or brush.
6. If any dust is attached to vacuator valve (4) installed to cover (3), remove it.
7. When the outer element has been cleaned 6 times or used for 1 year, replace it.
   - When the element needs to be replaced
     Replace the inner and outer elements with new ones. For details, see “REPLACE AIR CLEANER ELEMENT (4-22)”.
   - When the element does not need to be replaced
     Clean the outer element. Continue the cleaning procedure.



8. Blow dry compressed air (0.2MPa {2.1kgf/cm^2} or below) from the inside of the outer element along the pleats.
9. Blow along the pleats from the outside, then blow again from the inside.



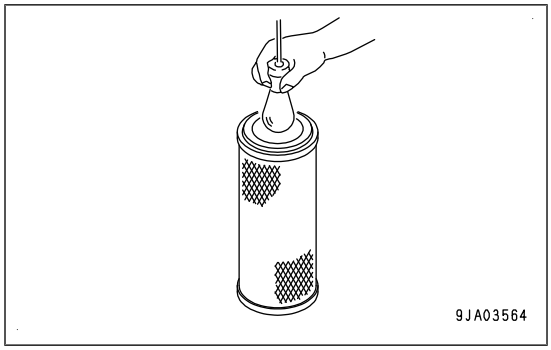
10. Peel off a seal (9) every time after the cleaning of the element.



11. After cleaning, illuminate the inside of the element with an electric bulb to check.

    If any holes or thin places are found, replace the inner and outer elements.

12. Remove the cover of cloth or tape attached to inner element (6).



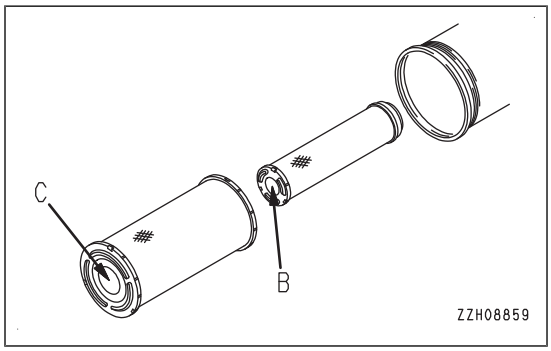
NOTICE

- **Do not use the element with damaged pleats or a damaged gasket or seal.**
- **If the element and O-ring are cleaned and used again after they are used for more than one year, it will cause problems. Do not use them again.**

13. Check the seal of the cleaned or new element for sticking of dusts and oil and wipe them off, if any.

NOTICE

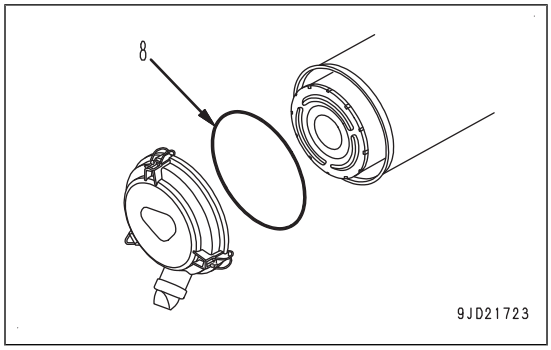
- **Be sure to install the air cleaner element facing in the correct direction. Install so that the bottom of the air cleaner element (face where no hole is drilled) (B), (C) comes to cover (3) end. If it is installed in wrong direction, it may cause breakage of the air cleaner element or serious damage to the engine.**
- **When inserting the element into the body, if the rubber at the tip is swollen or the outer element is not pushed in straight, and cover (3) is installed by force with hook (2), there is a danger that the hook and air cleaner body may be damaged, so be careful when installing.**



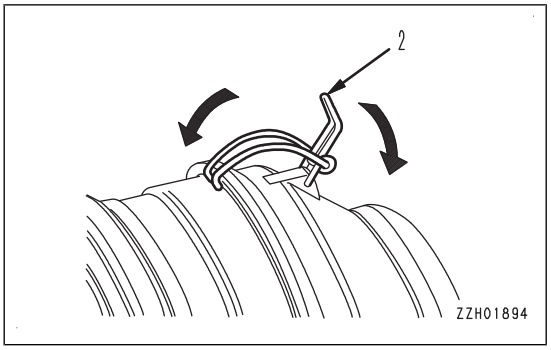
14. Push the outer element in straight with your hand when installing it to the air cleaner body.

    Hold the outer element, and rock it lightly up and down and to the right and left while pushing it in, the outer element can be inserted easily.

15. Install cover (3) according to the following procedure.
    1) Check that O-ring (8) is fitted to cover (3).
    2) Align cover (3) with the element.



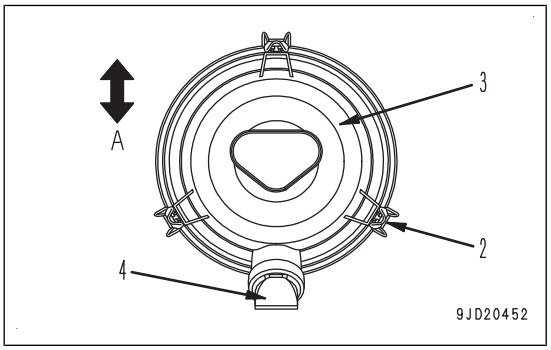
3) Lock the tip of hook (2) on the protrusion of the air cleaner body.



4) Always install the cover (3) so that vacuator (4) faces right below (A).

5) When cover (3) is installed, check that the clearance between the air cleaner body and cover (3) is not too large.

   If the clearance is too large, remove cover (3), and then install it again.



16. Check the air cleaner clogging caution lamp (1) on the machine monitor.

    If it light up just after cleaning of the elements has been finished, replace the inner and outer elements.

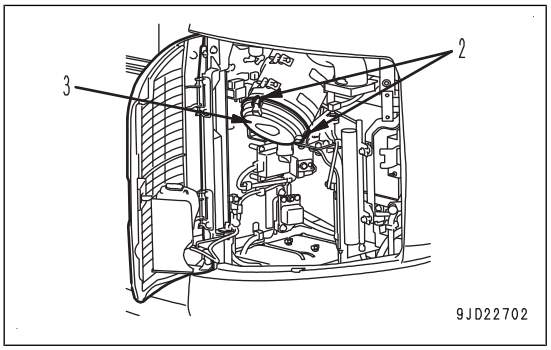
REPLACE AIR CLEANER ELEMENT

NOTICE

- **Do not clean and reuse the inner element. When replacing the outer element, replace the inner element with a new one at the same time.**
- **If the outer element and cover are installed while the inner element is not installed properly, the outer element may be damaged.**
- **The sealing portion of the improper part lacks precision, and allows the entry of dust, which leads to damage of the engine. Do not use such improper part.**

Replace the outer element in the following procedure.

1. Open the battery inspection cover on the left side of the machine, remove the hooks (2) (3 places), and remove the cover (3).

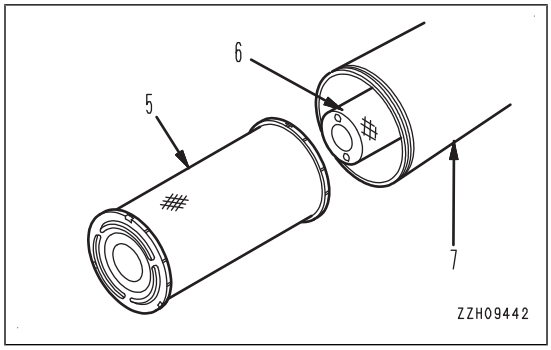


2. Hold the outer element (5), rock it lightly up and down and to the right and left, and pull it out while turning it to the right or left.

Do not remove inner element (6) at this time.

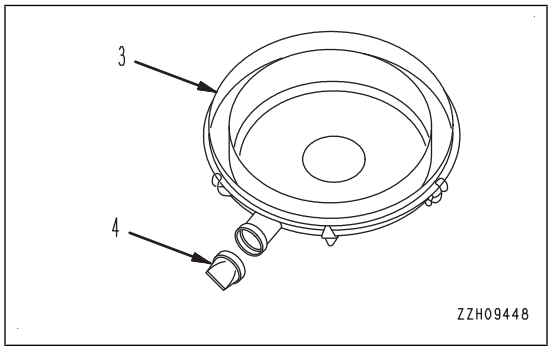
3. When outer element (5) is removed, check that the inner element does not come out of position and is not at an angle.

   If the inner element is inclined, push it in straight by hand to the end.



4. Clean dust sticking inside air cleaner body (7) and on cover (3) by using a clean cloth or brush.
5. If any dust is attached to vacuator valve (4) installed to cover (3), remove it.
6. Remove the inner element (6), then quickly install the new inner element.

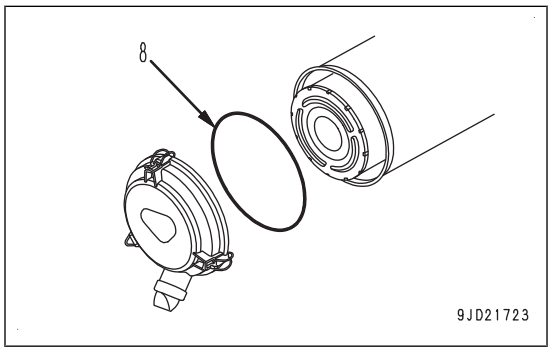
   Install the inner element securely so that it does not move.



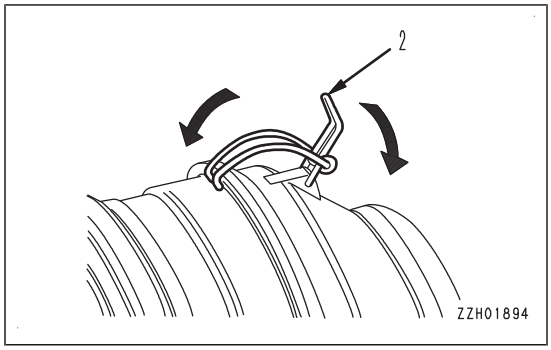
7. Push new outer element (5) in straight with your hand into the air cleaner body.

   Hold the element, and rock it lightly up and down and to the right and left while pushing it in, the element can be inserted easily.

8. Install the cover (3) according to the following procedure.
   1) Check that O-ring (8) is fitted to cover (3).
   2) Align the cover (3) with the element.

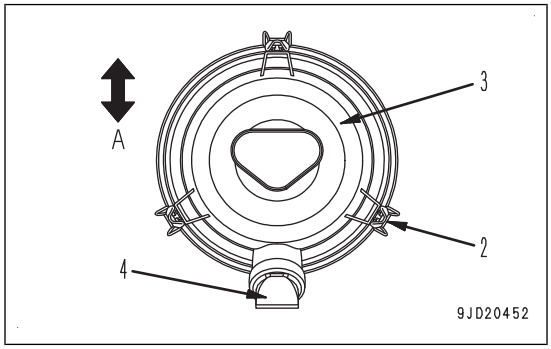


   3) Lock the tip of hook (2) on the protrusion of the air cleaner body.

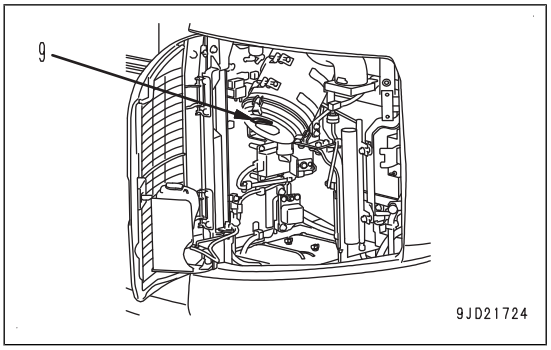


   4) Always install the cover (3) so that vacuator (4) faces right below (A).
   5) When cover (3) is installed, check that the clearance between the air cleaner body and cover (3) is not too large.

      If the clearance is too large, remove cover (3), and then install it again.



9. Replace the seal (9) on the cover (3) with a new one.



CHECK AND REPLACE VACUATOR VALVE

Check vacuator valve (4) for damage and deformation of its rubber portion.

If the vacuator is damaged or its rubber part is deformed, replace it with a new one.

CLEAN INSIDE OF COOLING SYSTEM

⚠ WARNING

- **Wait for the temperature of the machine to go down, and then start the work. Immediately after the engine is stopped, the cooling system is very hot and can cause burn injury.**
- **When you remove the cap from the expansion tank, wait for the temperature to go down, and turn the cap slowly to release the pressure, and remove the cap carefully. Immediately after the engine is stopped, the coolant is very hot and the pressure is accumulated in the expansion tank. If you remove the cap in this state, it can cause burn injury.**
- **Check that the conditions that follow are satisfied always before you stand up or go away from the operator's seat.**
  - **Each control lever is in the NEUTRAL position.**
  - **The lock lever is in LOCK position.**
- **When you do the cleaning, operate the engine. While the engine is in operation, keep away from the rear part of the machine. It is dangerous that you are behind the machine if the machine starts.**
- **The coolant is poisonous. When you open the drain plug, be careful not to get coolant on you. If coolant gets into your eyes, immediately wash your eyes by a lot of clean water and consult a doctor.**
- **Consult your Komatsu distributor or a qualified company for disposal of the discharged coolant. The coolant is poisonous. Do not put it into drainage ditches or drain it onto the ground surface.**

NOTICE

Komatsu recommends the use of Non-Amine Engine Coolant (AF-NAC).

- Stop the machine on a hard and level ground, and clean inside the cooling system or change the coolant. Clean inside the cooling system and change the coolant as in the table that follows.

Coolant	Cleaning of inside of cooling system and change of coolant
Non-Amine Engine Coolant (AF-NAC)	Every 2 years or every 4000 hours that comes first

- The coolant has the function to prevent corrosion and freeze.
  Although the machine is operated in an area where freeze is not an issue, use coolant.
- Komatsu machines are supplied with Non-Amine Engine Coolant (AF-NAC).
  Non-Amine Engine Coolant (AF-NAC) has excellent corrosion resistance, 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 the coolant that is not recommended, it can cause dangerous failure such as the corrosion of the cooling system or engine.
- The supplied Non-Amine Engine Coolant (AF-NAC) is mixed with pure water.
  It is mixed with pure water, so it is not flammable.
- The coolant density is different by the ambient temperature. Find the lowest temperature in the past and select the correct density for the coolant as in the “Coolant density table” that follows.

Coolant density table

Min. atmospheric temperature (℃)	-10 or more	-15	-20	-25	-30	-35	-40	-45	-50
Density (%)	30	36	41	46	50	54	58	61	64

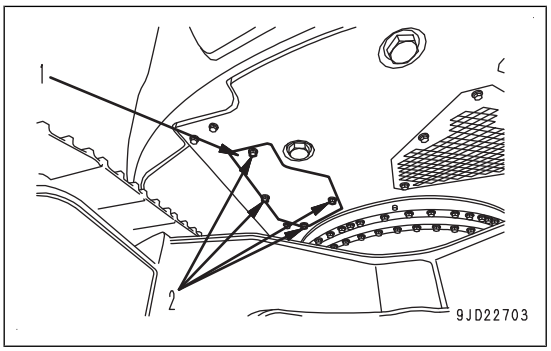
When you select the density for the coolant, set it for a temperature 10℃ lower than the actual lowest temperature in the jobsite.
The coolant density is different by the ambient temperature, but it must be 30% or more.
Check the density with a coolant tester.

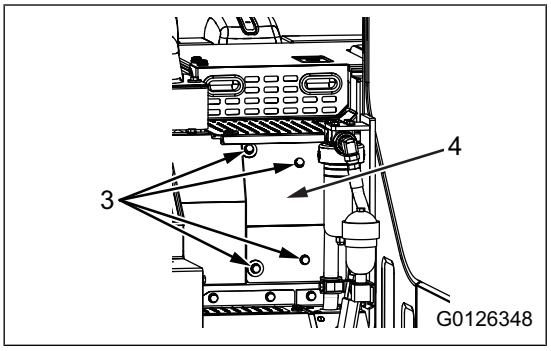
CLEAN INSIDE OF COOLING SYSTEM

Prepare a container with the capacity larger than the specified coolant quantity to catch the drained coolant.

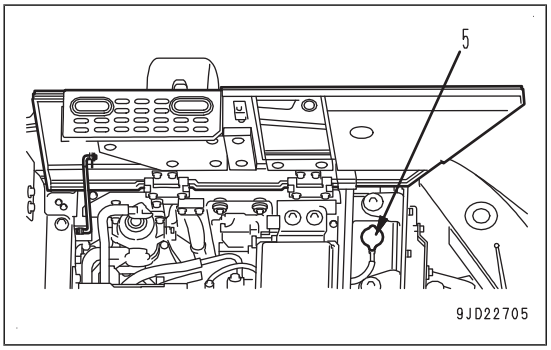
Prepare a hose to use when filling with coolant and water.

1. Stop the engine.
2. Remove the 4 cover mounting bolts (2), and remove the undercover (1).
3. Remove the 4 cover mounting bolts (3), and remove the cover (4) between the hydraulic tank and operator cab.



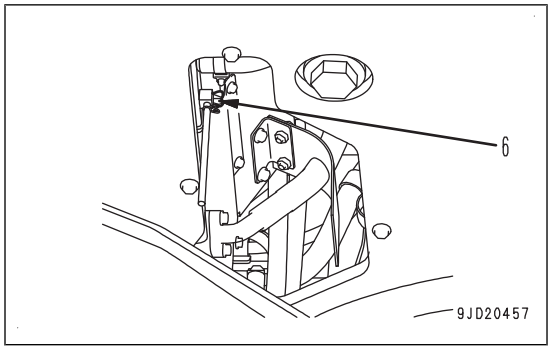


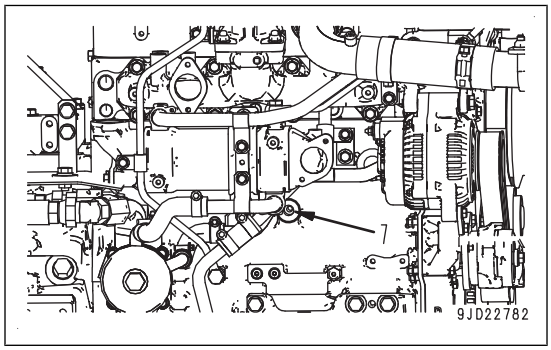
4. Check that the coolant temperature is sufficiently low to touch the radiator cap surface by bare hand, turn the radiator cap (5) slowly until it hits the stopper, and release the pressure.
5. Push and turn the radiator cap (5) more until it touches the stopper, and remove it.



6. Put containers to receive coolant below the drain hose installed to the drain valve (6) and below the coolant drain plug (7) of the engine cylinder block.
7. Open the drain valve (6) at the lower part of the radiator.
8. Remove the drain plug (7) of the cylinder block, and drain coolant.
9. After coolant is drained, close the drain valve (6).
10. Tighten the drain plug (7), and add tap water.

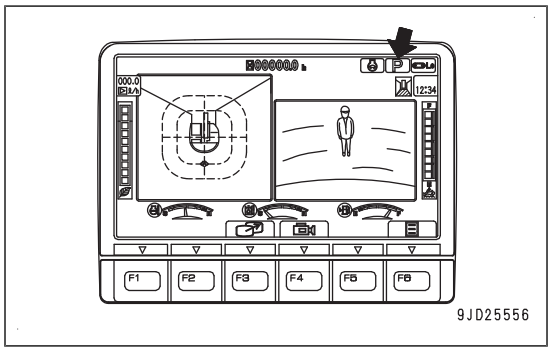
    Add water until it fills the radiator.
11. Start the engine.



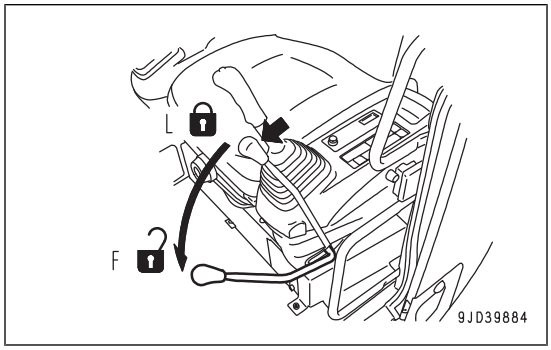


12. To complete the warm-up operation of the hydraulic component more quickly, set the working mode to the P mode (heavy-duty mode).

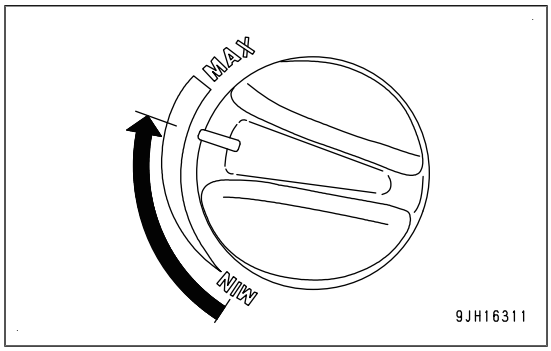
    For the working mode setting, see “SELECT WORKING MODE (3-209)”.



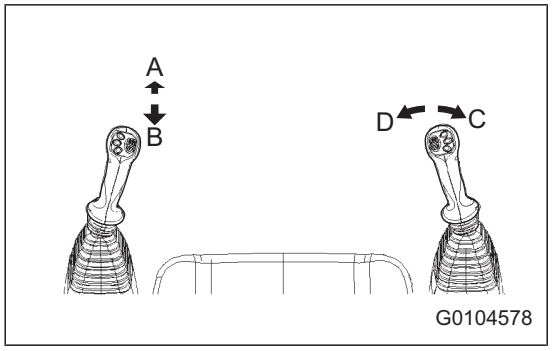
13. Hold the red part on the top of the lock lever, and set it slowly and securely to the FREE position (F).
14. Raise the bucket off the ground.



15. Turn the fuel control dial to a point of 2/3 between the Low idle (MIN) position and High idle (MAX) position.



16. Operate the work equipment control levers as follows.

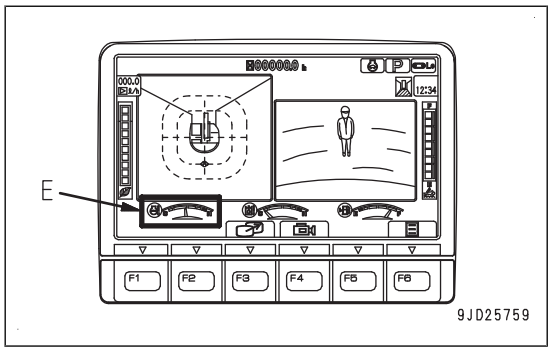


NOTICE

When you operate the work equipment, be careful not to let it interfere with the machine or ground.

1) Move the R.H. work equipment control lever slowly in the direction of the bucket IN 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 OUT position (C). Operate the lever to the end of its stroke, and hold it in the position for 30 seconds.
3) And then, 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 the 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 the position for 30 seconds.

When the operations from step 1) to 4) are done continuously, the pointer of the engine coolant temperature caution lamp will move up. The pointer of the engine coolant temperature caution lamp moves down temporarily around the center of the scale (E). After that, continue the operation for approximately 10 minutes.

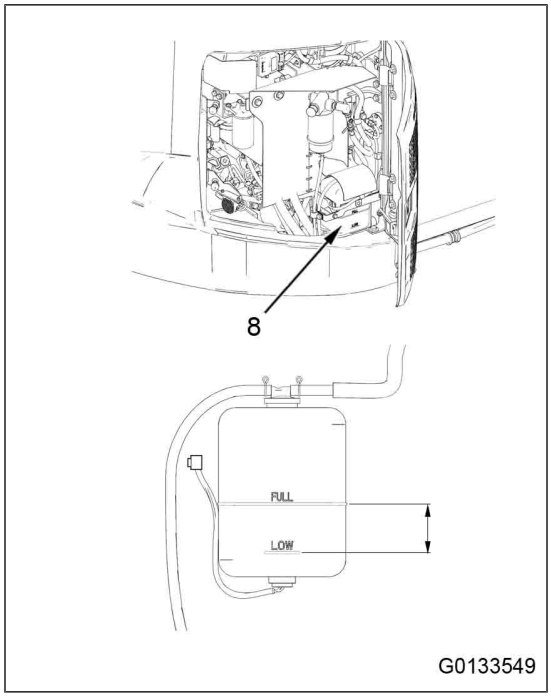


17. Stop the engine.
18. Open the drain valve (6).
19. Remove the drain plug (7) to drain coolant.
20. After coolant is drained, close the drain valve (6).
21. Put a sealing tape around the drain plug (7), and close it.
22. Install the covers (1) and (4).
23. Add the Non-Amine Engine Coolant (AF-NAC) through the filler port up to the mouth of the port.

    For the density of Non-Amine Engine Coolant, see “Coolant density table”.
24. Run the engine at low idle for 5 minutes to remove the air from the coolant, and then run it at high idle for 5 minutes.

    At this time, keep the radiator cap (5) removed.

25. Drain coolant from the reservoir tank (8).
26. Clean the inside of reservoir tank.
27. Add Non-Amine Engine Coolant to the middle between FULL and LOW.
28. Stop the engine.
29. Add Non-Amine Engine Coolant (AF-NAC) up to the filler port after approximately 3 minutes.
30. Tighten the radiator cap (5).



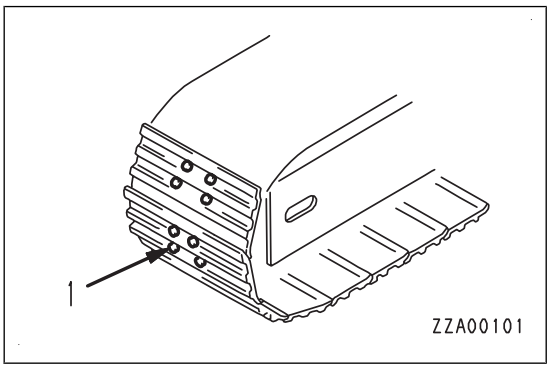
CHECK LOOSENESS OF TRACK SHOE BOLTS, RETIGHTEN BOLTS

(Steel shoe specification)

NOTICE

Tighten the track shoe bolt immediately if it is loose. If it is used as it is loose, shoe bolt will be broken.

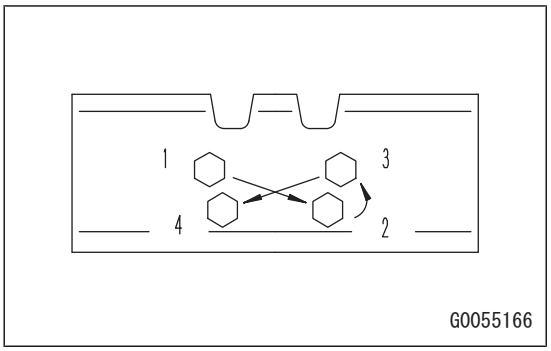
1. Check the track shoe bolts (1) for looseness.



2. If a loose bolt is found, tighten it in the sequence shown in the figure.

   Tightening torque: 176.4 to 215.6 Nm {18 to 22kgfm}

3. Make sure that the nut and shoe contact with the link contact surface securely.
4. After you check it, retighten it by 80 to 100°.

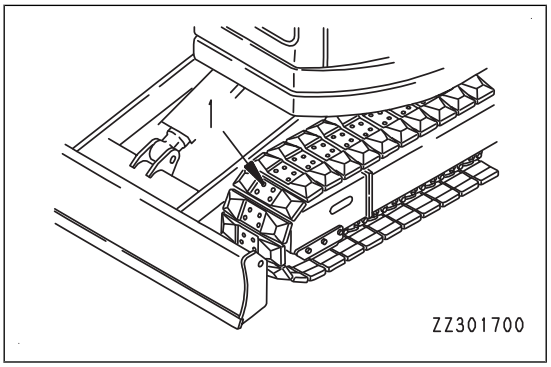


CHECK LOOSENESS OF ROADLINER SHOE BOLTS, RETIGHTEN BOLTS

NOTICE

Tighten the roadliner shoe bolt immediately if it is loose. If it is used as it is loose, shoe bolt will be broken.

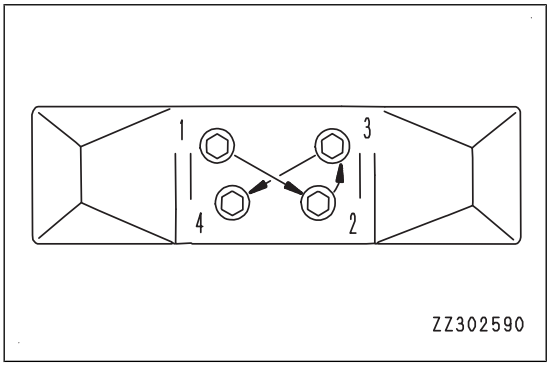
1. Check that the roadliner shoe bolt (1) is not loose.



2. If a loose bolt is found, tighten it in the sequence shown in the figure.

   Tightening torque: 176.4 to 215.6Nm {18 to 22kgfm}

3. Make sure that the nut and shoe contact with the link contact surface securely.



CHECK AND ADJUST TRACK TENSION

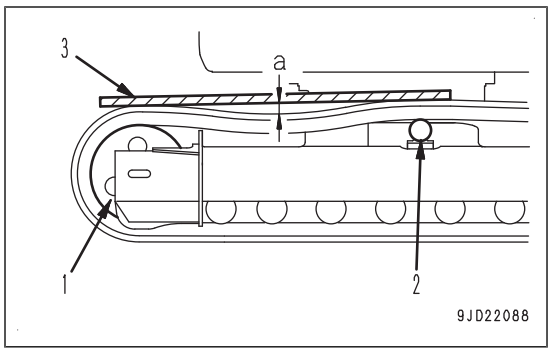
(Steel shoe, roadliner specification)

The wear of the pins and bushings of the undercarriage is different in response to the working condition and soil condition. Check the track tension in response to the state, and keep the standard tension.

Do the check and adjustment on a firm and level ground.

CHECK TRACK TENSION

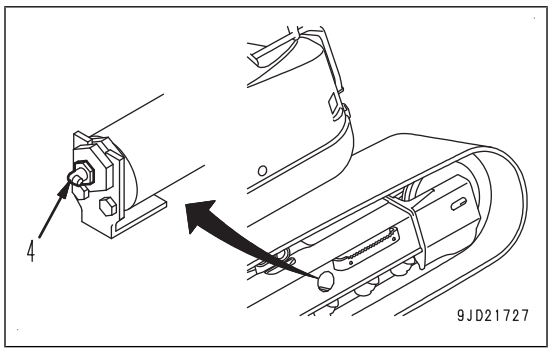
1. Run the engine at low idle.
2. Move the machine forward slowly for a distance equal to the length of the track on ground.
3. Put a wooden block (3) which reaches from the idler (1) to the carrier roller (2) on the track.
4. Measure the maximum deflection (a) between the wooden block and the track.
   - When the deflection (a) is in the range of the standard value (10 to 30mm), the tension of the track is correct.
   - When the deflection (a) is not in the range of the standard value (10 to 30mm), adjust the tension of the track in the procedure that follows.



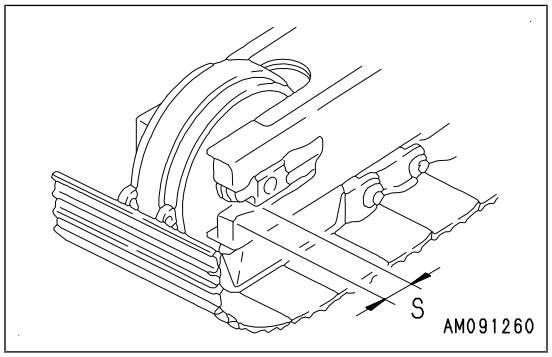
INCREASE TRACK TENSION

Prepare the grease pump.

1. Push in the grease through the grease fitting (4) with a grease pump.



   The limit that grease can be push in is until the distance (S) from the idler support to the track frame becomes 0mm. If the tension remains loose, pins and bushings have been worn out. Consult your Komatsu distributor for turn the pins and bushing or replace them.



2. To check that the tension is correct, move the machine forward slowly for a distance equal to the length of the track on ground with the engine at low idle.
3. Check the tension of the tracks.

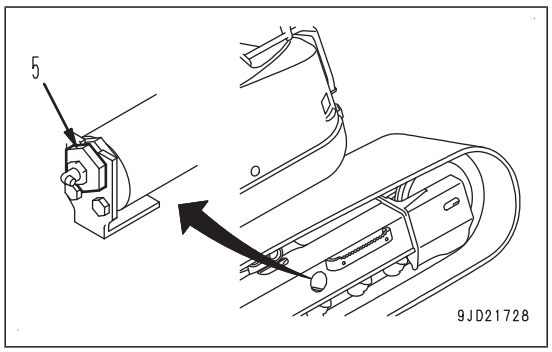
If the tension is not correct, adjust it again.

DECREASE TRACK TENSION

⚠ WARNING

The pressure inside of track tension adjustment device is high. If you do not follow the correct adjustment procedure, the plug (5) can fly out and cause serious injury or death. Obey the items that follow.

- **Do not stand in front of the plug (5).**
- **Do not loosen the plug (5) one turn or more. Be sure to slowly loosen the plug less than 1 turn.**
- **Loosen only the plug (5). Do not loosen other parts.**
- **Do not point your face towards the installation direction of the plug (5).**



- **If track tension is not loosened even when you adjust it with the correct procedure, consult your Komatsu distributor for repair.**

1. Loosen the plug (5) gradually to drain the grease.
   If the grease does not come out smoothly, move the machine back and forth for a short distance.
2. Tighten the plug (5) securely.
3. To check that the tension is correct, move the machine forward slowly for a distance equal to the length of the track on ground with the engine at low idle.
4. Check the tension of the tracks.

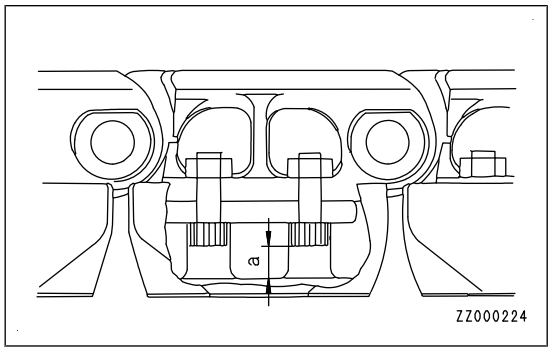
If the tension is not correct, adjust it again.

CHECK ROADLINERS

Check that the height of the lug (a) is 5mm or higher.

REMARK

If the lug height (a) is reduced by wear, the drawbar pull will decrease.



If the lug height (a) is 5mm or less, ask your Komatsu distributor to make a determination regarding the roadliner, such as replacement, repair, or continued use.

REPLACE ROADLINERS

- If you replace all the roadliners installed on a machine, consult your Komatsu distributor for replacement.
- If you replace a part of roadliners, use tools for removal and installation of roadliner, and replace. Make an order of the tools to your Komatsu distributor.

REPLACE BUCKET TEETH (VERTICAL PIN TYPE)

Replace the tooth before it is worn to the end surface of the adapter.

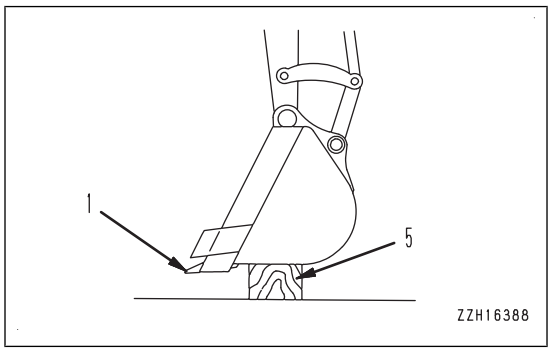
⚠ WARNING

- **Before you replace the tooth, set the machine to the state that follows. If the machine starts moving by mistake, it is dangerous.**
  - **The machine is kept in stable condition.**
  - **The engine is stopped.**
  - **The work equipment lock lever is in the LOCK position.**
- **When you do the work, wear the protective equipment such as protective eyeglasses and gloves. There is a danger that the broken pieces will fly.**
- **Make sure that there is no person around when you punch out a pin. There is a danger that the pin jumps out.**

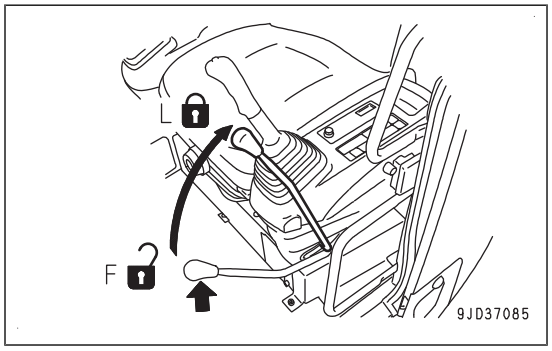
Items to be prepared

- Hammer
- Bar
- Putty knife

1. Set the work equipment to be the posture shown in the figure to let you punch out the pin of the tooth (1).
   1) Lower the blade to the ground.
   2) Put the block (5), and lower the bucket onto it to let the bottom face of the bucket be horizontal.
   3) Check that the work equipment is in a stable condition.



   4) Hold the red part on the top of the lock lever, and then set it to the LOCK position (L).
   5) Stop the engine.



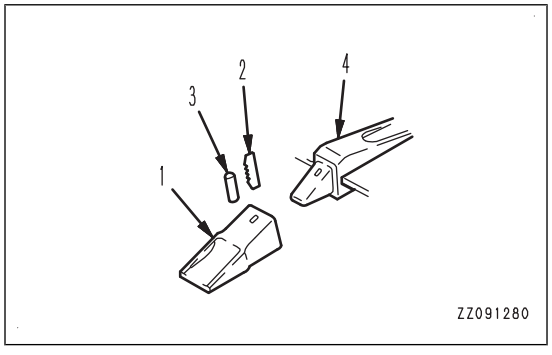
2. Punch out the lock pin (2) with the hammer and the bar.

   NOTICE

   Set the bar against the back of the pin. If the bar is set against the rubber pin lock (3) when it is hit, the rubber pin lock possibly breaks.

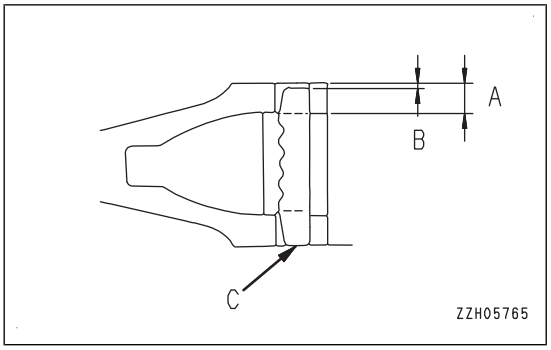
3. After the lock pin (2) and rubber pin lock (3) are removed, check them.

   Check the shape of the lock pin (2) and the rubber pin lock (3), and replace it with a new one if an abnormality is found. Do not use the lock pin (2) and rubber pin lock (3) as shown. If you use them, the tooth (1) will come off during the operation.



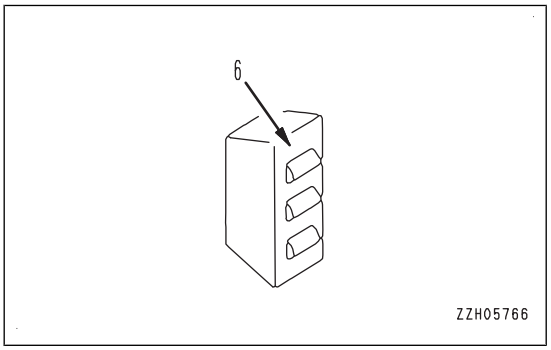
- Lock pin (2) is too short.

  When dimension (B) is 1/3 or more of dimension (A) when the end surface of the lock pin (2) is aligned with the bottom face (C)



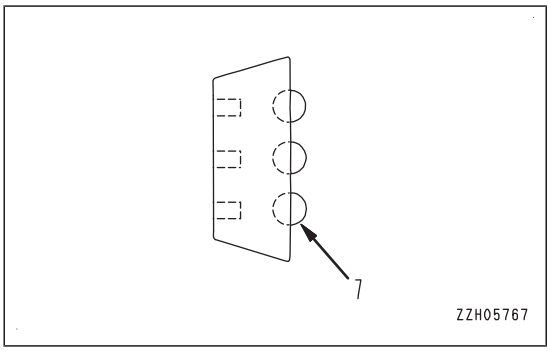
- Steel ball is about to come off.

  The rubber (6) of the rubber pin lock (3) is deteriorated or damaged.



- The steel ball (7) sinks.

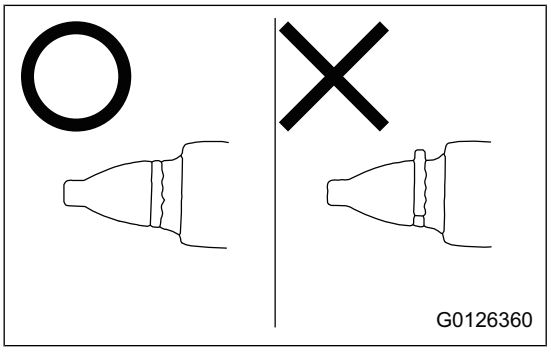
  Rubber of the rubber pin lock (3) is deteriorated and the steel ball (7) sinks into it when you push the ball by hand.



4. Remove dirt stuck to the adapter (4) with a putty knife.
5. Push the rubber pin lock (3) into the hole of the adapter (4) by hands or the hammer.

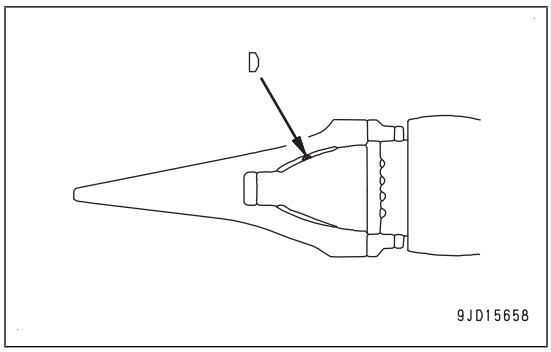
   At this time, be careful that the rubber pin lock (3) does not fly out from the adapter surface.
6. Clean the inside of tooth (1), and then install it to the adapter (4).

   If mud stuck to it or if there are protrusions, the tooth (1) will not be fully inserted to the adapter (4), and it does not engage well.
7. Set the tooth (1) to the adapter (4), and push the tooth (1) strongly.



8. Check that the back surface of the pin hole of the tooth (1) is almost on the same line of the back surface of the pin hole of the adapter (4).

- If the back of the pin hole on the tooth (1) protrudes from the back of the pin hole on the adapter (4), remove the deposit (D) which prevents a full connection of the tooth (1) and adapter (4).

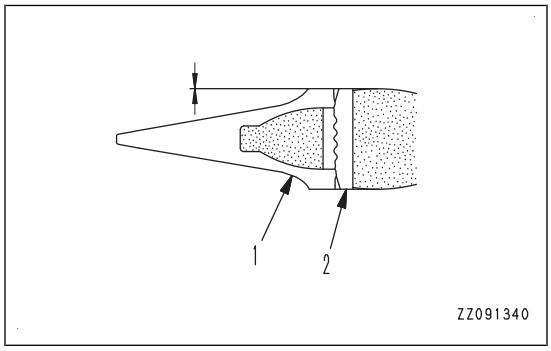


9. Insert the lock pin (2) in the pin hole in the tooth (1), and hit it in until the top surface of the lock pin (2) becomes the same height as the surface of the tooth (1).

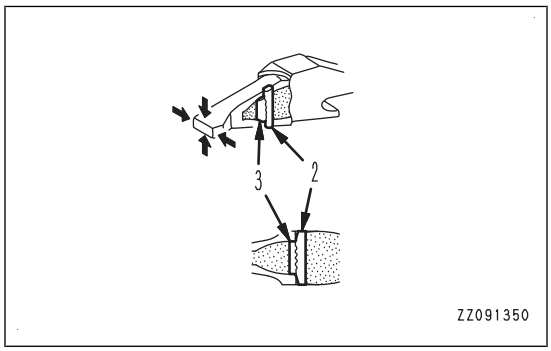
   At this time, if you punch it in too strong, the position of the lock pin (2) can be misaligned. Be careful.

10. Punch back the lock pin (2) lightly in the opposite direction to that when you punched it in.

11. Lightly hit the top of the tooth (1) up and down and the sides from right and left with a hammer.



12. Check the items that follow.
    - The lock pin (2) is fixed on the face of the tooth (1).
    - The rubber pin lock (3) and the lock pin (2) are set as shown in the figure.



REMARK

- If you turn over the tooth (1) after you used it for some period of time, you can continuously use it while wear will be uniform, service life will be extended, and the number of replacements can be reduced.
- At the same time as you replace the tooth (1), replace the lock pin (2) and the rubber pin lock (3) with new ones. This will prevent a drop of tooth (1).

REPLACE BUCKET TEETH (HORIZONTAL PIN TYPE)

Replace the tooth before it is worn to the end surface of the adapter.

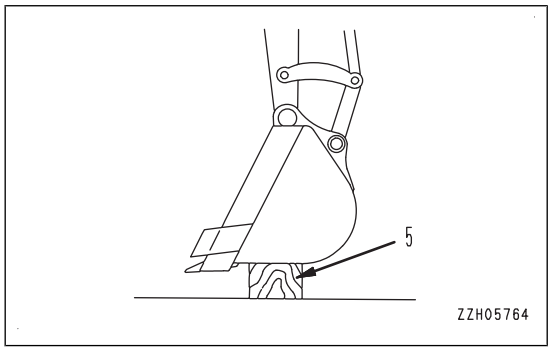
⚠ WARNING

- **Before you replace the tooth, set the machine to the state that follows. If the machine starts moving by mistake, it is dangerous.**
  - **The machine is kept in stable condition.**
  - **The engine is stopped.**
  - **The work equipment lock lever is in the LOCK position.**
- **When you do the work, wear the protective equipment such as protective eyeglasses and gloves. There is a danger that the broken pieces will fly.**
- **Make sure that there is no person around when you punch out a pin. There is a danger that the pin jumps out.**

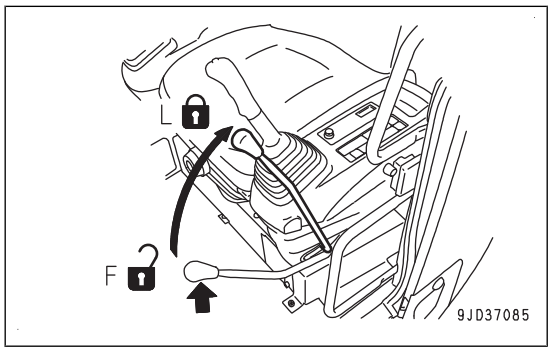
Items to be prepared

- Hammer
- Bar

1. Set the work equipment to be the posture shown in the figure to let you punch out the pin (1) of the tooth (2).
   1) Lower the blade to the ground.
   2) Put the block (5), and lower the bucket onto it to let the bottom face of the bucket be horizontal.
   3) Check that the work equipment is in a stable condition.



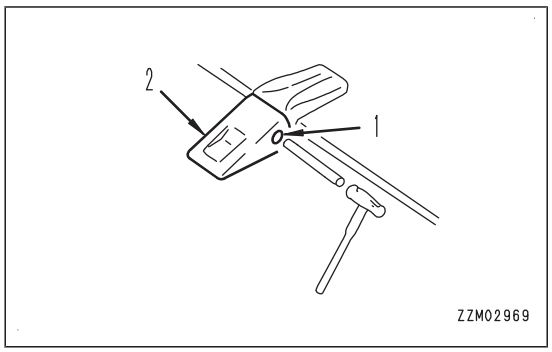
   4) Hold the red part on the top of the lock lever, and then set it to the LOCK position (L).
   5) Stop the engine.



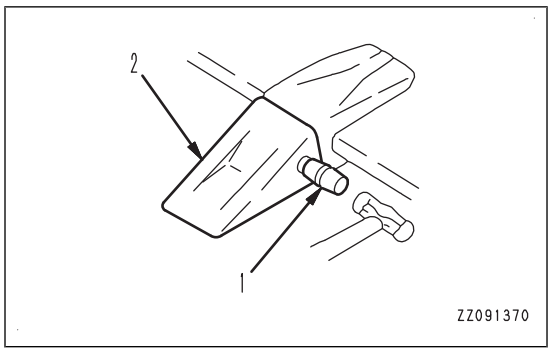
2. Put a bar on the pin (1), hit the bar with a hammer to push out the pin, and then remove the tooth (2).

   The bar must be round and thinner than the pin.

   If it cannot be removed by this method, consult your Komatsu distributor for replacement work.



3. Clean the mounting face and fit new tooth (2) to the adapter.
4. Insert the pin (1) to the half way.
5. Punch in the pin (1) with a hammer to install the tooth (2) to the bucket.



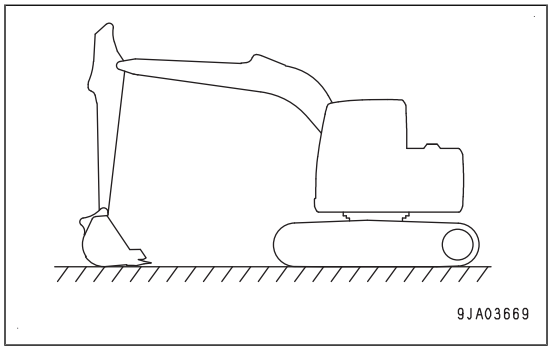
ADJUST BUCKET CLEARANCE

⚠ WARNING

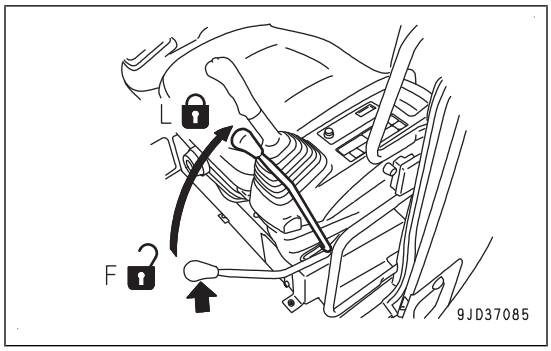
Before you adjust the bucket clearance, let the machine be in the state that follows. If the machine starts moving by mistake, it is dangerous.

- **The work equipment is lowered to the ground and kept in a stable condition.**
- **The engine is stopped.**
- **The work equipment lock lever is in the LOCK position.**

1. Set the machine to be in the work posture with the operations that follow.
   1) Lower the work equipment to the ground.
   2) Check that the work equipment is in a stable condition.



   3) Hold the red part on the top of the lock lever, and then set it to the LOCK position (L).
   4) Stop the engine.



