OPERATOR'S MANUAL

Original instructions

TB215R

Serial No. 215002408~

Book No. AC8E019

OETB215R_A-XT

MINI EXCAVATOR

TAKEUCHI

WARNING Read and understand these instructions.
Failure to do so can cause injury or death.

SAFETY ALERT SYMBOL

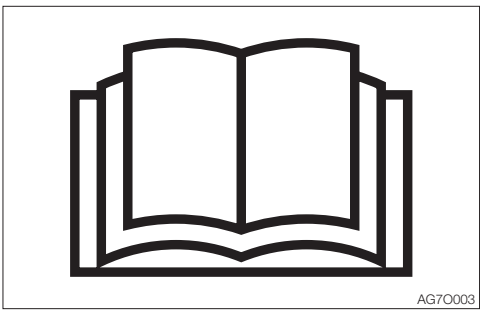
This symbol represents the safety alert. The message that follows the symbol contains important information about safety.
Read and understand the message to avoid personal injury or death.

It is the owner or employer's responsibility to fully instruct each operator in the proper and safe operation of all equipment. All persons using this machine should thoroughly familiarize themselves with the contents of this manual.

All operators must be instructed on the proper functions of the excavator before running the machine.

Learn and practice correct use of the machine controls in a safe, clear area before operating this machine on a job site.

⚠ WARNING



Improper operation, inspection and maintenance of this machine can cause injury or death.
Read and understand this manual before performing any operation, inspection or maintenance on this machine.

Always store this manual near at hand preferably on the machine itself. If it should be lost or damaged, immediately order a new one from your Takeuchi dealer.
When transferring ownership of this machine, be sure to hand this manual to the next owner.

Takeuchi supplies machines complying with the local regulations and standards of the country of export. If your machine has been purchased in another country or from a person or company of another country, it may not have the safety devices or safety standards required for use in your country. Should you have any question about whether your machine complies with the regulations and standards of your country, contact a Takeuchi dealer.

SIGNAL WORDS

Safety messages appearing in this manual and on machine decals are identified by the words “DANGER”, “WARNING” and “CAUTION”. These signal words mean the following:

⚠ DANGER

DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor moderate injury.

IMPORTANT: The word IMPORTANT is used to alert operators and maintenance personnel about situations which could result in damage to the machine and its components.

It is impossible to foresee every possible circumstance that might involve a potential hazard. The warnings in this manual or on the machine can not cover all possible contingencies. You must exercise all due care and follow normal safety procedures when operating the machine so as to ensure that no damage occurs to the machine, its operators or other persons.

INTRODUCTION

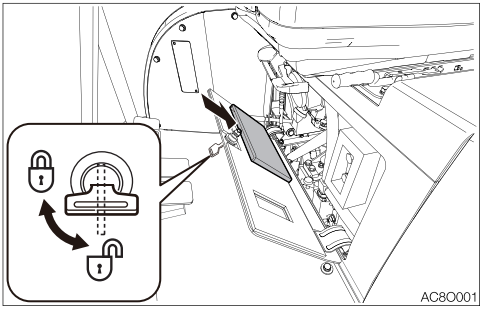
FOREWORD

This manual describes operation, inspection and maintenance of the machine, as well as safety instructions to be heeded during these operations.
If you have any questions about the machine, please contact a Takeuchi sales or service outlet.

- Some details in this manual may differ from those provided in the machine you are using.
- Please note that the information and specifications in this manual are subject to change without prior notice.

MANUAL STORAGE COMPARTMENT

A compartment for storing this manual is provided at the position shown on the diagram below.

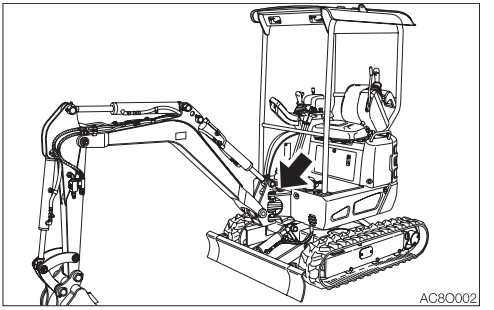


1. Insert the starter key and turn it counterclockwise to open the cover under the seat.
2. After using the manual, place it in the plastic pouch and store it back in the manual storage compartment.