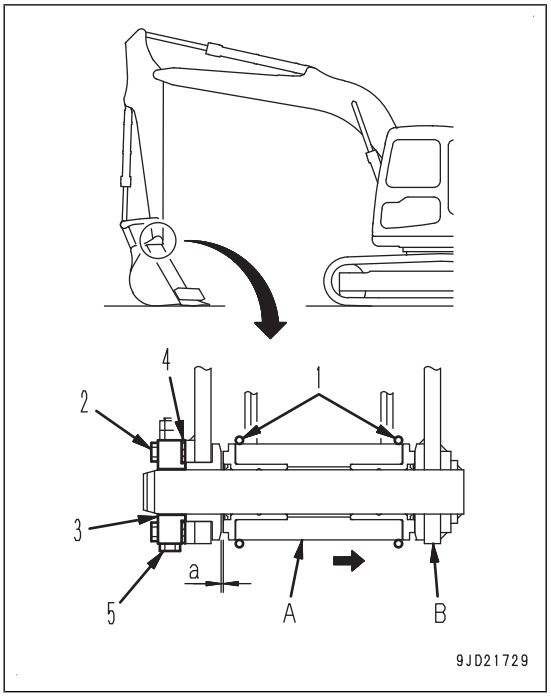
2. Shift the O-ring (1) of connecting portion and measure the amount of play (a).

   REMARK

   Measurement is easier if you move the bucket to one side so that all the play can be measured at 1 place (the right side in the figure).
   Use a clearance gauge for easy and accurate measurement.

3. Loosen the plate mounting bolts (2) (4 pieces) and loosen the plate (3).

   The shim is a split type, so the work can be performed without removing the bolts.



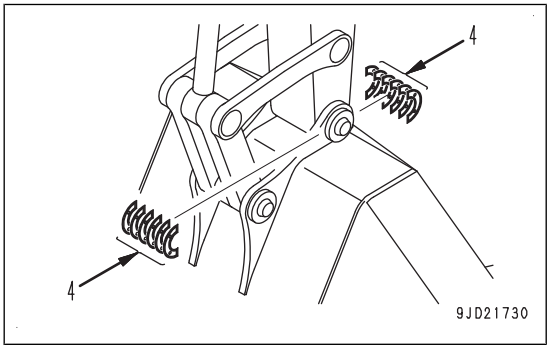
4. Remove the shim (4) corresponding to the amount of play (a).

   2 types of 1.0mm and 0.5mm of shim (4) are installed.

   When play (a) is smaller than 1 shim, do not adjust it by tightening bolts (2).

5. Tighten the bolts (2) (4 pieces).

   If bolts (2) are too stiff to tighten, pull out pin stopper bolt (5) for easier tightening.

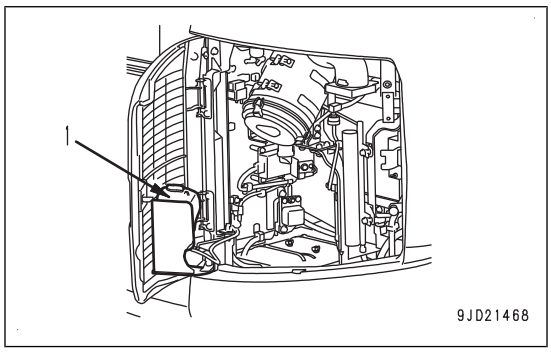


CHECK AND ADD WINDOW WASHER FLUID

If air is mixed in window washer fluid, check the fluid level in the window washer tank (1).

1. Check the fluid level in the window washer tank (1).
2. If it is not sufficient, add window washer fluid for automobile.

   Be careful not to allow entry of foreign material when you add the window washer fluid.



Mixing proportion of pure window washer fluid and water

The mixing proportion is different by the ambient temperature. Add the window washer fluid mixed with water in the proportion that follows.

Area, season	Mixing proportion	Freezing temperature
Normal	Undiluted solution 1/3 : water 2/3	-10℃
Winter in cold district	Undiluted solution 1/2 : water 1/2	-20℃
Winter in very cold district	Pure washer fluid	-30℃

There are 2 types of commercially available window washer fluid for automobile (undiluted solution) by the freezing temperature, one is -10℃ (for general use) and the other is -30℃ (for cold district). Select by area or season.

REMARK

There is an air bleeding hole on the cap of window washer tank to prevent breakage caused by negative pressure in the tank when window washer is operated. The window washer fluid possibly leaks from the hole for air bleeding by its volume or the vibration of the machine, but it is not a failure.

CHECK AND MAINTENANCE AIR CONDITIONER

Check and maintenance items

Some maintenance items of the air conditioner are to be done regularly and the others are to be done when required.

Do the inspection and maintenance as in the table that follows.

Check and maintenance items	Content of check and maintenance	Guideline for maintenance interval
Refrigerant (gas)	Fill quantity	Two times a year (spring, autumn)
Air conditioner condenser	Clogged fins	Every 500 hours “CHECK AND CLEAN FINS (4-68)”
Compressor	Operation condition	Every 4000 hours
V-belt	Damage, tension	Every 250 hours “CHECK AND ADJUST AIR CONDITIONER COMPRESSOR BELT TENSION (4-59)”
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 connection part, leakage of gas, damage	When required

Even during the off-season, operate the air conditioner for 3 to 5 minutes one time a month to keep the oil film at all parts of the compressor.

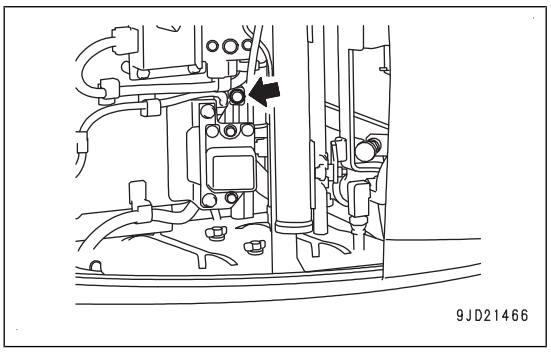
CHECK REFRIGERANT LEVEL FOR AIR CONDITIONER (GAS)

⚠ WARNING

- **Do not loosen the parts of the refrigerant circuit. There is a danger that the refrigerant leaks.**
- **Do not touch the refrigerant of the air conditioner. There is a danger of loss of sight If the refrigerant gets into your eye, or frostbite if it is splashed on your hand.**
- **Do not let an open flame be near the point where the refrigerant gas leaks.**

If the refrigerant level is not sufficient, the performance of the air conditioner decreases.

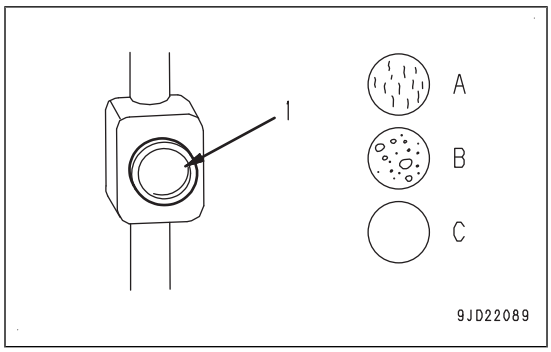
1. Run the engine at high idle.
2. Set the temperature to 18.0℃ (maximum cooling) and operate the air conditioner.
3. Check the condition of the refrigerant gas (Hydrofluorocarbons HFC-R134a) in the refrigerant circuit, through the sight glass (1) (inspection window) at the refrigerant hose fitting.



(A) No bubbles are found in refrigerant flow: Sufficient

(B) Bubbles are found in refrigerant flow: Not sufficient (bubbles pass continuously)

(C) Colorless, transparent: No refrigerant



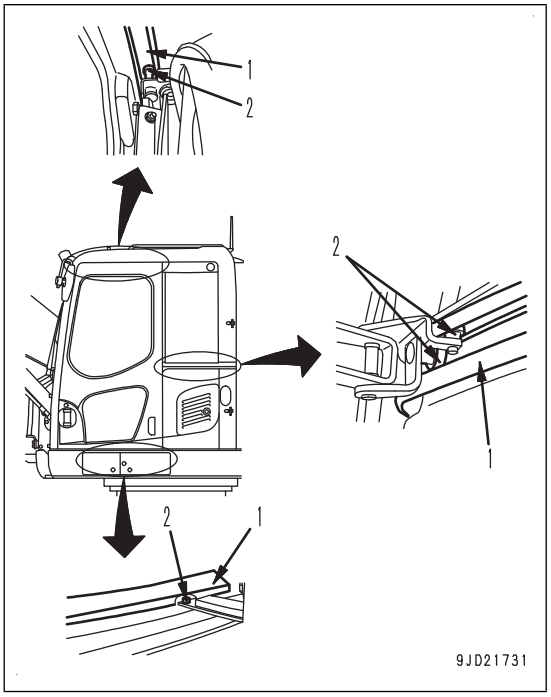
REMARK

If bubbles are found, the refrigerant gas is not sufficient. Consult your Komatsu distributor to add the refrigerant gas. If the air conditioner is operated with low refrigerant level, it can cause damage to the compressor.

CHECK, CLEAN AND LUBRICATE SLIDE DOOR RAIL AND ROLLER

CHECK SLIDE DOOR RAIL AND ROLLER

Open and close the slide door to check that there is no foreign material such as mud stuck to the rail (1) or the roller (2) of the 3 slide doors shown in the figure.
If there are foreign materials such as mud stuck to there, the movement becomes bad.



If there are foreign materials such as mud stuck to there, clean the rail (1) and the roller (2) of the slide door, and lubricate them.

CLEAN SLIDE DOOR RAIL

1. Open and close the slide door, and remove dirt in the rail (1) with a brush.
2. Remove dirt in the rail (1) with a cloth.

LUBRICATE SLIDE DOOR RAIL AND ROLLER

NOTICE

Do not use a high viscosity lubrication oil.
Product recommended by the manufacturer: “PANDO 18C” manufactured by ThreeBond Holdings Co., Ltd.

Prepare the lubricating oil.

1. Spray the spray type lubrication oil sufficiently to the rail (1) and the roller (2).
2. After lubrication, slide the door to check that you can smoothly open and close the door.

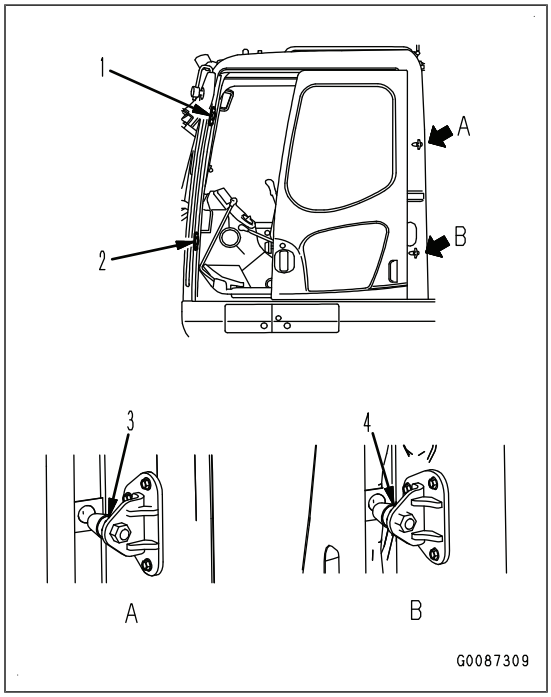
If you cannot smoothly open and close the door, consult your Komatsu distributor.

CHECK, CLEAN AND LUBRICATE SLIDE DOOR STOPPER

Prepare the lubricating oil.

Lubricant recommended by manufacturer: Lithium grease

1. Check the items that follow.
   - No unusual noise such as creak sound is heard from the slide door stopper parts (1) and (2).
   - Slide door is not hard to be closed.
2. If an unusual noise such as creak or the slide door becomes hard to be closed, wipe off the stain at the stoppers.
3. Lubricate the stoppers.
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.



If the stoppers are worn, consult your Komatsu distributor.

CHECK CLEARANCE AT STOPPER WHEN YOU PULL UP FRONT WINDOW

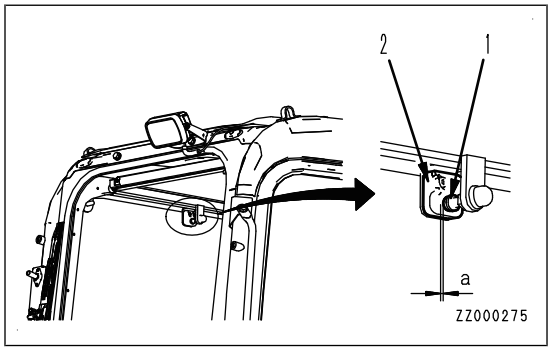
⚠ WARNING

- **Be sure to set the lock lever in the LOCK position when you open or close the front window, lower window, or door. If the lock lever is in the FREE position and the control lever or control switch is touched by mistake, it can cause serious personal injury or death.**
- **Before you open or close the front window, stop the machine on a level ground, lower the work equipment to the ground, and stop the engine.**
- **When you open the front window, hold the handle securely with two hands to pull up. Do not let go of it until it is locked by the lock catch.**
- **When you close the front window, hold the handle securely with two hands to close. The window is heavy, and there is a danger that you drop the window if you do not hold it securely.**

Do this when the front window is pulled up and it has backlash.

Check that there is the clearance (a) between the rubber stopper (1) and the resin guide (2).
A part of the rubber stopper (1) can be worn in some cases, but this is not a problem if there is no backlash or clearance.

If you find clearance, consult your Komatsu distributor.



REPLACE ADDITIONAL FILTER ELEMENT FOR BREAKER

⚠ WARNING

- **Wait for the temperature of the machine to go down, and then start the work. Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury.**
- **Loosen the cap of the oil filler port (F) slowly to release the internal pressure, and then remove it carefully.**

NOTICE

For the element replacement interval, see "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-18)".

Prepare a container to catch oil.

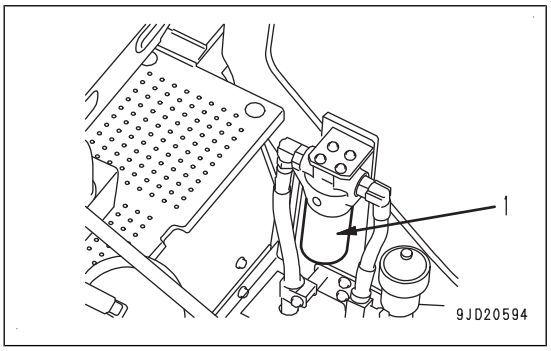
1. Place a container to catch drained oil under the filter element.
2. Turn filter case (1) counterclockwise and remove it.
3. Remove element (2).
4. Remove plug (3) from filter case (1).
5. After checking that the hydraulic oil temperature has dropped, turn filter case (1) counterclockwise, remove it, then take out element (2).
6. Clean the removed parts.
7. Install new element (2).
8. Install filter case (1) and plug (3).

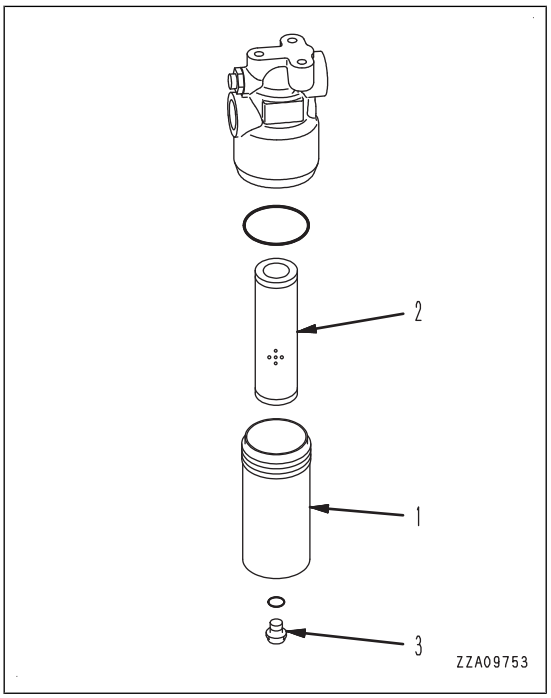
   Tighten filter case (1) and plug (3) to the following torque.

   Tightening torque

   Filter case (1): 90.0 to 110.0Nm {9.2 to 11.2kgfm}

   Plug (3): 15.0 to 17.0Nm {1.5 to 1.7kgfm}





CLEAN WASHABLE FLOOR

On the washable cab floor, you can flush out the dirt directly with water.

⚠ WARNING

- **Do the work on a firm and level area.**
- **Put strong blocks below the undercarriage to tilt the machine, and be very careful when you do the operation.**
- **Before you stand up from the operator's seat, be sure to set the lock lever to the LOCK position. If you touch the control levers by mistake with the lock lever is in the FREE position, there is a danger that the machine suddenly moves and it causes serious personal injury or death.**

CLEAN CAB FLOOR

NOTICE

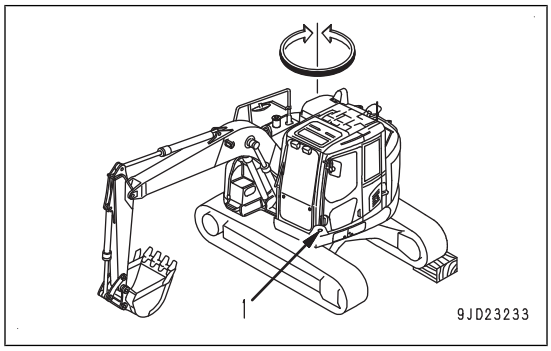
Do not let the monitors, connectors, air conditioner and the filters inside the operator cab get wet during the cleaning.

1. Set the machine at angle.

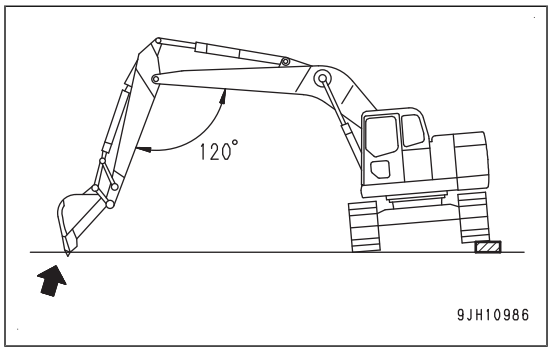
   Referring to “TILT MACHINE (4-46)”, select a safe method, depending on the state of the machine.

   In this example, the machine is set at angle by using blocks.

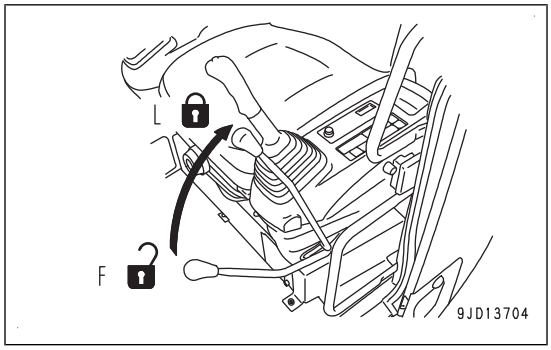
2. Swing the upper structure slowly so that water drain holes (1) in the cab floor are at a low position.



3. Lower the work equipment to the ground and set the machine in a stable condition.



4. Set the lock lever 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

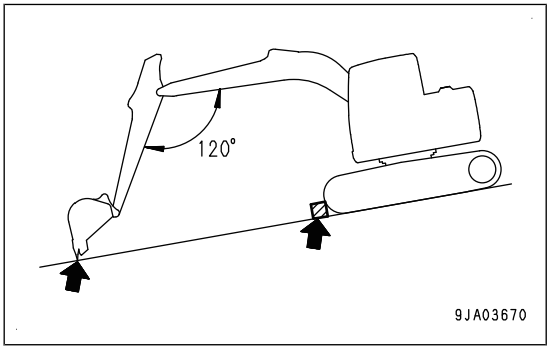
You can set the machine at an angle by using a slope or blocks. Consider the condition of the machine and select the safe method.

USE 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.

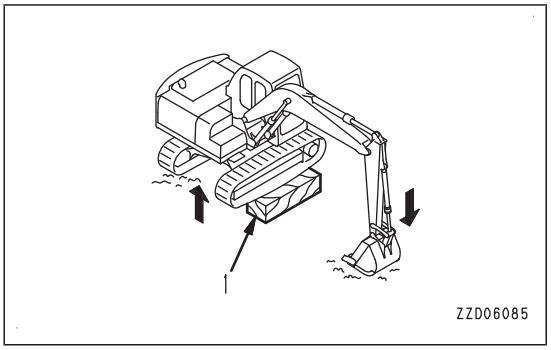


WHEN YOU USE BLOCKS

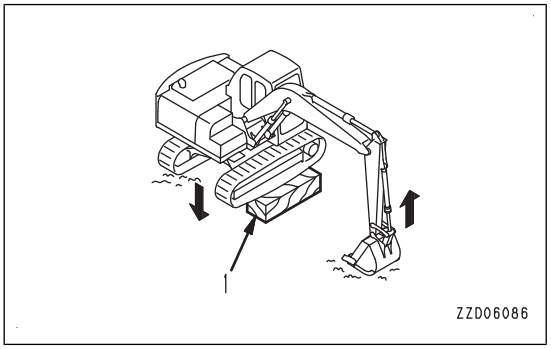
⚠ WARNING

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. Raise the boom slowly and lower the machine.
   When doing this, check that the machine is always stable.



CHECK GAS SPRING

⚠ WARNING

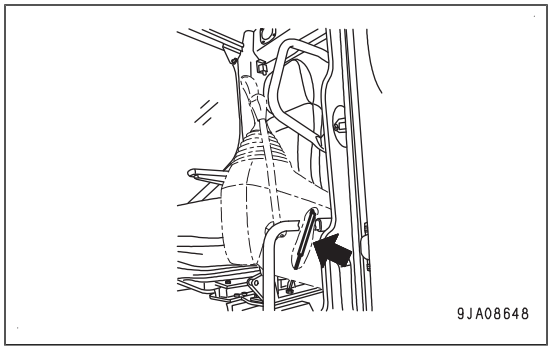
The gas springs include the high-pressure nitrogen gas. If there is a mistake when you handle them, an explosion can occur, and there is a danger of serious personal injury or death. Obey the items that follow.

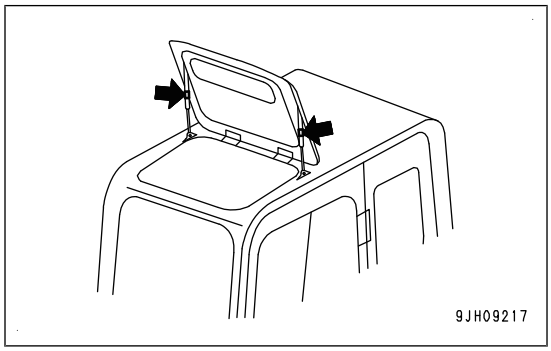
- **Do not disassemble.**
- **Do not let an open flame be near them. Do not throw them in fire.**
- **Do not do the drilling, welding or flame-cutting.**
- **Do not hit it or roll it, or give shocks to it.**
- **When you dispose of it, the gas must be released. Consult your Komatsu distributor.**

The gas springs are located in the left console (1 place) and at the ceiling window of cab (1 place each on right and left).

In the cases that follow, consult your Komatsu distributor for inspection, repair, or replacement.

- When the lock lever cannot be pulled up with light operation force
- When the lock lever does not stay at the LOCK position
- When the ceiling window cannot be pulled up with light operation force
- When the cab ceiling window does not stay open.
- When oil or gas leaks from the gas spring





BLEED AIR FROM HYDRAULIC CIRCUIT

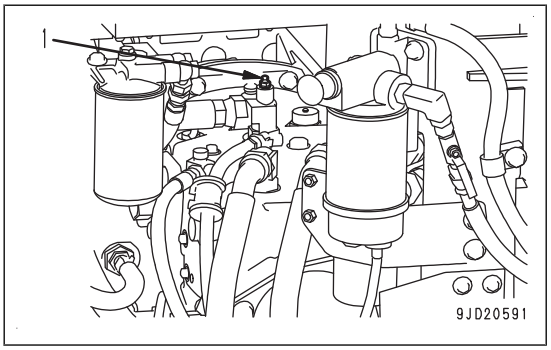
BLEED AIR FROM PUMP

NOTICE

Be sure to bleed air. If you do the operation when air bleed of the pump is not done, the pump can overheat abnormally, which causes damage to the pump in a short period.

Bleed air when you replace the hydraulic component or replace oil.

1. Run the engine at low idle.
2. Open the right rear cover.
3. Loosen the air bleeder (1) installed on the pump and make sure that small quantity of oil comes out through the air bleeder (1).
4. Tighten the air bleeder (1).



BLEED AIR FROM BETWEEN PUMP AND HYDRAULIC TANK

Bleed air when you replace the hydraulic component or replace oil.

NOTICE

Be sure to bleed air. If the engine runs at high speed when air between the pump and the hydraulic tank has not been bled, the pump can overheat abnormally, which causes damage to the pump in a short period.

1. Start the engine, and hold the engine speed at a medium speed (1650rpm).
2. Slowly operate the work equipment for approximately 5 minutes.

   Air between pump and hydraulic tank is bled.

BLEED AIR FROM CYLINDER

Bleed air when you replace the hydraulic component or replace oil.

NOTICE

If you run the engine at high speed immediately after the start-up or if you operate a cylinder to its stroke end, air taken in the cylinder can cause damage to the part such as a piston packing, etc.

1. Run the engine at low idle.
2. Extend and retract each of the cylinders 4 to 5 times. At this time, be careful not to operate them to the stroke end (stop them approximately 100mm short of the stroke end).
3. Operate each cylinder to the stroke end 4 to 5 times.

   All of air in the cylinder will be bled.

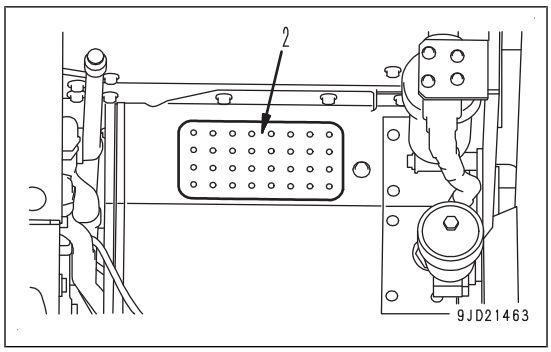
BLEED AIR FROM SWING MOTOR

Do this work only when you drain the oil in the swing motor case.

NOTICE

Be sure to bleed air. If the air is not bled from the swing motor, the motor bearings can be damaged.

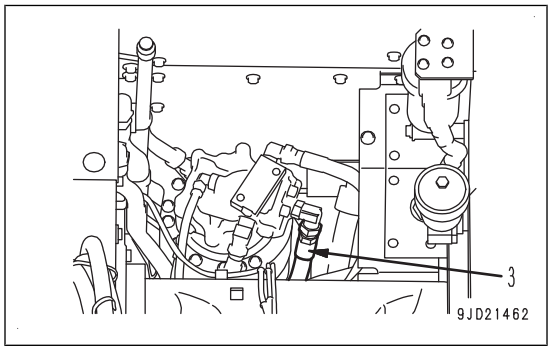
1. Run the engine at low idle.
2. Remove the cover (2).



3. Loosen the hose at motor S port (3), and check that oil oozes out from the fitting of the motor S port (3).

   NOTICE

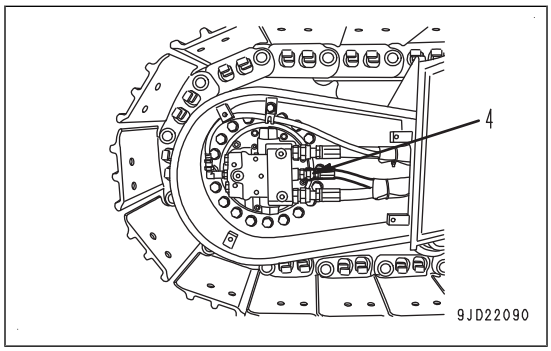
   Do not do the swing operation at this time.
4. If oil does not ooze out, stop the engine, remove the motor S port (3), and fill the motor case with hydraulic oil.
5. After completely bleeding the air, tighten the motor S port (3).
6. Run the engine at low idle and slowly swing at least 2 turns uniformly to the right and left.



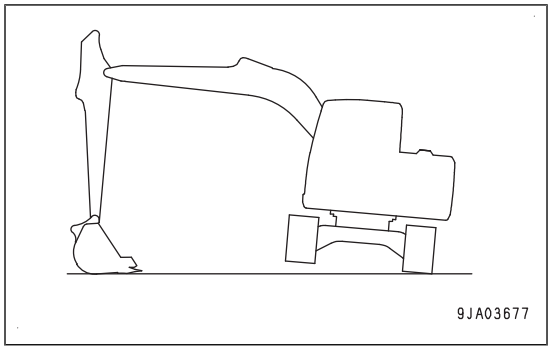
BLEED AIR FROM TRAVEL MOTOR

Do this work only when you drain the oil in the travel motor case.

1. Run the engine at low idle.
2. Loosen the hose (4) of port C. When oil flows out, tighten it.



3. Run the engine at low idle and swing the upper structure 90° to bring the work equipment to the side of the track.
4. Push up the machine until the track is raised slightly from the ground. Perform idle rotation of track for 2 minutes. Repeat this procedure on both the right and left sides. When rotating the track off the ground at low idle, rotate equally both forward and in reverse.



BLEED AIR FROM ATTACHMENT

(When attachment is installed on the machine)

Bleed air when you replace the hydraulic component or replace oil.

NOTICE

If the attachment has its own air bleeding procedure specified by the manufacturer, obey it.

If a breaker or other attachment is installed, do the air bleeding procedure until the air is fully bled from the attachment circuit.

1. Run the engine at low idle.
2. Operate the attachment control switch (approximately 10 times).
   Air is bled from the attachment circuit.

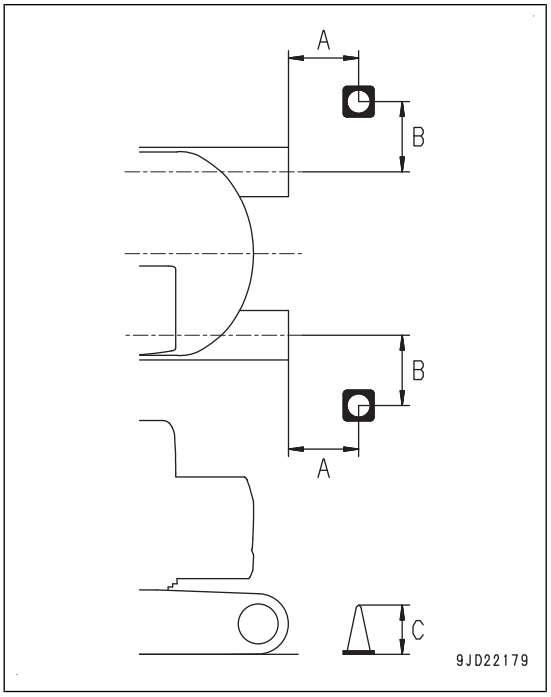
NOTICE

- **After the air is bled, stop the engine one time. Leave the machine for 5 minutes or longer, then start the operation. This operation bleeds air contained in the hydraulic oil in the tank.**
- **Check that no oil leaks. Wipe off the leaked oil off if found.**

CHECK 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 70cm height (C) to the position at the rear outside of the machine, where the distance (A) is approximately 1m behind the centerline of a track and also the distance (B) is approximately 1m 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.

CHECK BEFORE YOU START OPERATION

For the items that follow, see OPERATION, “CHECK BEFORE STARTING (3-153)”.

- Drain water and sediment from fuel tank
- Check water separator, drain water and sediment
- Check oil level in hydraulic tank, add oil
- Check coolant level, add coolant
- Check oil level in engine oil pan, add oil
- Check electric wiring
- Check fuel level, add fuel
- Check DEF level, add DEF
- Check working lamp
- Check horn

EVERY 100 HOURS MAINTENANCE

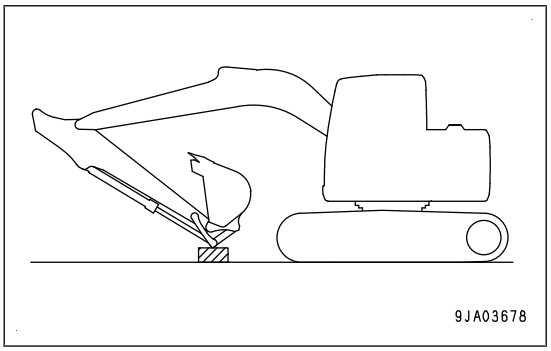
LUBRICATE WORK EQUIPMENT

NOTICE

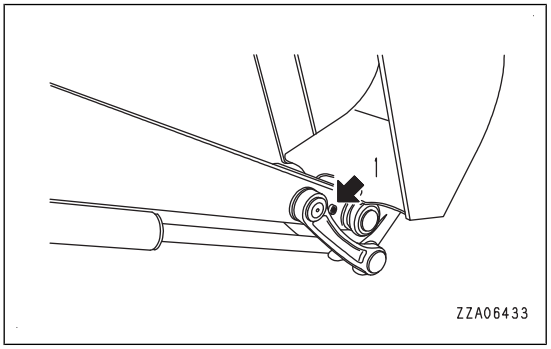
- **If unusual noise comes out of greasing point, do the greasing regardless of the greasing interval.**
- **On a new machine, add grease every 10 hours for the first 50 hours of operation.**
- **After digging work in the water such as private land digging is done, be sure to lubricate the pins that was submerged in the water.**

Prepare the grease pump.

1. Set the machine to the greasing posture as shown in the figure, and lower the work equipment to the ground, and then stop the engine.



2. Lubricate the grease fittings shown by arrows with a grease pump.
   (1) Arm and bucket connection pin (1 place)



3. Wipe off the grease that is pushed out from the grease fitting with cloth.

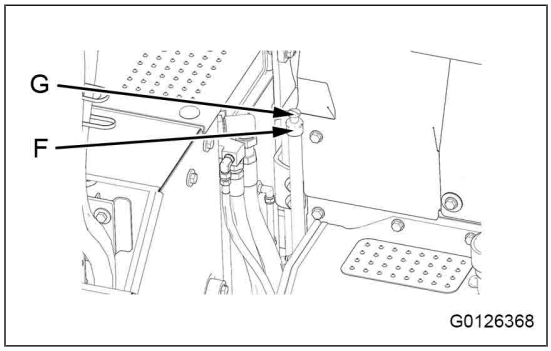
CHECK OIL LEVEL IN SWING MACHINERY CASE, ADD OIL

⚠ WARNING

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

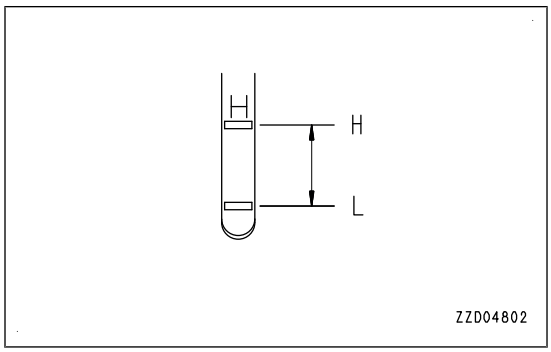
Prepare a container to collect oil.

1. Pull out dipstick (G).
2. Wipe off the oil from the dipstick with a cloth.
3. Fully insert dipstick (G) into the dipstick pipe, then remove it.
4. Check the oil level with dipstick (G).

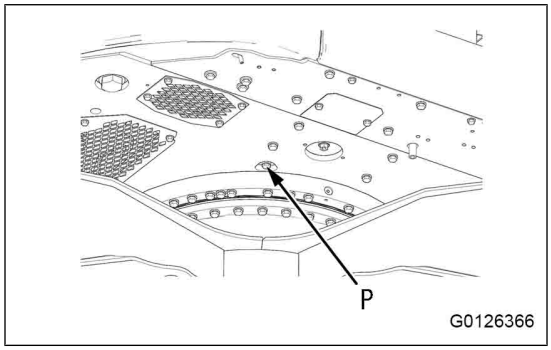


The oil level should be between H and L marks on the dipstick.

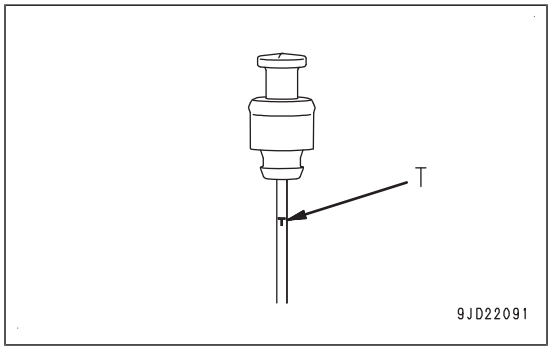
5. Add the engine oil through the oil filler port (F) by the refill capacity if the oil level does not reach the stamping mark (L) of the oil level gauge (G).
6. If the oil level is higher than (H) mark on dipstick (G), lower it to a proper level according to the following procedure.



   1) Place a container to receive the oil under drain valve (P).
   2) Loosen drain valve (P) and drain excessive oil.
   3) Check the oil level again.



7. After the oil level check and the adding the oil, insert the oil level gauge so that the stamping mark (T) of it faces the center of the swing machinery.



EVERY 250 HOURS MAINTENANCE

CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL

⚠ WARNING

- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **If there is remaining pressure inside the case, the oil or plug can jump out. Loosen the plug slowly to release the pressure.**
- **Do not stay in front of the plug when you loosen it.**

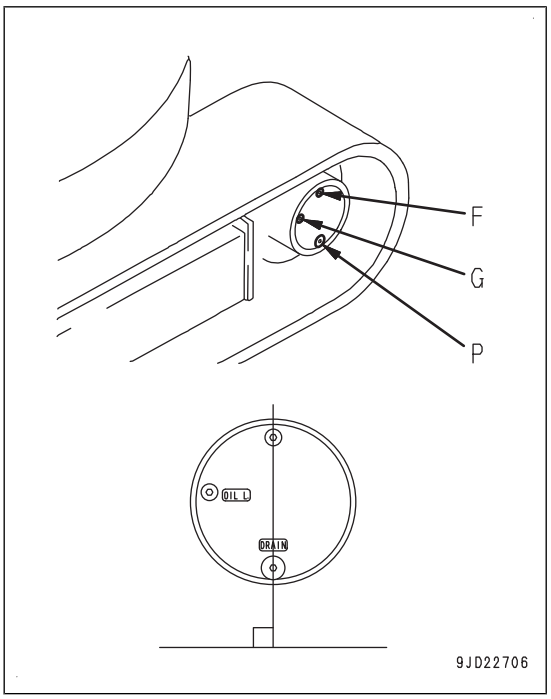
Items to be prepared

- Container to catch oil
- Hexagonal wrench

1. Set the plug (F) at the top, and set the plug (F) and plug (P) vertically to the ground surface.
2. Put a container to catch oil below the plug (P).
3. Remove the plug (G) with the hexagonal wrench.
4. Check the oil level.

   When the oil level exceeds the 10mm below the lower edge of the plug (G) hole, the oil level is correct.
5. If the oil level is low, remove the plug (F) with the hexagonal wrench, and add oil through the hole of the plug (F).

   Add oil until it flows out from the plug (G) hole.
6. After inspection, install the plug (F) and plug (G).



CHECK OIL IN LARGE CAPACITY FINAL DRIVE CASE

(if equipped)

⚠ WARNING

- **Wait for the temperature of the machine to go down, and then start the work. Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury.**
- **When you disconnect the plug, loosen it slowly to release the pressure. If there is remaining pressure in the case, the oil or plug can jump out.**
- **Do not stand in front of the plug when you loosen the plug.**

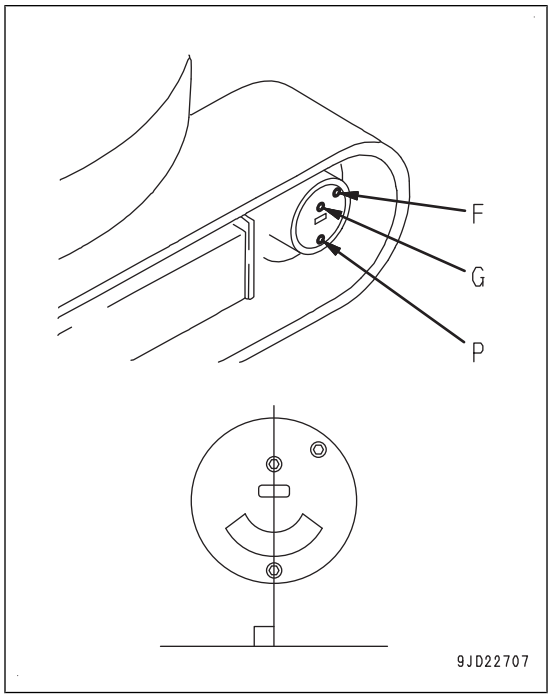
Items to be prepared

- Container to catch oil
- Hexagonal wrench

1. Set the plug (G) at the top so that the line running on the plug (G) and plug (P) is perpendicular to the ground surface.
2. Place the container to receive the oil under plug (P).
3. Remove the plug (G) with the hexagonal wrench.
4. Check the oil level.

   When the oil level exceeds the 10mm below the lower edge of the plug (G) hole, the oil level is correct.
5. If the oil level is low, remove plug (F) with the hexagonal wrench and add oil through the hole of plug (F).

   Add oil until it overflows from the hole of plug (G).
6. After checking, install the plugs (F) and (G).



CHECK BATTERY ELECTROLYTE LEVEL

⚠ WARNING

- **Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. If you do so, it will deteriorate the inner side of battery and the service life of the battery can be decreased. In addition, it can cause an explosion.**
- **Battery discharges flammable gas. There is a danger of explosion. Do not let an open flame be near.**
- **Battery electrolyte is dangerous object. Be careful not to allow the battery electrolyte to get in contact with your eyes, skin or clothes.**
  If the battery electrolyte gets into your eyes, immediately wash your eyes with a large quantity of clean water and consult a doctor.
  If the battery electrolyte gets on your clothes or skin, immediately wash the part by a lot of clean water.
- **Do not use a dry cloth to clean the battery. A wet wipe will prevent fire or explosion from static electricity.**

NOTICE

- **Do not add battery electrolyte more than the UPPER LEVEL line. Battery electrolyte can leak and cause damage to the paint surface or corrosion to the parts.**
- **If there is a risk that battery electrolyte can freeze, add the battery electrolyte before you start the work on the next day.**
- **To prevent a fire, be careful that the rubber cover is not to be turned upward when install it.**

Do the battery electrolyte level check before you operate the machine.

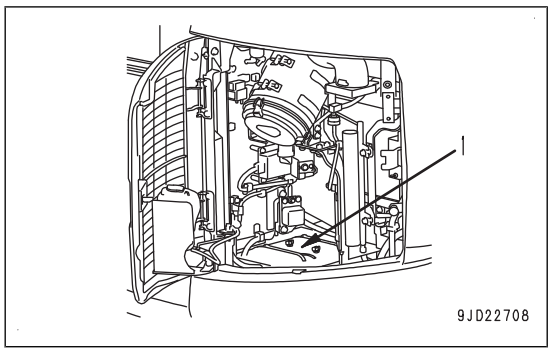
Check the battery electrolyte level for a minimum of one time in a month.

Prepare the purified water such as commercially available battery fluid.

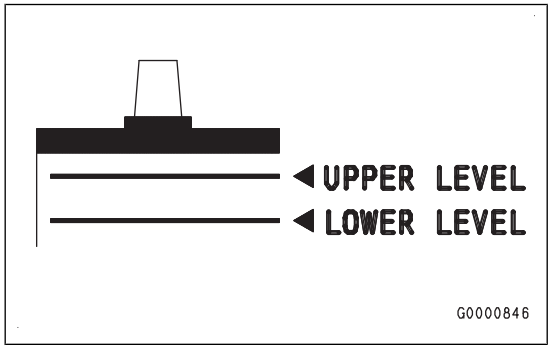
CHECK ELECTROLYTE LEVEL FROM SIDE OF BATTERY

When you check the electrolyte level from the side of the battery, check as follows.

1. Open the left rear cover.
2. Flip up the rubber cover (1) on the battery.
3. Clean the area around the electrolyte level lines with a wet cloth.

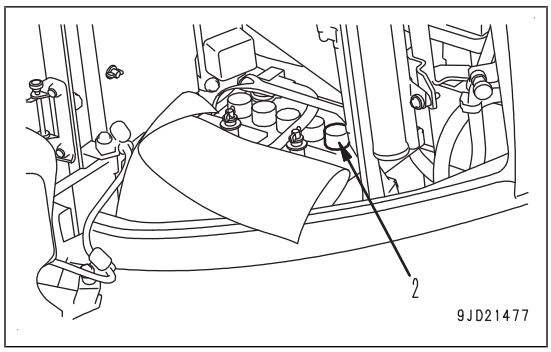


4. Make sure that the electrolyte level is between UPPER LEVEL and LOWER LEVEL.



5. If the battery electrolyte level is at a half or less in the range between UPPER LEVEL and LOWER LEVEL, immediately remove the cap (2), and add the battery electrolyte up to the UPPER LEVEL.

   If you added the battery electrolyte above UPPER LEVEL, suck it with a syringe until it drops to UPPER LEVEL.
6. Tighten the cap (2) securely.
7. Put the rubber cover (1) back to the original position.

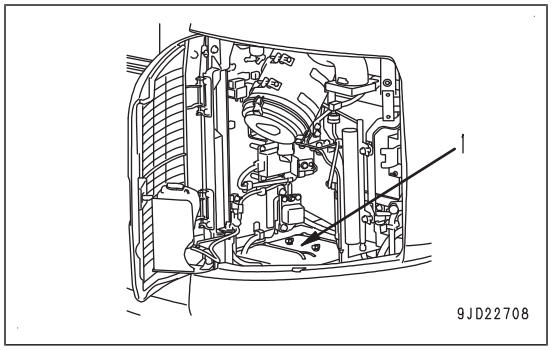


If you suck the battery electrolyte with the procedure of 5, neutralize the battery electrolyte with a chemical such as sodium bicarbonate, then rinse with plenty of water. If necessary, consult your Komatsu distributor or a battery manufacturer.

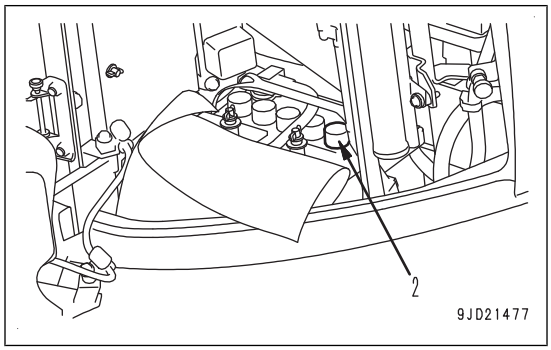
CHECK ELECTROLYTE LEVEL WHEN IT IS IMPOSSIBLE TO CHECK FROM SIDE OF BATTERY

If you cannot check the electrolyte level from the side of the battery, or there is no UPPER LEVEL line on the side of the battery, check as follows.

1. Open the left rear cover.
2. Flip up the rubber cover (1) on the battery.



3. Remove the cap (2) on the top surface of the battery.



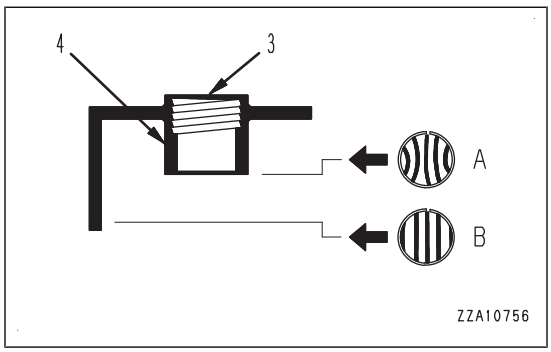
4. Check the battery electrolyte level through the filler port (3).

   (A) Correct level

   The electrolyte level reaches the bottom of the sleeve (4), so the surface tension causes the battery electrolyte surface to bulge and the pole plate does not look straight.

   (B) Not sufficient

   Electrolyte level is not up to bottom of sleeve (4), so poles appear straight and not bent.



5. If the electrolyte level does not reach the bottom of the sleeve (4), add the battery electrolyte until it reaches the bottom of the sleeve (4).

   If the battery electrolyte is added to a level above the bottom end of the sleeve, use a syringe to remove the electrolyte until it reaches the bottom of the sleeve (4).

6. Tighten the cap (2) securely.
7. Put the rubber cover (1) back to the original position.

If you suck the battery electrolyte with the procedure of 5, neutralize the battery electrolyte with a chemical such as sodium bicarbonate, then rinse with plenty of water. If necessary, consult your Komatsu distributor or a battery manufacturer.

CHECK ELECTROLYTE LEVEL ON INDICATOR

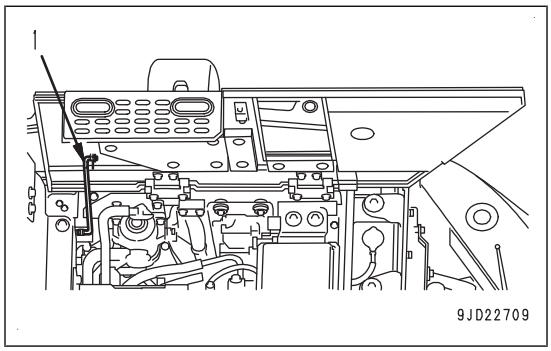
When you use an indicator to check the electrolyte level, obey the provided instructions.

CHECK 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.

CHECK AIR CONDITIONER COMPRESSOR BELT

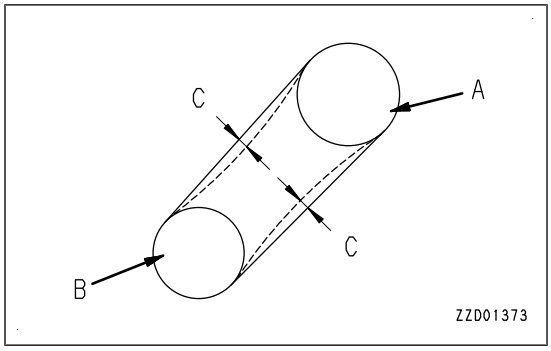
1. Open the engine hood.
2. Lock the engine hood securely with the hood support lever (1).



3. Press the center between compressor pulley (A) and fan pulley (B) with a finger (approximately 60N {6.12kgf}).

   If deflection (C) is 6 to 9 mm, the belt tension is normal.

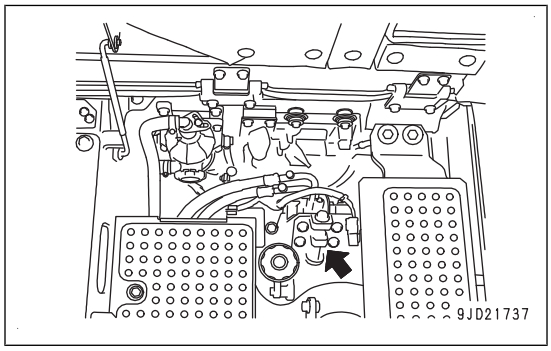
   If the deflection is out of the standard, adjust it to the standard value.

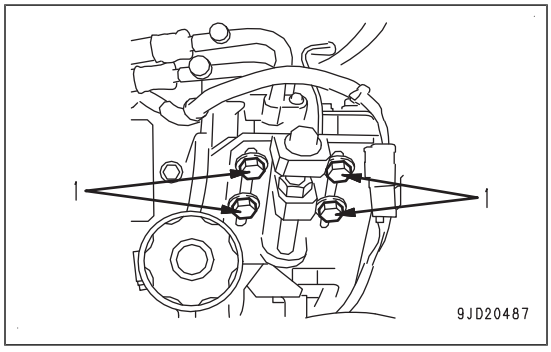


ADJUST AIR CONDITIONER COMPRESSOR BELT

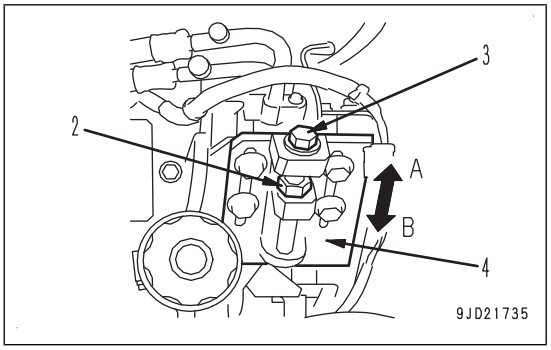
1. Loosen the bolts (1) (4 pieces).

   There is no need of removing bolt (1). Also, take care not to loosen too much.

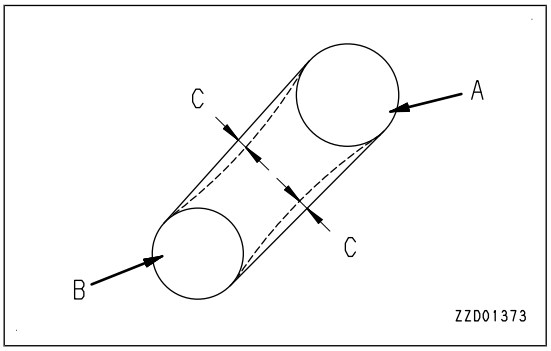




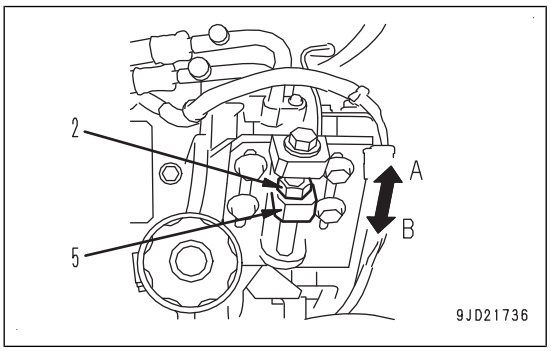
2. Loosen nut (2) in direction (A).
   Nut (2) is provided to prevent loosening of jack bolt (3).
3. Tighten the jack bolt (3).
   Compressor (4) moves in direction (A), and the compressor belt is tensed.



4. Press the center between drive pulley (A) and compressor pulley (B) with a finger (approximately 60N {6.12kgf}).
   If deflection (C) is 6 to 9 mm, the belt tension is normal.



5. After adjusting the belt tension properly, tighten the nut (2) until it touches the boss (5) and tighten it further in direction B so that it does not become loose.
   Tightening torque 108 to 132 Nm {11.0 to 13.5 kgmf}
6. Tighten the bolts (1) (4 pieces) to fix them.
   Tightening torque 58.8 to 73.5 Nm {6.0 to 7.5 kgmf}
7. After fixing, check again that the belt tension is proper.
   Adjust it again if the tension is not within the proper range.
8. Check each pulley for damage, wear of the V-groove, and the wear of the V-belt. In particular, be sure to check that the V-belt is not touching the bottom of the V-groove.



9. Replace the belt with a new one if the belt is stretched and has no allowance for adjustment, or has slipping sound or squeak because of cuts or cracks of the belt.

NOTICE

When the new V-belt is installed, readjust it after operating for 1 hour.

EVERY 500 HOURS MAINTENANCE

Maintenance for every 100 hours and 250 hours must be done at the same time.

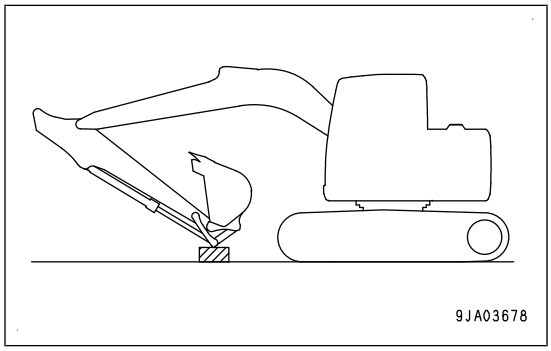
LUBRICATION

NOTICE

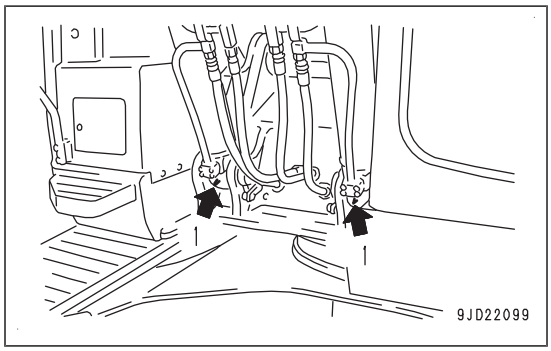
- **If unusual noise comes out of lubrication point, do lubrication regardless of the lubrication interval.**
- **On a new machine, add grease every 10 hours for the first 50 hours of operation.**
- **After digging work in the water such as digging of private land is done, be sure to lubricate the pins that have been in the water.**

Prepare the grease pump.

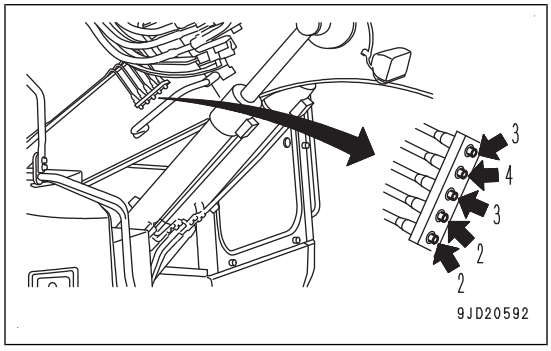
1. Set the machine to the lubrication posture as shown in the figure, and lower the work equipment to the ground, and then stop the engine.



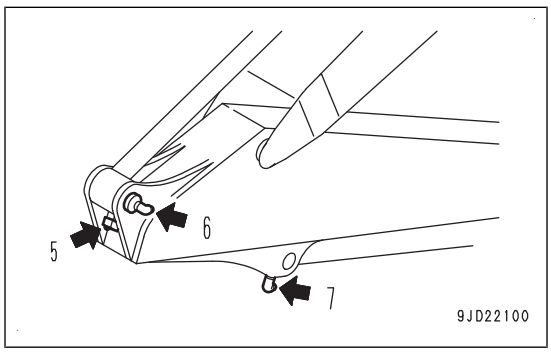
2. By using a grease pump, pump in grease through the grease fitting shown by arrow.
   (1) Boom cylinder foot pin (2 places)



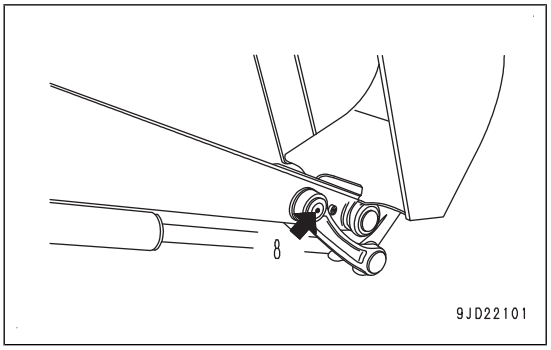
   (2) Boom foot pin (2 places)
   (3) Boom cylinder rod end pin (2 places)
   (4) Arm cylinder foot pin (1 place)



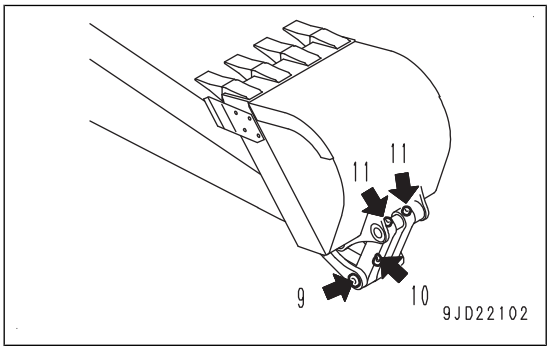
   (5) Boom and arm connection pin (1 place)
   (6) Arm cylinder rod end (1 place)
   (7) Bucket cylinder foot pin (1 place)



(8) Arm-Link connection pin (1 place)

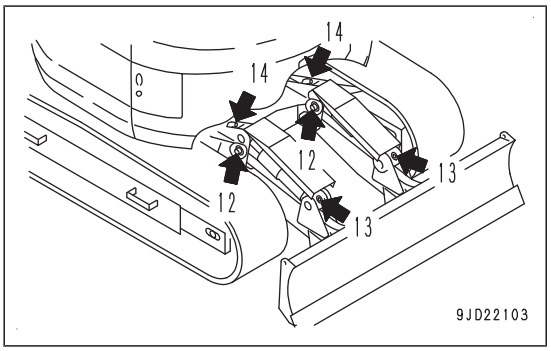


(9) Link connection pin (1 places)
(10) Bucket cylinder rod end (1 place)
(11) Bucket and Link connection pin (2 places)



(12) Blade connection pin (2 places)
(13) Blade cylinder foot pin (2 places)
(14) Blade cylinder rod end pin (2 places)

3. After greasing, wipe off any old grease that is pushed out.



CHANGE OIL IN ENGINE OIL PAN AND ENGINE OIL FILTER CARTRIDGE

⚠ WARNING

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

Refill capacity: 11.5ℓ

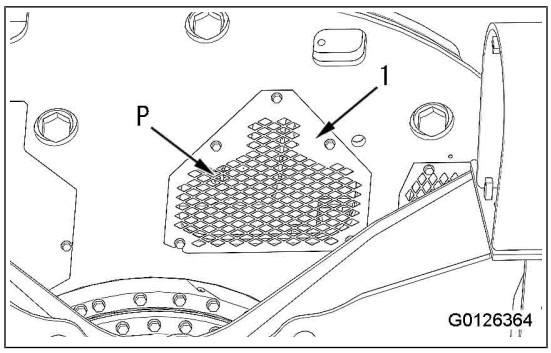
Items to be prepared

- Container to collect the oil
- Filter wrench

REMARK

Replace the oil filter and fuel prefilter at the same time.

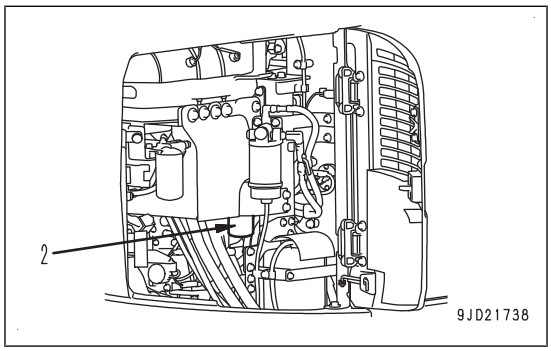
1. Remove the undercover (1) at the bottom of the machine.
2. Place the oil container to receive the oil under drain plug (P).
3. Loosen drain plug (P) to drain oil. Do it slowly so that you do not get splashed with drained oil.
4. Tighten the drain plug (P).



5. Open the fuel filter inspection cover on the right side of the machine.
6. Turn the filter cartridge (2) counterclockwise by using the filter wrench, and remove it.
7. Clean the filter head.

   REMARK

   Check that there is no old packing stuck to the filter holder. If there is any old packing stuck to the filter, it will cause oil leakage.



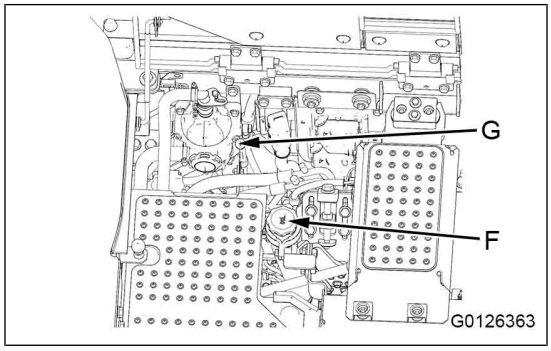
8. When installing the new filter cartridge, apply clean engine oil (or grease) to its packing and thread portion.

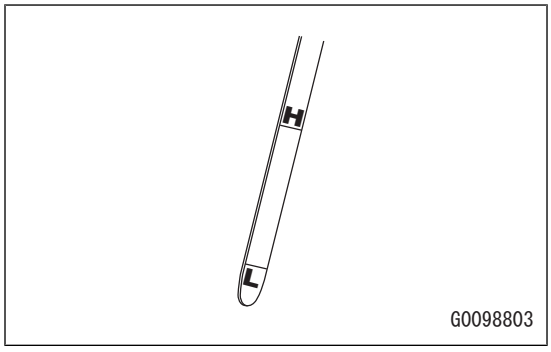
   When installing the cartridge, tighten it until the packing surface contacts the seal surface of the filter holder, then tighten it 1/2 or more turns.

9. After replacing the filter cartridge, refill with engine oil through oil filler port (F) until the oil level is between the H and L marks on dipstick (G).
10. Run the engine at low idle for a while and then stop it.
11. Check the oil level in the engine oil pan.

    Make sure that the oil level is between marks H and L on the dipstick.

    For the oil level check procedure, see “CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (3-158)”.
12. Install undercover (1).





REPLACE FUEL PREFILTER CARTRIDGE

⚠ WARNING

- **Wait for the temperature of the machine to go down, and then start the work. Immediately after the engine is stopped, all the parts are very hot, and they can cause burn injury.**
- **Do the replacement work of the filter 30 seconds or more after you stop the engine. High pressure occurs in the engine fuel pipes when the engine is in operation. The internal pressure lowers more than 30 seconds after you stop the engine.**
- **Do not let an open flame be near.**

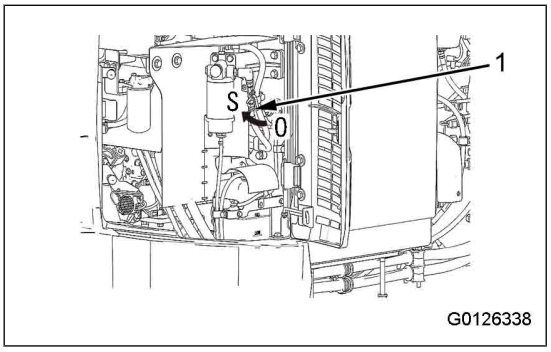
NOTICE

- **When you replace the fuel filter cartridge, it is recommended to use Komatsu genuine parts. Komatsu genuine fuel filter cartridges use a special filter that has high filtration efficiency. The common rail fuel injection system used on this machine consists of more accurate parts than those in the conventional injection pump and nozzles. If a fuel filter cartridge other than Komatsu genuine part is used, dirt or foreign material can be mixed and cause failure to the injection system.**
- **During inspection and maintenance of the fuel system, be very careful to prevent entry of foreign material. If dirt or such sticks, wash it off fully with fuel.**

Items to be prepared

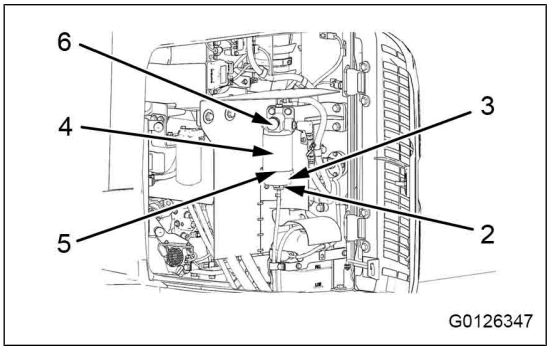
- Filter wrench
- Container to receive the oil

1. Open the fuel inspection cover on the right side of the machine.
2. Turn the valve (1) to CLOSE position (S).



3. Place a container under the fuel prefilter cartridge to receive the fuel.
4. Loosen the drain valve (2) and drain water and sediments from transparent cup (3), and also drain all the fuel from filter cartridge (4).
5. Turn the transparent cup (3) counterclockwise to remove it by using the filter wrench.

   This cup is used again.
6. Turn the filter cartridge (4) counterclockwise by using the filter wrench, and remove it.



7. Install currently removed transparent cup (3) to the bottom of the new filter cartridge.

   At this time, be sure to replace O-ring (5) with a new one.

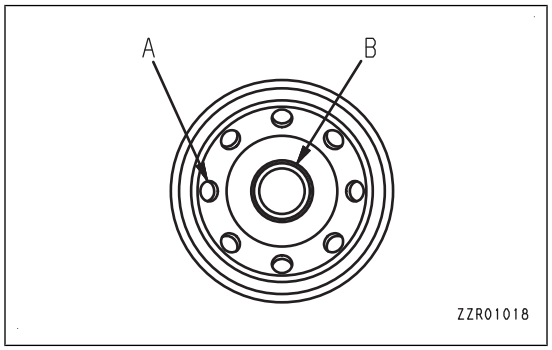
   When installing the transparent cup, thinly apply oil to the packing surface, contact it to the sealing surface of filter cartridge (4), and then tighten it 1/4 to 1/2 turn.

   If the transparent cup is fastened too much, the O-ring will be damaged and this leads to leakage of fuel. If it is too loose, fuel will also leak from gaps of the O-ring. Be sure to observe the tightening angle.
8. Clean the filter head.

9. Fill the new filter cartridge with clean fuel, thinly apply oil to the packing surface, then install it to the filter head.

NOTICE

- **When filling the filter cartridge with fuel, do not remove cap (B). Always fill with fuel from 8 small holes (A) on the dirty side.**
- **After filling with fuel, remove cap (B) and install the fuel filter.**
- **Always fill with clean fuel. Be careful not to let any dirt or dust get into the fuel. In particular, center portion is the clean side, so do not remove cap (B) when filling with fuel. Be careful not to let dirt or dust get into the center portion on the clean side.**



When installing the cartridge, tighten it until the packing surface contacts the seal surface of the filter holder, then tighten it 3/4 of a turn.

If the filter cartridge is tightened too much, the packing may be damaged and this will cause the leakage of fuel. If it is not tightened enough, fuel will leak through the gap at packing. Be sure to observe the tightening angle.

When tightening with a filter wrench, be extremely careful not to dent or damage the filter.

10. Check that drain valve (2) is closed securely.
11. Turn the valve (1) to OPEN position (O).
12. After completing the replacement of filter cartridge (4), bleed air according to the following procedure.
    1) Fill up the fuel tank with fuel (to the level where the float is at the highest position).
    2) Loosen the knob of feed pump (6), pull it out, then pump it in and out until the movement becomes heavy.

REMARK

- It is not necessary to remove the plugs at the fuel prefilter head and at the fuel main filter head.
- When the engine runs out of fuel, use the same procedure to operate feed pump (6) and bleed the air.

13. After bleeding air, push in the knob of feed pump (6) and tighten it.
14. After replacing the filter cartridge (4), start and run the engine at low idle for 10 minutes.
15. Check for leakage of oil from the filter seal surface and transparent cup mounting face.

    If the leakage is noticed, check the filter cartridge for its tightening condition.

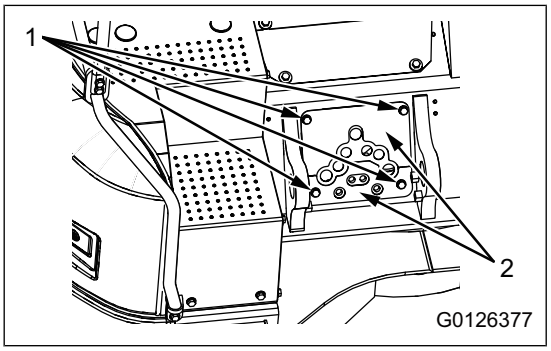
If there is still fuel leakage, repeat steps 2 to 8 to remove the filter cartridge, and if any damage or pinched foreign material on the packing surface is found, replace it with a new cartridge and repeat steps 9 to 14 to install it.

CHECK SWING PINION GREASE LEVEL, ADD GREASE

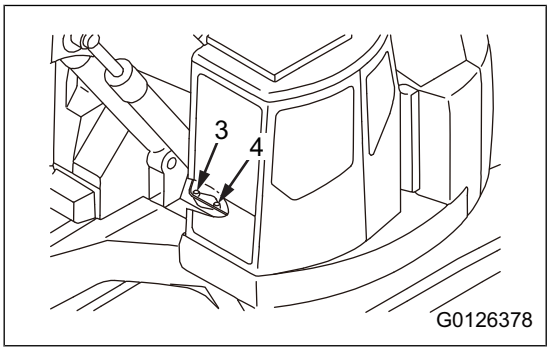
Items to be prepared

Ruler

1. Remove the 4 bolts (1), and remove the cover (2).



2. Remove the 2 bolts (3) at the 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), and make sure that the grease level (S) at the pinion path is 4mm or more.

   If the grease level (S) is 4mm or less, add grease.

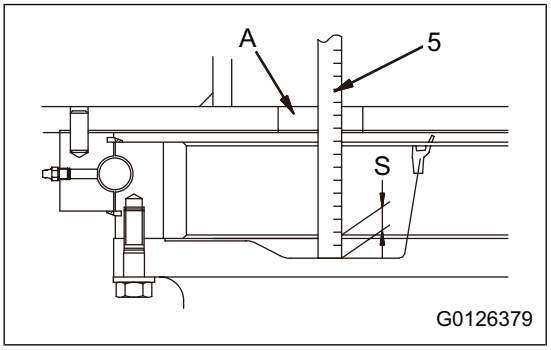
4. Make sure that grease is not milky white.

   All capacity of grease: 10ℓ

   If grease is milky white, it needs to be replaced. Consult your Komatsu distributor for replacement.

5. Install the cover (4) with the bolt (3).

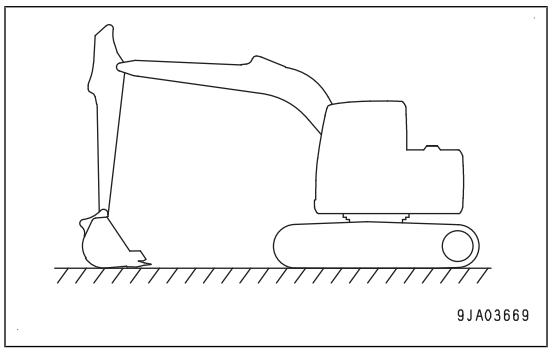
6. Install the cover (2) with the bolt (1).



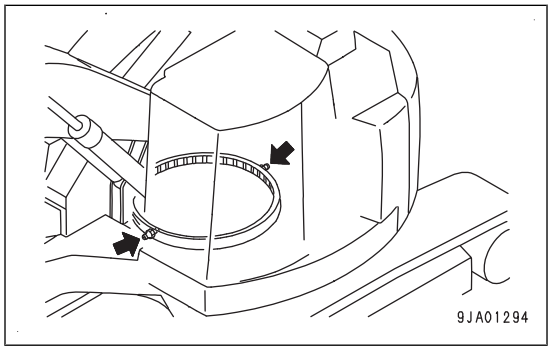
LUBRICATE SWING CIRCLE

Prepare the grease pump.

1. Set the machine to the lubrication posture as shown in the figure, and lower the work equipment to the ground, and then stop the engine.



2. Use a grease pump to lubricate through the grease fittings (2 places) shown by arrow.



3. Wipe off the grease that is pushed out with cloth.

CHECK AND CLEAN FINS

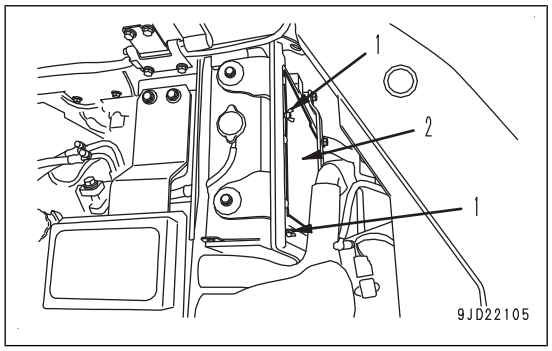
⚠ WARNING

Wear the protective equipment such as protective eyeglasses and dust mask. 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.

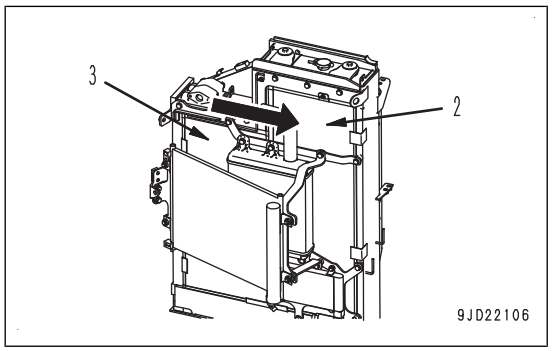
NOTICE

- **To prevent damage of fins, use the compressed air from a distance, and directly blow to the core with the right angle. Damage on the fins can cause water leakage and overheating.**
- **In a dusty jobsite, check the fins every day, regardless of the maintenance interval.**

1. Open the battery inspection cover on the left side of the machine.
2. Remove the wing screws (1) (2 pieces) and remove nets (2) and (3).



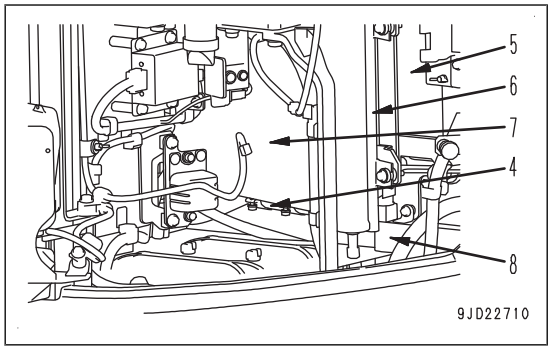
3. Clean nets (2) and (3).



4. Check the front and rear surfaces of oil cooler fins (4), radiator fins (5), aftercooler fins (6), air conditioner condenser fins (7), and fuel cooler fins (8). If there is any mud, dirt, or leaves stuck to the fins, blow it off with compressed air.

   NOTICE

   Steam or water may be used instead of the compressed air. However, when performing powerful steam cleaning (high-pressure machine wash) of the heat exchange equipment (radiator, oil cooler, aftercooler, fuel cooler, air conditioner condenser), maintain sufficient distance from the machine when performing the work. If steam cleaning (high-pressure machine wash) is performed at close distance, there is a danger that the internal fins of the heat exchange equipment may be deformed, and this will cause early clogging and breakage of the equipment.



5. Check the rubber hoses and check the hose clamps for looseness.

   If the rubber hoses are cracked or fragile, replace them.

   If the hose clamps are loosened, tighten them.

6. After inspecting and cleaning, install nets (2) and (3) as they were.

CLEAN AIR CONDITIONER FRESH/RECIRC FILTERS

⚠ WARNING

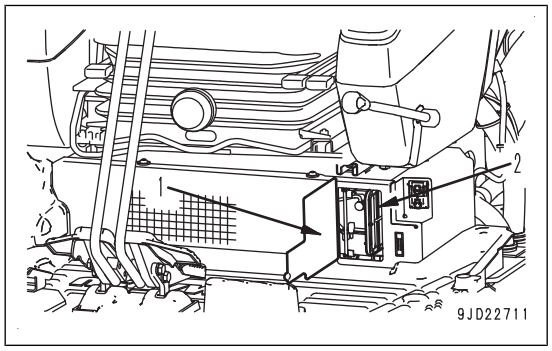
- **When you use the compressed air, use the protective equipment such as protective eyeglasses and dust mask. There is a danger of personal injury when dirt is scattered.**
- **Before you do the cleaning of fresh/recirc air filters, be sure to check that the slide door is locked regardless of whether it is open or closed. If the slide door moves during cleaning, you can get caught by the slide door, or the cover can be damaged.**

NOTICE

- **The cleaning interval of 500 hours is an approximate standard. Do the cleaning at shorter intervals in dusty jobsites.**
- **If you use compressed air, it must be 0.2MPa {2.1kgf/cm^2} or below.**

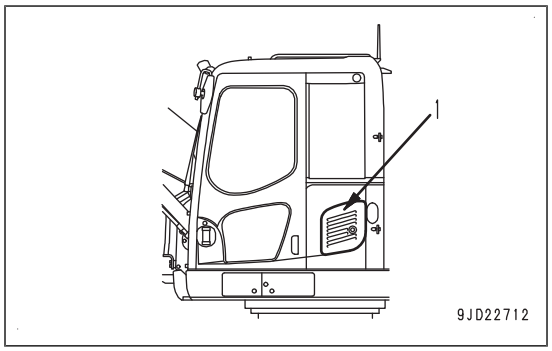
CLEAN AIR CONDITIONER RECIRC AIR FILTER

1. Open the cover (1) at the lower front left of the operator's seat.
2. Remove the recirculation air filter (2).
3. Clean the recirculation air filter (2) with compressed air.
   - If the recirculation air filter (2) is very dirty, especially if it is dirty with oil or such, wash it with a neutral detergent. After you wash it with water, install it which has been fully dried.
   - Replace the filter (2) with a new one in the cases that follow.
     - If the clogging cannot be removed by the compressed air
     - When it has been 1 year from the start of use.
4. Set the recirculation air filter (2) to the original position, and close the cover (1).

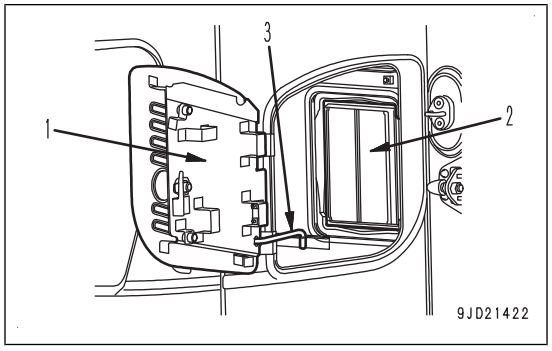


CLEAN AIR CONDITIONER FRESH AIR FILTER

1. Open the cover (1) on the rear left of the operator's cab.



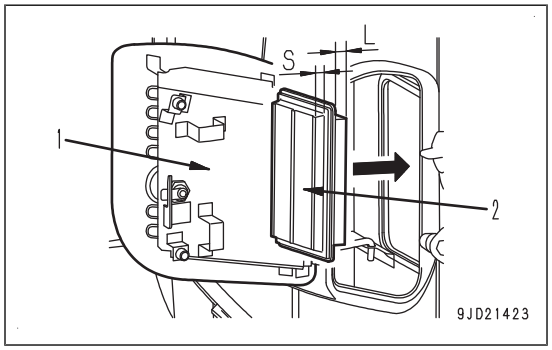
2. Fix it securely with the cover support lever (3).
3. Remove the filter (2).
4. Clean the filter (2) with compressed air.
   - If the filter (2) is very dirty, especially if it is dirty with oil or such, wash it with a neutral detergent. After you wash it with water, install it which has been fully dried.
   - Replace the filter (2) with a new one in the cases that follow.
     - If the clogging cannot be removed by the compressed air
     - When it has been 1 year from the start of use.



5. Install the filter (2) as follows.
   1) Insert the longer side (L) of the filter (2) first into the filter case.

      The filter (2) must be installed in the correct direction. If you insert the shorter side (S) first, you cannot close the cover (1).

   2) Fit in four corners of the filter (2).
6. Unlock the cover support lever (3).
7. Close the cover (1).



EVERY 1000 HOURS MAINTENANCE

Maintenance for every 100 hours, 250 hours, and 500 hours must be done at the same time.

REPLACE HYDRAULIC OIL FILTER ELEMENT

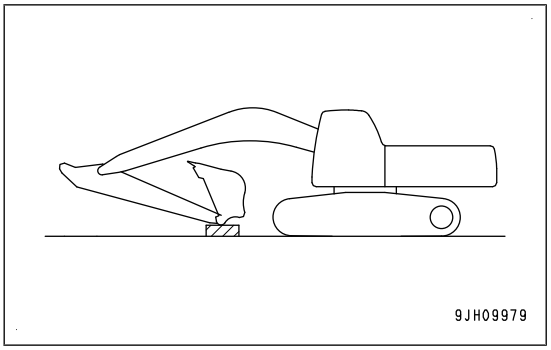
⚠ WARNING

Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.
When you remove the oil filler port cap, there is a possibility that oil spurts out. Slowly turn the oil filler port cap to release the internal pressure, and then remove it carefully.

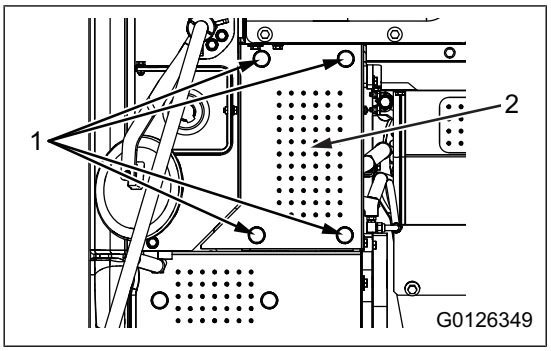
NOTICE

When a hydraulic breaker is installed to the machine, the hydraulic oil deteriorates faster than in the normal bucket digging operation. For the maintenance, see "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-18)".

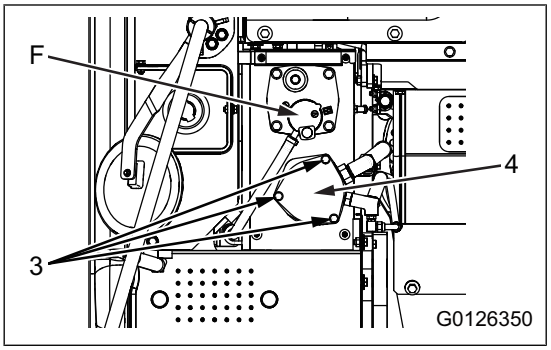
1. Lower the work equipment to a level and firm ground in the posture shown in the figure, and stop the engine.

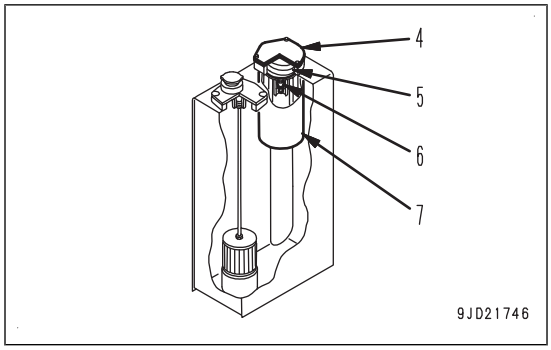


2. Remove the 4 bolts (1), and open the hydraulic tank top cover (2).



3. Loosen the cap of oil filler port (F) gradually to release the internal pressure.
4. Remove the cap of the oil filler port (F).





5. Loosen the 3 bolts (3), and remove the cover (4).

   The cover (4) possibly jumps out by the force of spring (5), so hold the cover (4) down when you remove the bolts.
6. After you remove the spring (5) and valve (6), remove the element (7).
7. Clean the removed parts in flushing oil.
8. Install the new element in the position where the old element (7) was installed.
9. Check the O-ring to be put between the hydraulic tank and cover (4).

   If the O-ring is damaged, replace it.
10. Put the valve (6) and spring (5) on the element.
11. Set the cover (4), and install the cover (4) with the 3 bolts (3) while you push it down with your hand.
12. Install the cap of the oil filler port (F).
13. Close the hydraulic tank top cover, and install the 4 bolts (1).
14. Start the engine and run it at low idle for 10 minutes to bleed air.
15. Stop the engine.

    REMARK

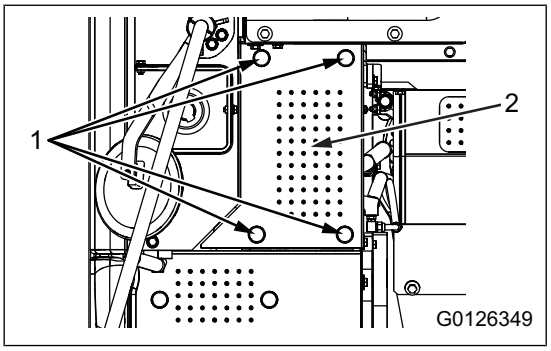
    Let the machine be as it is for 5 minutes or more, and then start the operation. This will remove the air bubbles in the oil inside the tank.
16. Check that there is no oil leakage and wipe off the oil that is spilled.

REPLACE HYDRAULIC TANK BREATHER ELEMENT

⚠ WARNING

- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When you remove the oil filler port cap, there is a possibility that oil spurts out. Slowly turn the oil filler port cap to release the internal pressure, and then remove it carefully.**

1. Remove the 4 bolts (1), and open the hydraulic tank top cover (2).

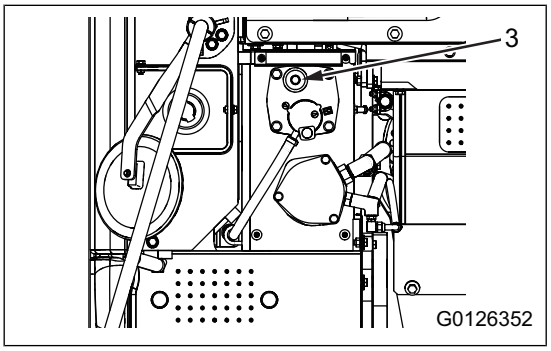


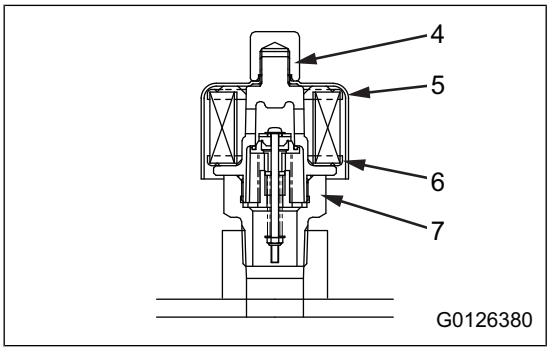
2. Remove the nut (4) of the breather assembly (3) on the top of the hydraulic tank, and remove the cover (5).
3. Replace the filter element (6) with a new one.
4. Install the cover (5) and nut (4).

   To protect the threaded part of the nut, tighten the nut (4) by hand until it is seated, and tighten it by 15 to 30° with a tool.

   NOTICE

   If you remove the breather assembly (3) for replacement, apply a tool to the bolt (7) and tighten it.
   Tightening torque: 30 to 40Nm {3.1 to 4.1kgfm}





CHANGE OIL IN SWING MACHINERY CASE

⚠ WARNING

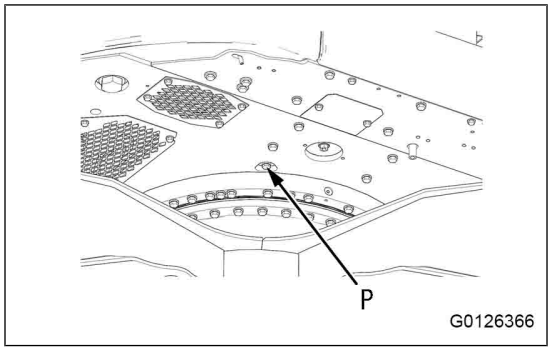
Wait for the temperature of the machine to go down, and then start the work. Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury.

Refill capacity: 2.5ℓ

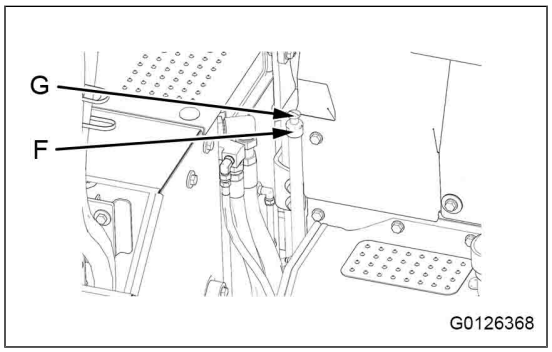
Prepare a container to collect oil.

1. Swing the upper structure so that drain plug (P) on the underside of the machine is in the middle between the right and left tracks.
2. Place the oil container to receive the oil under drain plug (P).
3. Remove the drain plug (P), drain the oil, then tighten the plug again.

   Tightening drain plug (P) to 44.1 to 93.1Nm {4.5 to 9.5kgfm} .



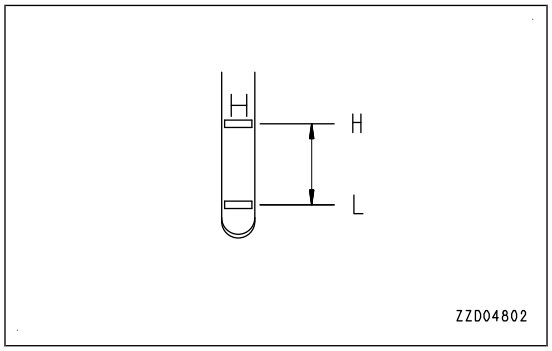
4. Add the refill capacity of engine oil through oil filler port (F).



5. Check the oil level in the swing machinery case.

   Check that the oil level is between H and L marks on dipstick (G).

   For the oil level check procedure, see “CHECK OIL LEVEL IN SWING MACHINERY CASE, ADD OIL (4-53)”.



CHANGE OIL IN FINAL DRIVE CASE

⚠ WARNING

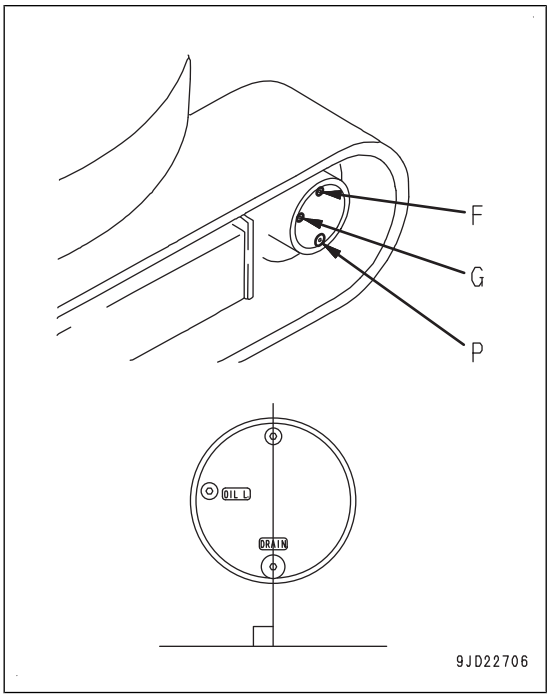
- **Wait for the temperature of the machine to go down, and then start the work. Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury.**
- **When you disconnect the plug, loosen it slowly to release the pressure. If there is remaining pressure in the case, the oil or plug can jump out.**
- **Do not stand in front of the plug when you loosen the plug.**

Refill capacity: 2.1ℓ each for the right and left sides

Items to be prepared

- Container to catch oil
- Hexagonal wrench

1. Set the plug (G) at the top so that the line running on the plug (G) and plug (P) is perpendicular to the ground surface.
2. Place the oil container to catch oil under plug (P).
3. By using a hexagonal wrench, remove plugs (P), (G), and (F) , and drain the oil.
4. Tighten plug (P) .
5. Add the refill capacity of oil through the hole of plug (F).
6. When oil begins to overflow from plug (G) hole, install plugs (G) and (F).



CHANGE OIL IN LARGE CAPACITY FINAL DRIVE CASE

(if equipped)

⚠ WARNING

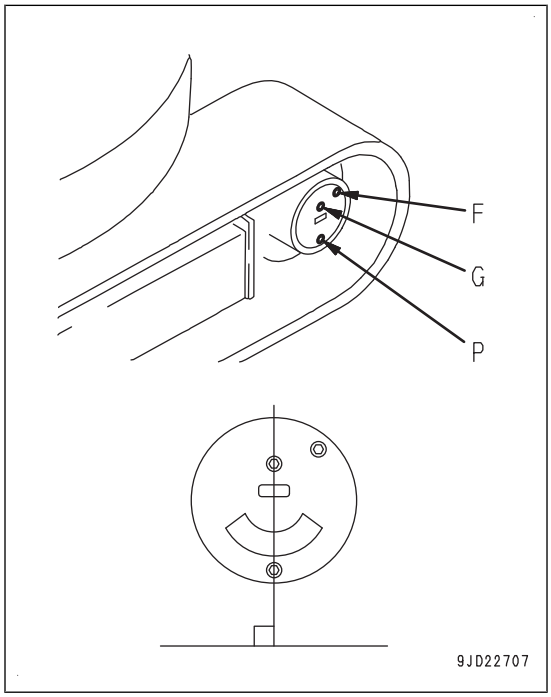
- **Wait for the temperature of the machine to go down, and then start the work. Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury.**
- **When you disconnect the plug, loosen it slowly to release the pressure. If there is remaining pressure in the case, the oil or plug can jump out.**
- **Do not stand in front of the plug when you loosen the plug.**

Refill capacity: each of right and left 4.7ℓ

Items to be prepared

- Container to receive the oil
- Hexagonal wrench

1. Set the plug (G) at the top so that the line running on the plug (G) and plug (P) is perpendicular to the ground surface.
2. Place the container to receive the oil under plug (P).
3. Remove plugs (P), (G), and (F) by using a hexagonal wrench, and drain the oil.
4. Tighten the plug (P).
5. Add the refill capacity of oil through the hole of plug (F).
6. When oil begins to overflow from plug (G) hole, install plugs (G) and (F).



CHECK OIL LEVEL IN PTO GEAR CASE, ADD OIL

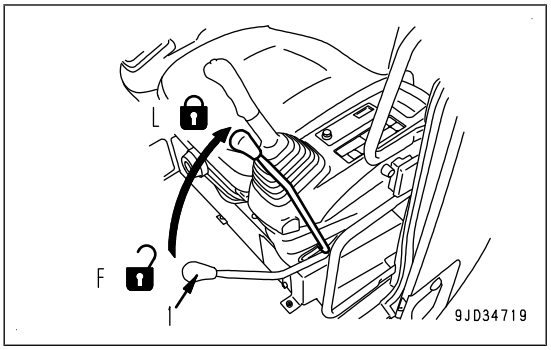
⚠ WARNING

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

Items to be prepared

- Ratchet
- Extension (2 pieces)
- Socket

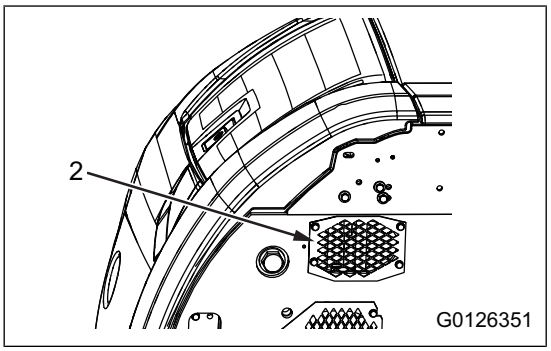
1. Swing the upper structure to let the PTO gear case come at the center between the right and left tracks.
2. Hold the red part at the front end of the lock lever (1), and operate it to the LOCK position (L).
3. Stop the engine.

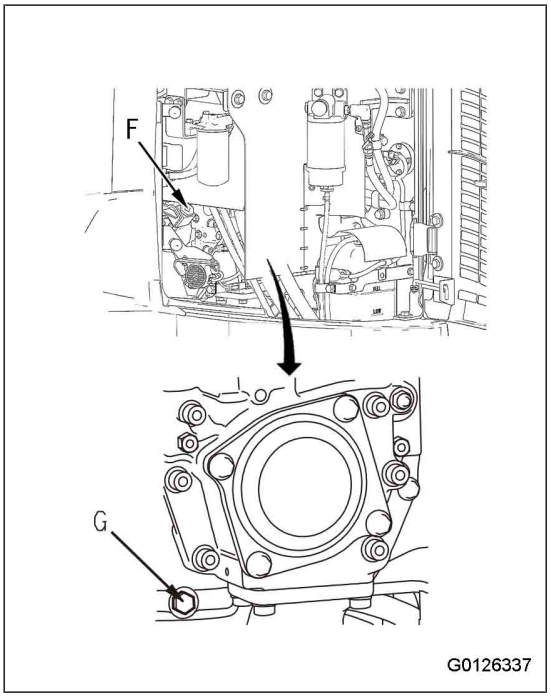


4. Remove the cover (2) at the bottom of the machine.
5. Remove the inspection plug (G), and check the oil level.

   If the oil level is near the lower edge of the plug hole, the oil level is correct.
6. If the oil level is not sufficient, open the fuel filter inspection cover at the right side of the machine, and remove the plug of oil filler port (F), and add oil.

   Add oil up to near the lower edge of the hole of the inspection plug (G).
7. Install the inspection plug (G) and the plug of the oil filler port (F).
8. Close the cover (2) at the bottom of the machine.





REPLACE FUEL MAIN FILTER CARTRIDGE

⚠ WARNING

- **After the engine stops, all parts are still very hot, so do not replace the filter immediately. Wait for all of parts to cool down before starting the work.**
- **High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.**
- **Do not bring any open flame close.**

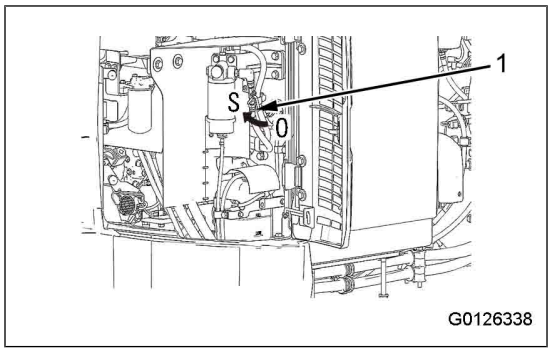
NOTICE

- **Komatsu genuine fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing parts, Komatsu recommends using Komatsu genuine parts.**
- **The common rail fuel injection system used on this machine consists of more precise parts than those in the conventional injection pump and nozzles. If any cartridge other than a Komatsu genuine filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Never use a substitute.**
- **When performing the inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt sticks to any part, use fuel to wash it off completely.**

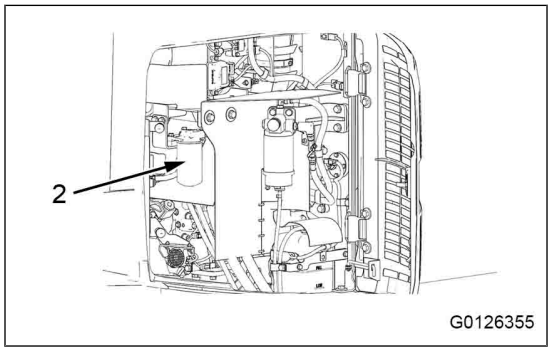
Items to be prepared

- Container to receive the oil
- Filter wrench

1. Open the fuel filter inspection cover on the right side of the machine.
2. Turn the valve (1) to CLOSE position (S).



3. Place the container to receive the oil under filter cartridge (2).
4. Turn the filter cartridge (2) counterclockwise by using the filter wrench, and remove it.
5. Clean the filter head.