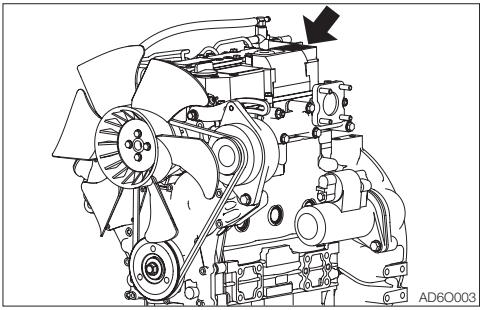
SERIAL NUMBERS

IMPORTANT: Do not remove the machine name plate with the serial number. Check the serial numbers of the machine and engine and write them down in the spaces below.

Machine number:

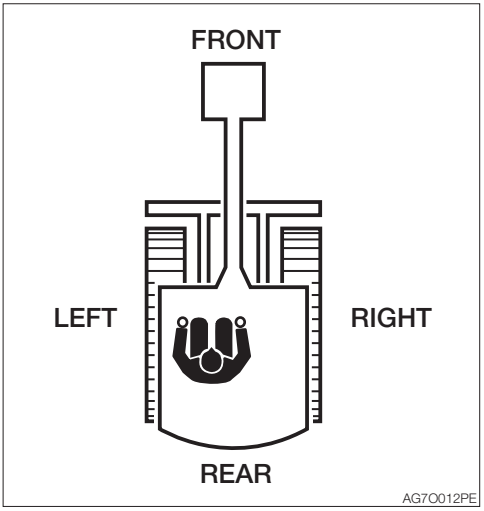


Engine number:



MACHINE DESCRIPTION

FRONT, REAR, LEFT AND RIGHT



This manual refers the front, rear, left and right of the machine as seen when sitting in the operator's seat with the dozer blade visible to the front.

DESIGNATED OPERATIONS

Use this machine primarily for the following operations:
- Excavation
- Digging ditches
- Digging side ditches
- Leveling
- Loading

FEATURES

- "Flexible machine width mechanism" for crawler width
- Low engine noise and exhaust emissions
- Smaller rear slew radius, smaller turns (stability is retained)

BREAK-IN PERIOD

When the machine is new, operate the machine for the first 100 hours (as indicated on the hour meter) by following the instructions below.
Using a new machine without a break-in period will lead to quicker deterioration of machine performance and may shorten the machine's service life.
- Sufficiently warm up the engine and hydraulic oil.
- Avoid heavy loads and rapid operations. Operate with a load of about 80% the maximum load.
- Do not abruptly start up, accelerate, change directions, or stop unless necessary.

NOTES ON READING THIS MANUAL

Please note that the descriptions and diagrams included in this manual may not be applicable to your machine.
The numbers used in the illustration are with circles around them. The same numbers appear between the parentheses in the text.
(Example: ① → (1))

Symbols used in this manual
The symbols used in this manual have the following meanings.
⃠, ✕..... Prohibition
..... Lock
..... Unlock

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SAFETY

GENERAL PRECAUTIONS

It is your responsibility to observe all pertinent laws and regulations and to follow the manufacture's instructions on machine operation, inspection and maintenance.

Virtually all accidents occur as the result of a failure to observe basic safety rules and precautions.
Most accidents can be prevented by identifying the potentially hazardous situations beforehand.
Read and understand all safety messages which describe how to prevent accidents.
Do not operate the machine until you are sure that you have gained a proper understanding of its operation, inspection and maintenance.

Observe all safety rules

- Operation, inspection and maintenance of this machine must be performed only by a trained and qualified person.
- All rules, regulations, precautions and safety procedures must be understood and followed when performing operation, inspection and maintenance of this machine.
- Do not perform any operation, inspection and maintenance of this machine when under the adverse influence of alcohol, drugs, medication, fatigue, or insufficient sleep.