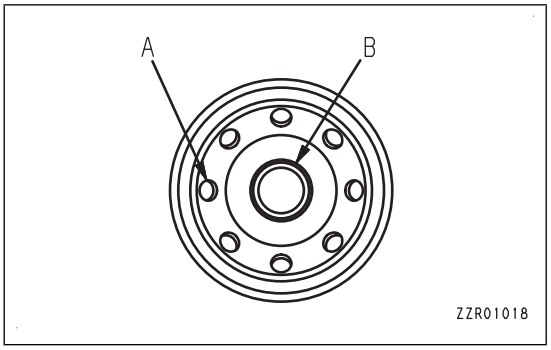
6. Thinly apply oil to the packing surface of the new filter cartridge, then install the filter cartridge to the filter head.

NOTICE

- **Do not fill the new filter cartridge with fuel.**
- **Remove the cap (B) at center and install the filter cartridge.**

When installing the cartridge, tighten it until the packing surface contacts the seal surface of the filter holder, then tighten it 2/3 or more turns.

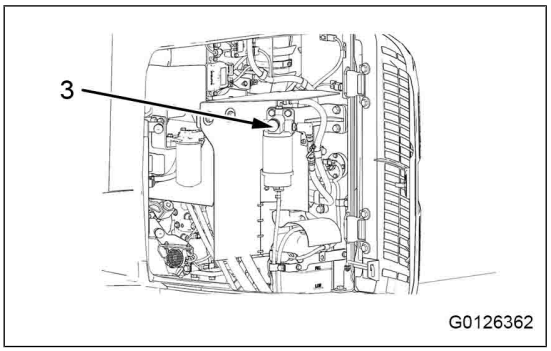
If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is tightened too loose, fuel will also leak from the packing, so always tighten to the specified angle.



7. Turn the valve (1) to OPEN position (O).
8. After completing the replacement of filter cartridge (2), bleed air according to the following procedure.
   1) Fill up the fuel tank with fuel (to the level where the float is at the highest position).
   2) Loosen the knob of feed pump (3), pull it out, then pump it in and out until the movement becomes heavy.

   REMARK

   - It is not necessary to remove the plugs at the fuel pre-filter head and at the fuel main filter head.
   - When the engine runs out of fuel, use the same procedure to operate feed pump (3) and bleed the air.



9. After bleeding air, push in the knob of feed pump (3) and tighten it.
10. After replacing the filter cartridge (2), start and run the engine at low idle for 10 minutes.
11. Check for leakage of oil from the filter seal surface and transparent cup mounting face.

    If the leakage is noticed, check the filter cartridge for its tightening condition.

If there is still fuel leakage, repeat steps 2 to 4 to remove the filter cartridge, and if any damage or pinched foreign material on the packing surface is found, replace it with a new cartridge and repeat steps 5 to 10 to install it.

CHECK ALL TIGHTENING POINTS OF ENGINE INTAKE PIPE CLAMPS

Consult your Komatsu distributor for the check of each clamp between the air cleaner and turbocharger, between the turbocharger and aftercooler, and between the aftercooler and engine.

CHECK FAN BELT TENSION AND AUTO-TENSIONER, REPLACING AUTO-TENSIONER

The fan belt tension is automatically adjusted by auto-tensioner (belt tensioner). Normally, no belt tension adjustment is required. But, if there is a problem of the tension of fan belt, you need to check the fan belt and auto-tensioner.

Special tools are required for the inspection and replacement of auto-tensioner.

Consult your Komatsu distributor.

REPLACE DEF TANK BREATHER ELEMENT

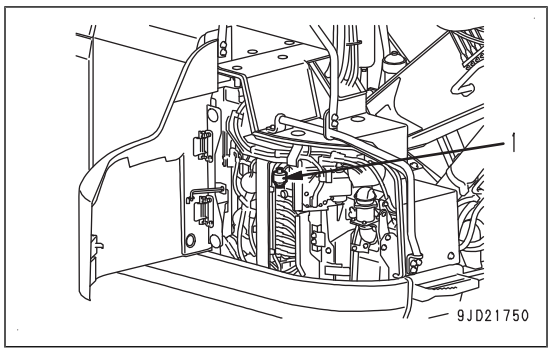
⚠ WARNING

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 DEF tank breather element attached, or with the element other than Komatsu genuine parts, foreign materials may enter into DEF pump and DEF injector which will cause failure of the machine. Never operate the machine without DEF tank breather element attached, nor use the element other than Komatsu genuine parts.**
- **Do not flush DEF tank breather element. Flushing or regenerating of it will degrade the performance of element, and will cause the breakage of DEF tank. Never reuse the DEF element.**
- **Always stop the engine and clean around the DEF tank before replacing.**
- **After the engine is stopped, DEF system devices automatically purge DEF in DEF injector and DEF pump and return it to DEF tank to prevent malfunction of the devices caused by freezing of DEF or deposition of urea.**
  After the engine is stopped, the devices are operated up to 7 minutes. Replace the element after the DEF system devices stop.
- **Improper assembly of DEF tank breather element may cause leakage of DEF. Replace the element in the correct procedure.**

1. Open the machine right front cover.

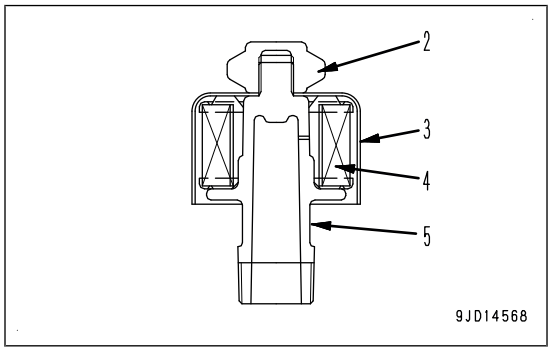


2. Remove nut (2) of breather assembly (1) at the top of DEF tank, then remove cover (3).
3. Replace element (4) with a new one.
4. Install cover (3) and nut (2).

   In order not to damage the threaded portion of nut, tighten nut (2) by hand until it is seated, then tighten it 15° to 25° by using a tool.

   NOTICE

   If the breather assembly (1) is removed for replacement, apply a tool to the bolt (5) and tighten it.
   Tightening torque: 6.5 to 8.5 Nm {0.66 to 0.87 kgfm}



5. Close the machine right front cover.

CHECK FUNCTION OF ACCUMULATOR FOR CONTROL CIRCUIT AND RELEASE INTERNAL PRESSURE IN HYDRAULIC CIRCUIT (FOR BREAKER)

A special tool is needed for checking and charging of nitrogen gas. Ask your Komatsu distributor to perform this work.

EVERY 2000 HOURS MAINTENANCE

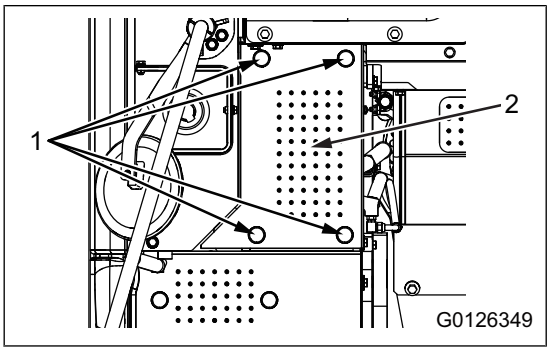
Maintenance for every 100 hours, 250 hours, 500 hours, and 1000 hours must be done at the same time.

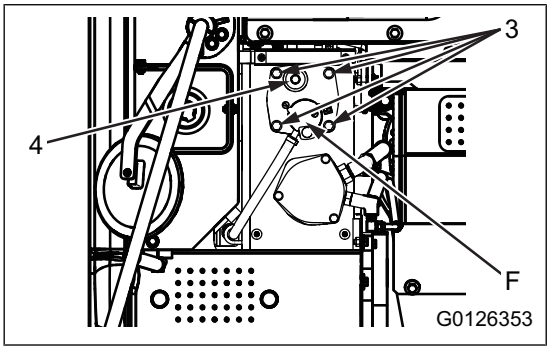
CLEAN HYDRAULIC TANK STRAINER

⚠ WARNING

- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When you remove the oil filler port cap, there is a possibility that oil spurts out. Slowly turn the oil filler port cap to release the internal pressure, and then remove it carefully.**

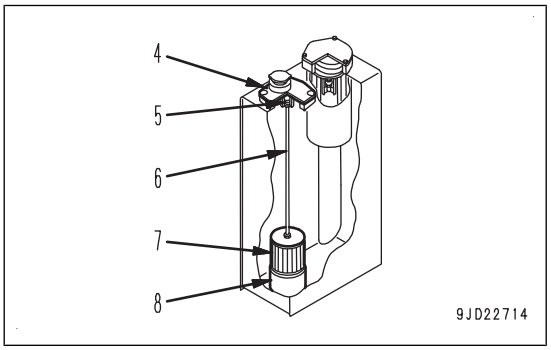
1. Remove the 4 bolts (1), and open the hydraulic tank top cover (2).
2. Remove the cap of the hydraulic tank filler port (F) to release the internal pressure.





3. Remove the 4 bolts (3), and remove the cover (4).

   The cover (4) can jump out by force of the spring (5). Remove the bolts while you push down the cover.
4. Pull up the top of the rod (6), and remove the spring (5) and strainer (7).
5. Remove dirt from the strainer (7), and wash it in flushing oil. Replace the strainer (7) with a new one if it is damaged.
6. Insert the strainer (7) into the protrusion part (8) of the tank to install it.
7. Install the cover (4) with the bolt while the spring (5) is pushed by the protrusion at the bottom of the cover.
8. Close the hydraulic tank top cover, and install the 4 bolts (3).



CHECK FUNCTION OF ACCUMULATOR FOR CONTROL CIRCUIT AND RELEASE INTERNAL PRESSURE IN HYDRAULIC CIRCUIT

⚠ WARNING

The accumulator includes the high-pressure nitrogen gas. If there is a mistake when you handle them, an explosion can occur, and there is a danger of serious personal injury or death. When you handle it, obey the items that follow.

- **The pressure in the hydraulic circuit cannot be fully released. When you remove the hydraulic equipment, do not stand in the direction that the oil spurts out. Loosen the screws slowly.**
- **Do not disassemble.**
- **Do not let an open flame be near them. Do not throw them in fire.**
- **Do not do the drilling, welding or flame-cutting.**
- **Do not hit it or roll it, or give shocks to it.**
- **When you dispose of it, consult your Komatsu distributor.**

NOTICE

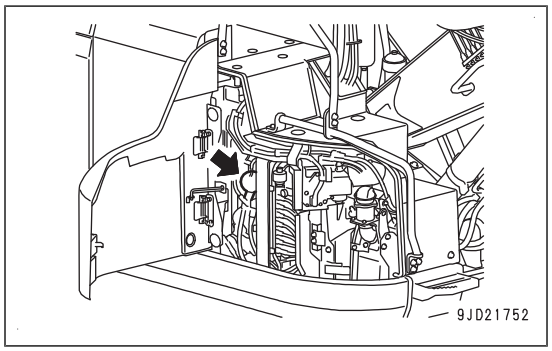
If the nitrogen gas charge pressure in the accumulator is low and operations are continued, it is not possible to release the remaining pressure in the hydraulic circuit if a failure occurs on the machine.

FUNCTION OF ACCUMULATOR

The accumulator has a function to store the pressure of the control circuit in it. Even after the engine is stopped, the control circuit can be operated, so you can do the procedure that follows.

- 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.
- You can release the pressure from the hydraulic circuit.

The accumulator is in the position shown in the figure.



CHECK NITROGEN GAS CHARGE PRESSURE IN ACCUMULATOR

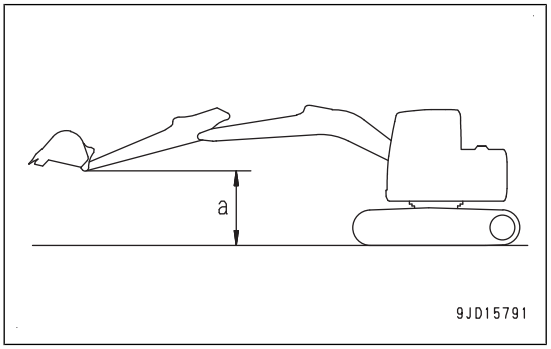
⚠ CAUTION

Check that there is no person or obstacles in the area around the machine before you start the work.

Replace the accumulator every 2 years or every 4000 hours that comes first.

Check the charged pressure of the nitrogen gas as follows.

1. Stop the machine on a firm, level ground.
2. Operate the work equipment control lever to set the work equipment at the maximum reach posture (arm OUT and bucket DUMP end).
3. Hold the work equipment 1.5m position off from the ground.

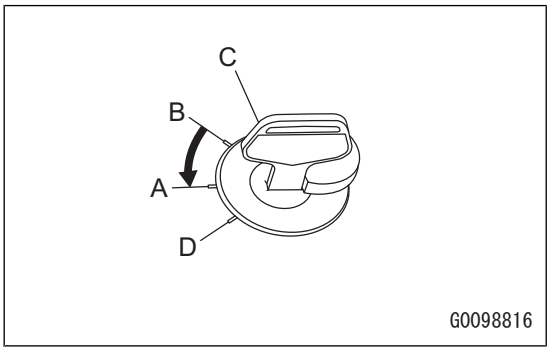


4. Do the procedure that follows in less than 15 seconds.

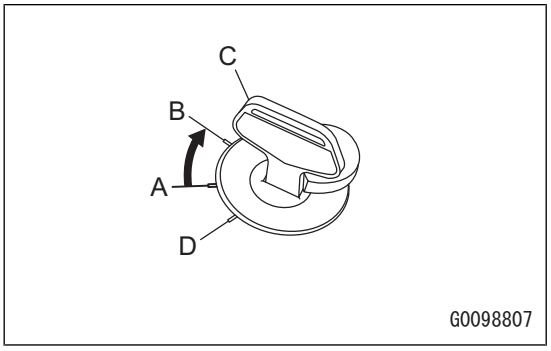
   After the engine stops, the accumulator pressure decreases gradually. If time has passed since the engine was stopped, you cannot do the inspection.

   1) Turn the starting switch to the OFF position (A).

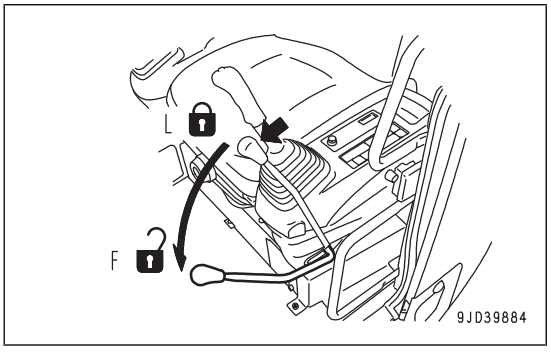
      Engine stops in a state that the work equipment is at the maximum reach posture.



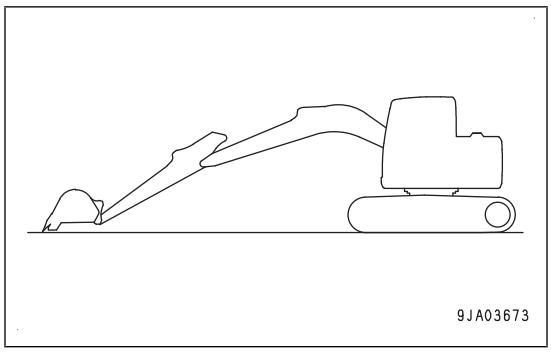
   2) Turn the starting switch to the ON position (B).



   3) Hold the red part on the top of the lock lever, and then set it to the FREE position (F).
   4) Slowly operate the work equipment control lever in the boom LOWER direction and check that the work equipment touches the ground.



- If the work equipment goes down with its own weight and it touches 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 was possibly low. Consult your Komatsu distributor for inspection.

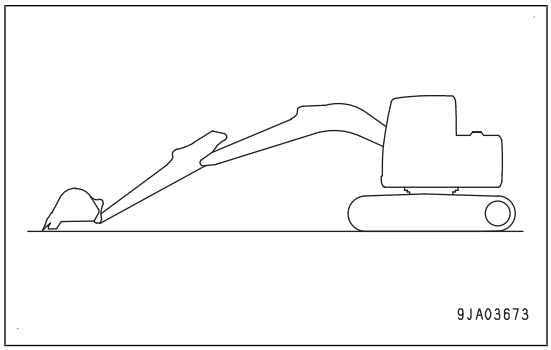


After completion of the inspection, set the lock lever to the LOCK position and turn the starting switch to the OFF position.

RELEASE INTERNAL PRESSURE IN HYDRAULIC CIRCUIT

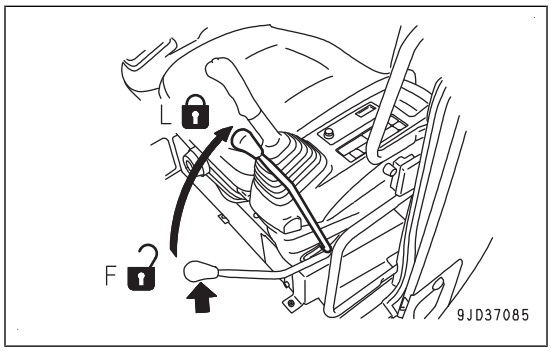
1. Operate the work equipment control levers to set the work equipment to the maximum reach posture (arm and bucket dump end).

   Close the crusher attachment jaws, etc.
2. Lower the work equipment to the ground.



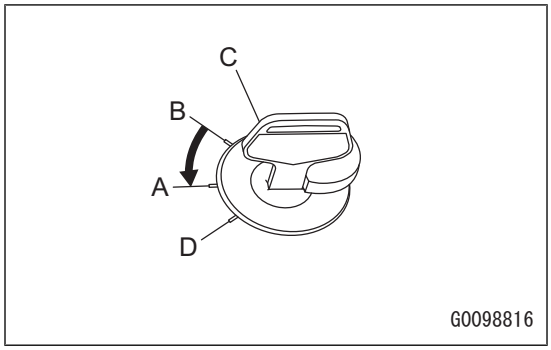
3. Hold the red part at the top of the lock lever, and then set it to the LOCK position (L).
4. Do the procedure that follows in less than 15 seconds.

   After the engine stops, the accumulator pressure decreases gradually. If time elapses after it stopped, you cannot do the inspection.

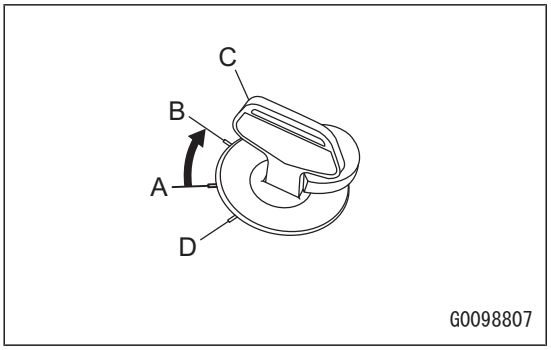


   1) Turn the starting switch to the OFF position (A).

      Engine stops when the work equipment is at the maximum reach posture.

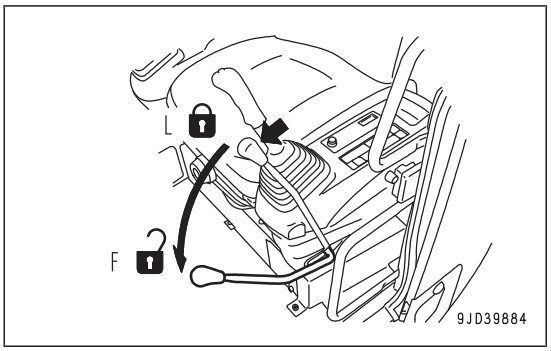


2) Turn the starting switch to the ON position (B).



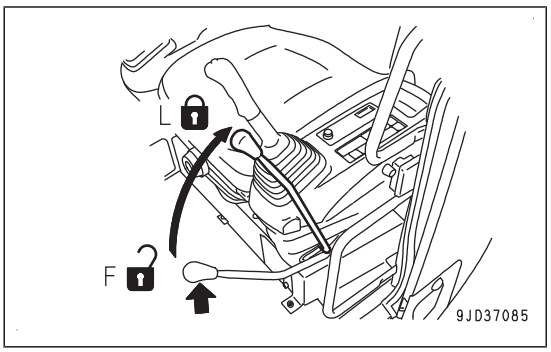
3) Hold the red part at the top of the lock lever, and then set it to the FREE position (F).
4) Operate the work equipment control levers and the attachment control switches in full stroke to the front, rear, right and left.

Air is bled from the operation circuit.

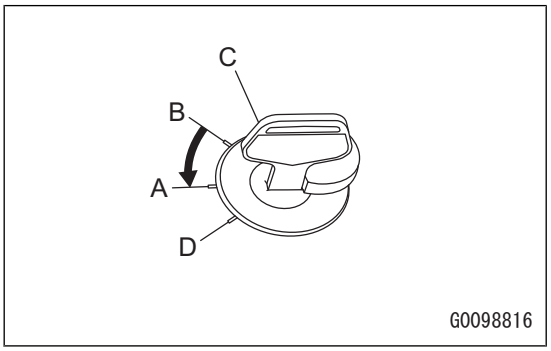


5. Hold the red part at the top of the lock lever, and then set it to the LOCK position (L).

Work equipment control lever and attachment control switch are locked.



6. Turn the starting switch to the OFF position (A).



CHECK ALTERNATOR AND STARTING MOTOR

The brush can be worn or the grease cannot be sufficient on the bearing. Consult your Komatsu distributor for the inspection and repair.

If you start the engine frequently, consult for inspection every 1000 hours.

CHECK AND ADJUST ENGINE VALVE CLEARANCE

Special tools are necessary to do the checks and adjustment. Consult your Komatsu distributor.

REPLACE KCCV FILTER ELEMENT

⚠ WARNING

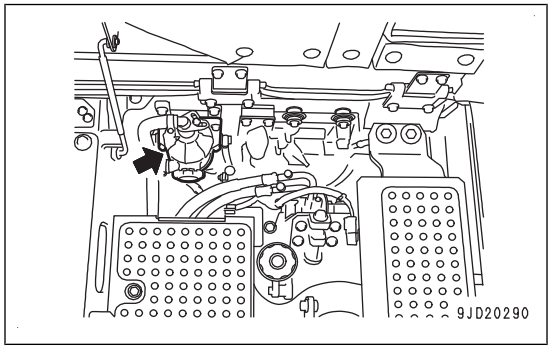
After the engine has been operated, all of parts are still very hot. Do not replace the filter element immediately. Wait until all of parts cool down before starting the work.

NOTICE

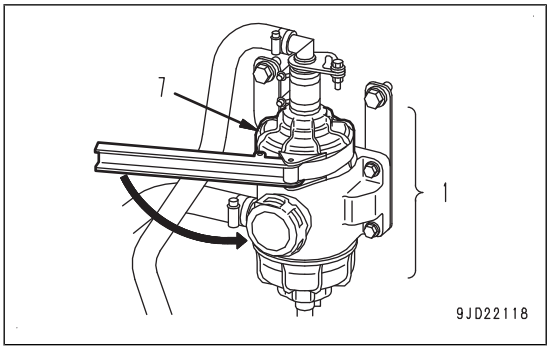
- **If the engine is operated without the filter element, the turbocharger and aftercooler become dirty and their performance will lower and that can cause engine problems such as overrun caused by suction of oil. Therefore, do not start the engine without the filter element.**
- **The filter element cannot be cleaned. If the filter element is cleaned or refurbished, the filter performance lowers. As a result, the turbocharger and aftercooler become dirty and the crankcase pressure increases. Never reuse the filter element since it can cause an engine failure.**
- **After the filter element is replaced, if KCCV is not assembled correctly, oil or blowby gas may leak. Replace the filter element in the correct procedure.**

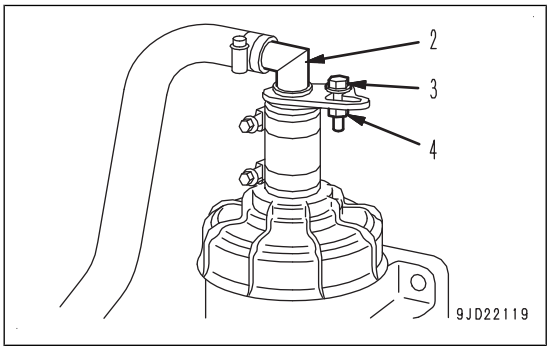
Prepare a container to catch oil.

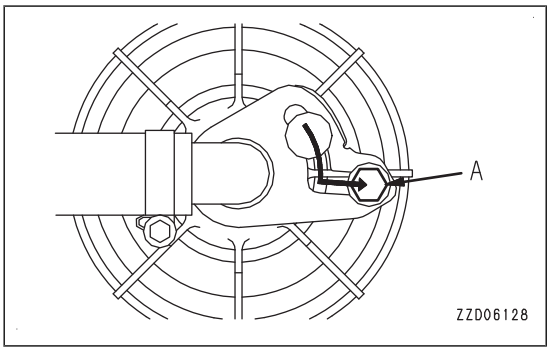
The KCCV ventilator is located in the positions shown in the figure.



1. By using tools, loosen bolt (3) and nut (4) of elbow (2) above KCCV ventilator (1).
2. Move loosened bolt (3) and nut (4) along the groove of elbow (2) to position (A) shown in the figure.

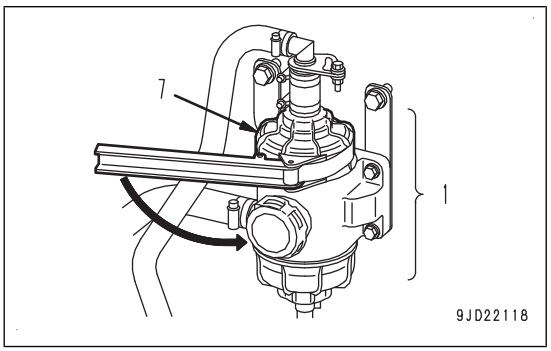


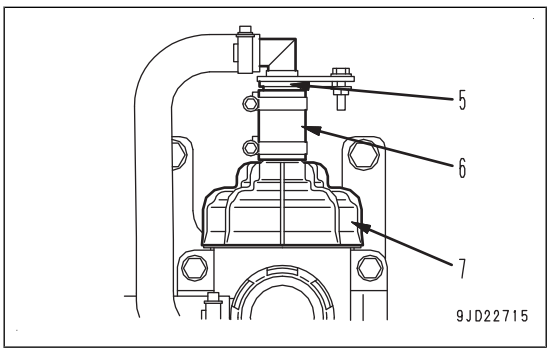




3. By using the filter wrench, loosen cover (7) of KCCV ventilator (1).

   At this time, tube (5) and hose (6) rotate together with cover (7).



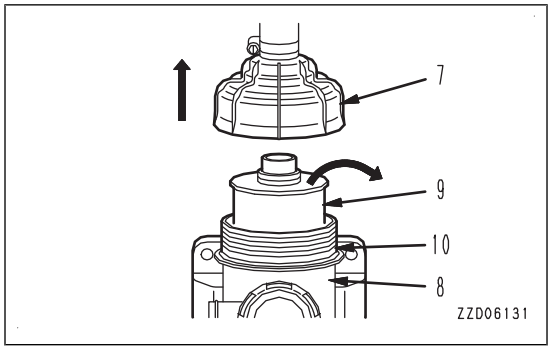


4. After removing cover (7) from ventilator body (8), remove element (9).

   Oil may be accumulated in or sticking to cover (7) and element (9). When replacing the element, take care that the oil will not spill out.

   REMARK

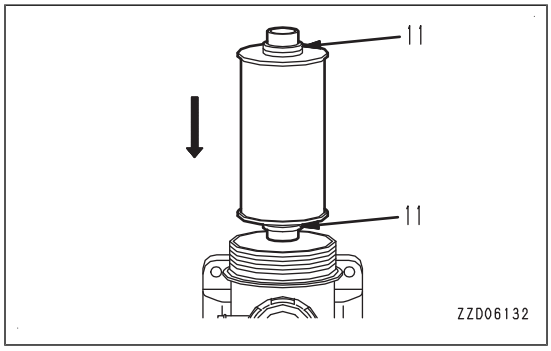
   When the ambient temperature is low, water or emulsified matter may stick to the inside of KCCV because of condensation of water vapor in the blowby gas. However, as far as the coolant level is normal, it is not a problem.



5. Apply engine oil to O-rings (11) (2 pieces) fitted to the top and bottom of the new element and insert the element into the body.

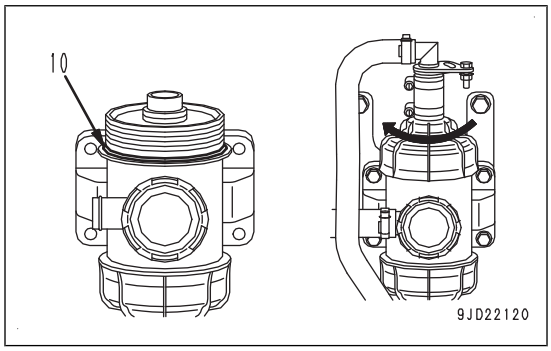
   REMARK

   You can install the element with either side up.



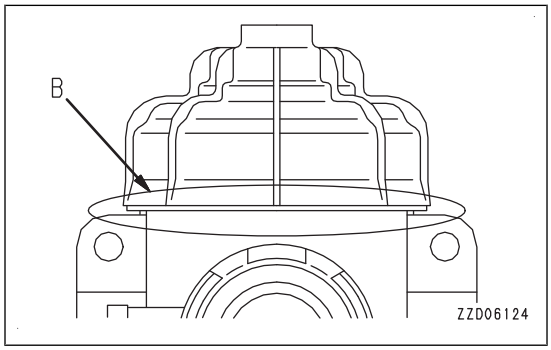
6. Replace O-ring (10) of ventilator body (8) with new one and apply engine oil to it, and then install cover (7) to the body.

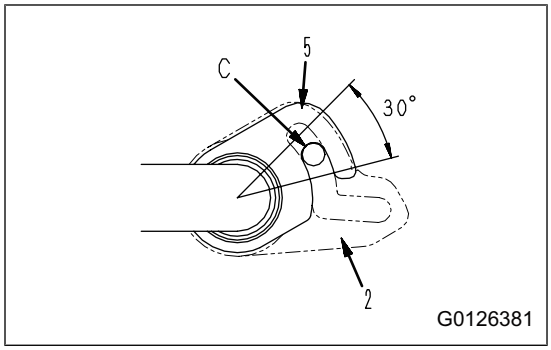
   Tighten the cover firmly with the hand until you cannot tighten any more.



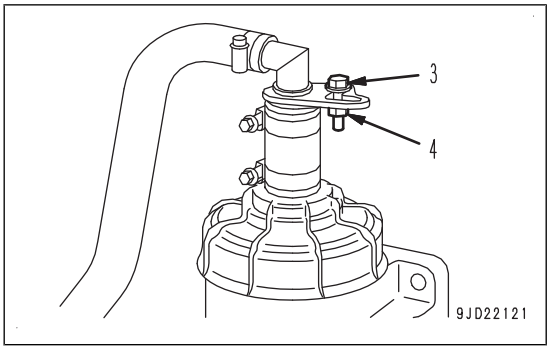
7. Tighten the cover until clearance (B) between it and body is eliminated with the bare hand or a filter wrench.

   At this time, check that bolt-fixed position (C) of tube (5) is within the range of the groove of elbow (2).





8. By using tools, tighten bolt (3) and nut (4).



Check the KCCV hose for leakage, crack, and loose clamp, and replace it if necessary.

REPLACE DEF FILTER

⚠ WARNING

Immediately after the engine is stopped, the parts are still very hot. Do not replace the filter immediately. Wait for all of parts to cool down before starting the work.

NOTICE

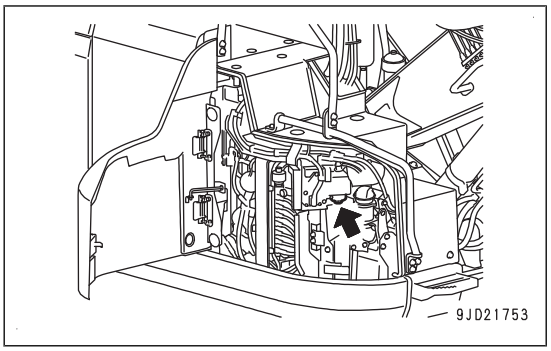
- **Komatsu recommends using Komatsu genuine parts for replacement parts.**
- **If the machine is operated without the DEF filter attached, or with the filter other than Komatsu genuine parts, foreign materials may enter the DEF pump and DEF injector which will cause failure of the machine. Never operate the machine without the DEF filter attached, nor use the filter other than Komatsu genuine parts.**
- **The DEF filter cannot be flushed. Flushing or regenerating of it will degrade the performance of filter, and will cause the breakage of the DEF tank. Never reuse the element.**
- **Improper assembly of the DEF filter may cause leakage of the DEF. Replace the DEF filter in the correct procedure.**
- **The DEF freezes at -11°C. If it is frozen, replacement of the filter becomes difficult. Replace the filter when the temperature around the DEF pump is higher than -11°C, and in the condition that the DEF is not frozen.**

After the engine is stopped, the DEF system devices automatically purge the DEF in the DEF injector and DEF pump and return it to the DEF tank to prevent malfunction of the devices caused by freezing of the DEF or deposition of urea.

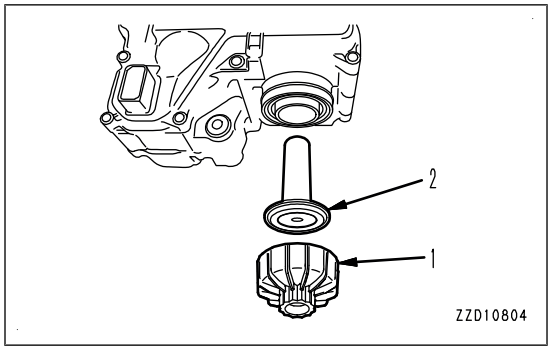
After the engine is stopped, the devices are operated up to 7 minutes. Before replacing the filter, clean around the DEF pump first after the DEF system devices stop.

Prepare the DEF filter removal tool.

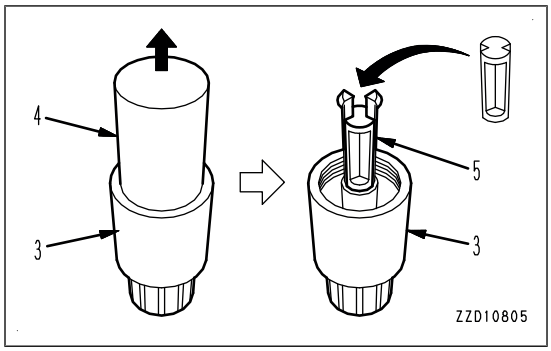
The DEF filter is located at the positions shown in the figure.



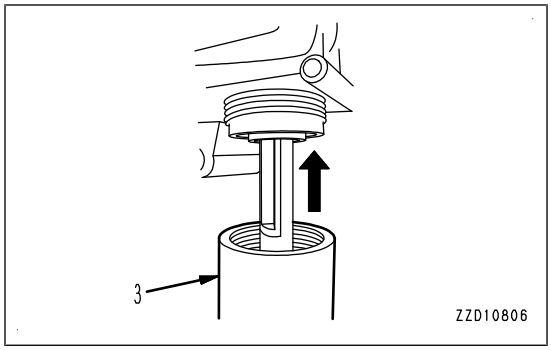
1. Remove the filter cap (1) at the bottom of the DEF pump, and remove equalizing element (2).



2. Turn the cap (4) of filter removal tool (3) and remove it.
3. Check the installation of spacer (5).

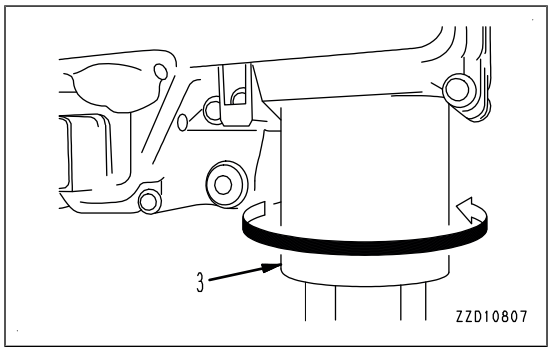


4. Insert the filter removal tool (3) into the bottom of the DEF pump and thrust in with hand.



5. Check that filter removal tool (3) is fully inserted to the end.

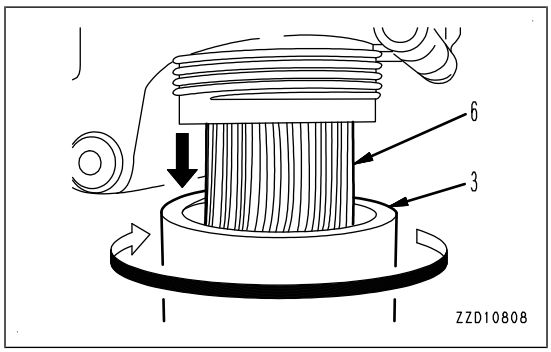
   Insert the filter to the end where you cannot thrust it in any further.



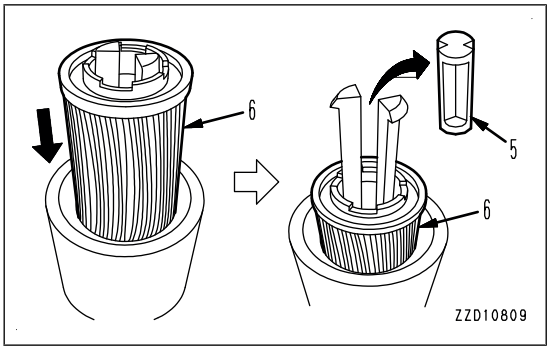
6. Turn the filter removal tool (3) in reverse, and remove filter (6).

   Filter (6) is removed and you can take it out together with filter removal tool (3).

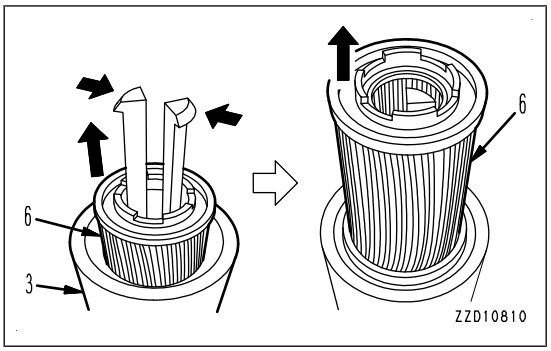
   If filter (6) cannot be removed from the DEF pump, grip filter removal tool (3), pull it down, then it will be removed.



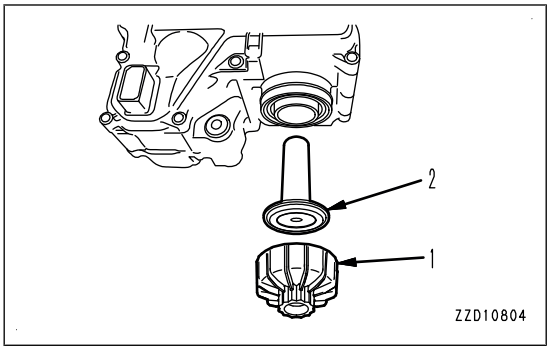
7. Slide the filter (6) down, and remove spacer (5) from filter removal tool (3).



8. Pull the filter (6) up while pushing in the tip of filter removal tool (3), and remove it.
9. Return the removed spacer (5) to filter removal tool (3), and keep them.
10. Insert a new filter and a new equalizing element into the bottom of the DEF pump, and lightly tighten them with hand.



11. Tighten the filter cap (1).
    Tightening torque: 20 to 25 Nm {2.0 to 2.5 kgfm}



EVERY 4000 HOURS MAINTENANCE

Maintenance for every 100 hours, 250 hours, 500 hours, 1000 hours, and 2000 hours must be done at the same time.

CHECK WATER PUMP

Do the inspection for play of pulley, leakage of oil, leakage of water and clogging of drain hole. If you found an abnormality, consult your Komatsu distributor for disassembly and repair or replacement.

REPLACE ACCUMULATOR (FOR CONTROL CIRCUIT)

⚠ WARNING

The accumulator includes the high-pressure nitrogen gas. If there is a mistake when you handle them, an explosion can occur, and there is a danger of serious personal injury or death. When you handle it, obey the items that follow.

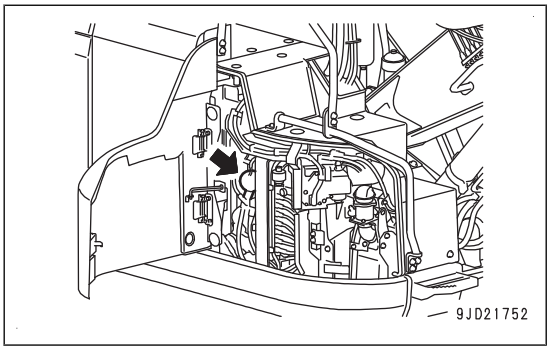
- **The pressure in the hydraulic circuit cannot be fully released. When you remove the hydraulic equipment, do not stand in the direction that the oil spurts out. Loosen the screws slowly.**
- **Do not disassemble.**
- **Do not let an open flame be near them. Do not throw them in fire.**
- **Do not do the drilling, welding or flame-cutting.**
- **Do not hit it or roll it or give shocks to it.**
- **When you dispose of it, consult your Komatsu distributor.**

NOTICE

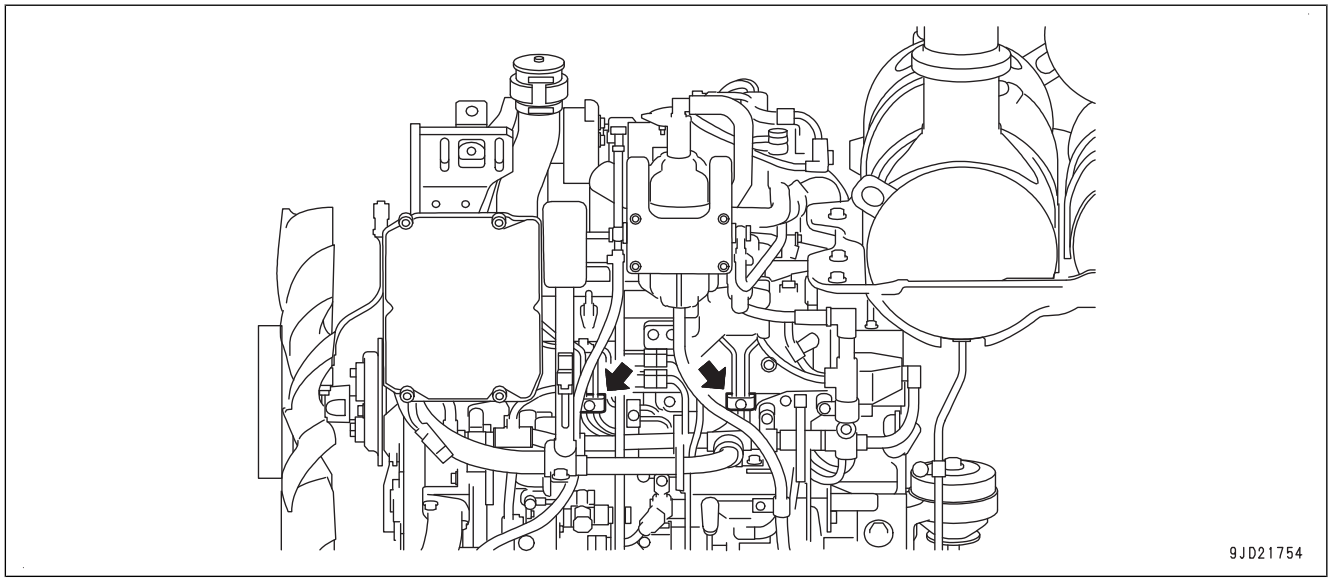
If the nitrogen gas charge pressure in the accumulator is low and operations are continued, it is not possible to release the remaining pressure in the hydraulic circuit if a failure occurs on the machine.

Replace the accumulator every 2 years or every 4000 hours that comes first. Consult your Komatsu distributor for replacement.

The accumulator is in the position shown in the figure.



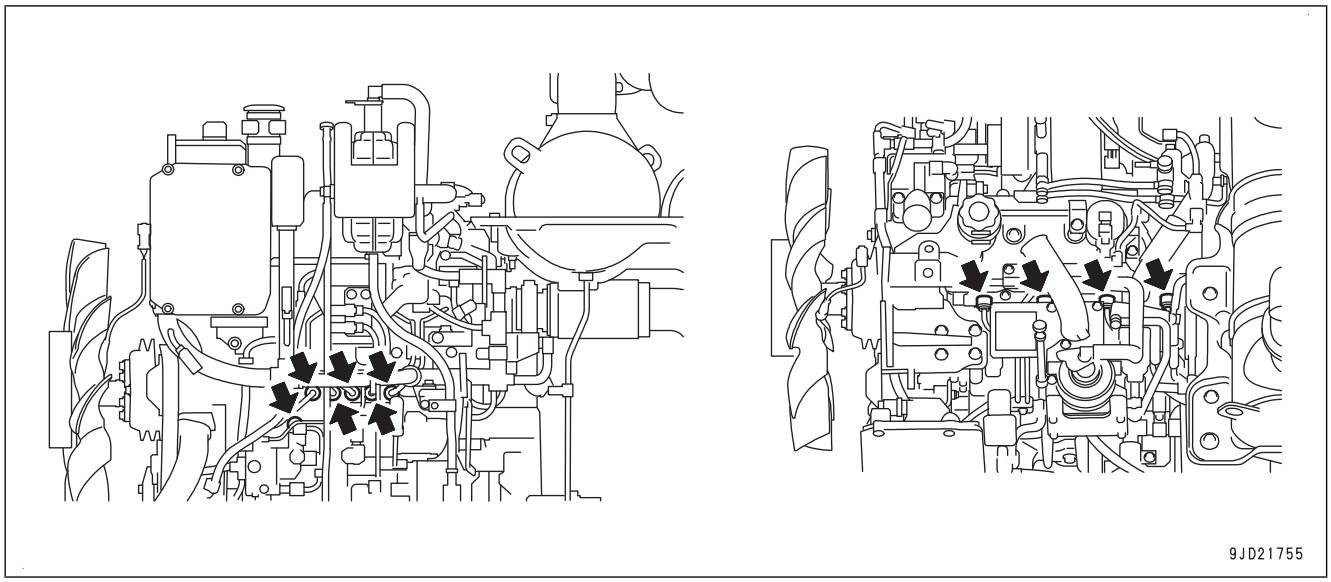
CHECK FOR LOOSENESS OF ENGINE HIGH-PRESSURE PIPING CLAMP, HARDENING OF RUBBER



Check visually and touch by hand to check that there is no hardening of the rubber and no loose bolts of the mounting clamps (2 places) for the high-pressure piping between the supply pump and the common rail.

If there are any problems, the replacement must be performed. Ask your Komatsu distributor for replacement.

CHECK FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER



The fuel spray prevention caps (10 places) on the fuel injection piping and both ends of the high-pressure piping act to prevent the fuel from coming into contact with high-temperature parts of the engine and causing a fire if the fuel should leak or spray out.

Check visually and touch by hand to check that there are no missing fuel spray prevention cap, loose bolts or hardening of the rubber.

If there is any problem, the replacement must be performed. Ask your Komatsu distributor for replacement.

EVERY 4500 HOURS MAINTENANCE

Maintenance for every 100, 250 and 500 hours should be performed at the same time.

CLEAN KDPF

Contact your Komatsu distributor for cleaning of the KDPF.

CLEAN DEF TANK

Ask your Komatsu distributor for cleaning of the DEF tank.

REPLACE DEF TANK FILLER PORT FILTER

⚠ CAUTION

If DEF spurts back because of clogging of filter when DEF is added, replace the filter even before 4500 hours.

Ask your Komatsu distributor for replacement of the DEF tank filler port filter.

EVERY 5000 HOURS MAINTENANCE

Maintenance for every 100 hours, 250 hours, 500 hours, and 1000 hours must be done at the same time.

CHANGE OIL IN HYDRAULIC TANK

⚠ WARNING

- **Immediately after the engine is stopped, the parts and oil are very hot and they can cause burn injury. Wait for the temperature to go down, and then start the work.**
- **When you remove the oil filler port cap, there is a possibility that oil spurts out. Slowly turn the oil filler port cap to release the internal pressure, and then remove it carefully.**

NOTICE

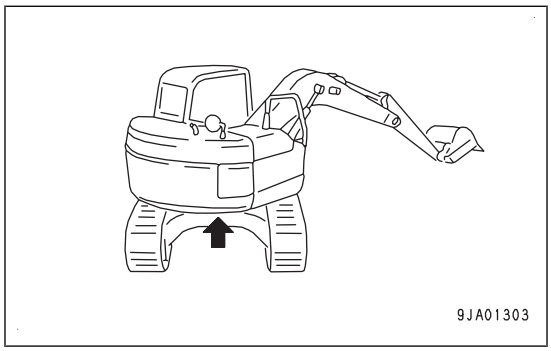
When a hydraulic breaker is installed to the machine, the hydraulic oil deteriorates faster than in the normal bucket digging operation. For the maintenance, see "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-18)".

Refill capacity: 69ℓ

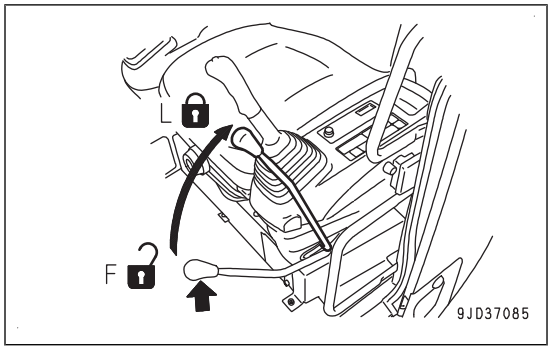
Items to be prepared

- Container to receive drained oil
- Socket wrench handle

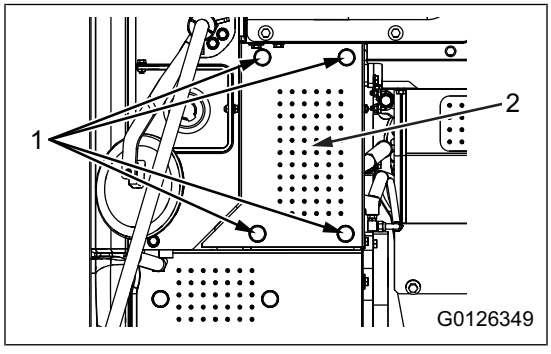
1. Swing the upper structure to let the drain plug of the hydraulic tank come to the middle point between the right and left tracks.
2. Retract the arm and bucket cylinder, and then lower the boom to lower the tooth to the ground.



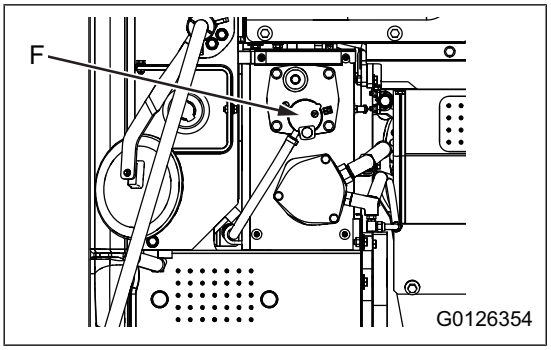
3. Hold the red part at the front end of the lock lever, operate it to the LOCK position (L), and stop the engine.



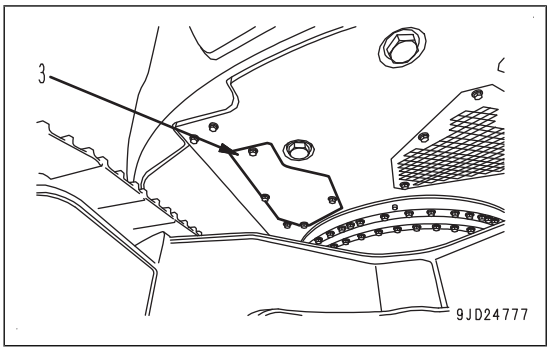
4. Remove the 4 bolts (1), and remove the hydraulic tank top cover (2).



5. Remove the cap of the oil filler port (F).



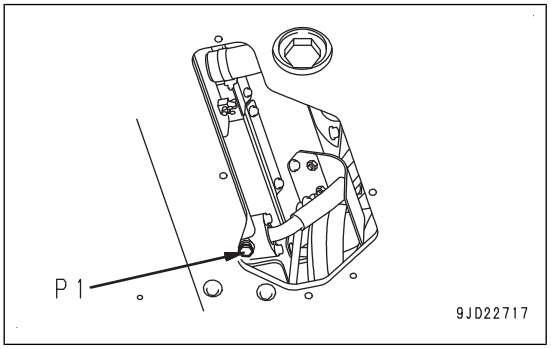
6. Remove the undercover (3).
7. Put a container to receive oil below the drain plug (P1) at the bottom of the machine.

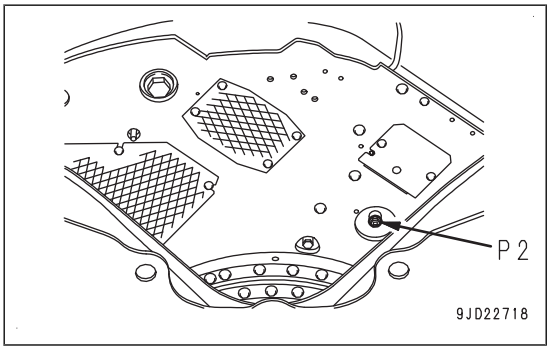


8. Remove the drain plug (P1) to drain oil.
   - When you remove the drain plug (P1), be careful not to get oil on yourself. Check the installed O-ring for damage. If it is damaged, replace the O-ring.
9. After oil is drained, tighten the drain plug (P1).

   Tightening torque: 35 to 63Nm{3.6 to 6.4kgfm}
10. Install the undercover (3).
11. Put a container to receive oil below the drain plug (P2) at the bottom of the machine.
12. Remove the drain plug (P2) to drain oil.
    - When you remove the drain plug (P2), be careful not to get oil on yourself. Check the installed O-ring for damage. If it is damaged, replace the O-ring.
13. After oil is drained, tighten the drain plug (P2).

    Tightening torque: 58.8 to 78.4Nm{6 to 8kgfm}
14. Add the refill capacity of oil through the oil filler port (F).





15. Make sure that the oil level is between the lines H and L on the sight gauge (G).

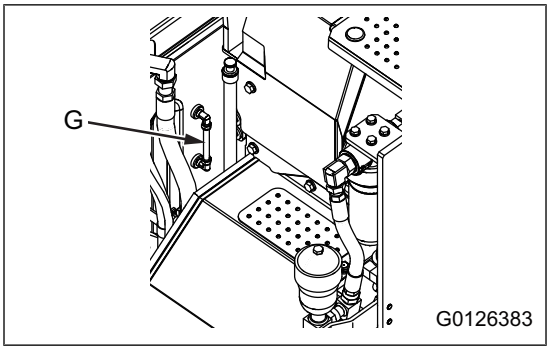
    For the applicable oil, see “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-8)”.

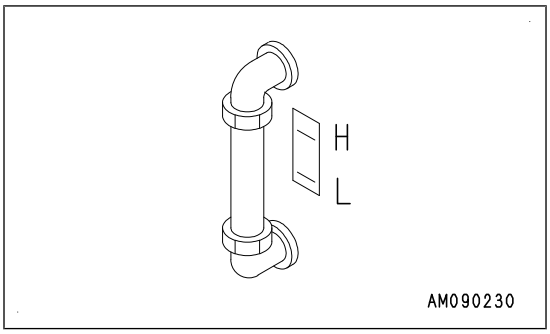
    For the oil level check procedure and procedure to remove the oil filler cap, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (3-155)”.

16. Bleed air from the hydraulic circuit.

    For the procedure to bleed air from the hydraulic circuit, see “BLEED AIR FROM HYDRAULIC CIRCUIT (4-48)”.

17. Install the hydraulic tank top cover (2).





EVERY 8000 HOURS MAINTENANCE

Maintenance for every 100, 250, 500, 1000, 2000 and 4000 hours service should be performed at the same time.

REPLACE ENGINE HIGH-PRESSURE PIPING CLAMP

Special techniques and tools are required for this work.

Ask your Komatsu distributor for replacement of the engine high-pressure piping.

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.

REPLACE DEF HOSE

Ask your Komatsu distributor for replacement of the DEF hose.

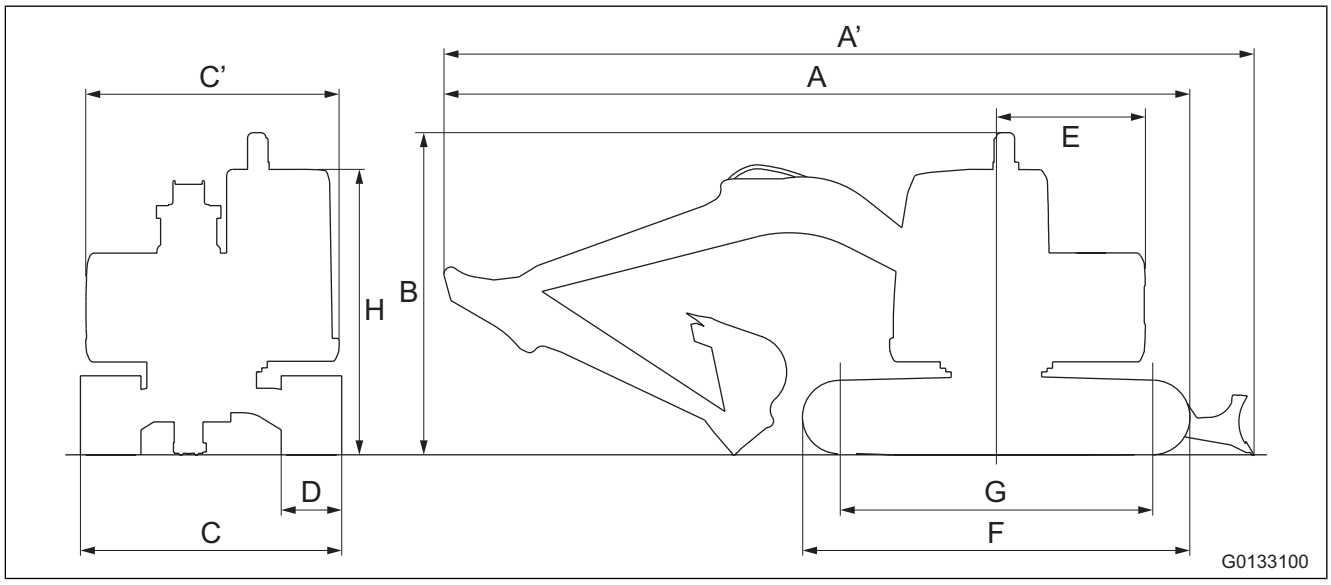
END OF SERVICE LIFE

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

SPECIFICATIONS

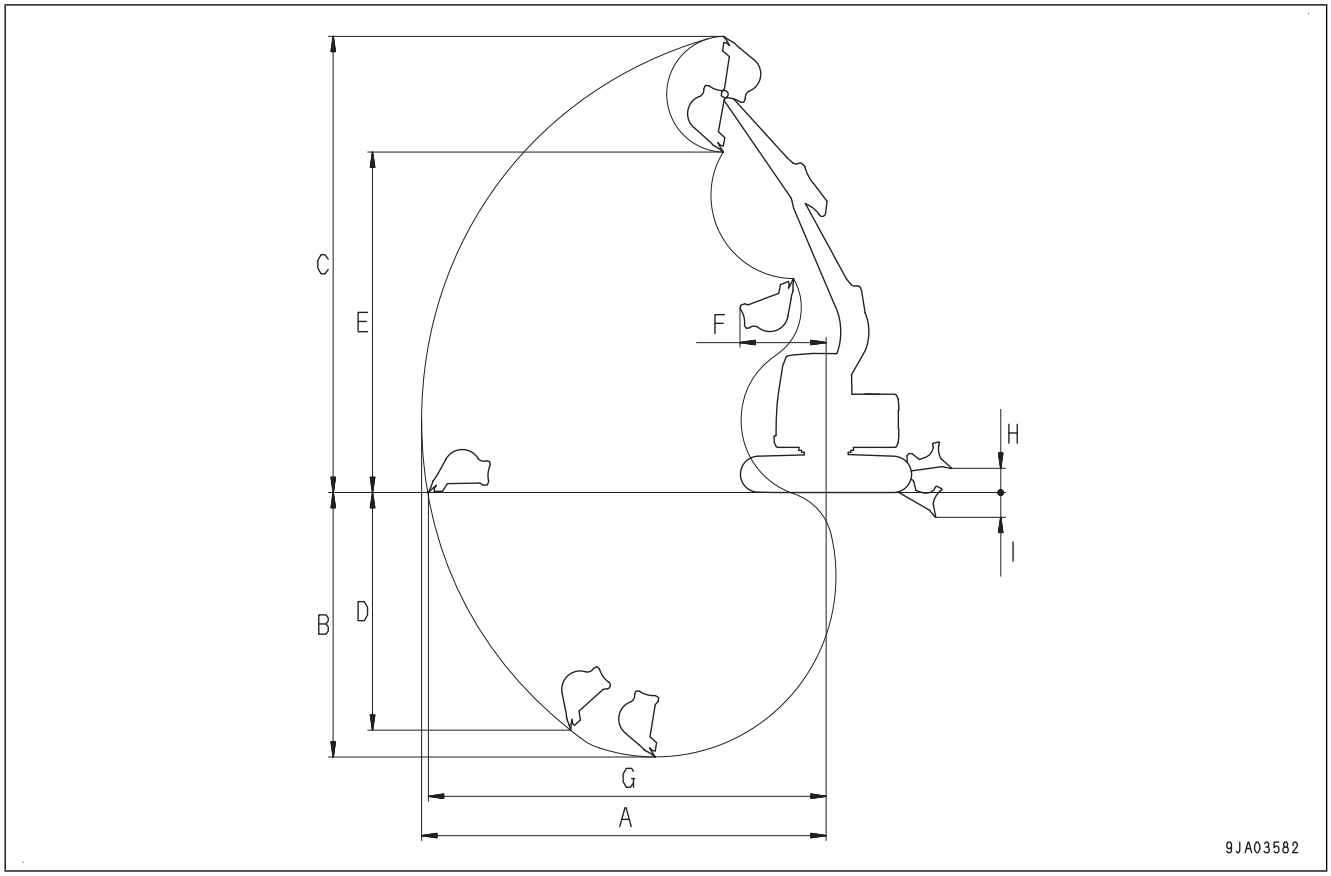
SPECIFICATIONS: PC138US-11E0

	Item		Unit	PC138US-11E0
	Machine weight		kg	14000
	Bucket capacity		m^3	0.50
	Engine model		-	Komatsu SAA4D95LE-7 diesel engine
	Rated horsepower	SAE J1995 (gross)	kW {HP}/min^{-1} {rpm}	72.6/2050
		ISO 9249/SAE J1349 (net)		72.5/2050
A	Overall length (standard specification)		mm	7260
A'	Overall length (blade specification)		mm	7970
B	Overall height		mm	3150
C	Overall width		mm	2490
C'	Overall width		mm	2490
D	Shoe width		mm	500
E	Tail swing radius		mm	1480
F	Overall length of track		mm	3610
G	Distance between tumbler centers		mm	2880
H	Cab height		mm	2835
	Minimum ground clearance		mm	395
	Travel speed (Lo/Hi)		km/h	2.9/5.1
	Continuous swing speed		rpm	11.0



Working range drawing

	Working ranges	Unit	PC138US-11E0
A	Max. digging reach	mm	8300
B	Max. digging depth	mm	5480
C	Max. digging height	mm	9340
D	Max. vertical wall digging depth	mm	4900
E	Max. dumping height	mm	6840
F	Min. swing radius of work equipment	mm	1980
G	Max. reach at ground level	mm	8180
H	Max. blade lift above ground	mm	470
I	Max. blade drop below ground	mm	525



EXPLANATION OF LIFT CAPACITY CHART

⚠ WARNING

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

Legend

A: Reach from swing centre

B: Bucket hook height

(1) Position of lifting point

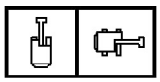
(2) Arm length

(3) Boom length

(4) Hydraulic pressure: 34.8 MPa {355 kgf/cm^2}

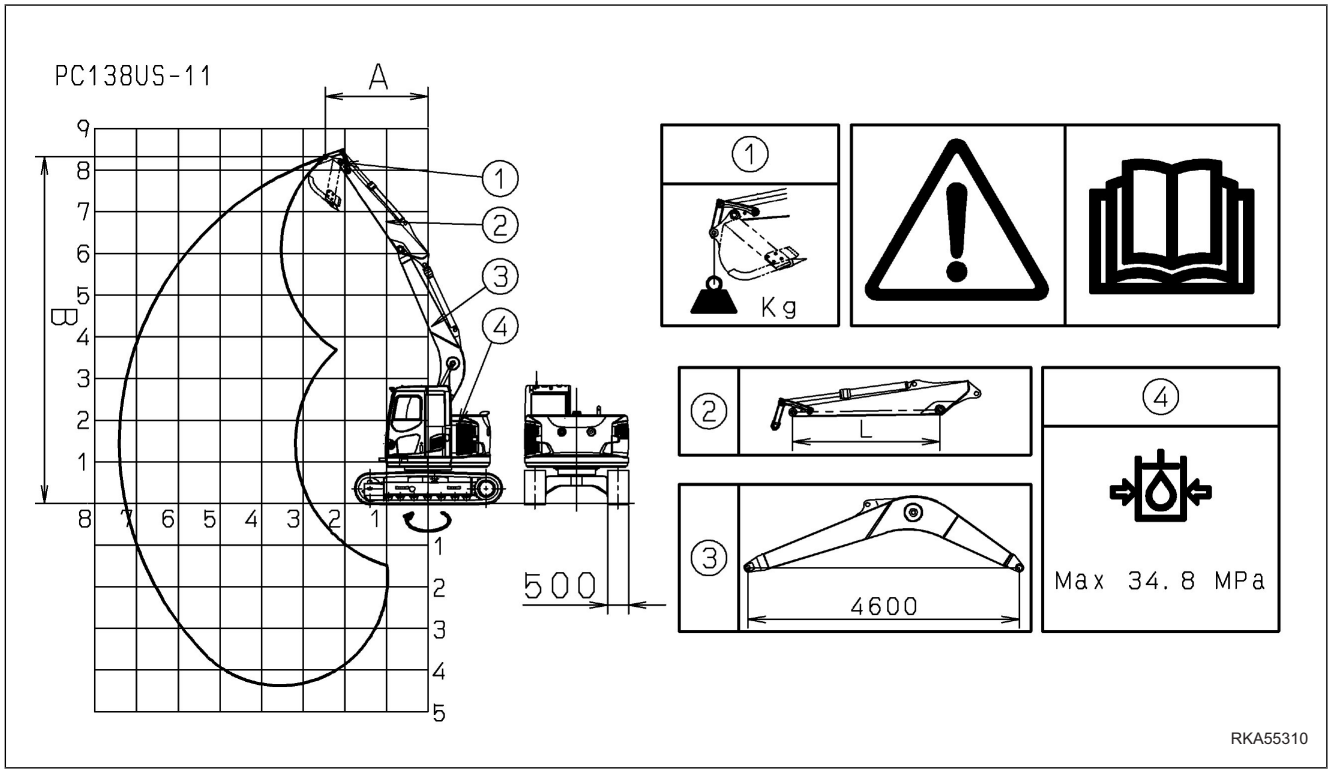
OF: Lifting capacity (rating overfront)

OS: Lifting capacity (rating overside)



Working conditions

- Bucket: 0.50 m³ ISO - 400 kg
- Width shoe: 500 mm
- With fully extended bucket cylinder.
- On a compact horizontal level ground.
- If object handling is performed with other tool installed, the weight difference of the tool shall be deducted from value of this table.



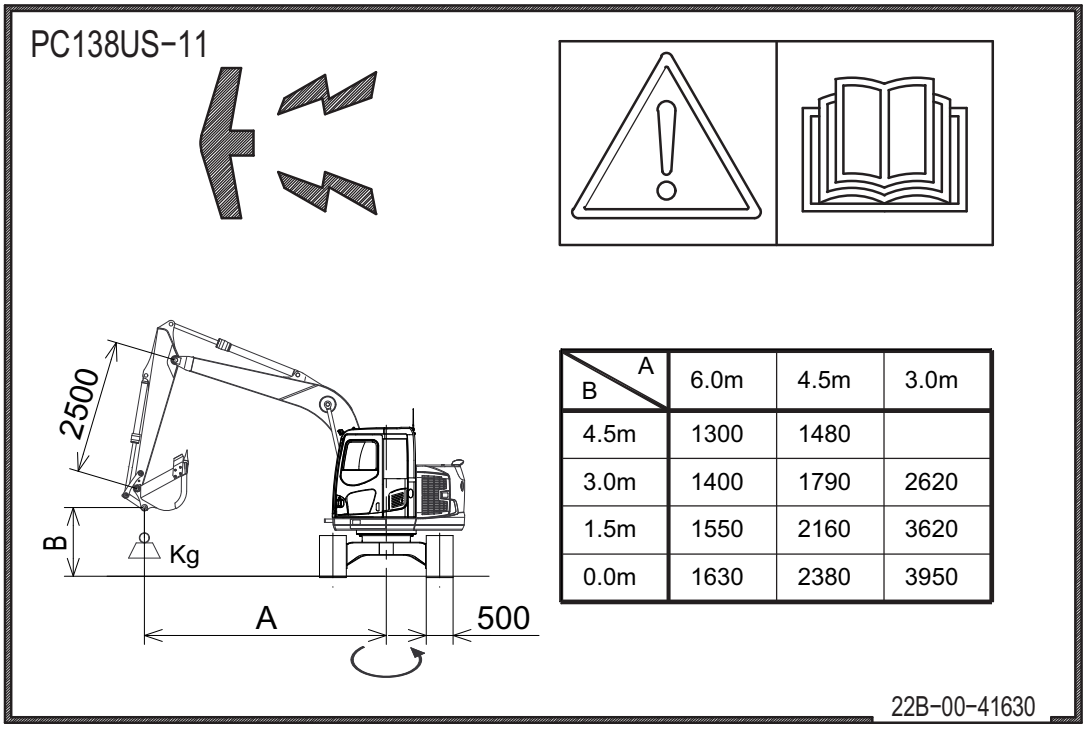
Loads do not exceed 87% of hydraulic capacity or 75% of tipping capacity (* load limited by hydraulic capacity rather than tipping).

PC138US-11

L	A / B	kg MAX		7.0m		6.0m		4.5m		3.0m		1.5m	
3.0m	6.0m	*1340	*1340			*1870	*1870	*2670	*2670				
	4.5m	*1250	*1250	*1600	1430	*2680	1950	*2840	*2840				
	3.0m	*1250	1170	2250	1400	2950	1870	*3760	3090	*3740	*3740		
	1.5m	*1330	1090	2180	1340	2830	1760	4580	2840	*7560	5440		
	0.0m	*1500	1100	2120	1280	2720	1660	4330	2620	*6480	4930		
	-1.5m	*1810	1200	2080	1250	2650	1600	4200	2500	*6220	4760	*3840	*3840
	-3.0m	2460	1490			2660	1600	4180	2490	*6480	4780	*5760	*5760
	-4.5m	*2920	2290					*3500	2590	*5500	4950		
2.5m	6.0m	*1650	*1650					*3100	*3100				
	4.5m	*1540	*1540			*2850	1920	*3570	3210				
	3.0m	*1550	1340	*1970	1390	2930	1860	*4360	3040	*5880	*5880		
	1.5m	*1660	1250	2180	1340	2830	1770	4540	2820	*7430	5310		
	0.0m	*1910	1260	2140	1300	2740	1680	4340	2640	*6090	4940		
	-1.5m	2310	1410			2700	1640	4250	2560	*6070	4860	*4370	*4370
	-3.0m	2940	1800					4270	2570	*6540	4920	*5750	*5750
	-4.5m												
2.1m	6.0m	*2060	*2060					*3420	3190				
	4.5m	*1900	1770			*2600	1880	*3960	3160	*4220	*4220		
	3.0m	*1920	1480			2910	1840	*4680	2990	*6630	5830		
	1.5m	*2070	1370			2820	1760	4500	2780	*6570	5170		
	0.0m	2280	1400			2740	1690	4330	2630	*5990	4900		
	-1.5m	2570	1580			2720	1670	4260	2570	*6090	4880	*4830	*4830
	-3.0m	3420	2100					4310	2610	*6680	4990	*5910	*5910
	-4.5m												

RKA55300

Overload diagram



A / B	6.0m	4.5m	3.0m
4.5m	1300	1480	
3.0m	1400	1790	2620
1.5m	1550	2160	3620
0.0m	1630	2380	3950

G0084545

ATTACHMENTS AND OPTIONS

⚠ WARNING

Before you read ATTACHMENTS AND OPTIONS, read and understand SAFETY.

PRECAUTIONS TO USE ATTACHMENTS AND OPTIONS SAFELY

⚠ WARNING

Do not install attachments or optional devices other than those authorized by us. We will not be responsible for personal injury, damage, or property damage related to attachments or optional devices other than those authorized by us.

When you install the attachments or options to the machine, safety precautions are necessary. Obey the precautions below when you select, install or remove, or use the attachments or options.

Caution when you select

When you install attachments and optional equipment, you need to take into consideration the following. Before that, consult your Komatsu distributor.

- By the type of the attachments or options, it can be necessary to install a front guard, overhead guard, or other safety structure to the machine.
- By the type of the attachments or options, the work equipment and the machine body possibly interfere with each other.

Read the Operation and Maintenance Manual

Before you install/remove or use the attachments or options, make sure that you fully read and understand the instruction manuals of the attachment or option and the Operation and Maintenance Manual of the machine.

If you lose the instruction manual or it is damaged, get a new one from the manufacturer of the attachments or options, or your Komatsu distributor.

⚠ WARNING

General precautions

- **For the attachment that makes hitting sound, it cannot be easy to communicate the work instructions between workers. Give a signalman in the location first and find the signals to be used.**
- **Do not swing the work equipment sideways with a heavy load on it. It will be more dangerous on a slope.**
- **If a breaker is installed to the machine, the machine is less balanced because a load larger than the bucket is applied to the front of the work equipment. To avoid the danger of falling, do not do the work sideways.**
- **If an attachment is installed, the swing range and the center of gravity of the machine change, and the machine moves unexpectedly. Be sure to check the condition of the machine.**
- **Before you start the work, make fences around the machine to prevent entry of person to the work area.**
  Also, when there is a person near the machine, do not move the machine.
- **To prevent an accident caused by operation error, you must not put your foot on the pedal other than when you operate the pedal.**

Precautions for removal and installation
When you remove and install the attachments or options, obey the precautions below, and be careful of the safety.

- **Do the work on a level and solid ground.**
- **When the operation is done by 2 or more persons, allocate a leader and follow his/her instructions.**
- **Use a crane when you handle the heavy objects (25kg or more).**
- **Before you remove a heavy object, use a support to prevent falling as necessary. Be careful of the balance of the machine after the heavy object was removed. When you lift a load with a crane, be very careful of the center of gravity.**
- **Do not do the operations while you keep the object lifted by a crane. Be sure to use a stand to prevent falling.**
- **Before the installation or after the removal, make the attachment or option be in a stable condition not to fall over.**
- **Do not enter the area below the object which is lifted by a crane.**
  Be sure to stay in an area that is safe even if the load falls off.

NOTICE

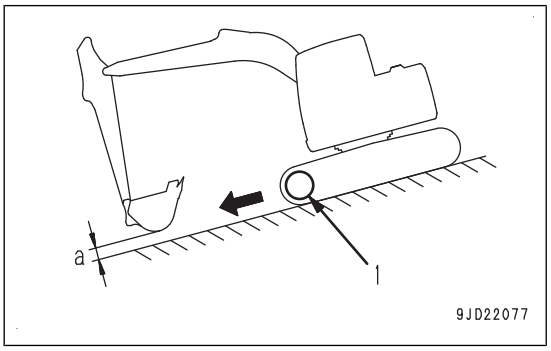
Qualifications are required to operate a crane. Only a qualified operator can operate.
For details about the removal and installation operations, consult your Komatsu distributor.

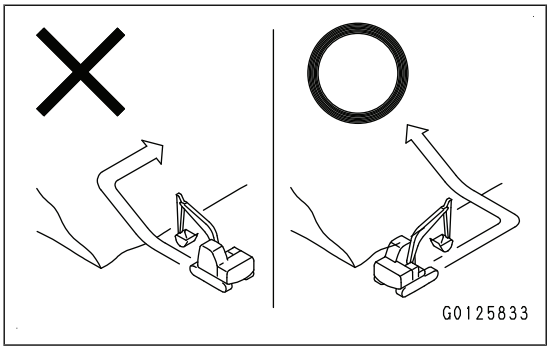
Precautions when attachment is installed

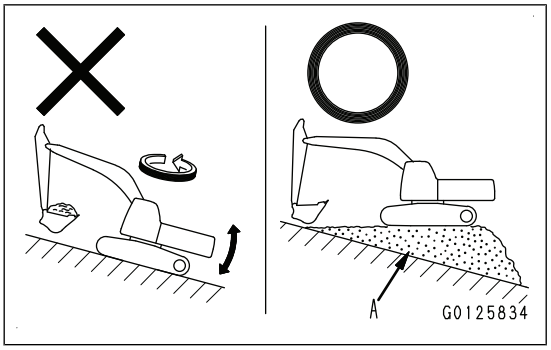
⚠ WARNING

If a long or heavy work equipment is installed, the machine is less stable, and it can lose balance and fall over when it travels down a steep slope or when it swings on a slope. Do not do the works that follows. They are very dangerous.

- **Travel down a slope with work equipment raised.**
  (a): 20 to 30cm
- **Travel across a slope**
- **Swing operation on a slope**
- **If a heavy work equipment is installed, the swing overrun (the distance that the work equipment swings until it fully stops after you stopped the swing operation) will be larger. There is a possibility that you cannot judge the distance correctly and hit the work equipment. Operate while you keep the safe distance from the position where the swing operation is stopped. In addition, the hydraulic drift (the phenomenon that the work equipment lowers gradually by its own weight when it is held in air) increases, as well. When you stop the work equipment in the air, be careful of the hydraulic drift.**
- **To select the boom or arm, consult your Komatsu distributor. If you do not follow the correct work procedure, it can cause serious damage.**
- **If a long work equipment is installed, there is a danger that you cannot judge the distance correctly and hit the work equipment as the working range increases largely.**
  Always keep a safe distance from obstacles around the machine.







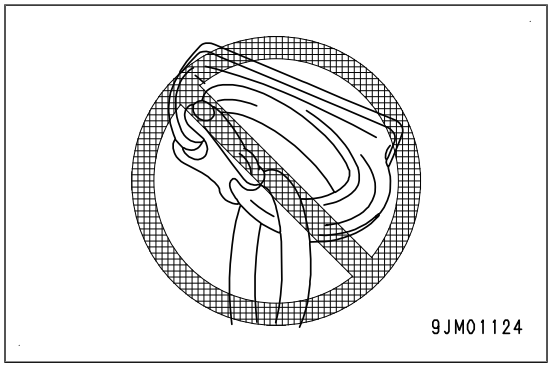
HANDLE BUCKET WITH HOOK

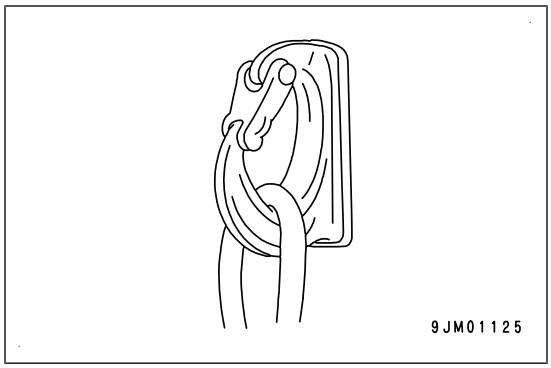
When you use the bucket with hook, check that there is no damage to the hook, stopper, or hook mounting part. If a problem is found, consult your Komatsu distributor.

WORK PRECAUTIONS

PRECAUTIONS FOR LIFTING OPERATIONS

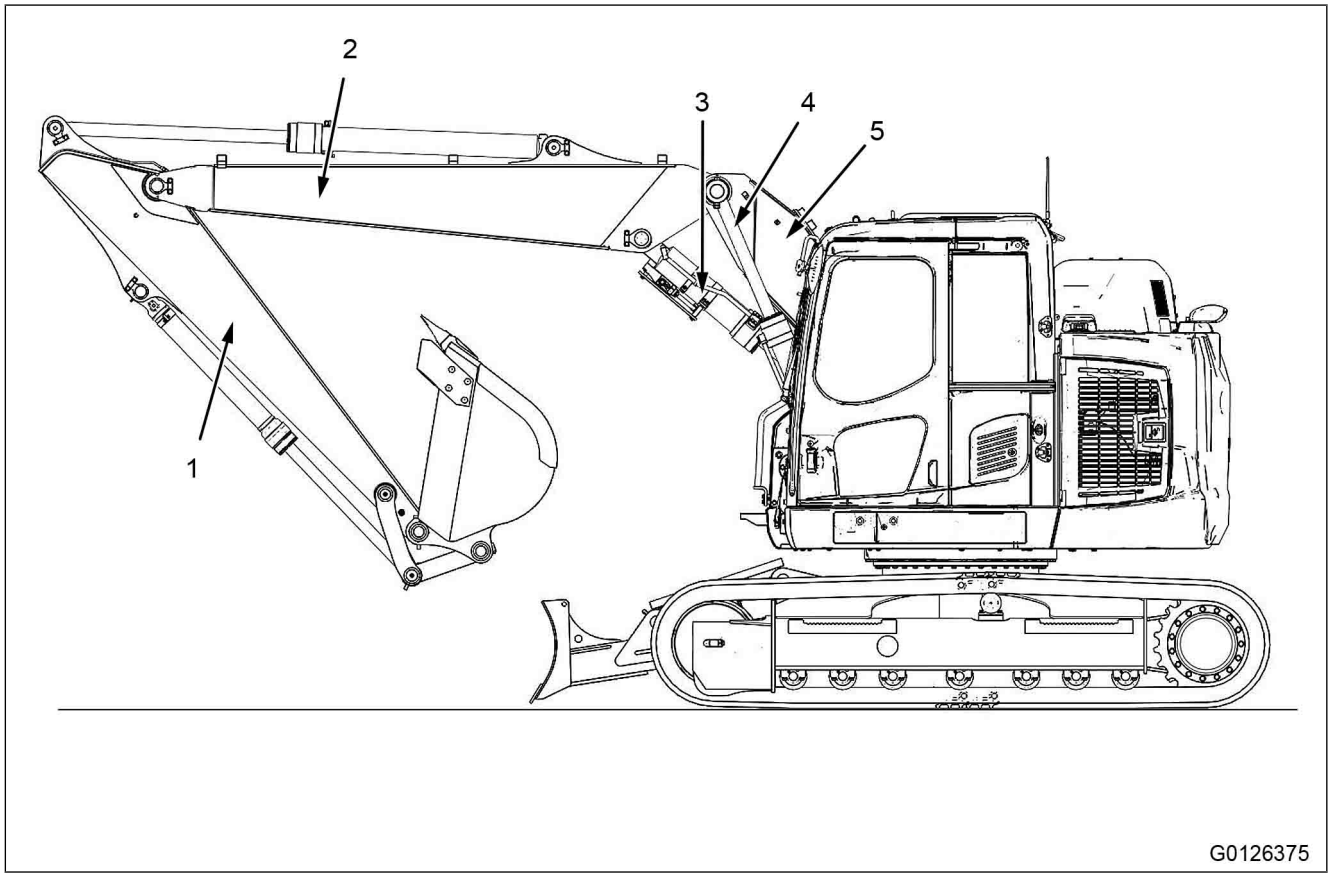
- Set the L mode before you do the lifting work.
- Do not drive the machine during the lifting operation.
- There is a danger that the wire or sling comes off the hook by the working posture. Be careful of the hook angle not to let it come off. Prohibit the personnel to be in the area around or below the lifted load.
- If the bucket with hook is inverted and used for operations, the arm and the bucket will interfere with each other during the bucket DUMP operation. Be careful.
- If you install a hook, consult your Komatsu distributor.





HANDLE 2-PIECE BOOM

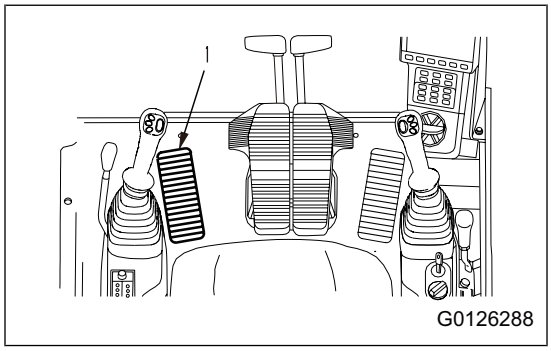
2-PIECE BOOM COMPONENTS



(1) Arm
(2) Second boom
(3) Second boom adjust cylinder
(4) First boom raise cylinder
(5) First boom

2-PIECE BOOM CONTROL PEDAL

The 2-piece boom control pedal is situated at the left of travel levers.

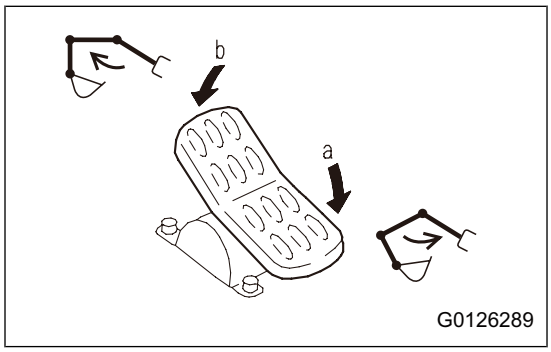


It controls the extension and folding of the 2-piece boom according to the movements indicated.

(a): Boom folding

(b): Boom extension

N(Neutral): boom at rest.

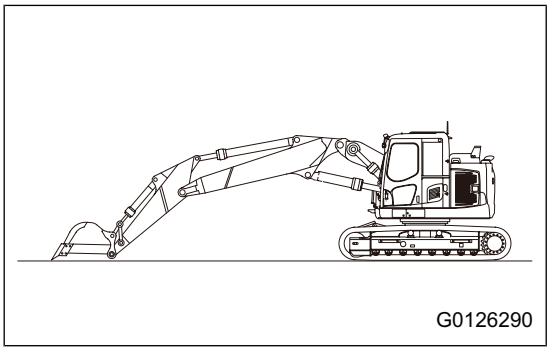


PREPARATION FOR STORAGE AND LIFTING MACHINE

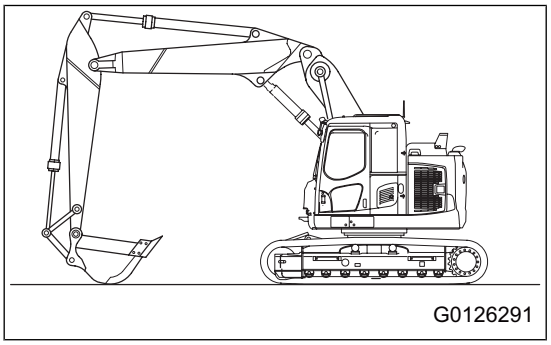
Preparation for storage machine

When leaving the operator's cab, set the machine in the following posture for safety reason.

When leaving the machine for a long time.


G0126290

When leaving the machine for a short time.

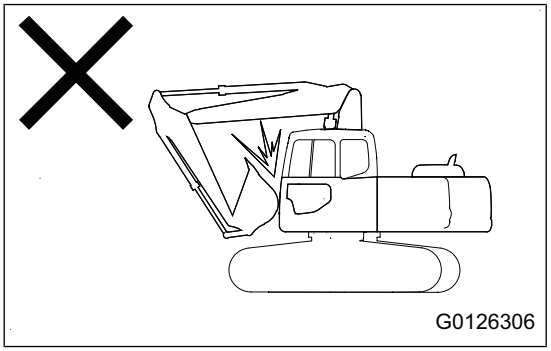

G0126291

Preparation for lifting machine

⚠ WARNING

Do not operate the adjust cylinder during lift operations as work equipment may move suddenly and cause serious damage.
When the second boom adjust cylinder is retracted, the bucket or attachment can hit the operator's cab or revolving frame.
Operate work equipment slowly and carefully to avoid any injury and damage.

Recommended posture during lifting operations is with adjust cylinder fully retracted.


G0126306

MAINTENANCE SCHEDULE

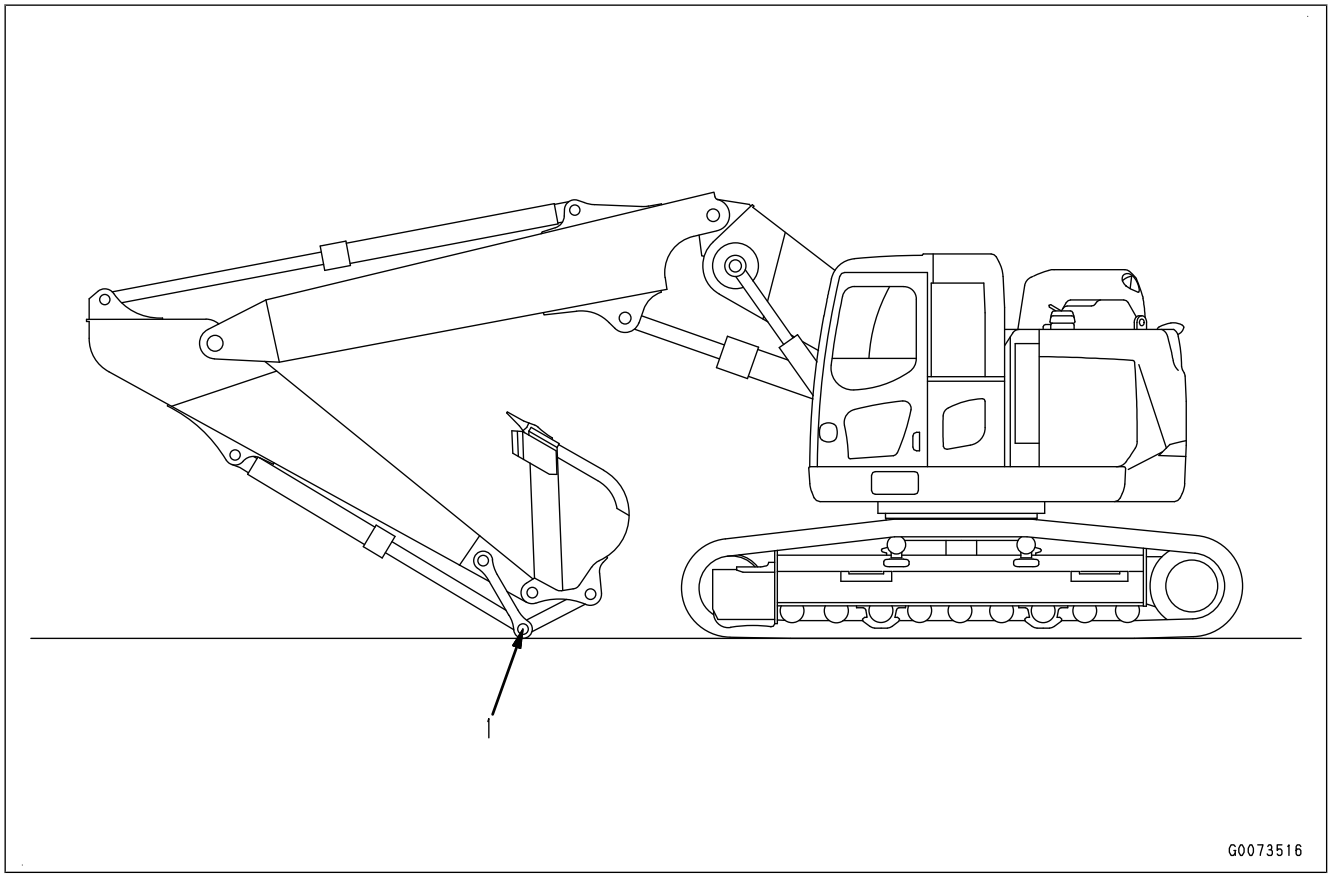
EVERY 100 HOURS MAINTENANCE

LUBRICATION

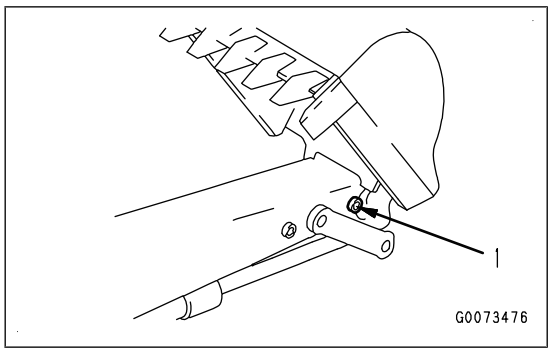
NOTICE

- **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

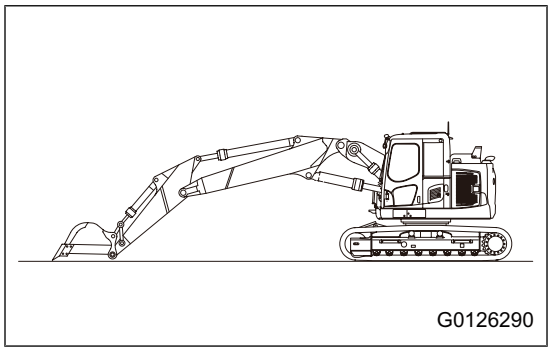
LUBRICATION

NOTICE

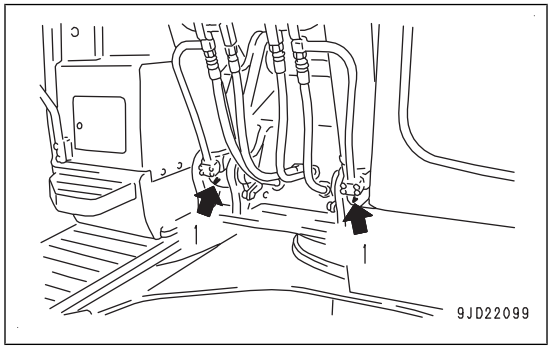
- **If any unusual noise is generated from any greasing point, perform greasing regardless of the greasing interval.**
- **Perform greasing every 10 hours for the first 50 hours operation on a new machine.**
- **After the machine is subjected to digging work in the water, be sure to grease the wet pins.**

By using a grease pump, pump in grease through the grease fittings shown by arrows.

1. Set the machine to the greasing posture shown on the figure, lower the work equipment to the ground, and stop the engine.


G0126290

2. By using a grease pump, pump in grease through the grease fittings shown by arrows.
   (1) Boom cylinder foot pin (2 places)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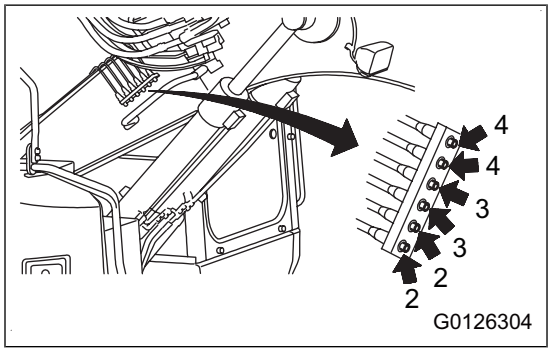
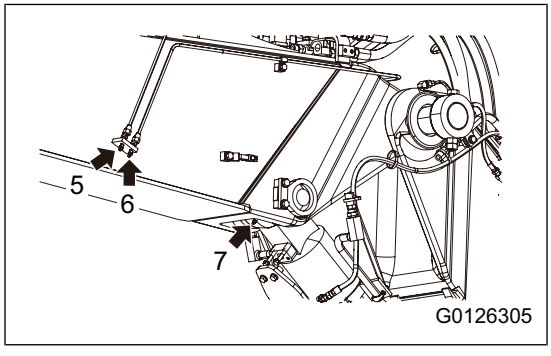
   (2) Boom foot pin (2 places)
   (3) Boom cylinder rod end pin (2 places)
   (4) 2-piece boom pin (2 places)



G0126304

   (5) Arm cylinder foot pin (1 place)
   (6) 2-piece boom pin central (1 place)
   (7) 2-piece boom cylinder foot pin (1 place)



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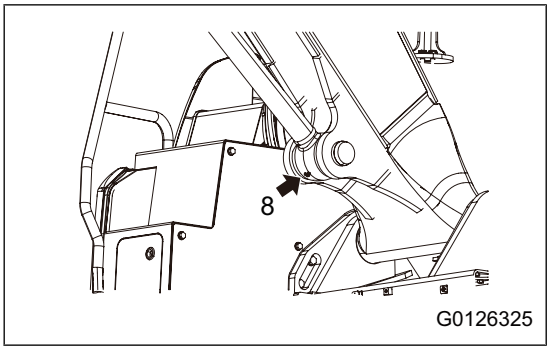
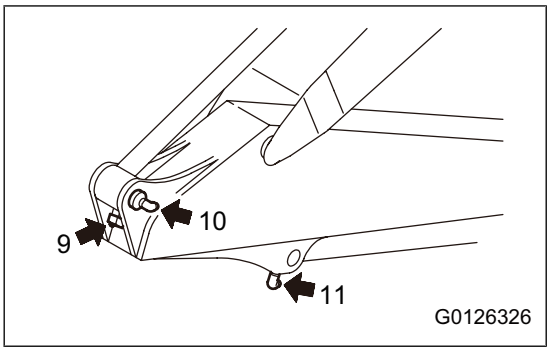
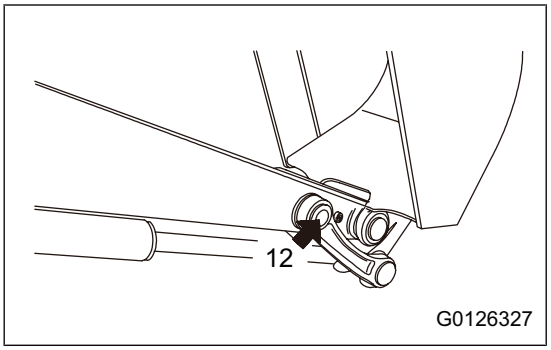
(8) 2-piece boom cylinder rod end pin (1 place)



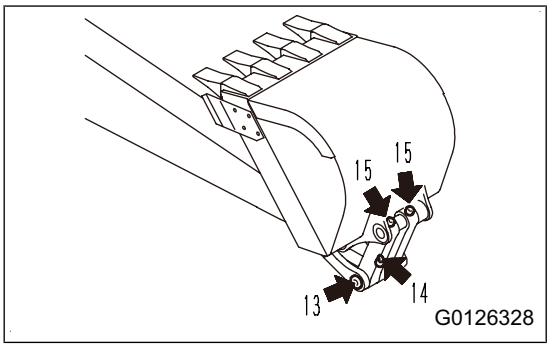
(9) Boom and arm connection pin (1 place)
(10) Arm cylinder rod end pin (1 place)
(11) Bucket cylinder foot pin (1 place)



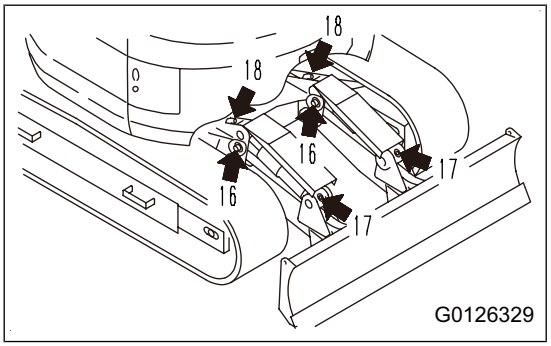
(12) Arm-link connection pin (1 place)



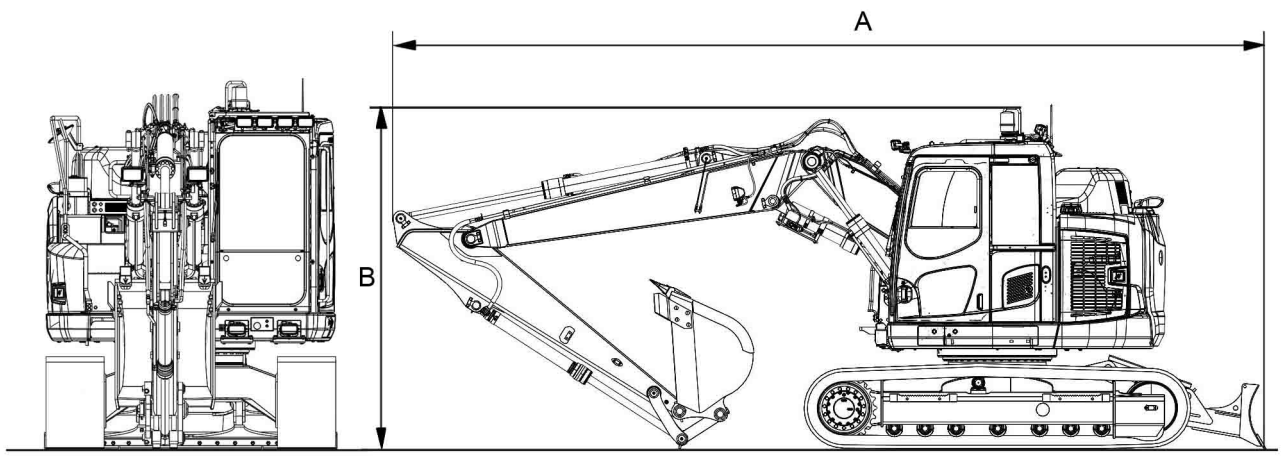
(13) Link connection pin (1 place)
(14) Bucket cylinder rod end pin (1 place)
(15) Bucket and link connection pin (2 places)



(16) Blade connection pin (2 places)
(17) Blade cylinder foot pin (2 places)
(18) Blade cylinder rod end pin (2 places)

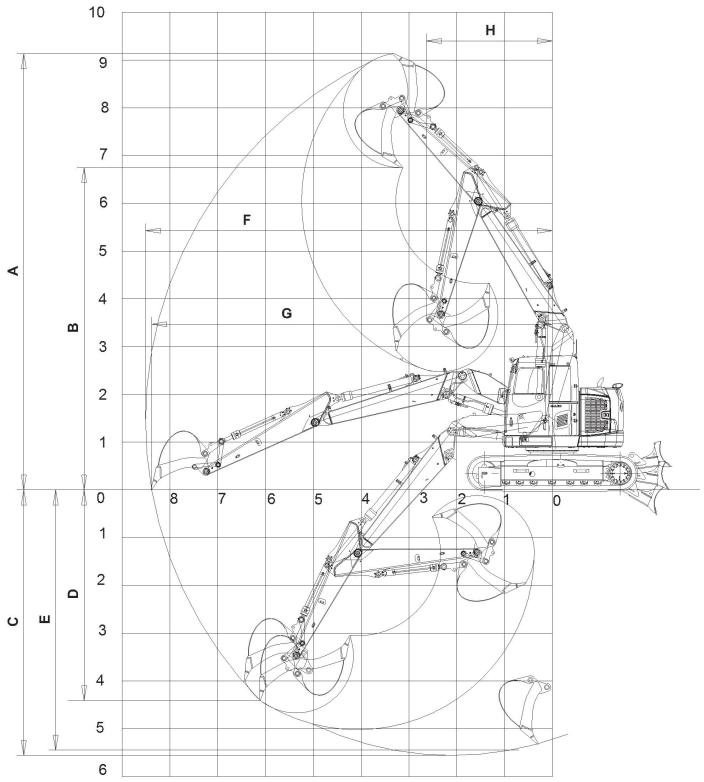


SPECIFICATIONS



G0126330

	Item	Unit	2500mm arm specification
A	Overall length	mm	8100
B	Overall height	mm	3150



G0126331

	Working ranges (mm)	Unit	2500mm arm specification
A	Max. digging height	mm	9130
B	Max. dumping height	mm	6750
C	Max. digging dept	mm	5680
D	Max. vertical wall digging depth	mm	4440
E	Max. digging depth of cut for 2440mm level	mm	5570
F	Max. digging reach	mm	8510
G	Max. digging reach at ground level	mm	8380
H	Min. swing radius	mm	2500

EXPLANATION OF LIFT CAPACITY CHART

⚠ WARNING

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

Legend

A: Reach from swing centre

B: Bucket hook height

(1) Position of lifting point

(2) Arm length

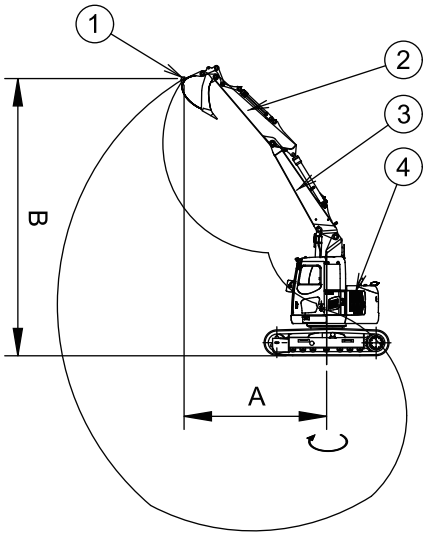
(3) Boom length

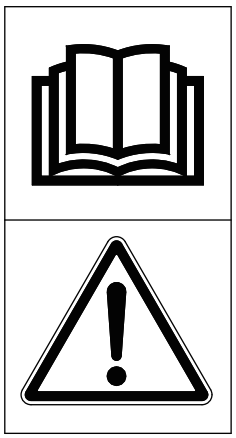
(4) Hydraulic pressure: 34.8MPa {355kgf/cm^2}

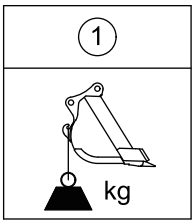
Working conditions

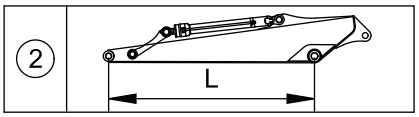
- Bucket: 400kg
- Width shoe: 500mm
- With fully extended bucket cylinder.
- On a compact horizontal level ground.
- If object handling is performed with other tool installed, the weight difference of the tool shall be deducted from value of this table.