When a problem is found on the machine

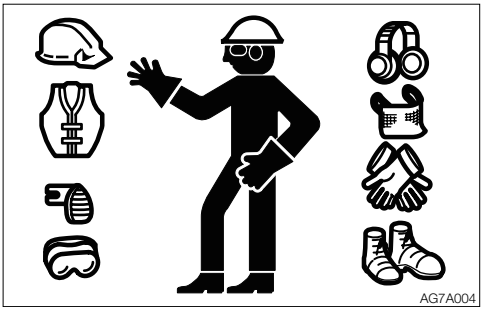
If any problem (noise, vibration, smell, disorder of instrument, smoke, oil leak or wrong indication of alarm and panel, etc.) is detected during the operation or inspection and maintenance of the machine, please inform the administrator and take proper actions. Do not operate the machine until the trouble is cleared.

Operating temperature range

To maintain the performance of machine and to prevent it from early wear, observe the following operating conditions.

- Do not operate the machine if the ambient temperature is higher than +45°C (+113°F) or lower than –15°C (+5°F).
  - If operated at an ambient temperature of higher than +45°C (+113°F), the engine may overheat and cause the engine oil to degrade. Also, the hydraulic oil may become very hot, causing damage to the hydraulic equipment.
  - If operated at an ambient temperature of lower than –15°C (+5°F), the parts made of rubber such as gaskets may get hardened to cause an early wear or damage to the machine.
  - If the machine is to be used outside the ambient temperature range described above, consult your sales or a service dealer.

Wear appropriate clothing and protective equipment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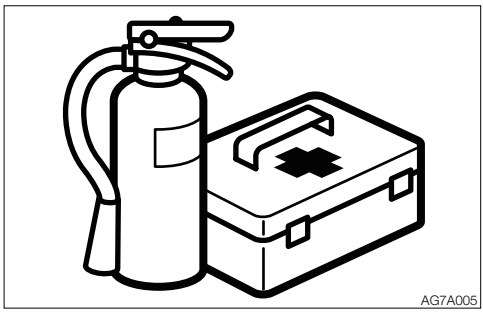
- Do not wear loose clothing or any accessory that can catch on controls or in moving parts.
- Do not wear oily or fuel stained clothing that can easily catch fire.
- Wear a hard hat, safety shoes, safety glasses, filter mask, heavy gloves, ear protection and other protective equipment as required by job conditions. Wear required appropriate equipment such as safety glasses and filter mask when using grinders, hammers or compressed air, as metal fragments or other objects can fly and cause serious injury.
- Use hearing protection when operating the machine. Loud prolonged noise can cause hearing impairments, even the total loss of hearing.

Install a fire extinguisher and first aid kit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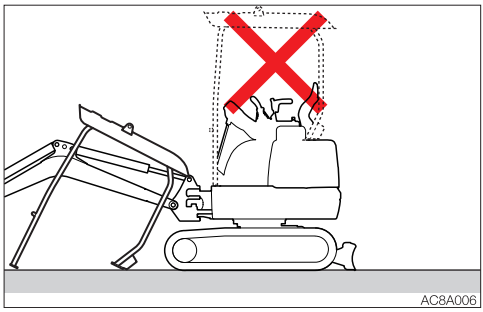
Be prepared for fire and accidents

- Install an extinguisher and a first aid kit, and learn how to use them.
- Lean how to fight a fire and how to deal with accidents.
- Know how to contact emergency assistance and make a list of emergency contacts.

Never remove safety equipment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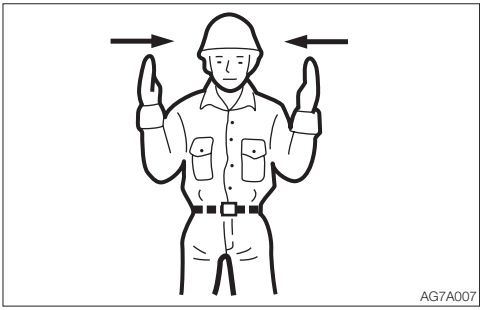
- Make sure all protective guards, canopies and doors are in place and secured. Repair or replace damaged parts before operating the machine.
- Know how to use the safety lock lever, seat belt and other safety equipment and use them properly.
- Never remove any safety equipment except for servicing. Keep all safety equipment in good operating condition.