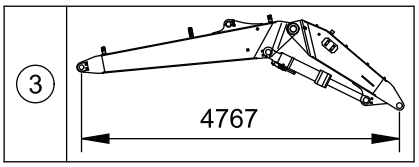
Loads do not exceed 87% of hydraulic capacity or 75% of tipping capacity (* load limited by hydraulic capacity rather than tipping).

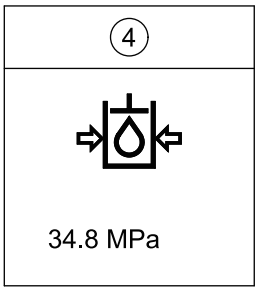








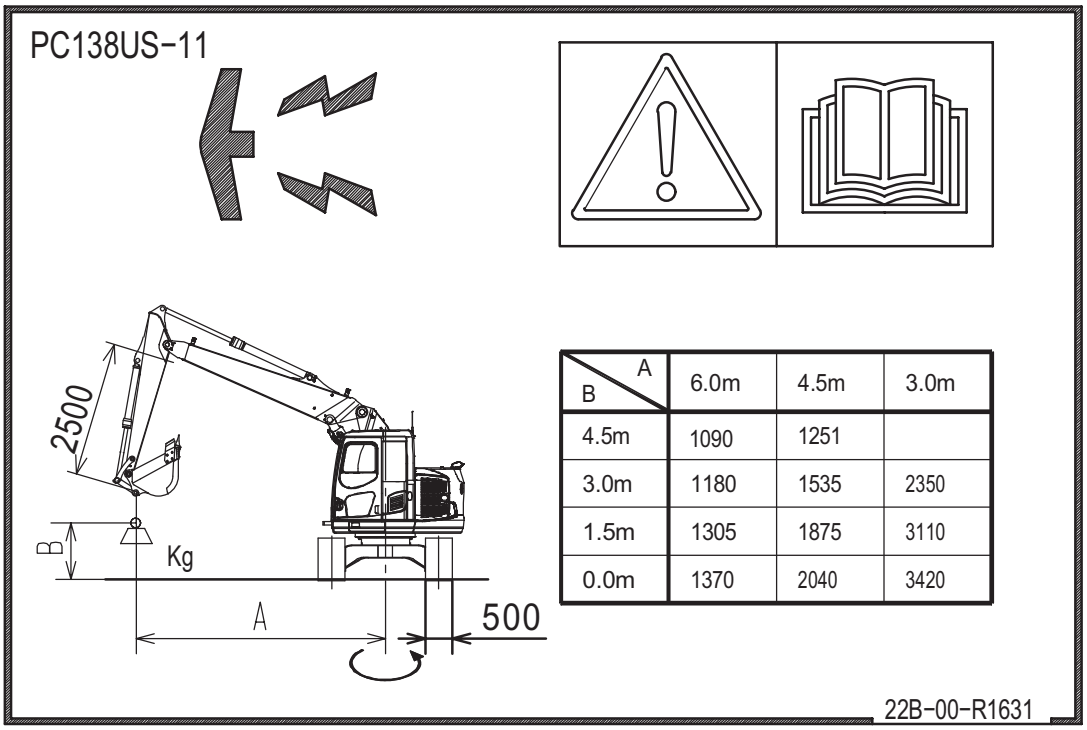




	L	A / B	kg MAX		7.5m		6.0m		4.5m		3.0m		1.5m	
PC138US-11	2.5m	7.5m	* 2500	* 2500										
		6.0m	* 2050	* 2050					* 3100	* 3100				
		4.5m	* 1900	1550			2750	2050	* 3350	* 3350				
		3.0m	1800	1300			2700	1950	* 4100	3250	* 5850	* 5850		
		1.5m	1700	1200	1700	1200	2550	1850	4200	3000				
		0.0m	1700	1200	1700	1200	2450	1750	4000	2800				
		-1.5m	1900	1350			2400	1700	3900	2700	* 7500	4600		
		-3.0m	2400	1700			2450	1700	3900	2700	* 7450	5300		
		-4.5m												
	2.1m	7.5m	* 3200	* 3200										
		6.0m	* 2500	2350					* 3500	* 3500				
		4.5m	* 2350	1700			2700	2000	* 3700	3450				
		3.0m	2000	1450			2650	1950	4350	3200	* 6550	6300		
		1.5m	1850	1350			2550	1850	4150	2950				
		0.0m	1900	1350			2450	1750	3950	2750				
		-1.5m	2150	1500			2450	1750	3900	2700	* 7750	4650		
		-3.0m	2800	2000					3950	2750	* 6850	5400		
		-4.5m												

G0133547

Overload diagram



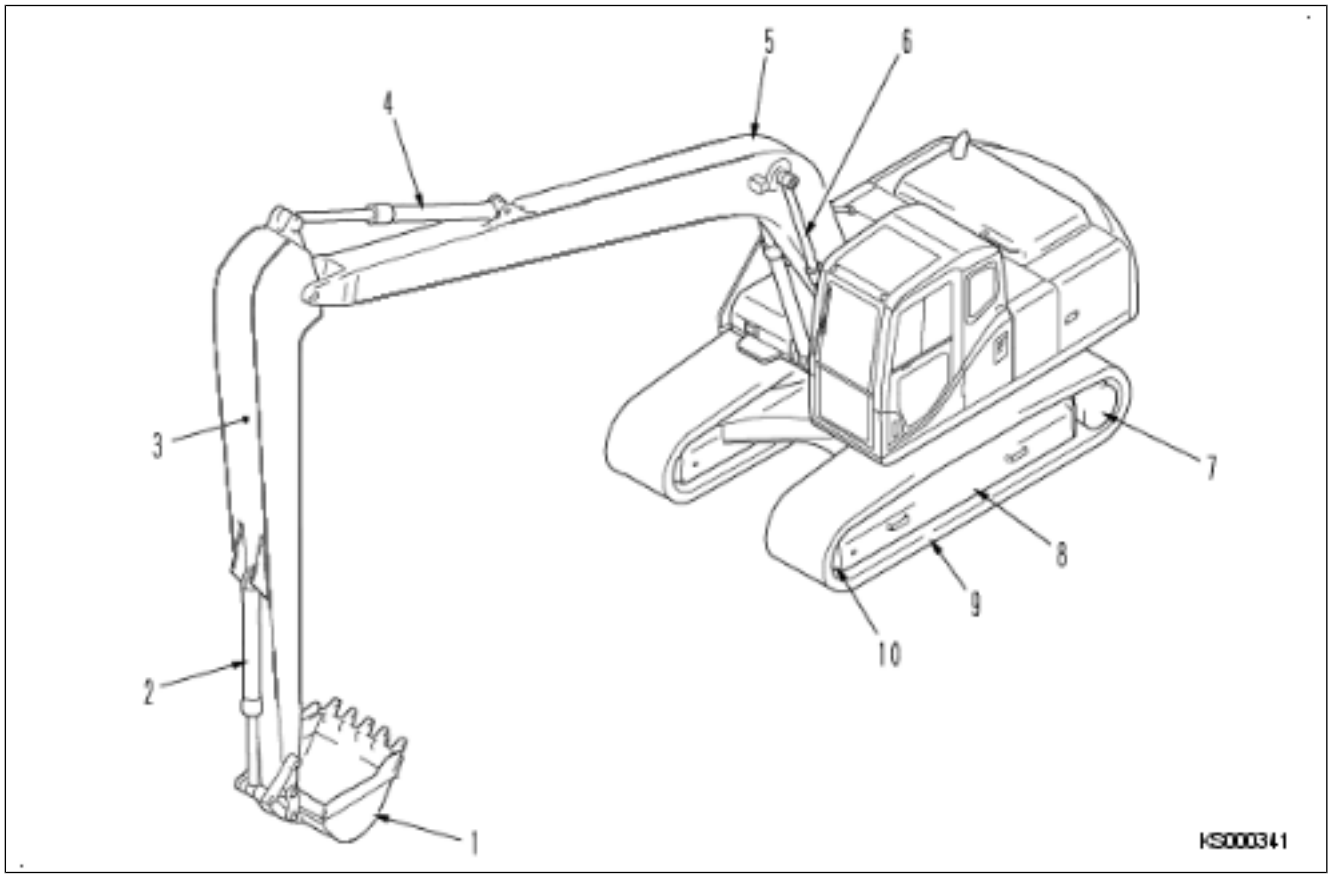
A / B	6.0m	4.5m	3.0m
4.5m	1090	1251	
3.0m	1180	1535	2350
1.5m	1305	1875	3110
0.0m	1370	2040	3420

G0084546

SUPER LONG FRONT BOOM AND ARM

GENERAL VIEW OF MACHINE FOR SUPER LONG FRONT BOOM AND ARM

General View of Machine

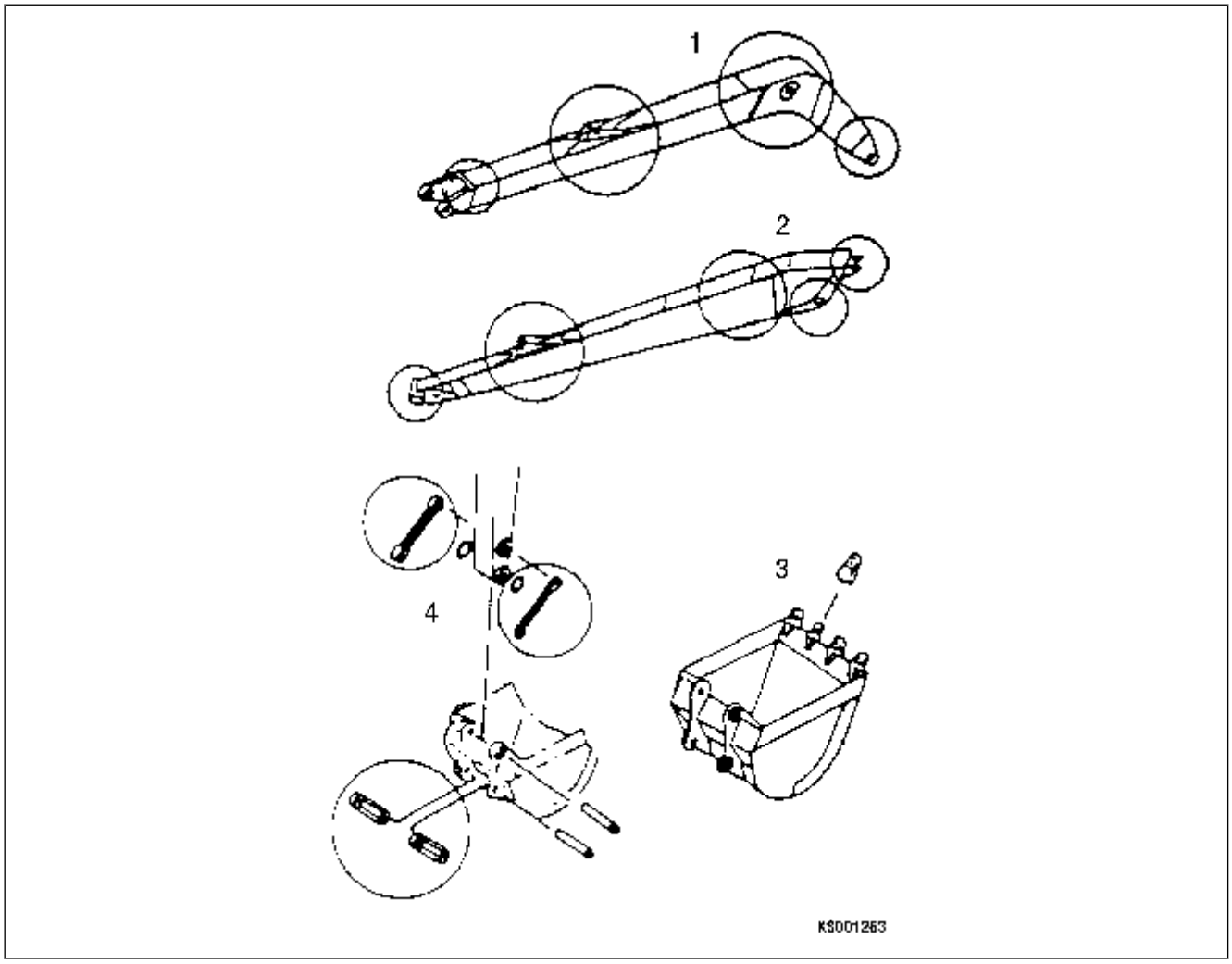


(1) Bucket
(2) Bucket cylinder
(3) Arm
(4) Arm cylinder
(5) Boom
(6) Boom cylinders
(7) Travel motor sprocket
(8) Track frame
(9) Track shoe
(10) Idler

CHECKS BEFORE STARTING

To maximise safety when using the super long front machine and to identify any damage to the equipment early, carry out the following checks before starting the machine.

- Check daily for any loose nuts or bolts and tighten any that are found.
- Check daily for any oil leakage.
- Check all parts of the work equipment for any cracks, bending, buckling and play of the boom and arm. If any abnormality is found, contact your Komatsu distributor immediately. Locations for checking are shown below.



1	Boom
2	Arm
3	Bucket
4	Bucket link

WORKING MODES

The table gives an indication of the type of work and method of use recommended. Please follow these recommendations.

Type of work

R - Recommended work

C - Work requiring caution

N - Work that is not permitted

	Applicable operations	
1	Dredge rivers (specific gravity max 1.8)	R
2	Hauling, loading dry sand (specific gravity max 1.8)	R
3	Digging, hauling piled soil (specific gravity max 1.8)	R
4	Digging clay layers	C
5	Digging bank	C

	Applicable operations	
6	Quarry work or digging bedrock	N

METHOD OF WORK

- Avoid operating the bucket cylinder and arm cylinder to the end of their stroke.
- Use the maximum specific gravity 1.8 t/m^3
- Take care when using the super long front machine on soft ground. Ensure the ground has sufficient strength to support the weight of the machine with loaded bucket before commencing operations.
- Where possible, avoid using the super long front machine on slopes.
- Do not use this equipment for compacting slope faces.
- When travelling, lower the boom, pull in the arm, keep the work equipment parallel to the track and travel slowly.
- Do not use any bucket with a capacity greater than shown in this table.

Buckets which do not conform to this table must not be used.

Item	Unit	PC138US-11E0
Max digging radius	mm	12320
Bucket, material density 1.8 t/m^3		
• Capacity (new JIS)	m^3	0.28
• Width	mm	750
• Weight	kg	210
Powered attachment		
• Weight at the end of the arm	kg	600620
Bucket		
• Weight at the end of the arm	kg	200-210

Values shown are in accordance with EN474-5:2006+A1:2009 (E)

⚠ WARNING

Do not use any attachment which imposes vibration loading onto the equipment.

⚠ CAUTION

- **The Super Long Front machine is not to be used for lifting.**
- **Do not use the equipment so that the machine lifts off the ground.**
- **Check the stability of the super long front machine carefully (left, right, front and rear) before starting work operations.**
- **Do not use the POWER MAX switch. Avoid using P mode.**
- **Do not bring any shock loading on the work equipment.**
- **Do no apply any side load to the bucket.**
- **Attachments like breakers and fork grabs may not be used.**
- **Use with engine throttle at 70-80% for ease of use and safety.**
- **Do not operate the Super Long Front control levers in the same way as a standard excavator. The Super Long Front equipment has a higher inertia and will achieve higher velocities, causing wear and damage.**

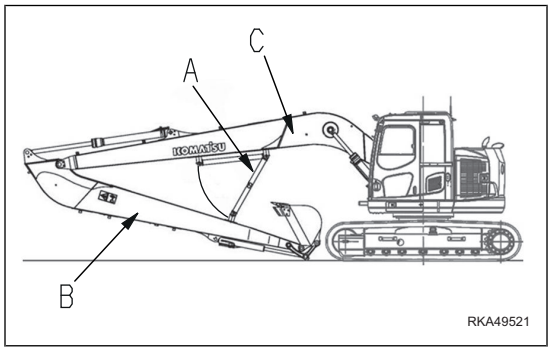
WHEN TRAVELLING

- Lower the boom, pull in the arm, keep the work equipment parallel to the track and travel slowly.
- Never mount obstacles when travelling on rough ground. This may cause the machine to become unstable and overturn.

TRANSPORT AND STORAGE OF SUPER LONG FRONT MACHINE

NOTICE

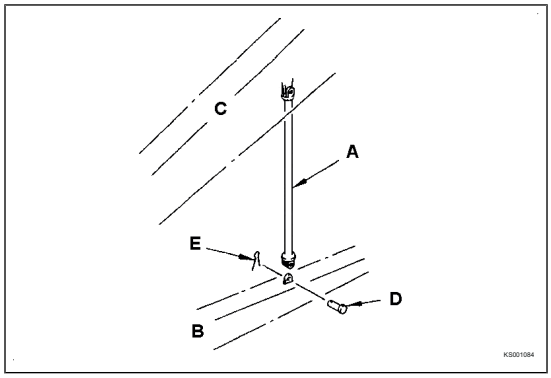
- **For transportation or storage, always use the supporting link (A) to secure the arm (B) and boom (C) as shown. This will help to prevent excessive force bearing on the boom and arm.**
- **Other precautions for transport and storage can be found in "TRANSPORTATION PROCEDURE" of the standard machine.**



Procedure for installing link

Supporting link - weight 30kg.

1. Lower the boom and extend the arm cylinder to set in the stow posture.
2. When the arm cylinder is almost at the end of the stroke, lower the boom slowly to bring the bucket or bucket link into light contact with the ground.
3. Remove the end of the supporting link (A) from the boom (held by a pin (D) and snap ring (E)), then install it to the arm with the pin (D) and snap ring (E). When doing this, raise the boom slightly and retract the arm cylinder slightly from the end of the stroke (5mm - 10mm) to align the holes correctly.
4. It is dangerous to carry out this operation with the arm raised from the ground.



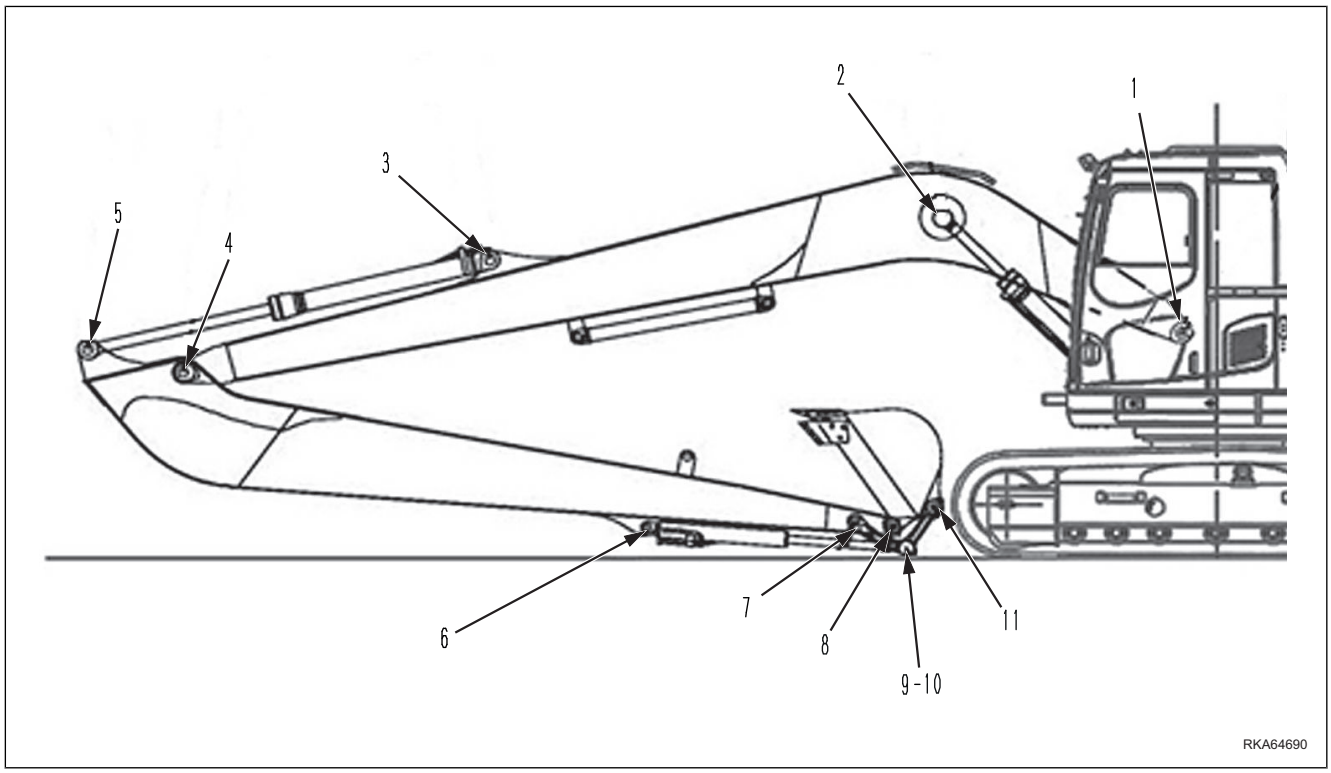
MAINTENANCE

⚠ WARNING

Before carrying out maintenance, always attach the WARNING TAG to the control lever in the operator's cab.

In addition to the standard service schedule, the following servicing should be carried out.

Lubrication



1. Set the work equipment in the greasing posture below, then lower the work equipment to the ground and stop the engine.
2. Using the grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any old grease that was pushed out.

Lubrication interval

Specifications	Point to grease
Every 100 hours	6, 7, 8, 9, 10, 11
Every 500 hours	1, 2, 3, 4, 5

NOTICE

For the first 100 hours on new machines where the parts are setting in, carry out greasing every 10 hours.

Lubrication points

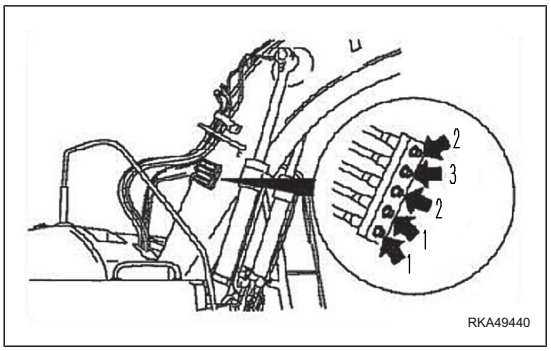
(1) Boom cylinder base pin (2 points)

(2) Boom cylinder rod end pin (2 points)

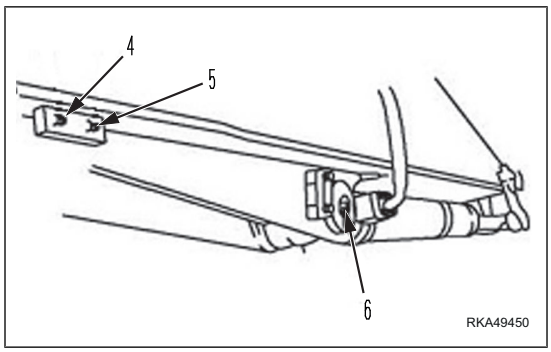
(3) Arm cylinder base pin (1 point)

(4) Boom-arm connection pins (1 point)

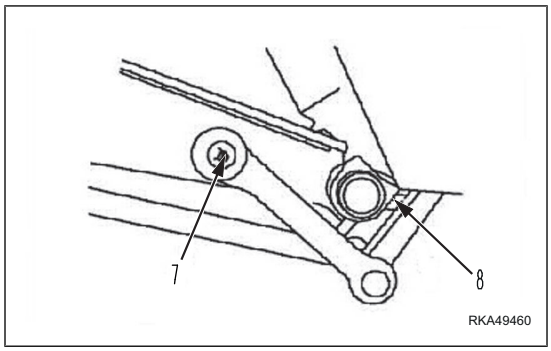
(5) Arm cylinder rod end pin (1 point)



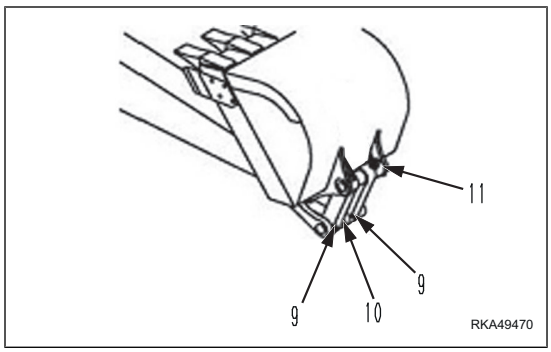
(6) Bucket cylinder base pin (1 point)
(7) Arm-link connection pin (1 point)



(8) Arm-bucket connection pin (1 point)
(9) Fulcrum link pin (2 points)
(10) Bucket cylinder rod end pin (1 point)

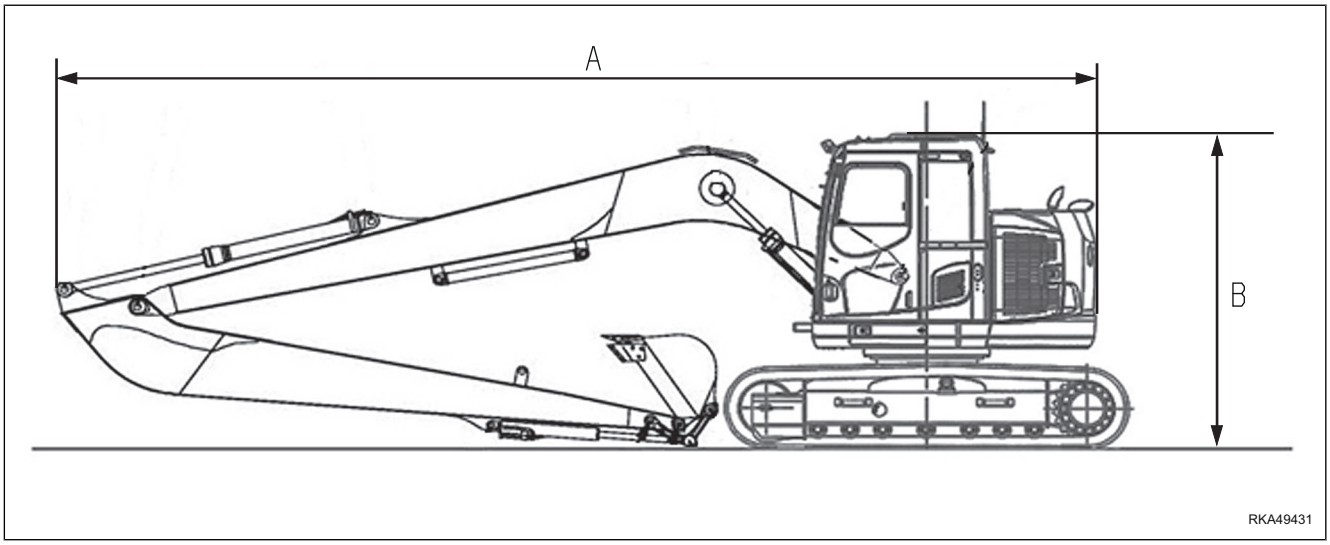


(11) Fulcrum link/bucket pin (2 point)

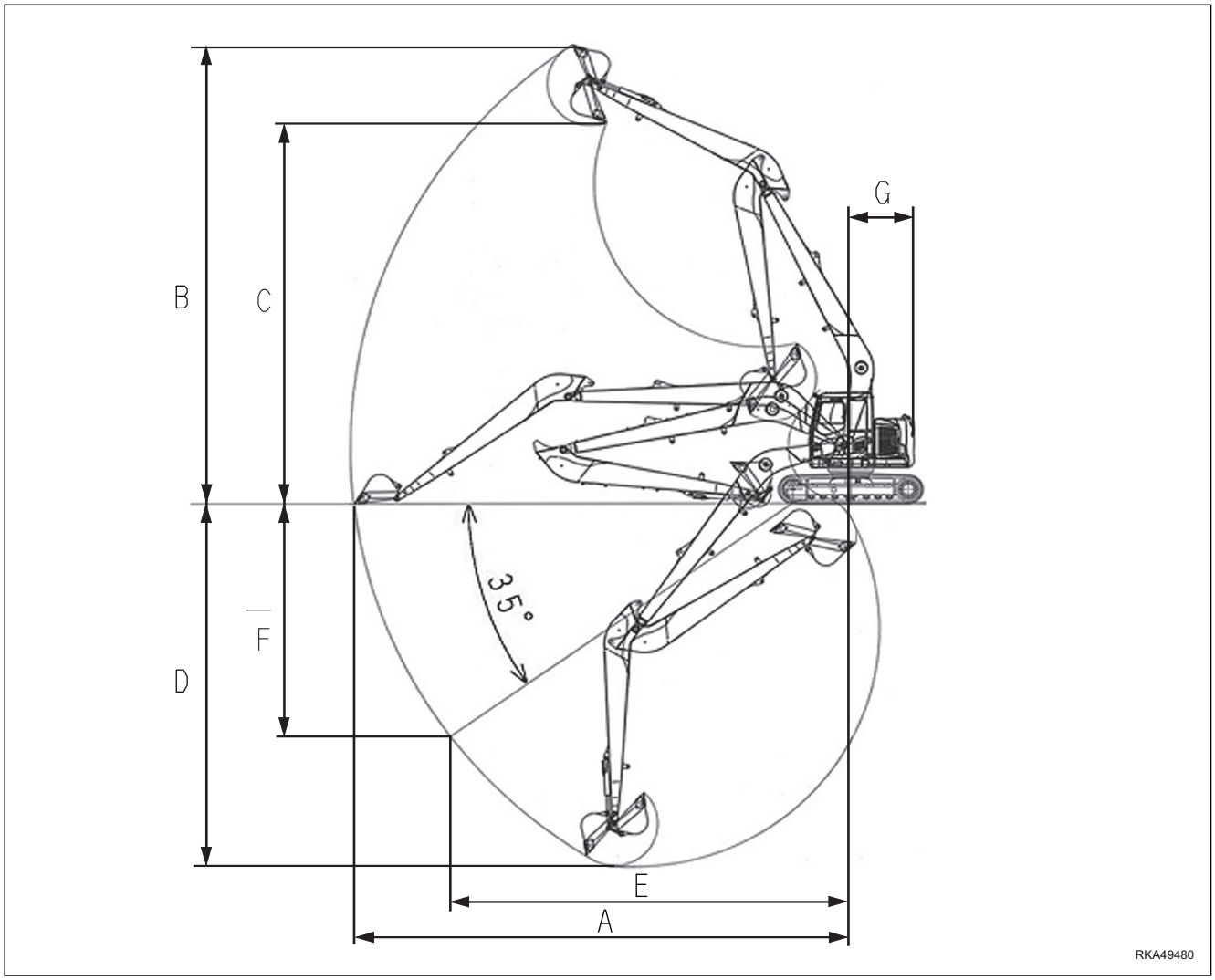


SPECIFICATIONS

	Item	Unit	PC138US-11E0
	Operating mass	kg	15000
	Track width	mm	500
A	Total lenght	mm	9580
B	Total width	mm	2810



	Working ranges	Unit	PC138US-11E0
A	Maximum digging reach	mm	12320
B	Maximum digging height	mm	11610
C	Maximum dumping height	mm	9560
D	Maximum digging depth	mm	9190
E	Digging distance with inclination of 35°	mm	9850
F	Digging depth with inclination of 35°	mm	5890
G	Turret swing radius	mm	1540



EXPLANATION OF LIFT CAPACITY CHART

⚠ WARNING

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

Legend

A: Reach from swing centre

B: Bucket hook height

(1) Position of lifting point

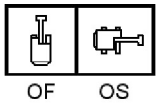
(2) Arm length

(3) Boom length

(4) Hydraulic pressure: 34.8 MPa {355 kgfm/cm^2}

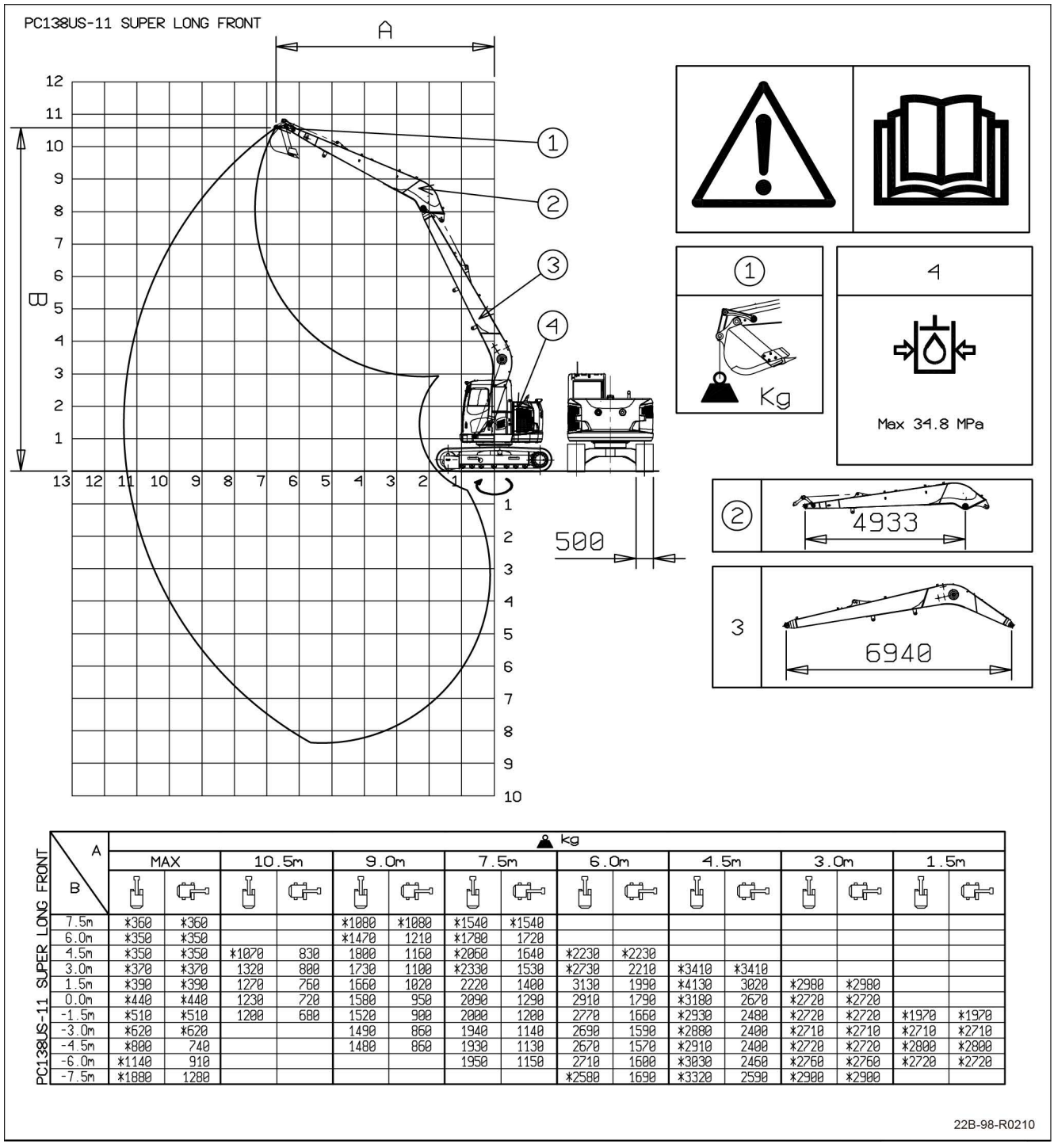
OF: Lifting capacity (rating overfront)

OS: Lifting capacity (rating overside)



Working conditions

- With fully extended bucket cylinder.
- On a compact horizontal level ground.
- If object handling is performed with other tool installed, the weight difference of the tool shall be deducted from value of this table.



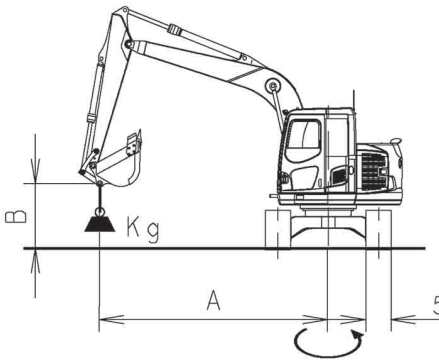
PC138US-11 SUPER LONG FRONT

A / B	kg MAX		10.5m		9.0m		7.5m		6.0m		4.5m		3.0m		1.5m	
7.5m	*360	*360			*1080	*1080	*1540	*1540								
6.0m	*350	*350			*1470	1210	*1780	1720								
4.5m	*350	*350	*1070	830	1800	1160	*2060	1640	*2230	*2230						
3.0m	*370	*370	1320	800	1730	1100	*2330	1530	*2730	2210	*3410	*3410				
1.5m	*390	*390	1270	760	1660	1020	2220	1400	3130	1990	*4130	3020	*2980	*2980		
0.0m	*440	*440	1230	720	1580	950	2090	1290	2910	1790	*3180	2670	*2720	*2720		
-1.5m	*510	*510	1200	680	1520	900	2000	1200	2770	1660	*2930	2480	*2720	*2720	*1970	*1970
-3.0m	*620	*620			1490	860	1940	1140	2690	1590	*2880	2400	*2710	*2710	*2710	*2710
-4.5m	*800	740			1480	860	1930	1130	2670	1570	*2910	2400	*2720	*2720	*2800	*2800
-6.0m	*1140	910					1950	1150	2710	1600	*3030	2460	*2760	*2760	*2720	*2720
-7.5m	*1880	1280							*2580	1690	*3320	2590	*2900	*2900		

Loads do not exceed 87% of hydraulic capacity or 75% of tipping capacity (* load limited by hydraulic capacity rather than tipping).

Overload diagram

PC138US-11 SUPER LONG FRONT

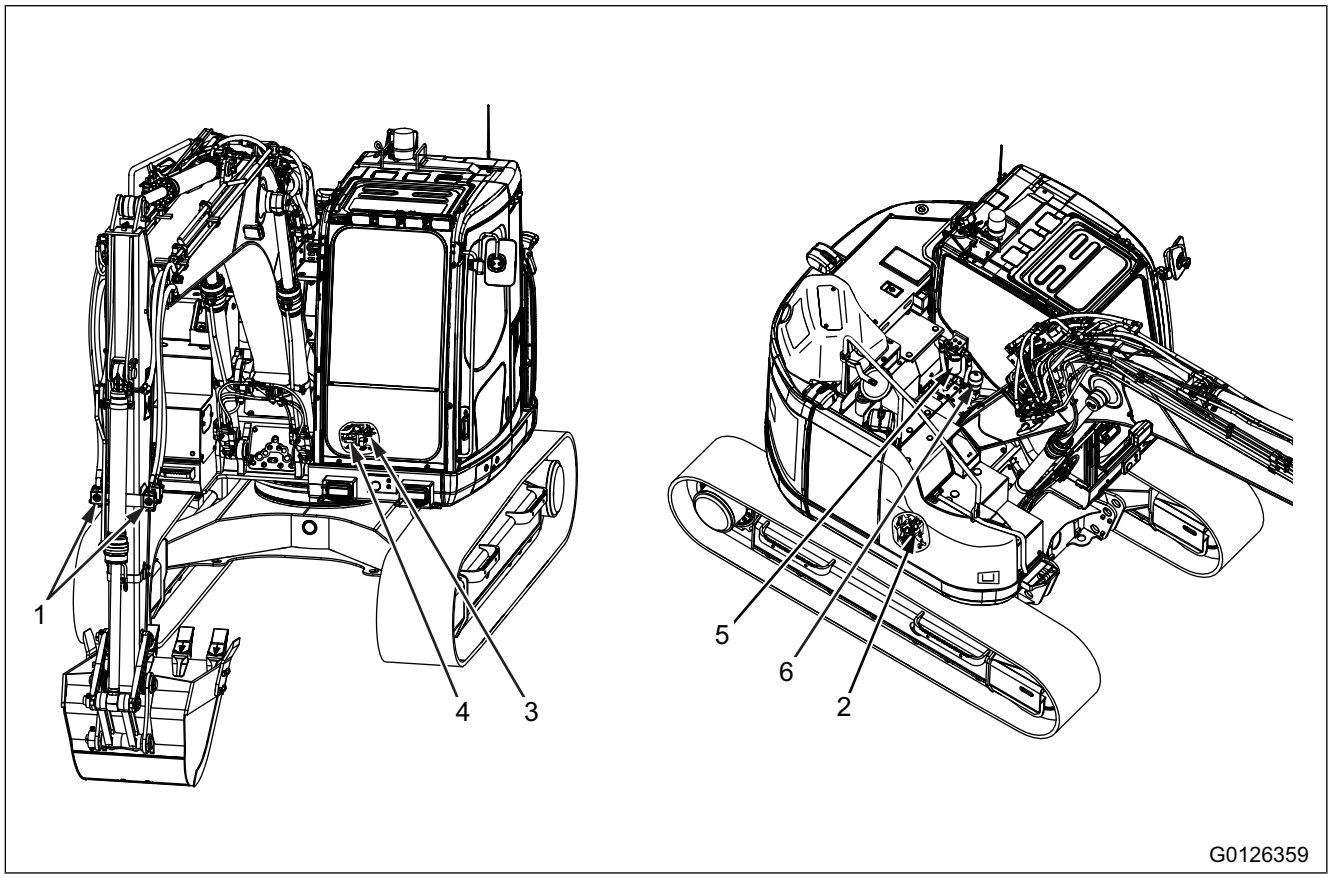


B \ A	10.5m	9.0m	7.5m	6.0m	4.5m
6.0m		500	580		
4.5m	430	520	630	760	
3.0m	440	540	670	880	1200
1.5m	460	560	720	950	1400
0.0m	470	600	800	1070	1600

22B-00-R1640

HANDLE MACHINE READY FOR INSTALLATION OF ATTACHMENT

EXPLANATION OF COMPONENTS



(1) Stop valve
(2) Selector valve
(3) Attachment control pedal
(4) Lock pin
(5) Additional filter for breaker
(6) Accumulator (for low pressure)

STOP VALVE

The stop valve stops the flow of the hydraulic oil.

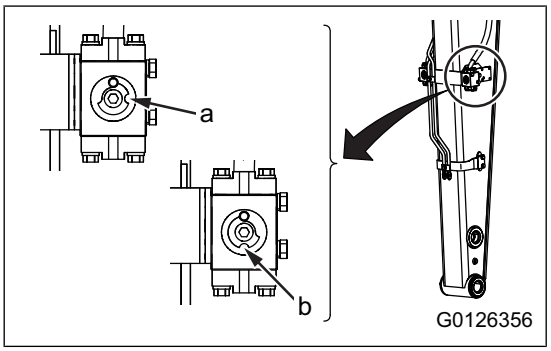
(a) FREE

Hydraulic oil flows.

(b) LOCK

Hydraulic oil stops.

When removing or installing attachments, set this valve to LOCK position.



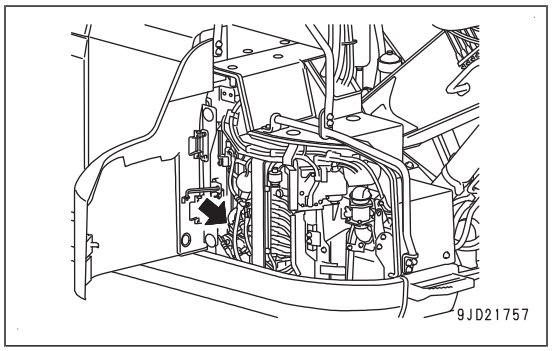
SELECTOR VALVE

The selector valve switches the flow of the hydraulic oil.

It is automatically switched according to the selected working mode. It is necessary to switch the working mode to match the attachment that is installed. When changing the working mode, see “SWITCH HYDRAULIC CIRCUIT (6-35)”.

NOTICE

If a service circuit from the attachment manufacturer is added, the return circuit may not switch automatically.

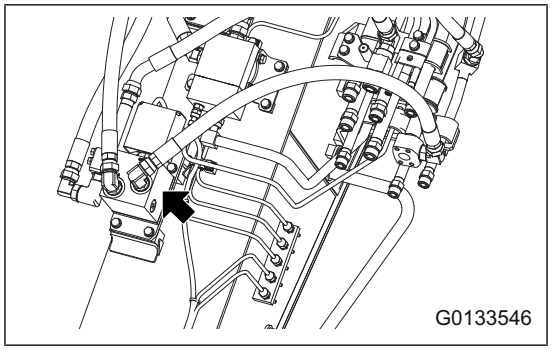


ATTACHMENT 1 VARIABLE RELIEF PRESSURE VALVE

(option)

When the tool control by attachment 1 is installed to the machine, the attachment set pressure that is selected with the machine monitor will be outputted.

The pressure automatically changes by the attachment to be selected.

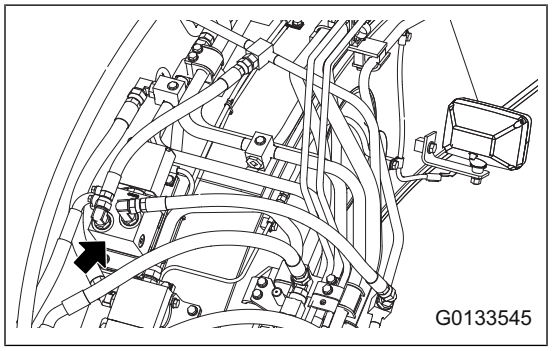


ATTACHMENT 2 VARIABLE RELIEF PRESSURE VALVE

(option)

When the tool control by attachment 2 is installed to the machine, the attachment set pressure that is selected with the machine monitor will be outputted.

The pressure automatically changes by the attachment to be selected.



ATTACHMENT CONTROL PEDAL

⚠ WARNING

If you perform operations with your foot on the pedal, the attachment may suddenly move if you depress the pedal by mistake, and this may lead to serious personal injury or death. Lock the pedal with the lock pin when pedal operation is not necessary.

The attachment control pedal is used to control the attachment.

When the front, center (neutral), and rear of the pedal are depressed, the movement of the attachment is as follows.

Hydraulic breaker

Front of pedal (A)

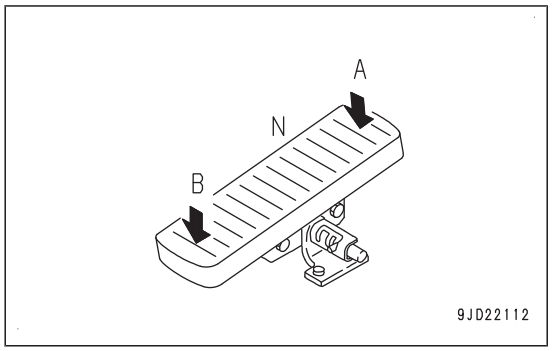
Actuated

Center of pedal (neutral) (N)

Stop

Rear of pedal (B)

Stop



REMARK

Regarding other attachments, discuss with the attachment manufacturer how the pedal and attachment operate at the time of installation before using it.
Before start using the attachment, make sure that the attachment operates normally.

LOCK PIN

The lock pin is used to lock the attachment control pedals.

Position (a)

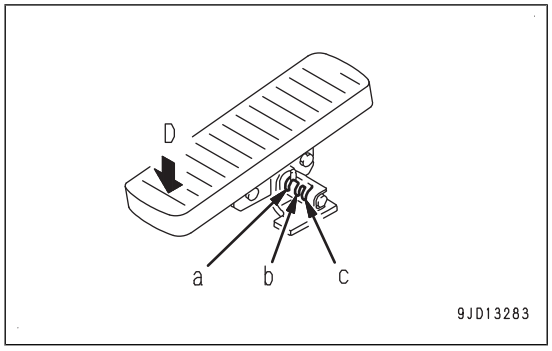
Lock

Position (b)

Only front of pedal can be operated to full travel position (rear is locked)

Position (c)

Both front and rear of pedal can be operated to full travel position



- Set the lock pin to (a) position except when using the attachment.
- When using the breaker, use the working mode selector switch on the monitor switch portion to set the working mode to B mode, and set the lock pin to position (b) when using the pedal.
- When using the crusher, use the working mode selector switch on the monitor switch portion to set the working mode to ATT mode, and set the lock pin to position (c) when using the pedal.

NOTICE

- **When using the breaker, if the lock pin is set to position (c) and the pedal is depressed in direction (D), it will cause damage or defective operation of the breaker. To prevent it, when using the breaker, always set the lock pin to position (b).**
- **Before changing the position of the lock pin, stop the engine.**

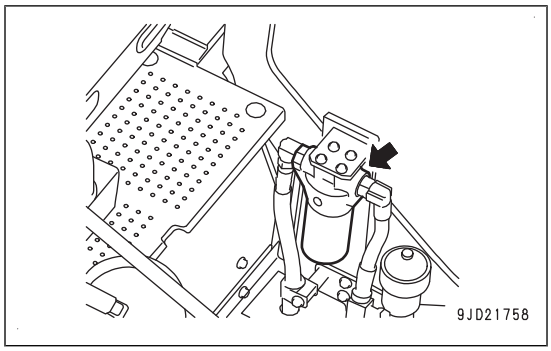
ADDITIONAL FILTER FOR BREAKER

NOTICE

Always install an additional filter in the return circuit on machines equipped with a hydraulic breaker.

The additional filter for breaker prevents deterioration of the hydraulic oil when using a breaker.

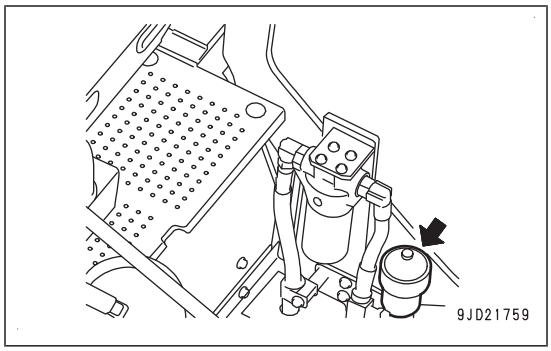
It is automatically switched according to the selected working mode. It is necessary to switch the working mode to match the attachment that is installed. The oil flows only when the selector valve is set in the breaker position.



ACCUMULATOR (FOR LOW PRESSURE)

The accumulator (for low pressure) is installed to protect the oil cooler when the breaker is used.

For necessity of this accumulator, consult the attachment manufacturer.



ATTACHMENT 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.

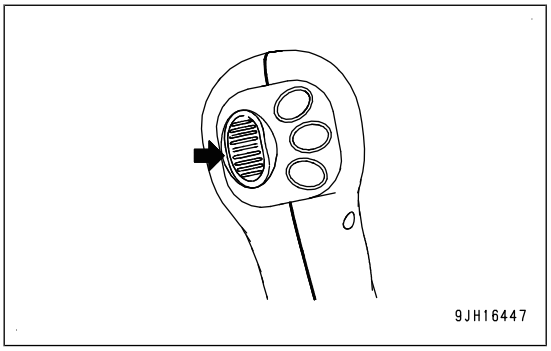
When the attachment operation is performed, the screen on the machine monitor is automatically switched to the bird's eye view display of KomVision.

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)

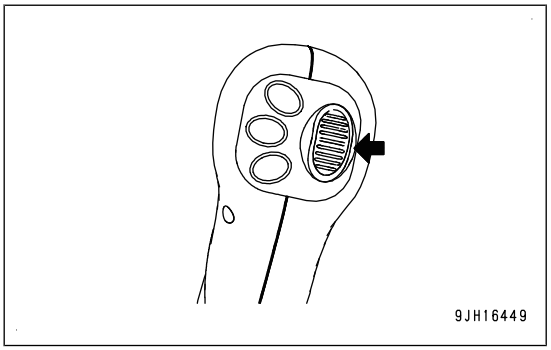
When the attachment operation is performed, the screen on the machine monitor is automatically switched to the bird's eye view display of KomVision.

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

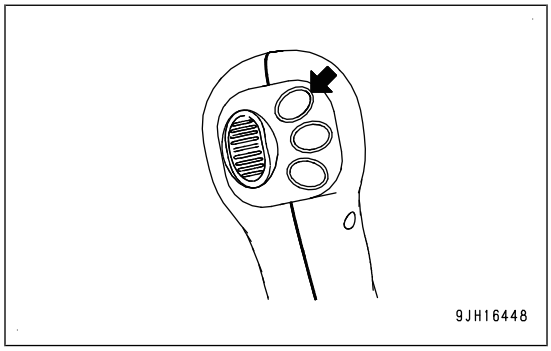
⚠ WARNING

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.

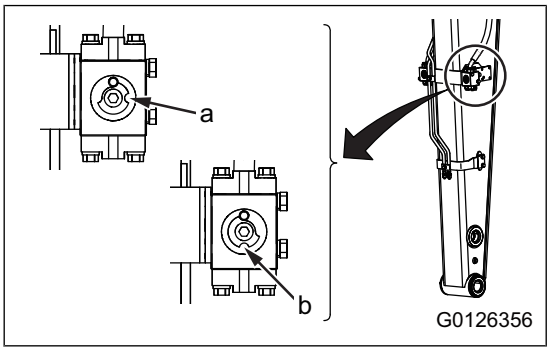


CHANGE OVER AND CONNECT HYDRAULIC CIRCUIT OF ATTACHMENT

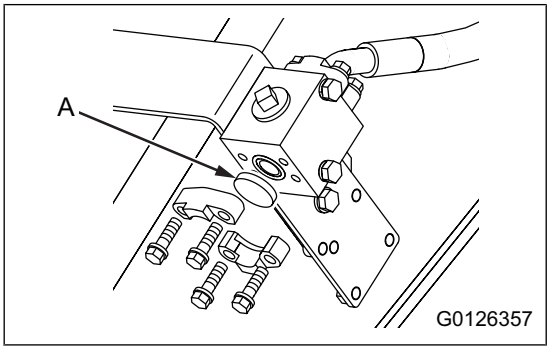
CONNECT HYDRAULIC CIRCUIT

When you install the attachment, connect the hydraulic circuit as follows.

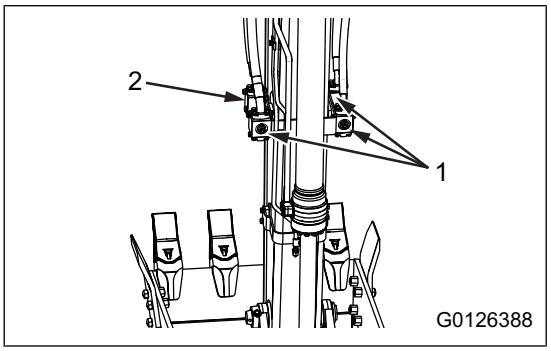
1. Check that the rotor of the stop valves installed to the piping for the inlet port and the outlet port on the side face of the arm, is at the LOCK position (b).
   (a) FREE: Hydraulic oil flows (direction of arrow is parallel to longitudinal direction of arm)
   (b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angle to longitudinal direction of arm)



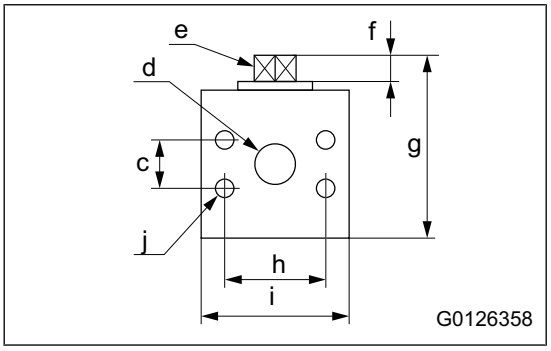
2. Remove the plug (A) of the stop valve.
   Be careful not to lose or damage the removed parts.



3. Connect the attachment piping supplied by the attachment manufacturer.
   The dimensions on the machine body side are shown in the figure. As for the dimensions on the attachment side, consult the attachment manufacturer.



Dimensions of stop valve (1)
(c): 22.2±0.2 mm
(d): 19 mm
(e): SW16
(f): 12 mm
(g): 86.3 mm
(h): 47.6±0.2 mm
(i): 70 mm
(j): 4-M10×20 DEEP



Dimensions of stop valve (2)

(k): 26.2±0.2 mm

(l): 25 mm

(m): SW16

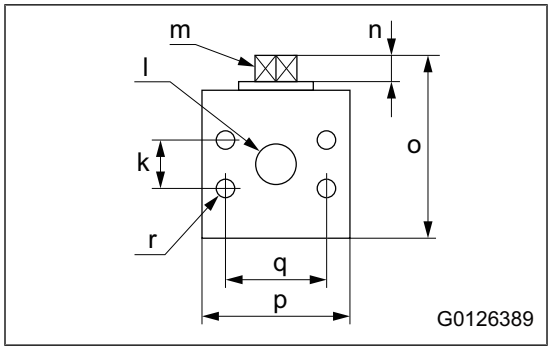
(n): 12 mm

(o): 96.3 mm

(p): 52.4±0.2 mm

(q): 80 mm

(r): 4-M10×20 DEEP



4. After the piping is connected, bleed air from the circuit as follows.

NOTICE

If the attachment has its own air bleeding procedure specified by the manufacturer, obey it.

1) Start the engine.

   Keep the engine running at low idle for 10 minutes after the start, and then go to the next step.

2) To bleed air from the attachment circuit fully, continue the operation of the attachment control pedal (approximately 10 times) while the engine is running at low idle.

3) After air is bled, stop the engine, keep the machine as it is for 5 minutes or more, and then start the operation.

   The air bubbles are discharged in the oil of the tank.

4) Check for the oil leakage, and wipe off spilled oil.

SWITCH HYDRAULIC CIRCUIT

Depending on the type of attachment, set the working mode on the monitor as follows.

The hydraulic circuit and the set pressure of the safety valve in the service valve switch according to the selected working mode.

Depending on the attachment, it is necessary to change the oil flow in the service circuit.

For setting of the flow, see “OPERATE ATTACHMENT (6-42)”.

Switch of breaker and general attachment

Install an optional attachment and set the working mode to B mode.
Hydraulic oil flowing through breaker circuit passes through additional filter for breaker. Relief valve is set to low pressure. Maximum oil flow can be adjusted in user mode.

Set pressure of safety valve of service valve (when shipped from plant): 17.2MPa{175kgf/cm^2}

Breaker circuit (one-way circuit) is formed.

Crusher or other attachment with 2-way circuit

Install an optional attachment and set the working mode to ATT/P or ATT/E mode.
Hydraulic oil flowing through crusher circuit does not pass through additional filter for breaker. Relief valve is set to high pressure. Maximum oil flow can be adjusted in user mode.

Set pressure of safety valve of service valve (when shipped from plant): 24.5MPa{250kgf/cm^2}

Crusher circuit (2-way circuit) is formed.

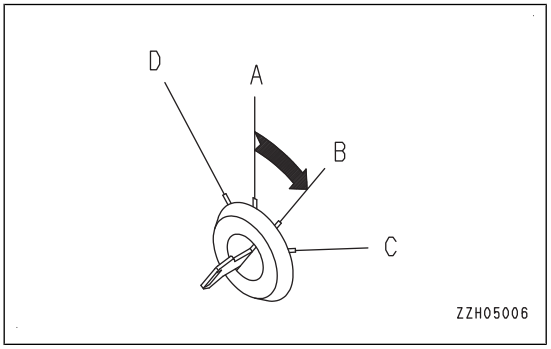
REMOVE AND INSTALL ATTACHMENT

⚠ WARNING

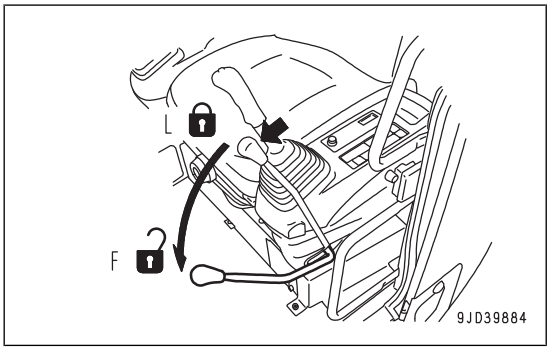
Lower the attachment to the ground and stop the engine.

REMOVE ATTACHMENT

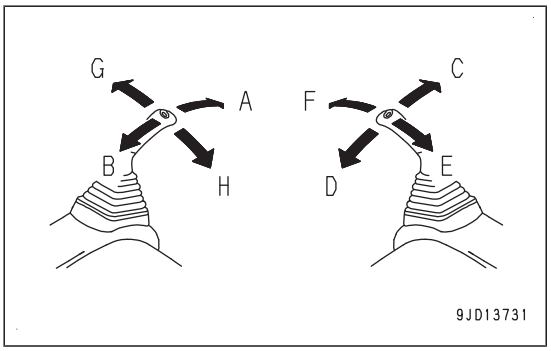
1. Lower the attachment to the ground and stop the engine.
2. Turn the starting switch to the ON position (B).

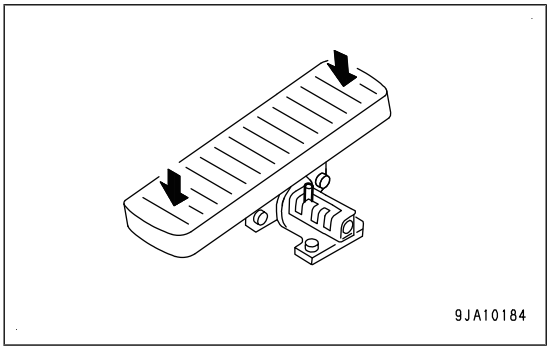


3. Hold the red part at the front end of the lock lever, and operate it to the FREE position (F).

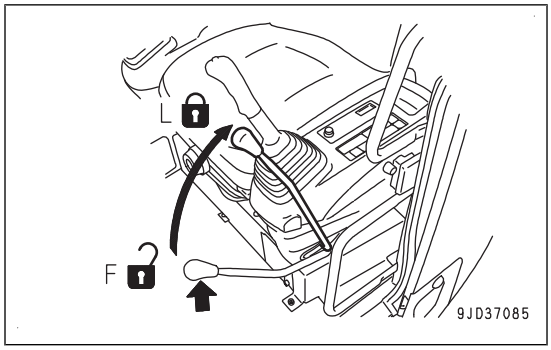


4. Operate each control lever (work equipment, travel) and attachment control pedal fully in each direction in 15 seconds after the engine is stopped to release the internal pressure from the hydraulic circuit.

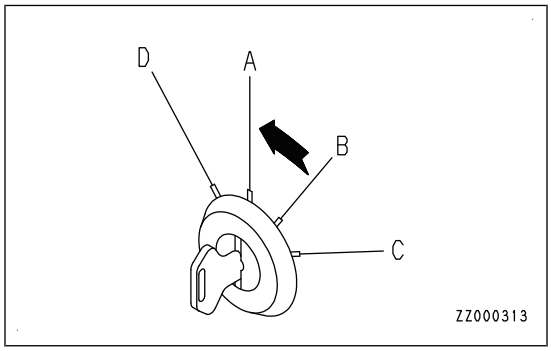




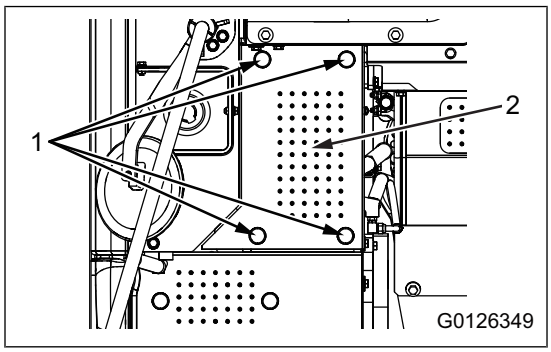
5. Hold the red part at the front end of the lock lever, and operate it to the LOCK position (L).



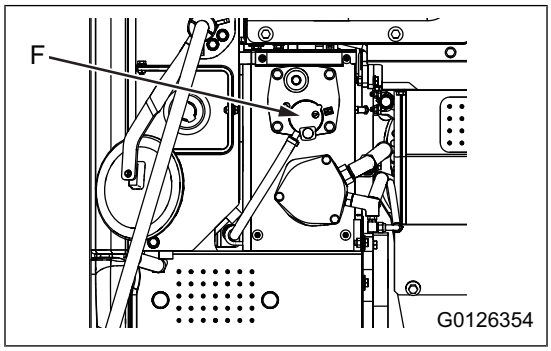
6. Turn the starting switch to the OFF position (A).



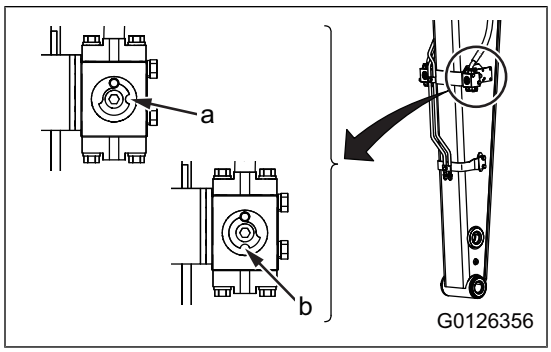
7. Remove the 4 bolts (1), and open the hydraulic tank top cover (2).



8. Loosen the cap of oil filler port (F) gradually to release the internal pressure.
9. Remove the cap of the oil filler port (F).
10. Makes sure that the hydraulic oil temperature becomes low.

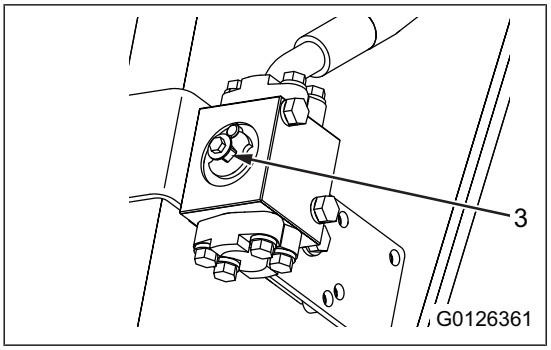


11. Set the rotor of the stop valve installed to the piping for the inlet port and the outlet port on the side face of the arm to the LOCK position (b).
    (a) FREE: Hydraulic oil flows (direction of arrow is parallel to longitudinal direction of arm)
    (b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angle to longitudinal direction of arm)



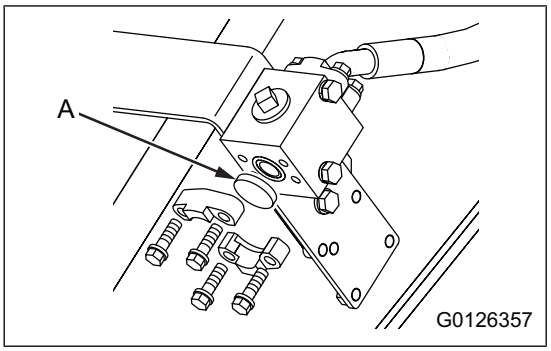
Set the rotor of the stop valve to the FREE or LOCK position as follows.

1) Turn the rotor (3) to set it to the FREE or LOCK position.



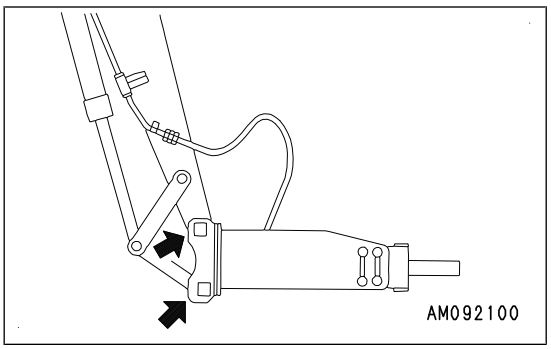
12. Remove the hose on the attachment side, and install the 2 plugs (a) to the outlet.

    The plug (A) is used to prevent the malfunction of attachment caused by the mixture of foreign material. Install them securely, and store the attachment.



13. Pull out the mounting pins (2 places), remove the attachment, and install the bucket.

    For the installation procedure of the bucket, see “REPLACE AND INVERT BUCKET (3-226)”.



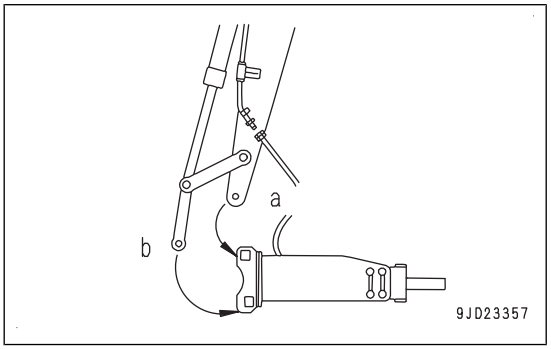
After the bucket is installed, check the oil level in the hydraulic tank.

INSTALL ATTACHMENT

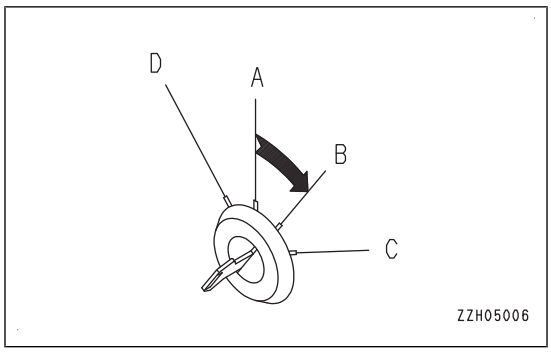
1. Remove the bucket.

   For the removal procedure of the bucket, see “REPLACE AND INVERT BUCKET (3-226)”.

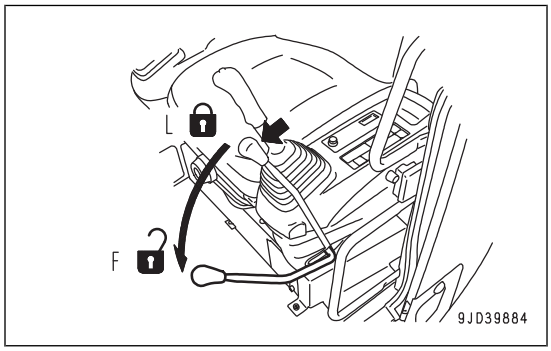
2. Put the attachment on a level area, install the pin (a) and pin (b) in this sequence to the arm.
3. Lower the attachment to the ground and stop the engine.



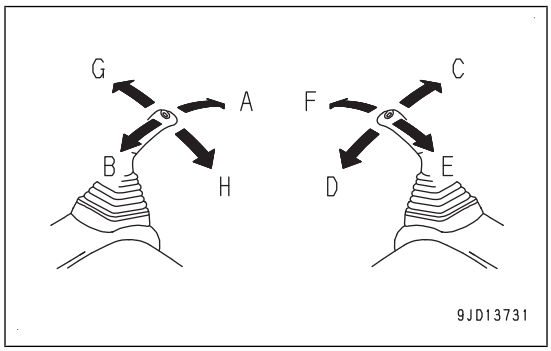
4. Turn the starting switch to the ON position (B).

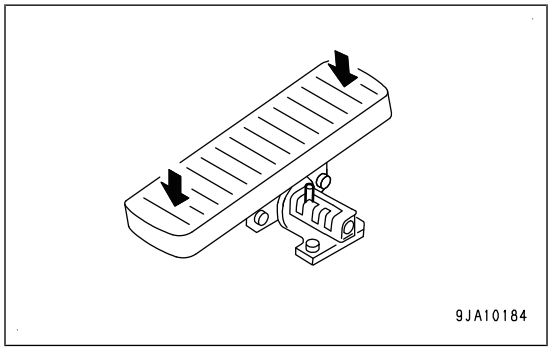


5. Hold the red part at the front end of the lock lever, and operate it to the FREE position (F).

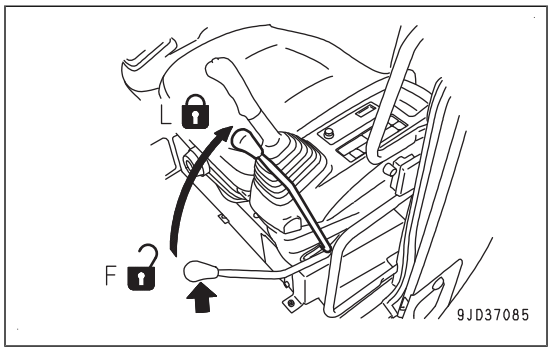


6. Operate each control lever (work equipment, travel) and attachment control pedal fully in each direction in 15 seconds after the engine is stopped to release the internal pressure from the hydraulic circuit.

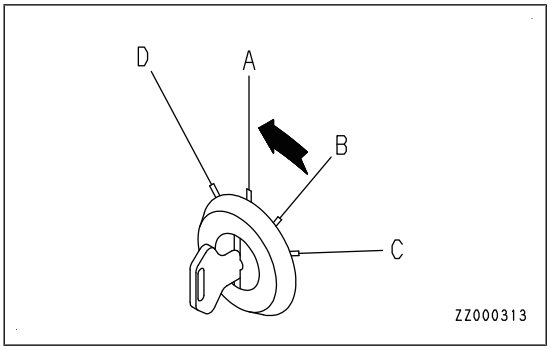




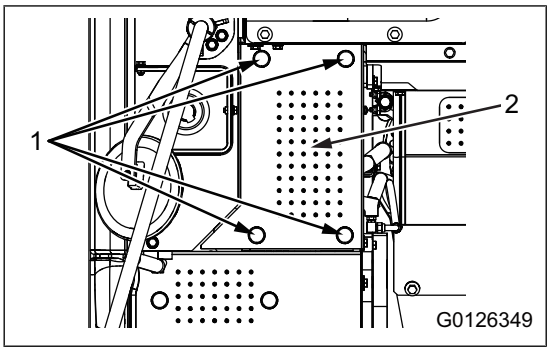
7. Hold the red part at the front end of the lock lever, and operate it to the LOCK position (L).

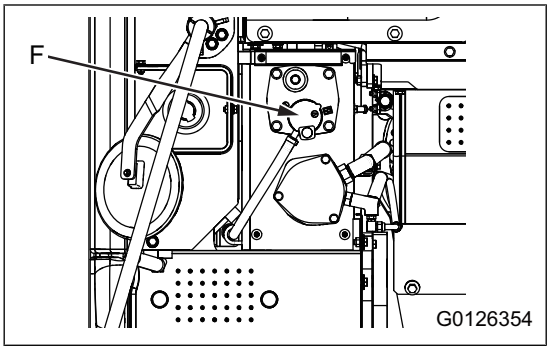


8. Turn the starting switch to the OFF position (A).



9. Remove the 4 bolts (1), and open the hydraulic tank top cover (2).
10. Loosen the cap of oil filler port (F) gradually to release the internal pressure.
11. Remove the cap of the oil filler port (F).
12. Makes sure that the hydraulic oil temperature becomes low.



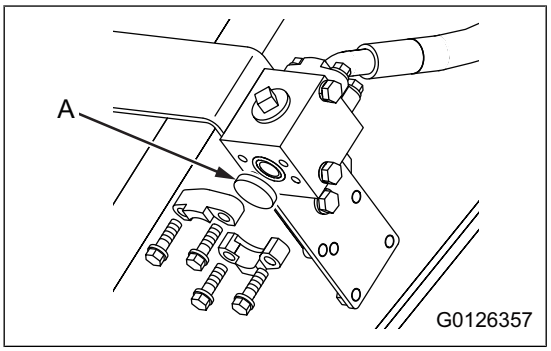


13. Remove the 2 plugs (A) at the outlet and inlet.

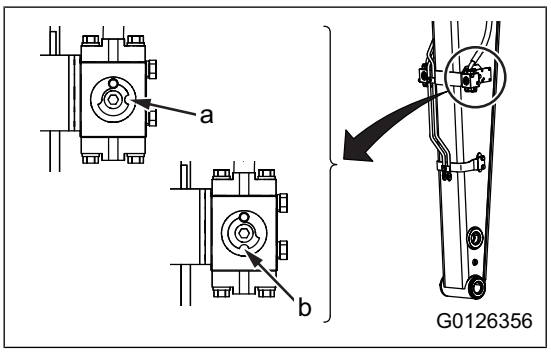
    Be careful not to let dirt or mud stick to the hose fitting.

    If the O-ring is damaged, replace it with a new one.
14. Connect the hose on the attachment side.

    Check the flow direction of the oil and be careful not to make a mistake of it.

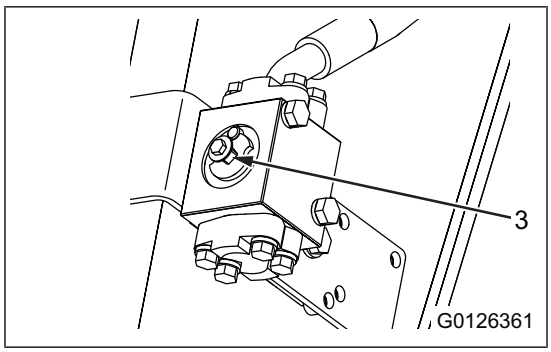


15. Set the rotor of the stop valve installed to the piping for the inlet port and the outlet port on the side face of the arm to the FREE position (a).
    (a) FREE: Hydraulic oil flows (direction of arrow is parallel to longitudinal direction of arm)
    (b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angle to longitudinal direction of arm)



Set the rotor of the stop valve to the FREE or LOCK position as follows.

1) Turn the rotor (3) to set it to the FREE or LOCK position.



After the attachment is installed, check the oil level in the hydraulic tank.

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.

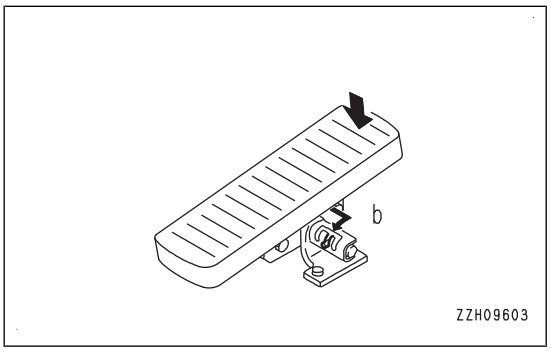
For the change of the flow setting for the breaker mode and attachment mode for the crusher, etc., see “MACHINE SETTING (3-70)”.

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.



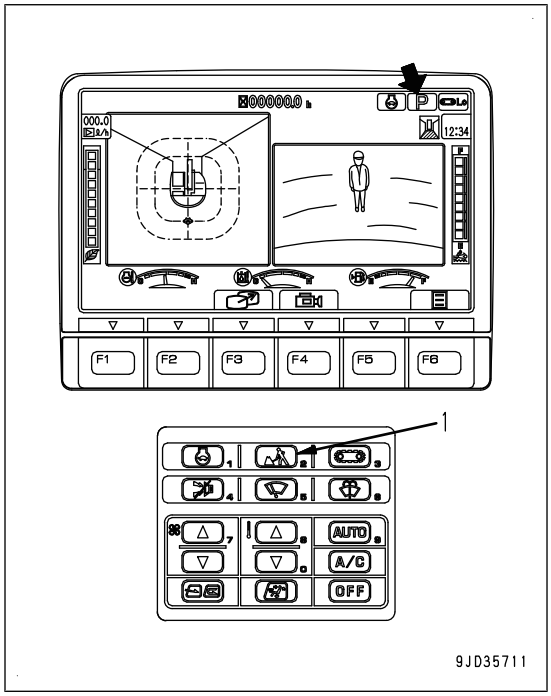
The breaker operates.

OPERATE MACHINE WHEN WORKING MODE IS NOT IN BREAKER MODE

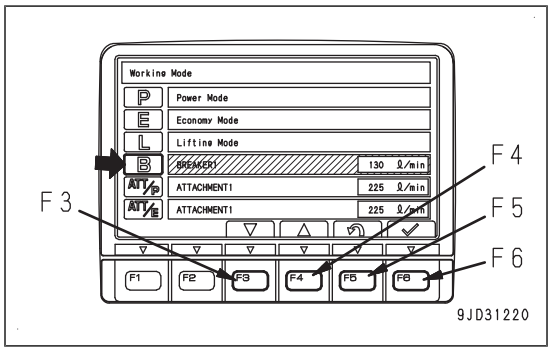
Change the working mode and enter the breaker mode.

1. Press the working mode selector switch (1).

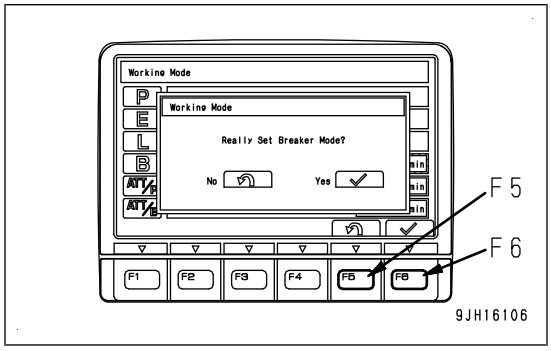
   The screen changes to the working mode selection screen.



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.

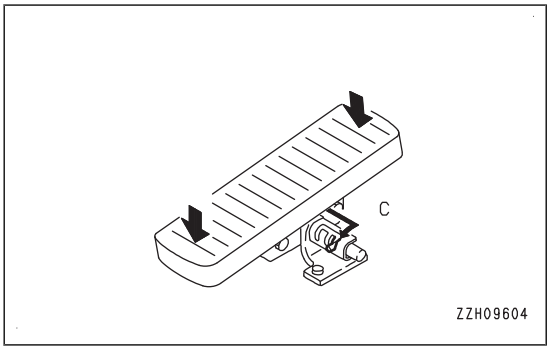
CHECK POINTS WHEN USING BREAKER

- Is the stop valve in FREE position?
- Is the working mode set to B mode?
  For the oil passage route, see “CHANGE OVER AND CONNECT HYDRAULIC CIRCUIT OF ATTACHMENT (6-34)”.
- Do you replace the hydraulic oil and its filter element at intervals shorter than the standard?
  The deterioration of the hydraulic oil when using the breaker is much faster than in the normal operations, so check the maintenance time with “MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (4-18)”.
  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.

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.

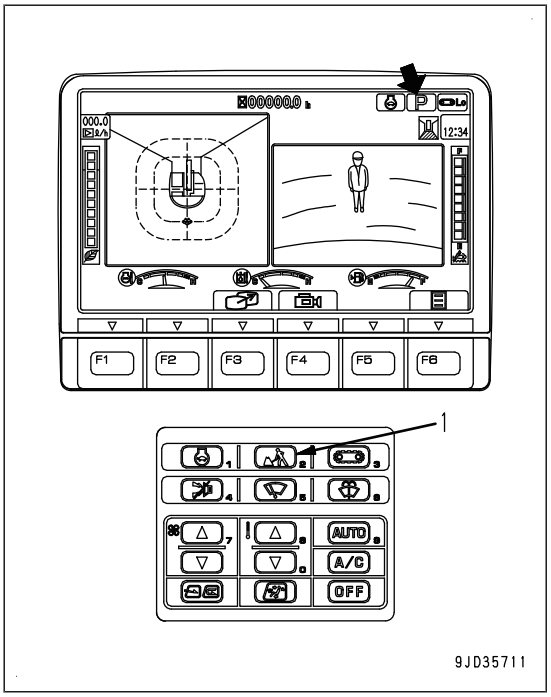


The attachment operates.

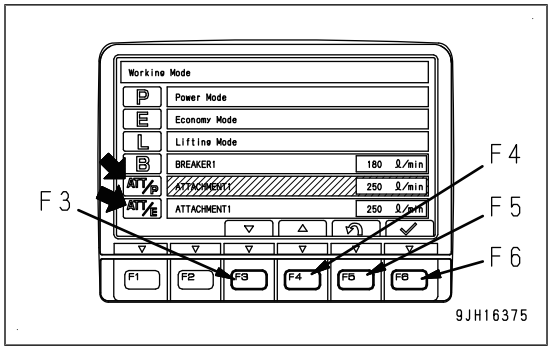
OPERATE WHEN WORKING MODE IS NOT IN ATTACHMENT MODE (ATT/P OR ATT/E)

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 USING GENERAL ATTACHMENT SUCH AS CRUSHER ETC

- Is the stop valve in FREE position?
- Is the working mode ATT/P or ATT/E?
  For the oil passage route, see “CHANGE OVER AND CONNECT HYDRAULIC CIRCUIT OF ATTACHMENT (6-34)”.
  When handling the attachment, follow the instruction manual from the manufacturer and use the attachment correctly.

OPERATE WHEN TOOL CONTROL SETTING IS ON

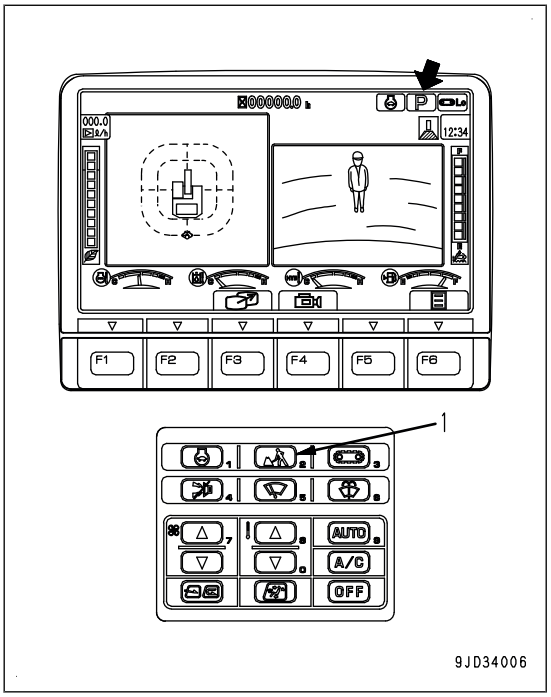
⚠ WARNING

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.

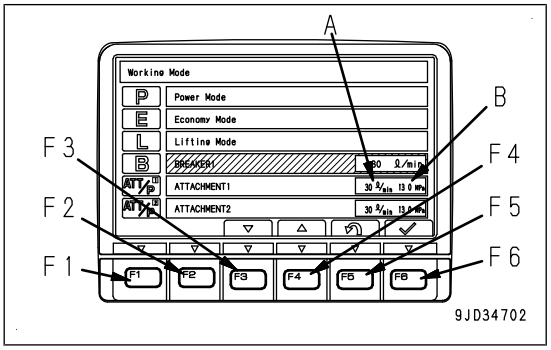
Change the working mode and enter the Attachment Mode.

1. Push the working mode selector switch (1).

   The screen changes to the working mode selection screen.

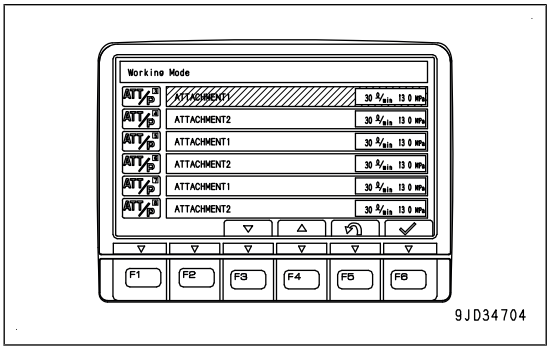


2. Push the working mode selector switch (1) or switch F3 or F4 to select the Attachment Mode ATT/P or ATT/E.
3. With the Attachment Mode ATT/P or ATT/E highlighted in yellow, do one of the operations that follow to enter the selection.
   1) Hold down the working mode selector switch (1).
   2) Keep 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.



OPERATE ATTACHMENT 1 (CRUSHER ETC)

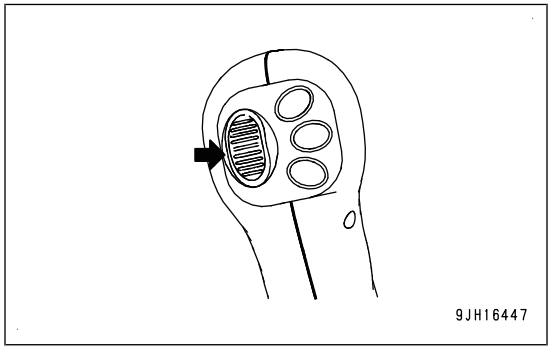
⚠ WARNING

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.

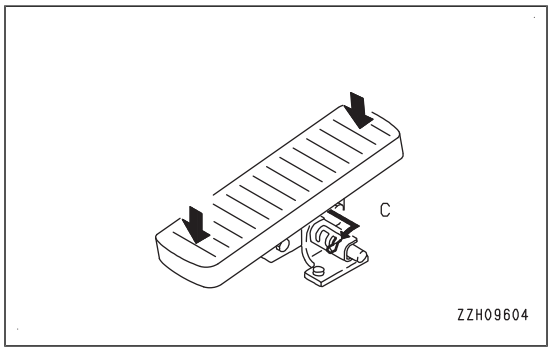


Rolling up the switch makes the attachment move. Rolling down the switch makes the attachment move in an opposite direction.

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.



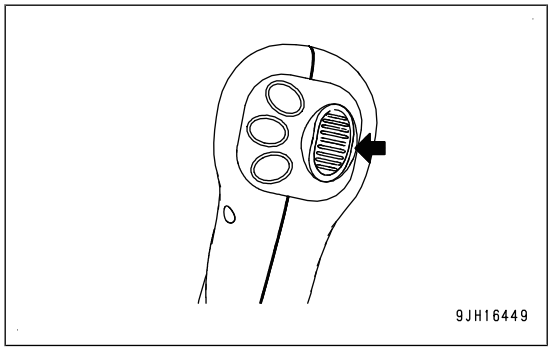
The attachment operates.

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 USING GENERAL ATTACHMENT SUCH AS CRUSHER ETC (6-45)”.

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.

SPECIFICATIONS

Hydraulic specifications

- Max. flow at merge: 121×2ℓ/min
- Safety valve cracking pressure of service valve: 24.5MPa{250kgf/cm^2} (other than B mode)
- Safety valve cracking pressure of service valve: 17.2MPa{175kgf/cm^2} (B mode)

When the tool control is installed

- Safety valve relief set pressure of service valve
  Port A: 41.7MPa {425kgf/cm^2}
  Port B: 41.7MPa {425kgf/cm^2}
- Safety valve cracking pressure of service valve
  Port A: 36.3MPa {370kgf/cm^2}
  Port B: 36.3MPa {370kgf/cm^2}

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.**

TRACK SHOES SELECTION

Select the appropriate track shoe to match the operating conditions.

Track shoe selection

1. Check the ground to work in Use column of Classification by use table, and then check Classification column.

Classification by use

Classification	Use	Precautions when using
A	Rocky ground, riverbeds Normal soil	• On rough ground with large obstacles such as boulders or fallen trees, travel at Lo speed.
B	Normal soil Soft ground	• These shoes cannot be used on rough ground where there are large obstacles such as boulders or fallen trees. • Travel at Hi 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 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 “HANDLE RUBBER PAD SHOES AND ROAD LINERS”.

2. Check the Classification column in List of shoe specifications and select a suitable shoe for the use.

	PC138US-11E0	
	Specification	Classification
Standard	500mm Triple	A
Optional	600mm Triple	B
Optional	700mm Triple	C
Optional	500mm 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

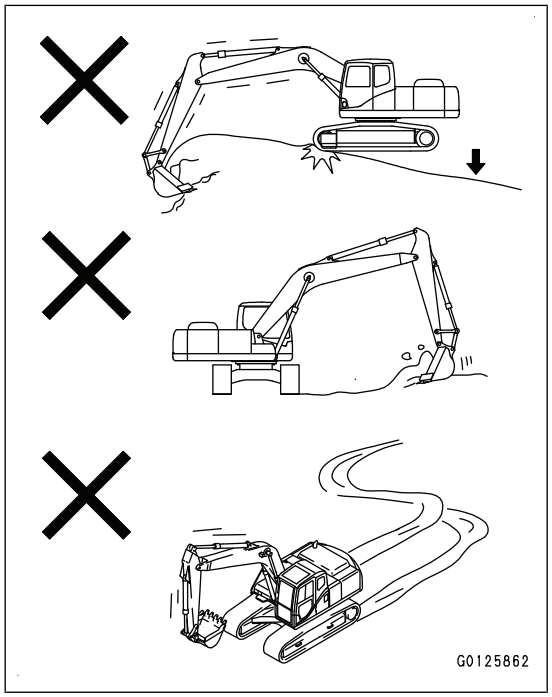
Be sure to observe the following instructions, when using a machine equipped with rubber pad shoes or the road liner.

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.

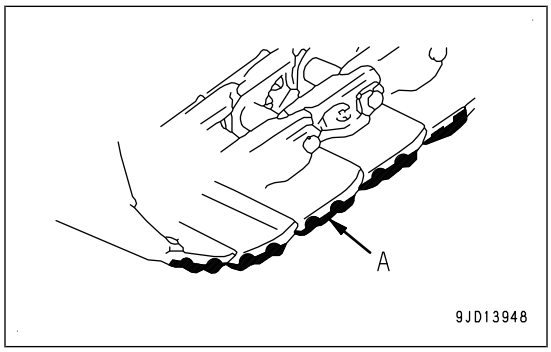
Work conditions

- 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.



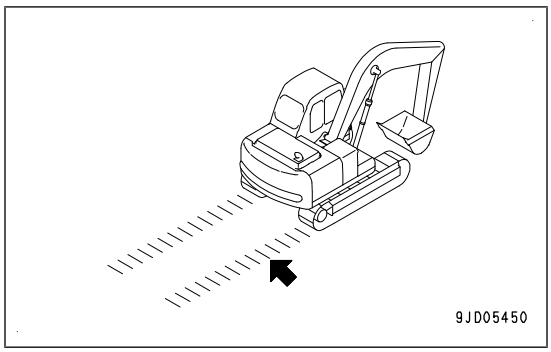
Storage and maintenance

- 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.



Extent of damage to rubber

- When traveling 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.



INSTALL ATTACHMENT

⚠ WARNING

Depending on the type or combination of work equipment, there is a danger that the work equipment may hit the cab or machine body.
When using unfamiliar work equipment for the first time, check before starting if there is any danger of interference, and operate it with care.

Table of the combination of attachments which can be installed to the standard arm and long arm

○: Can be used

∆: Can be used only for light duty work

x: Cannot be used

NOTICE

- **When the long arm is equipped, if the bucket is drawn to the machine body, the arm interferes with the body. Operate the long arm carefully.**
- **When the boom is fully lowered during oblique digging, the boom interferes with the undercarriage. Operate the boom carefully.**

Categories of use

Select a proper attachment for each use.

For general digging: Digging or loading sand, gravel, clay etc.

For light duty digging: Digging or loading dry and loose earth and sand, mud etc.

For loading: Loading of dry and loose earth

REMARK

For digging or loading hard soil or soft rock, the reinforced bucket having high durability and wear and abrasion resistance is recommended.

Name	Tooth mounting pin	Capacity m^3	Opening width (Body) mm	Opening width (Side cutter) mm	Use	Standard arm specification	Long arm specification
Narrow bucket	Vertical	0.18/0.16	450	570	Narrow digging	○	○
Narrow bucket	Vertical Horizontal	0.29/0.26	600	720	Narrow digging	○	○
Narrow bucket	Vertical Horizontal	0.38/0.33	700	820	Narrow digging	○	○
Standard bucket	Vertical Horizontal	0.45/0.40	833	953	General digging	○	×
Reinforced bucket	Vertical Horizontal	0.50/0.45	859	979	For heavy digging	○	×
Light duty bucket	Vertical Horizontal	0.50/0.45	859	979	Loading	○	×

RECOMMENDED ATTACHMENT OPERATIONS

NOTICE

Select the optimum attachment model for the hydraulic excavator body.
The attachments and models ready for installation are different by the machine body. For the selection of the attachments or the models, consult your Komatsu distributor.

This manual gives the precautions which must be obeyed when you install an attachment and operate the hydraulic excavator.

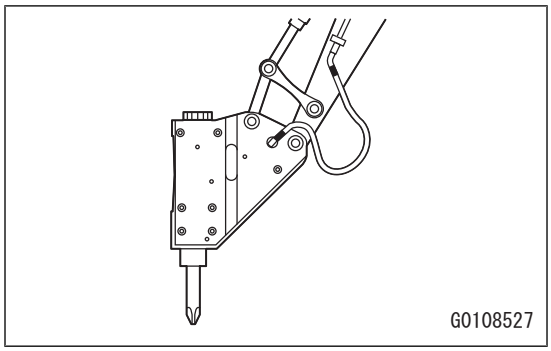
HYDRAULIC BREAKER

Applicable work

Major works applicable to the hydraulic breaker are as follows.

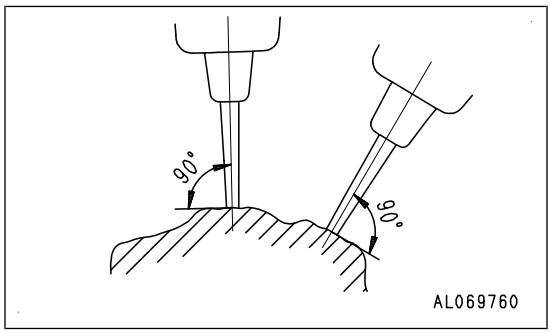
- Demolition work
- Crush rocks
- Road construction

This 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.