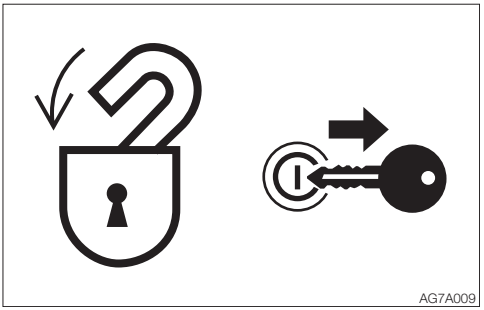
Use a signal person and a flag person



Learn how to use the hand signals required for particular jobs and make sure who has the responsibility for signaling.

- All personnel must fully understand all the signals.
- The operator must respond to signals only from the appointed signal person, but must obey a stop signal at any time from anyone.
- The signal person must stand in a clearly visible location when giving signals.

Cautions when standing up from or leaving the operator's seat



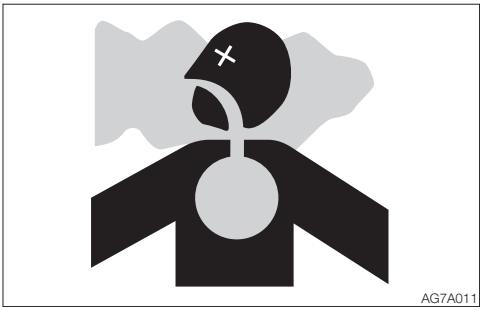
- Before standing up from the operator's seat to, for example, adjust the operator's seat, lower the working equipment to the ground, raise the safety lock lever to the lock position and then stop the engine. If any control is accidentally touched when the safety lock lever is lowered (unlocked), the machine will suddenly move and cause serious injury or death.
- Note that the dozer blade, boom swing and auxiliary hydraulic controls cannot be locked, even when the safety lock lever is set to the locked position.
  Do not carelessly touch these controls.
- Be careful not to touch the operating levers when raising or lowering the safety lock lever.
- Before leaving the operator's seat, lower the working equipment to the ground, raise the safety lock lever to engage the lock and stop the engine. Also, be sure to remove the key, lock the covers, take it with you and store it in a specified place.

Avoid fire and explosion hazards

Keep flames away from fuel, oil, grease and antifreeze. Fuel is particularly flammable and dangerous.

- When handling these combustible materials, keep lit cigarettes, matches, lighters and other flames or sources of flames away.
- Do not smoke or permit open flames while handling fuel or working on the fuel system.
- Do not leave the location while refilling with fuel or oil.
- Never remove the fuel cap or add fuel when the engine is running or still hot. Also, do not spill the fuel on the hot surface of the machine or the component of the electric system.
- Clean up spilled fuel or oil immediately.
- Check for fuel, oil leak. Stop all leaks and clean the machine before operating.
- When operating with grinder or welding, move inflammables to a safe place.
- Do not cut or weld on pipes or tubes that contain flammable fluids. Clean thoroughly with nonflammable solvent before cutting or welding.
- Remove all trash or debris from the machine. Make sure that oily rags or other flammable material are not stored on the machine.
- Handle all solvents and dry chemicals (foam type fire extinguisher) according to procedures identified on manufacturer's containers. Work in a well-ventilated area.
- Never use fuel for cleaning purposes. Always use a nonflammable solvent.
- When handling the fuel, washing oil or paint, open the door and windows to ventilate thoroughly.
- Store all flammable fluids and materials in a safe and well-ventilated place.
- The short circuit of the electric system may cause the fire. Check for any loosened connections or damage to the wires every day. Retighten the loosened connector and wire clamp. Fix or change the damaged wire.
- Fire from the pipes:
  Make sure that the clamps, guards and cushions of the hoses and tubes are securely fixed. If not, hoses or tubes may be damaged due to vibration or contact with other parts during operation. This can cause the high-pressure oil to spurt out, resulting in the fire or injury.