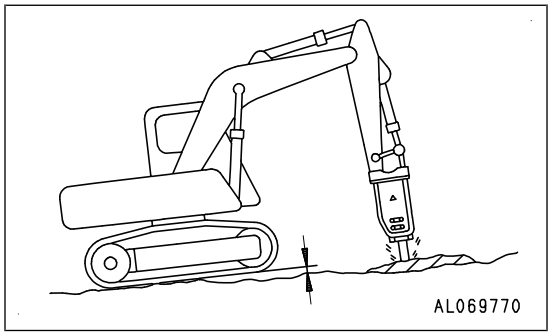
Precautions when you do break operations

Do the hitting operation with the chisel to let the chisel be perpendicularly against the breaking surface.

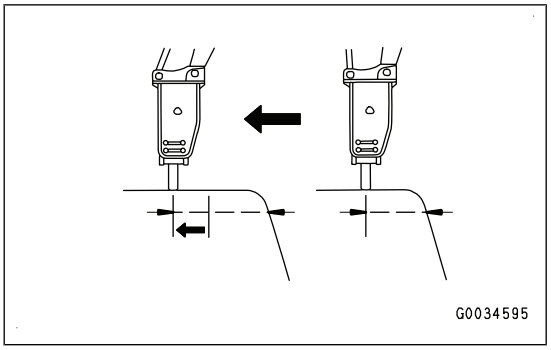


Push the chisel against the breaking surface, and make the machine be lifted approximately 5cm off the ground.

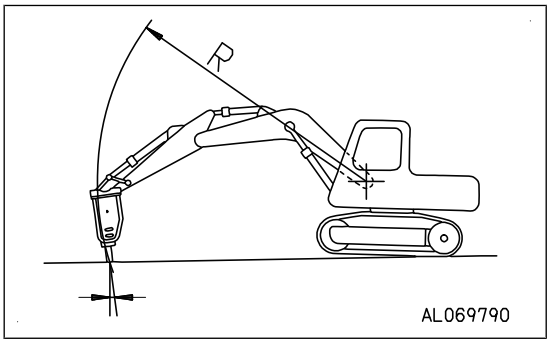
Do not make the machine be lifted further off the ground than necessary.



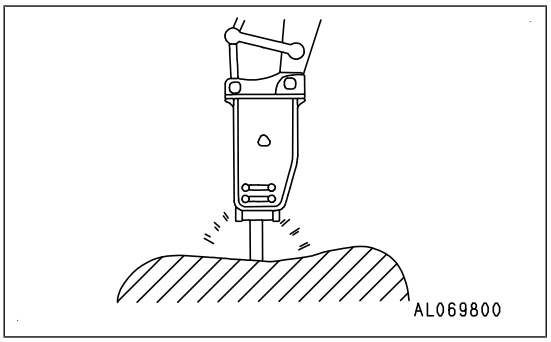
Hit the same surface continuously only 1 minute or less. When the chisel does not penetrate or break the surface by continuous hitting to the same surface for 1 minute, change the hitting point and scrape from the edge to break the surface.



When you change the position (R) of the breaker body from the machine, penetrating direction of the chisel gradually deviates from the direction of the breaker body. Adjust the direction with the bucket cylinder to let it keep the correct direction.



Always keep the chisel pushed against the breaking surface correctly not to strike at the air.

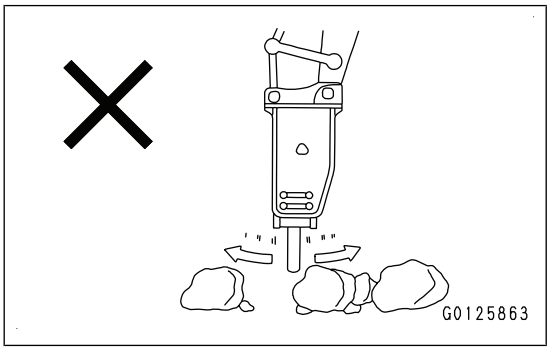


PROHIBITED OPERATIONS

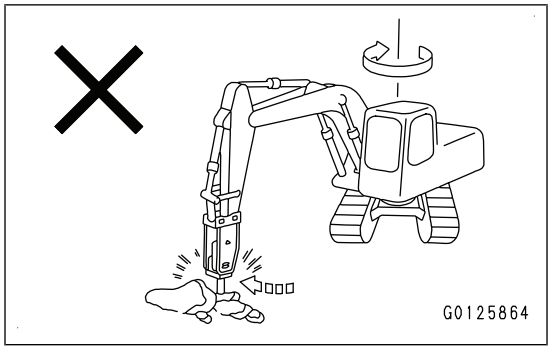
To increase the life of machine, and for the safety, do not use the machine as follows.

Do not operate all cylinders to the end of their strokes. Always spare approximately 5cm.

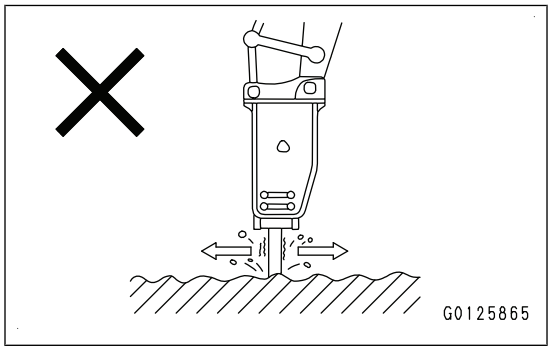
Do not do the scraping of rocks with the mounting part.



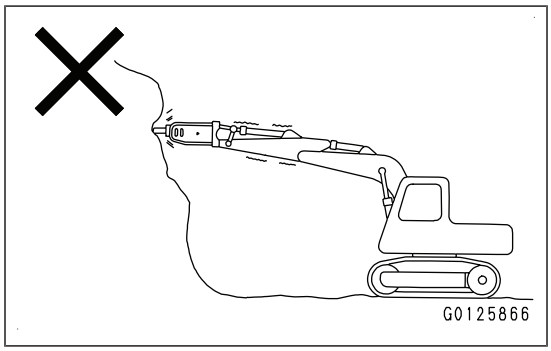
Do not do the work by swing force.



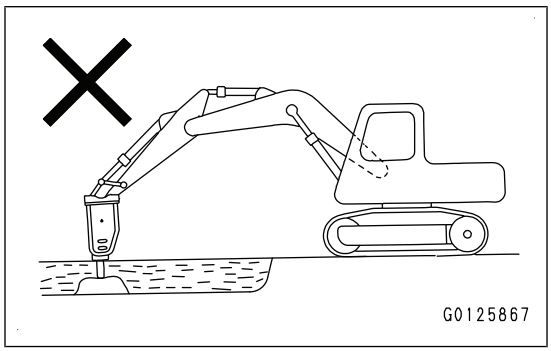
Do not move the chisel during the hitting.



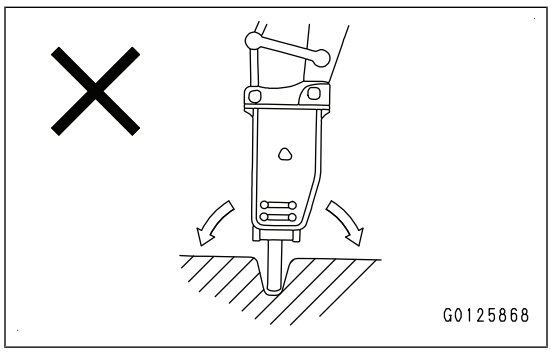
Do not hit horizontally or upward.



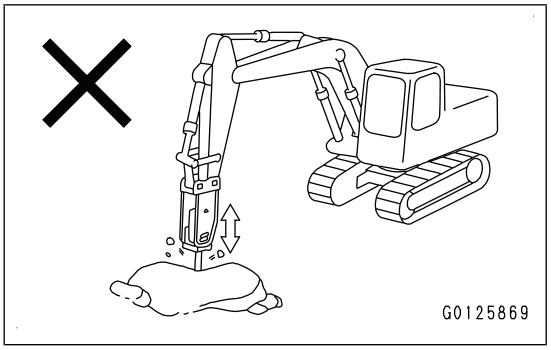
Do not do the work in water.



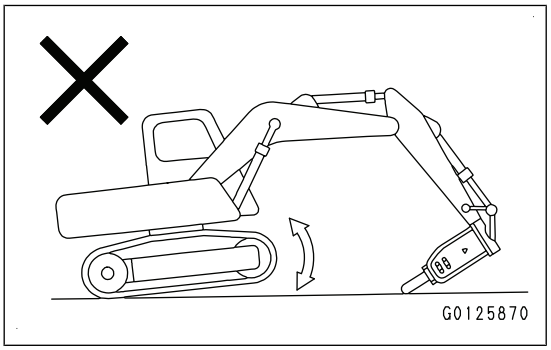
Do not twist the chisel while it is penetrated.



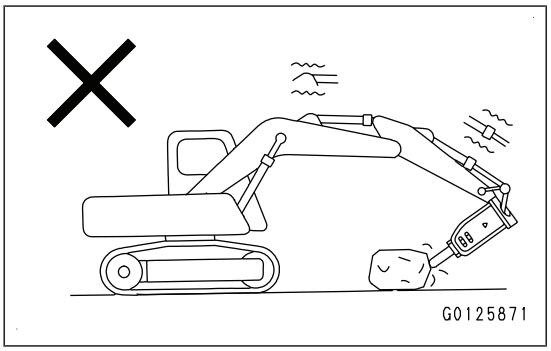
Do not do the pick work.



Do not extend the bucket cylinder rod fully to lift the machine off the ground. Do not do such work.



Do not do the hitting while the hydraulic cylinder is at the stroke end.



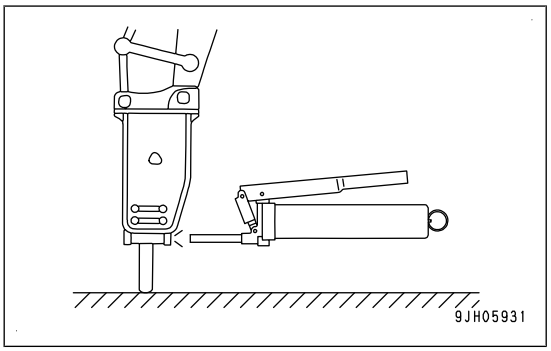
When you supply grease to hydraulic breaker, do it in correct posture

NOTICE

If you lubricate the grease in an incorrect posture, the inside of breaker becomes packed with grease unnecessarily.
Dirt will enter the hydraulic circuit and can damage the hydraulic components while the breaker is in use.
Supply grease in a correct posture.

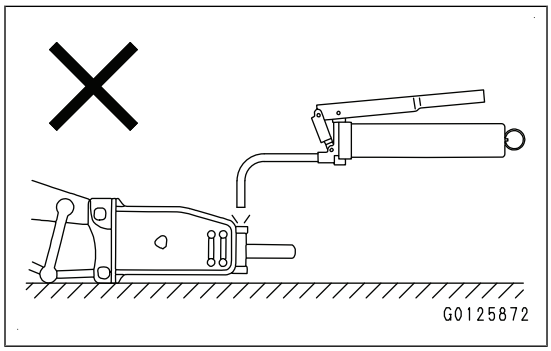
Supply grease in a correct posture as follows.

1. Lower the chisel to the ground perpendicularly.
2. Insert the grease pump perpendicularly to the lubrication point.

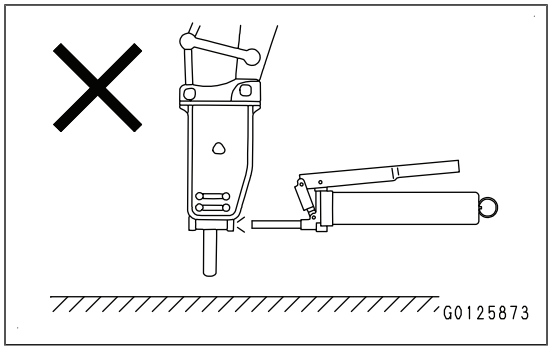


Incorrect posture

Do not lubricate it while the hydraulic breaker is lowered to the ground.



Do not lubricate it while the chisel is not lowered to the ground.



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.

The materials of these parts change easily over time, and wear and deterioration easily occur. But it is hard to understand the state of the change by periodic maintenance, etc. Accordingly, after the specified period of use, the parts must be replaced with a new one to keep the correct function at all time, even if you do not find an abnormality.

When you found an abnormality, these parts must be repaired or replaced even before the replacement period.

If a hose clamp is deformed or cracked, replace the clamp as well at the same time.

Also, check as follows the hydraulic hoses other than the periodic replacement parts, and if you found an abnormality, retighten and replace them.

When you replace the hose, replace the O-ring and gaskets as well at the same time.

Consult your Komatsu distributor for the replacement of the defined life parts.

DEFINED LIFE PARTS LIST

<table>
<tr><th>No.</th><th colspan="2">Target Parts</th><th>Inspection /Replacement interval</th></tr>
<tr><td>1</td><td>Fuel system</td><td>Fuel hose</td><td rowspan="2">Recommend to replace every 2 years or 4000 hours, whichever comes sooner.</td></tr>
<tr><td></td><td></td><td>Spill hose</td></tr>
<tr><td>2</td><td>Engine lubrication system</td><td>Turbocharger lubrication hose
Engine oil filter hose</td><td rowspan="5">Replace if any of the damages were found when the daily check or periodical maintenance.</td></tr>
<tr><td rowspan="3">3</td><td rowspan="3">Work equipment hydraulic system</td><td>Main pump delivery hose</td></tr>
<tr><td>Main pump LS hose
Swing line hose
Travel line hose</td></tr>
<tr><td>External work equipment hose
• Boom foot connection hose
• Boom cylinder hose
• Arm connection hose
• Arm cylinder hose
• Bucket cylinder hose
• Attachment additional line hose
• Blade cylinder hose</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Others</td><td>PPC accumulator
Attachment additional accumulator</td><td></td></tr>
<tr><td>Seat belt</td><td>Every 3 years from start of usage or 5 years after manufacturing of seat belt, whichever comes sooner.</td></tr>
</table>

CONSUMABLE PARTS

- Replace consumable parts such as the filter element or air cleaner element at the time of periodic maintenance or before the wear limit. Replace consumable parts to keep correct operations of the machine. Komatsu recommends the use of Komatsu genuine parts for replacement parts.
- As a result of our continuous efforts to improve product quality, the part number can be changed. When you make an order of the parts, tell your Komatsu distributor the machine serial number to check the latest part number.

CONSUMABLE PARTS LIST

The parts in parentheses are to be replaced at the same time.

Item	Part No.	Part Name	Q'ty	Replacement interval
Engine oil filter	600-211-2111	Cartridge	1	Every 500 hours
Fuel prefilter	600-319-4110	Cartridge	1	
Hydraulic tank breather	421-60-35170	Element	1	Every 1000 hours
Hydraulic oil filter	423-60-45461 (07000-12135)	Element (O-ring)	1 (1)	
Fuel main filter	600-319-3881	Cartridge	1	
DEF tank breather	421-60-35170	Element	1	
DEF filter	6540-71-2320	Filter kit	1	Every 2000 hours
KCCV filter	600-333-3900	Element	1	
Air conditioner RECIRC air filter	22B-979-2860	Filter	1	Every 1 year
Air conditioner FRESH air filter	17M-911-3530	Element	1	
Electric heater	6204-11-4850	Gasket	1	-
Air cleaner	600-185-2500	Element assembly	1	
Additional filter for breaker	22B-973-3311	Element assembly	1	
Bucket	Vertical pin type			
	205-70-74272 (205-70-74282) (205-70-74291)	Tooth (Pin) (Pin)	4 (4) (4)	
	Horizontal pin type			
	205-70-19570 (09244-02496)	Tooth (Pin assembly)	4 (4)	
	Side cutter type			
	202-70-63161 202-70-63171 (208-32-11231) (01803-02228)	Side cutter (left) Side cutter (right) (Bolt) (Nut)	1 1 (8) (8)	

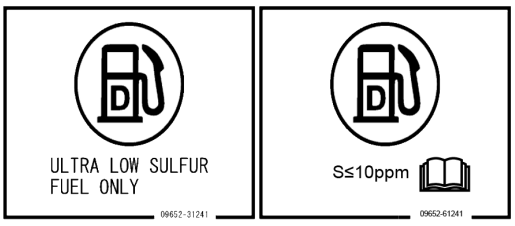
RECOMMENDED FUEL, COOLANT, AND LUBRICANT

NOTICE

- **Komatsu genuine oils are conditioned to keep the reliability and durability of Komatsu construction equipment and components.**
  To keep your machine in the best condition for long period of time, obey the instructions in this Operation and Maintenance Manual.
- **If you do not obey the instructions, the service life will become short or too much wear will occur on the engine, power train, cooling system, and/or other components.**
- **Commercially available lubricant additives can be 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.**
- **To operate the machine when the temperature is -20°C or below, auxiliary devices are necessary. Consult your Komatsu distributor.**

NOTICE

- **Be sure to use the ultra-low sulphur diesel fuel. (≤10ppm)**



  To get good fuel consumption characteristics and exhaust gas characteristics, an electronically controlled high-pressure fuel injection system and emission gas control system (KDPF) are used for the engine of this machine. The high-pressure fuel injection system 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 sulphur 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 constituents.
  Metallic components in the additives will not be burnt 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 diesel fuel shown above and its mixing ratio is up to 20%, obey the precautions that follow.

- **It is necessary to consult with the local regulatory authorities of engine exhaust gas regulation whether the biofuel can be used or not.**
- **The fuel can possibly leak because of the deterioration of rubber material of the fuel hose.**
  Replace it with the fuel hose applicable for biofuel. Consult your Komatsu distributor for replacement of the fuel hose.
- **Biofuel cannot be stored for a long time because it is easy to deteriorate and change in quality.**
  Use the fuel in the storage tank or the fuel tank of the machine within 6 months.
  If the deteriorated and altered biofuel is used, it can cause bad effects on the engine parts.
  When you store the machine which uses the diesel fuel mixed with the biofuel for more than 3 months, do the procedure that follows.
  - **Replace it with pure diesel fuel or the new diesel fuel mixed with the biofuel at the lowest possible mixing ratio.**
  - **After you change the fuel, run the engine for a minimum of 30 minutes before you store the machine.**
- **Because the biofuel dissolves the materials stuck to the fuel tank and fuel line, the fuel filter can be clogged with them.**
  When you change the diesel fuel to the biofuel, replace the fuel main filter cartridge and fuel prefilter cartridge with new ones. When you replace the fuel main filter cartridge and fuel prefilter cartridge, make the replacement interval half the normal time until the second replacement after you change the diesel fuel to the biofuel.
- **Because the biofuel absorbs moisture easily, it can possibly cause a growth of microorganism.**
  When the microorganism grows in the biofuel, it can cause corrosion of the fuel system and the clogging of the fuel filter.
  Drain the water from the fuel tank before you start the operation.
  When you complete the operation, fill the fuel tank to reduce the air layer.
- **If the biofuel is used in the conditions of the specific operation, the fuel can possibly get mixed into the engine oil.**
  The fuel level in the engine oil must not exceed 5%. Deteriorated engine oil can cause unwanted effects on the engine parts such as a reduction of lubricating function. It is recommended to take a sample of the oil on a periodic basis.
- **The characteristics of the biofuel change when outside air temperature is low. The fuel filter can be clogged and the fuel inside the fuel tank can solidify. Store the biofuel in the warm building or in the storage tank.**

NOTICE

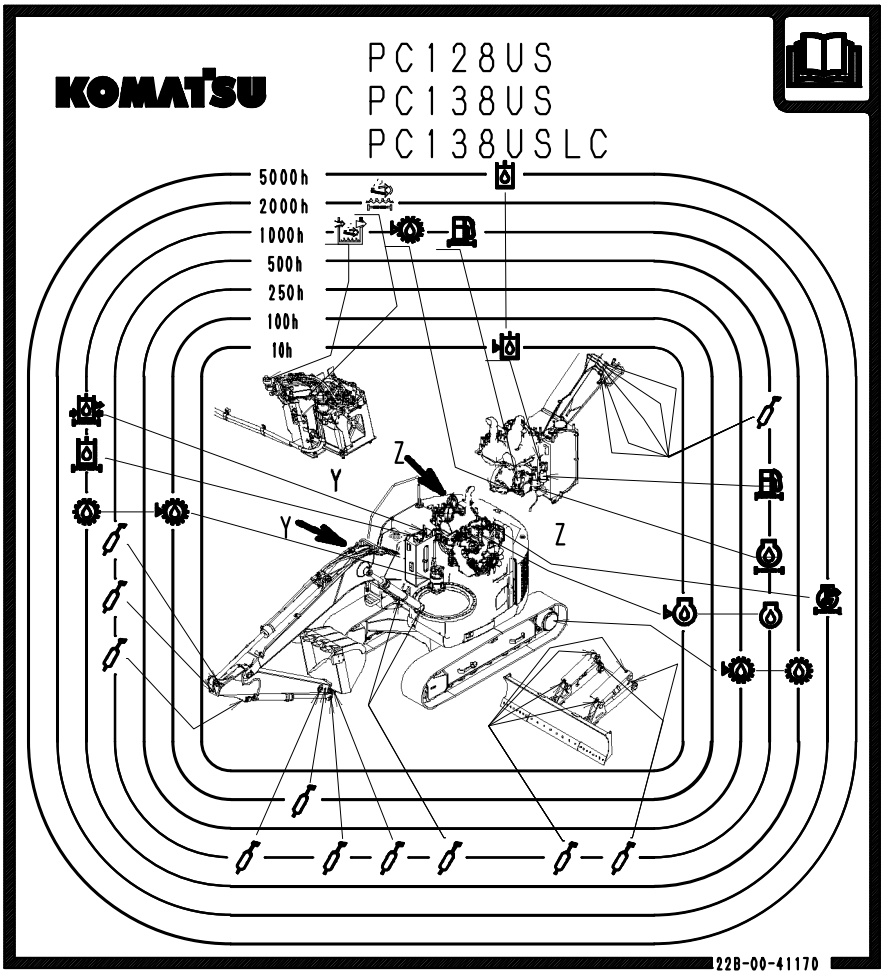
Use the paraffin-based fuel which agrees with EN15940:2016 and ASTM D975.
As long as the fuel agrees with EN15940:2016 and ASTM D975, its mixing ratio can be up to 100%.

NOTICE

Use DEF as the aqueous urea solution for urea SCR system.
DEF is a colorless transparent 32.5% aqueous urea solution.
The quality of DEF is provided in ISO22241-1. Always use DEF that agrees with this quality standard.
In Europe, use the AdBlue®.

LUBRICATION CHART

- The lubrication chart uses the symbols to show the lubrication points and types of lubricant by each lubrication interval.
  Keep this chart in the magazine box in the cab to allow the personnel to refer to it as needed for lubrication.
- Even if the same symbol is used in the chart, the recommended genuine oil can be different by the lubrication points and the ambient temperature. For details, follow “USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (7-8)”.
- For the detail of Lubrication, see “MAINTENANCE SCHEDULE (4-16)”.



The symbols used in the lubrication chart are explained as follows.

Symbol	Description of the symbol	Symbol	Description of the symbol
	Read the Operation and Maintenance Manual.		Supply grease
	Change engine oil		Check oil level in engine oil pan
	Change hydraulic oil		Check oil level in hydraulic tank
	Change power train oil		Check power train oil level
	Replace engine oil filter		Replace hydraulic oil filter
	Replace hydraulic tank breather element		Replace fuel filter
	Replace KCCV filter element		Replace DEF tank breather element
	Replace DEF filter	-	-

USE FUEL, COOLANT AND LUBRICANTS ACCORDING TO 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)	EOS5W30-LA (KES)	-25	35
		EOS5W40-LA (KES)	-25	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 PTO gear case	Power train oil (Note 2)	TO30 (KES)	-30	50
Hydraulic System	Power train oil	TO10 (KES)	-20	50
	Hydraulic oil	HO46-HM (KES)	-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)	-30	50
Fuel tank	Diesel fuel	EN 590 Class2	-30	20
		EN 590 Grade D	-10	50
DEF tank	DEF (Note 5)	DEF	-30	50

KES

Abbreviation for Komatsu Engineering Standard

Reservoir	Specified capacity (ℓ)	Refill capacity (ℓ)
Engine oil pan	12.5	11.5
Swing machinery case	2.8	2.5
Final drive case (each of right and left)	2.1	2.1
Large capacity final drive case (each of right and left) (if equipped)	4.7	4.7
PTO gear case	0.75	0.75
Hydraulic oil system	120	69
Cooling system	21.0	16.1
Fuel tank	200	-
DEF tank	21.1	-

REMARK

Specified capacity is the total quantity of fluid that includes the fluid in the tank and the piping. Refill capacity means the amount of fluid 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. Consult your Komatsu distributor to change the maintenance interval of the machine monitor.

Note 2: Power train oil has different performance from engine oil. Be sure to use the recommended oils.

Note 3: Hyper grease (G2-TE) has high performance. When it is necessary to make the lubricating performance of grease better to prevent squeaking of pins and bushings, the use of G2-TE is recommended.

- When it is necessary to make the lubricating performance of grease better to prevent creaks of pins and bushings.
- When it is necessary to prevent outside staining with black grease.

Note 4: Coolant

1. Komatsu genuine Non-Amine Engine Coolant (AF-NAC) has the important function to prevent corrosion of the cooling system as well as antifreeze. Even in the areas where freezing is not an issue, use this coolant continuously.
   Komatsu machines are supplied with Non-Amine Engine Coolant (AF-NAC). Non-Amine Engine Coolant (AF-NAC) has excellent corrosion resistance, 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). It can cause dangerous failure such as the corrosion of the cooling system or engine.
2. Use the diluted Non-Amine Engine Coolant (AF-NAC).
   The supplied Non-Amine Engine Coolant (AF-NAC) is mixed with pure water. Do not mix water with the Non-Amine Engine Coolant.

Coolant density table

Min. atmospheric temperature (℃)	-10 or more	-15	-20	-25	-30	-35	-40	-45	-50
Density (%)	30	36	41	46	50	54	58	61	64

Note 5: DEF freezes at -11℃. If thawing is necessary, the DEF system makes DEF warm automatically to thaw DEF after the engine is started.

RECOMMENDED BRANDS AND QUALITIES OTHER THAN KOMATSU GENUINE OILS

For locally available oil other than Komatsu genuine oil, consult your Komatsu distributor.

INDEX

Symbols

12h/24h mode....3-83
1st-line attachment proportional switch....3-93
2-piece - Preparation for storage and lifting machine....6-8
2-piece boom - Explanation of lift capacity chart....6-15
2-Piece boom - Handle....6-6
2-piece boom components....6-6
2-Piece boom control pedal....6-7
2nd-line attachment proportional switch....3-92

A

Abbreviation List....1-21
Accumulator - Function....4-83
Accumulator (for control circuit) - Replace....4-94
Accumulator (for low pressure)....6-31
Accumulator for control circuit and internal pressure in hydraulic circuit - Check and release....4-83
Accumulator for control circuit and internal pressure in hydraulic circuit (for breaker) - Check function and release....4-81
Accumulator nitrogen gas charge pressure - Check....4-84
Action level display....3-19
Actions - If fire occurs....2-21
Actions when battery is discharged....3-290
Actions when caution is shown on machine monitor....3-301
Actions when you run out of fuel....3-286
Additional filter element for breaker - Replace....4-44
Additional filter for breaker....6-31
Additional lamp switch....3-96
Adjustment....3-167
After cold weather season....3-283
Aftertreatment devices regeneration....3-76
Aftertreatment devices regeneration disable - Cancel....3-134
Aftertreatment devices regeneration disable - Set....3-130
Aftertreatment devices regeneration disable pilot lamp....3-42
Aftertreatment devices regeneration pilot lamp....3-42
Air cleaner - Check clogging....4-19
Air cleaner - Check/Clean/Replace....4-19
Air cleaner clogging caution lamp....3-33
Air cleaner element - Replace....4-22
Air cleaner outer element - Clean....4-19
Air conditioner....3-238
Air conditioner - Check refrigerant (gas) level....4-40
Air conditioner - Check/Maintenance....4-40
Air conditioner - Operate....3-244
Air conditioner - Warm-up operation....3-196
Air conditioner compressor belt - Adjust....4-59
Air conditioner compressor belt - Check....4-59
Air conditioner compressor belt tension - Check / Adjust....4-59
Air conditioner equipment....3-239
Air conditioner fresh air filter - Clean....4-71
Air conditioner fresh/recirc air filters - Clean....4-70
Air conditioner pilot lamp....3-40
Air conditioner recirculation air filter - Clean....4-70
Air conditioner switch....3-59,3-243
Air conditioner system caution lamp....3-33
Allowable depth of water or soil....3-219
Alternator and starting motor - Check....4-86
Anchor point for tie-off - Handle....3-266,4-5
Antenna - Stow....3-263
Armrest - Adjust angle....3-169
Ashtray....3-112
Attachment - Bleed air....4-49
Attachment - Install....3-123,6-38,6-54
Attachment - Operate....6-42
Attachment - Operate when tool control setting is on....6-46
Attachment - Operate when working mode is not in attachment mode....6-44
Attachment - Remove....3-122,6-36
Attachment - Remove / Install....6-36
Attachment 1 (crusher etc) - Operate....6-47
Attachment 1 proportional switch....6-32
Attachment 1 variable relief pressure valve....6-29
Attachment 2 (clamshell rotation and crusher rotation etc) - Operate....6-48
Attachment 2 proportional switch....6-32
Attachment 2 variable relief pressure valve....6-29
Attachment control pedal....3-102,6-30
Attachment name setting - Change....3-73
Attachment setting....3-73
Attachments and options....6-51
Attachments flow setting - Change....3-74
Auto idle stop timer setting....3-75
Auto preset - Set....3-256
Auto switch....3-242
Auto-deceleration pilot lamp....3-39
Auto-deceleration switch....3-55
Automatic operation - Stop....3-245
Automatic warm-up operation - Cancel....3-189
AUX selector switch....3-252
Average fuel consumption record....3-67

B

Backhoe work....3-223
Battery....3-282
Battery - Install....3-293
Battery - Remove....3-291
Battery charge mode - Set....3-262
Battery disconnect switch....3-118
Battery electrolyte - Check level....4-56
Battery electrolyte - Check level from side....4-56

Battery electrolyte - Check level when it is impossible to check from side....4-57
Bio-fuel....4-7
Blade control lever....3-102
Bleed air from between pump and hydraulic tank.4-48
Bluetooth®....3-255
Breaker - Check points when using....6-44
Breaker - Operate....6-42
Breaker flow setting - Change....3-72
Breaker mode - Operate when working mode is not in breaker....6-43
Breaker mode switch....6-33
Breaker name setting - Change....3-71
Breaker operation switch....3-93
Breaker setting....3-71
Bucket - Invert....3-227
Bucket - Replace....3-226
Bucket - Replace and invert....3-226
Bucket clearance - Adjust....4-37
Bucket teeth (vertical pin type) - Replace....4-32
Bucket tooth (horizontal pin type) - Replace....4-36
Buzzer cancel switch....3-58

C

Cab equipment name....3-4
Cab floor - Clean....4-45
Cab front window - Open/Close....3-104
Calendar....3-81
Camera - Check visibility....4-50
Camera image selector switch....3-60
Camera system caution lamp....3-37
Cap with lock - Lock....3-232
Cap with lock - Open....3-231
Cap with lock - Open / Close....3-231
Caution lamp for engine sudden stop by auto idle stop....3-30
Caution lamp list....3-20
Ceiling window - Open/Close....3-103
Charge level caution lamp....3-33
Check before you start operation....4-51
Checks and adjustment before you start engine.3-151
Cigarette lighter....3-95
Clock....3-48
Clock - Adjust....3-261
Clock adjustment....3-80
Cold weather information....3-281
Cold weather operation....3-281
Comparison of road liners and steel shoes....3-267
Configurations....3-68
Consumable parts....7-3
Consumable parts list....7-3
Contents of safety labels....2-3
Controls and gauges names....3-5
Coolant....3-281,4-9
Coolant - Check level/Add....3-157
Cooling system - Clean inside....4-25,4-26
Cover with lock....3-111
Cover with lock - Close....3-233
Cover with lock - Open....3-233
Cover with lock - Open/Close....3-233
Cup holder....3-111
Current abnormality display switch....3-23
Cylinder - Bleed air....4-48

D

Daylight saving time....3-83
Declaration of conformity....1-20
DEF....3-281,4-10
DEF - Check level / Add....3-164
DEF filter....3-149
DEF filter - Replace....4-90
DEF hose - Replace....4-101
DEF level caution lamp....3-27
DEF level gauge....3-49
DEF low level guidance....3-44
DEF Storage....4-12
DEF system caution lamp....3-28
DEF system high-temperature stop caution lamp.3-28
DEF tank - Clean....4-96
DEF tank breather element - Replace....4-81
DEF tank filler port filter - Replace....4-96
Defined life parts - Periodic replacement....7-2
Defined life parts list....7-2
Digging work....3-223
Display....3-253
Display monitor....3-242
Display selector switch....3-253
Ditching work....3-223
Do not perform the work if foreign material is accumulated around hydraulic cylinder....3-212
Drain valve - Adjust....3-153

E

ECO gauge....3-49
ECO gauge display....3-69
ECO gauge display fuel target value....3-69
ECO guidance....3-42
ECO guidance display....3-69
ECO guidance records....3-66
Economy mode adjustment....3-70
Economy mode recommended guidance....3-43
Electric wiring - Check....3-158
Electrical components....4-12
Electrical system - Troubles and actions....3-296
Electrolyte level - Check on indicator....4-58
Emergency escape hammer....3-110
End of service life....4-102
Energy saving guidance....3-66
Engine - Check low-speed run and acceleration 3-186
Engine - Check starting condition / Check unusual noise....3-186
Engine - Check/Adjust valve clearance....4-86
Engine - Operate in break in period....3-187

Engine - Operate/Check before you start..... 3-178
Engine - Start.....2-30,3-181
Engine - Start in cold weather.....3-183
Engine - Start in normal weather..... 3-181
Engine - Start with jumper cables.....3-294,3-295
Engine - Stop..... 3-199
Engine - Troubles and actions..... 3-299
Engine - Warm-up operation.....3-188
Engine coolant temperature caution lamp..... 3-24
Engine coolant temperature gauge.....3-45
Engine high-pressure piping - Replace.....4-100
Engine high-pressure piping clamp - Check for looseness and hardening of rubber.....4-94
Engine hood - Lock.....3-235
Engine hood - Open.....3-234
Engine hood - Open/Close.....3-234
Engine intake pipe clamps - Check all tightening points..... 4-80
Engine number plate - Location..... 1-17
Engine oil pan - Change oil/Engine oil filter cartridge - Replace.....4-62
Engine oil pan - Check oil level/Add oil.....3-158
Engine oil pressure caution lamp.....3-31
Engine overrun caution lamp..... 3-32
Engine shutdown secondary switch.....3-96
Engine stop pilot lamp.....3-41
Engine system caution lamp.....3-28
Escape from soft ground.....3-222
Every 100 hours maintenance.....4-52,6-9
Every 1000 hours maintenance..... 4-72
Every 2000 hours maintenance..... 4-82
Every 4000 hours maintenance..... 4-93
Every 4500 hours maintenance..... 4-96
Every 500 hours maintenance..... 4-61,6-11
Every 8000 hours maintenance..... 4-100
Every 9000 hours maintenance..... 4-101
Explanation of components..... 3-8,6-28
Explanation of lift capacity..... 5-4

F

Fan belt and Auto-tensioner - Check belt tension and auto-tensioner / Replace auto-tensioner.....4-80
Fan control system caution lamp..... 3-31
Fan switch.....3-240
Filter.....4-12
Fin - Check/Clean..... 4-68
Final drive case - Change oil..... 4-76
Final drive case - Check oil level/Add oil..... 4-54
Fire extinguisher.....3-118
Fluorinated greenhouse gases..... 1-18
Foreword.....1-6
Frequency - Adjust.....3-256
FRESH/RECIRC air selector switch..... 3-242
Front window - Check clearance at stopper when you pull up..... 4-43
Fuel.....4-7
Fuel - Add with refuel pump.....3-161
Fuel - Check level/Add.....3-160
Fuel and lubricants.....3-281
Fuel consumption gauge.....3-49
Fuel consumption gauge display..... 3-68
Fuel consumption record - Clear.....3-67
Fuel control dial.....3-90
Fuel gauge.....3-47
Fuel level caution lamp..... 3-25
Fuel low level guidance.....3-44
Fuel main filter cartridge - Replace.....4-79
Fuel prefilter cartridge - Replace.....4-64
Fuel spray prevention cap - check for missing and hardening of rubber..... 4-95
Fuel spray prevention cap - Replace..... 4-100
Fuel tank - Drain water and sediment.....3-153
Fuel, coolant and lubricants - Use by ambient temperature.....7-8
Function switch..... 3-60
Function switch and guidance icon.....3-52
Fuse..... 3-115
Fusible link..... 3-117

G

Gas spring - Check..... 4-47
General attachment such as crusher - Operate....6-44
General attachment such as crusher, etc. - Check points when using.....6-45
General precautions - Operation and maintenance.....
.....2-20
General view.....3-2
General view of machine..... 6-18
GPS synchronization..... 3-81
Graph display - Change.....3-67
Grease..... 4-10
Grease pump holder..... 3-117
Guidance display at key off.....3-69
Guidance of engine stop operation during aftertreatment devices regeneration..... 3-44
Guidance to avoid hydraulic relief.....3-43

H

Handle bucket with hook.....6-5
Headrest - Adjust in vertical direction..... 3-171
Headrest - Remove and install.....3-171
High register range (treble) - Adjust.....3-260
Horn - Check.....3-166
Horn switch..... 3-93
Hydraulic breaker.....6-55
Hydraulic circuit - Bleed air..... 4-48
Hydraulic circuit - Connect.....6-34
Hydraulic circuit - Release internal pressure..... 4-85
Hydraulic circuit - Switch.....6-35
Hydraulic circuit of attachment - Change-over / Connect.....6-34
Hydraulic oil filter element - Replace..... 4-72
Hydraulic oil temperature caution lamp.....3-24

Hydraulic oil temperature gauge.....3-46
Hydraulic quick coupler system caution lamp.....3-34
Hydraulic system - Warm-up operation.....3-190
Hydraulic system caution lamp.....3-26
Hydraulic tank - Change oil.....4-97
Hydraulic tank - Check oil level/Add oil.....3-155
Hydraulic tank breather element - Replace.....4-74
Hydraulic tank strainer - Clean.....4-82

I

Idling stop guidance.....3-43
Introduction.....1-14

J

Jumper cable - Connect.....3-294
Jumper cable - Disconnect.....3-295

K

KCCV filter element - Replace.....4-87
KDPF - Clean.....4-96
KDPF soot accumulation caution lamp.....3-27
KDPF system caution lamp.....3-26
Key-on camera position.....3-86
Komatsu Closed Crankcase Ventilation (KCCV) 3-135
Komatsu Diesel Particulate Filter (KDPF) - Handle.....3-124
Komatsu machine operator privacy policy.....1-7
KOMTRAX.....3-150
KOMTRAX - Power supply.....3-150
KomVision.....3-264
KOWA (Komatsu Oil Wear Analysis).....4-11

L

Lamp switch.....3-91
Language settings.....3-84
Large capacity final drive case - Change oil.....4-77
Large capacity final drive case - Check oil level / Add oil.....4-55
Left front mirror (A) - Adjust.....3-174
Left front mirror (B) - Adjust.....3-176
Leveling work.....3-224
Lifting device - Lift objects.....3-225
Lifting operation by bucket with hook.....2-41
Lightweight towing hole - Precautions.....3-289
Loading work.....3-224
Location of safety labels.....2-2
Lock.....3-231
Lock lever.....3-98
Lock lever automatic lock cancel pilot lamp.....3-41
Lock lever automatic lock cancel switch.....3-94
Lock pin.....3-102,6-30
Long-term storage precautions.....3-284
Loudness - Set.....3-261
Low register range (bass) - Adjust.....3-260
Lower wiper switch.....3-97
Lubrication chart.....7-6

M

Machine - Check after you finish work.....3-230
Machine - Check before you start.....3-153
Machine - Escape when track on one side is stuck.....3-222
Machine - Escape when tracks on two sides are stuck.....3-222
Machine - Information.....1-17
Machine - Lift.....3-279
Machine - Load.....3-271
Machine - Load/Unload with trailer.....3-270
Machine - Lubricate.....4-61
Machine - Lubrication.....6-9,6-11
Machine - Operate.....3-151
Machine - Operate after completion of warm-up operation.....3-196
Machine - Park.....3-229
Machine - Prepare to move.....3-201
Machine - Raise using block.....4-46
Machine - Secure.....3-273
Machine - Start (Travel forward and reverse)/Stop.....3-201
Machine - Start after long-term storage.....3-285
Machine - Steer (change direction).....3-204
Machine - Stop.....3-203
Machine - Store long-term.....6-49
Machine - Swing.....3-206
Machine - Tilt.....4-46
Machine - Travel forward.....3-202
Machine - Travel reverse.....3-202
Machine - Unload.....3-276
Machine equipment name.....3-2
Machine monitor - Basic operation.....3-9
Machine monitor - Basic operation when ID number of operator identification is set while starting switch is ON.....3-12
Machine monitor - Basic operation when trouble occurs while operate machine.....3-15
Machine monitor - Basic operation when you start engine in abnormal situation.....3-14
Machine monitor - Basic operation when you start engine in normal situation.....3-9
Machine monitor - Basic operation when you start engine while engine shutdown secondary switch is ON.....3-10
Machine monitor - Basic operation when you stop engine in normal situation.....3-11
Machine monitor equipment.....3-8
Machine monitor equipment name.....3-6
Machine monitor when operating work equipment, swing, travel and attachment - Basic operation.....3-17
Machine ready for installation of attachment - Handle.....6-28
Machine setting.....3-70

Magazine box....3-111
Maintenance....3-77,6-21
Maintenance - Every 250 hours....4-54
Maintenance - Every 5000 hours....4-97
Maintenance during long-term storage....3-285
Maintenance information....4-6
Maintenance interval for hydraulic breaker....4-18
Maintenance interval table....4-16
Maintenance procedure....4-19
maintenance schedule....6-9
Maintenance schedule....4-16
Maintenance time caution lamp....3-35
Manual operation - Stop....3-247
Manual stationary regeneration....3-128
Menu switch....3-254
Message - Reply....3-88
Message display....3-40,3-87
Meter display....3-45
Method for checking before starting....6-18
Method of work....6-20
Mirrors - Adjust....3-173
Monitor display....3-264
Monitor setting....3-79
Monitor switch....3-51
Music - Play with Bluetooth® connected....3-258

N

Names of control levers and pedals....3-98
Names of switch panel equipment....3-89
NOISE EMISSION LEVELS....1-11

O

OFF switch....3-239
Oil....4-6
Oil and fuel storage....4-12
Oil filler cap - Install....3-156
Oil, fuel, and coolant....4-6
Operate with USB flash drive connected....3-257
Operation records....3-66
Operation with cold air to face and warm air to feet - Start....3-248
Operations and checks after you start engine....3-186
Operator cab door - Lock....3-237
Operator cab door - Open....3-236
Operator cab door - Open/Close....3-236
Operator ID....3-85
Operator ID - Change operator ID during identification state....3-86
Operator seat - Adjust....3-167
Other equipment....3-103
Other labels....2-12
Other trouble....3-296
Overload caution lamp....3-33

P

Pairing....3-262
Paraffin-based fuel....4-9
Phenomena that are not failures....3-287
Pilot display....3-39
Pilot display and meter display....3-38
Play music with USB connected....3-257
Power supply outlet....3-113
Power switch....3-253
Precautions - Before starting operation....2-20
Precautions - Maintenance....2-44
Precautions - Operation....2-27
Precautions - Prevent fire....2-22
Precautions after daily work completion in cold weather....3-282
Precautions before you start inspection and maintenance....2-44
Precautions for blade position during backhoe operation....3-218
Precautions for check and maintenance....2-48
Precautions for high-speed travel....3-217
Precautions for jobsite....2-27
Precautions for lifting operations....6-5
Precautions for machine and jobsite....2-25
Precautions for maintenance....4-2
Precautions for operation....2-33
Precautions for severe job condition....3-289
Precautions for towing machine....3-288
Precautions for transportation....2-39
Precautions to use attachments and options safely6-2
Precautions when machine travels....3-217
Precautions when using KomVision....3-264
Precautions when you charge battery....3-292
Precautions when you get on or off machine....2-23
Precautions when you retract work equipment....3-217
Precautions when you use blade....3-218
Precautions when you work on slope....3-220
Preheating pilot lamp....3-39
Preparation for long-term storage....3-284
Preparations for safe operation....2-20
Preset - Load....3-256
Preset station....3-257
Preset/audio switch....3-254
Product identification number (PIN) and machine serial No. plate - Location....1-17
Prohibited operations....3-211
Prohibition of digging operation at an angle when teeth do not engage....3-213
Prohibition of digging operation on hard rocky ground....3-213
Prohibition of high-speed travel operations on rough ground....3-215
Prohibition of lifting operation....3-214
Prohibition of long-time continuous travel operations....3-216
Prohibition of operations at stroke end of hydraulic cylinder....3-211
Prohibition of operations by bucket drop force....3-212
Prohibition of operations by machine drop force.3-213
Prohibition of operations by swing force....3-211

Prohibition of operations by travel force.....3-211
Prohibition of operations when machine is not in stable condition.....3-214
Prohibition of operations which you use bucket as lever.....3-212
Prohibition of sudden lever or pedal shift during high speed travel.....3-215
Prohibition of swing or travel when rocks and soils are on top of track assembly.....3-214
PTO gear case - Check oil level/Add oil..... 4-78
Pump - Bleed air..... 4-48
Pump secondary drive switch..... 3-94

Q

Quick coupler - Equipment name.....3-121
Quick coupler - Handle..... 3-120
Quick coupler switch.....3-92

R

Radiator coolant level caution lamp.....3-32
Radio.....3-252
Radio - Check preset region..... 3-263
Radio - Check version.....3-263
Radio - Operate..... 3-256
Radio - Operate when you listen.....3-256
Radio - Set.....3-259
Radio band selector switch.....3-252
Radio equipment.....3-252
Recommended applications.....3-223
Recommended attachment operations.....6-55
Recommended brands and qualities other than KOMATSU genuine oils..... 7-9
Recommended fuel, coolant, and lubricant.....7-4
Recommended use of road liners.....3-267
Remaining time for maintenance - Reset.....3-78
Revolving lamp - Install.....3-278
Revolving lamp - Remove.....3-278
Revolving lamp - Remove / Install..... 3-278
Revolving lamp switch..... 3-96
Road liners - Handle..... 3-267
Road liners - Precautions.....3-267
Roadliner - Check..... 4-32
Roadliner shoe bolt - Check looseness/retighten. 4-30
Roadliners - Replace..... 4-32
Room lamp switch.....3-93
Rubber pad shoes and road liners - Handle..... 6-52
Rubber shoes - Check/Adjust track tension.....4-31

S

Safety - Information.....1-10
Screen adjustment.....3-79
Screen adjustment (camera).....3-80
Seat - Adjust height.....3-168
Seat - Adjust in fore-and-aft direction..... 3-167
Seat - Adjust lumbar support..... 3-169
Seat - Heat.....3-92,3-171
Seat - Recline..... 3-168
Seat - Tilt.....3-168
Seat belt - Fasten.....3-177
Seat belt - Fasten and unfasten.....3-177
Seat belt - Unfasten..... 3-177
Seat unit - Adjust in fore-and-aft direction.....3-170
Seatbelt caution lamp..... 3-36
Selector valve..... 6-29
Serial plate..... 1-19
Service meter.....3-48
Service meter - Location..... 1-18
Shovel work..... 3-223
Slide door.....3-110
Slide door rail - Clean..... 4-42
Slide door rail and roller - Check.....4-42
Slide door rail and roller - Check/Clean/Lubricate 4-42
Slide door rail and roller - Lubricate.....4-42
Slide door stopper - Check/Clean/Lubricate..... 4-43
Smart phone or mobile music player - Connect with USB..... 3-257
Sound balance - Adjust.....3-259
Specifications.....6-23,6-50
Specifications - PC138US-11E0..... 5-2
Specifications (2-piece boom).....6-13
Split measurement - Stop..... 3-68
Standard torque..... 4-14
Starting switch.....3-90
Steer machine.....3-204
Stop valve..... 6-28
Sunlight sensor..... 3-243
Super long front boom and arm..... 6-18
Super long front boom and arm - Explanation of lift capacity chart.....6-25
Support machine with two sides of blade.....3-215
Suspension seat - Adjust hardness..... 3-170
Swing circle - Lubricate.....4-67
Swing lock pilot lamp..... 3-39
Swing lock switch.....3-91
Swing machinery case - Change oil.....4-75
Swing machinery case - Check oil level/Add oil....4-53
Swing motor - Bleed air.....4-48
Swing parking brake cancel switch.....3-94
Swing pinion - Check grease level/Add grease.... 4-66
System caution lamp.....3-25
System operating lamp..... 3-120

T

Temperature control switch.....3-240
Time setting.....3-82
Tool box.....3-117
Towing and being towed..... 2-40
Track - Check tension..... 4-31
Track - Decrease tension.....4-32
Track - Increase tension.....4-31
Track shoe bolt - Check looseness/Tighten..... 4-30
Track shoes - Select..... 6-51
Transport and storage.....6-21

Transportation.....3-269
Travel lever..... 3-100
Travel motor - Bleed air.....4-49
Travel partial mode recommendation guidance....3-43
Travel speed display..... 3-40
Travel speed selector switch.....3-56
Troubles and actions.....3-286
Troubles and actions on chassis.....3-297
Tuning/time setting switch.....3-254
Turbo protection function..... 3-185

U

Urea SCR system warning - Handle.....3-135
USB.....3-255
Use automatic operation.....3-244
Use defroster..... 3-250
Use manual operation.....3-246
Use slope.....4-46
User menu..... 3-64
User menu - Contents.....3-64
User menu display switch..... 3-63
User menu screen.....3-65

V

Vacuator valve - Check /Replace.....4-24
Vent selector switch..... 3-241
Vibration level..... 1-12
Volume control switch..... 3-253

W

Walk-around check..... 3-151
Warning display.....3-18
Warranty of road liners.....3-267
Washable floor - Clean.....4-45
Water pump - Check..... 4-93
Water separator - Check/Drain water and sediment....
.....3-153
When required..... 4-19
When travelling..... 6-21
Window washer fluid - Check level/Add.....4-39
Window washer switch.....3-58
Wiper pilot lamp..... 3-39
Wiper switch.....3-57
Work equipment - Lubricate.....4-52
Work equipment - Operate.....3-207
Work equipment control lever..... 3-101
Work equipment lock pilot lamp.....3-41
Work precautions.....3-217,6-5
Working lamp - Check.....3-166
Working mode - Handle..... 3-209
Working mode - Select.....3-209
Working mode display.....3-40
Working mode selector switch..... 3-53
Working modes..... 6-19

Y

Your machine serial numbers and distributor.....1-18

PC138US-11E0 HYDRAULIC EXCAVATOR

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