Exhaust fumes from the engine are poisonous



- Do not operate the engine in an enclosed area without adequate ventilation.
- If natural ventilation is not possible, install ventilators, fans, exhaust extension pipes or other venting devices.

Handling asbestos dust

Inhaling asbestos dust can cause lung cancer. When handling the materials which may contain asbestos, take the following precautions:

- Never use compressed air for cleaning.
- Avoid brushing or grinding parts containing asbestos.
- For clean up, use a vacuum equipped with a high efficiency particulate air filter (HEPA).
- Wear the stipulated respirator if there is no other way to control the dust. When working indoors, install a ventilation system with a macromolecular filter.
- Do not allow unauthorized personnel in the work area while working.
- Follow the rules and environmental standard applicable to the work area.

Be careful not to get crushed or cut

Never put your hands, feet or other parts of your body between the upperstructure and the undercarriage or tracks, between the machine body and working equipment, or between a cylinder and moving part. The sizes of these gaps change when the machine moves, and a person can suffer severe injury or death.

Using optional products

- Consult with Takeuchi before installing optional attachments. Depending on the type of attachments or the combination of them, the attachment may come into contact with the operator's compartment or the other parts of the machine. Make sure that the optional attachment installed is not contacted with other parts before use.
- Do not use attachments that have not been approved by Takeuchi. Doing so may compromise safety or adversely affect the machine's operation or service life.
- Takeuchi will not be held responsible for any injuries, accidents or damage to its products caused by the use by a non-approved attachment.

Never modify the machine

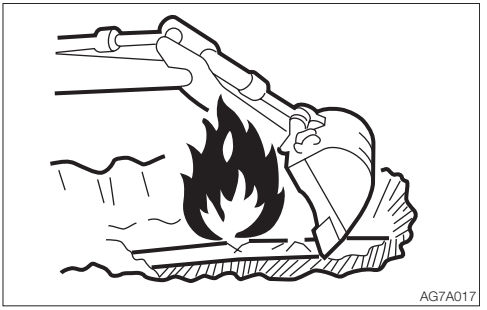
Unauthorized modifications to this machine can cause injury or death. Never make unauthorized modifications to any part of this machine.
If you modify or alter the configuration of the machine in a way which results in a restriction of the operator's field of vision, a new risk assessment will need to be performed. If this becomes necessary, contact your Takeuchi service or sales dealer.

PRECAUTIONS WHEN PREPARING

Know the work area

Before starting operation, know the working area condition to ensure safe operation.

- Inspect the topography and ground condition of the working area, or the structure of the building when working indoors, and take the safety precautions as necessary.
- Be sure to avoid all hazards and obstructions such as ditches, underground lines, trees, cliffs, overhead electrical wires, or places where there is a danger of falling rocks or slides.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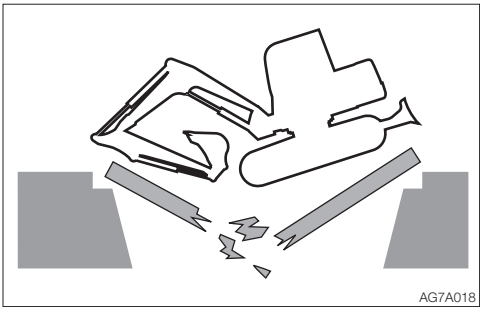
- Check with the administrator for the locations of buried gas pipes, water pipes and power cables. If necessary, determine what specific precautions must be taken to insure safety by consulting with the administrator.
- When working on roads, be sure to consider the safety of pedestrians and vehicles.
  - Use a flag person and/or a signal.
  - Fence off the working area and keep off unauthorized persons.
- When working in water or crossing shallow streams or creeks, check the depth of the water, the solidity of the ground and the water flow speed beforehand.
  Refer to “Cautions on operating” for further instructions.

Check the strength of the bridge

When traveling over a bridge or a structure, check the permissible load. If the strength is insufficient, reinforce the bridge or the structure.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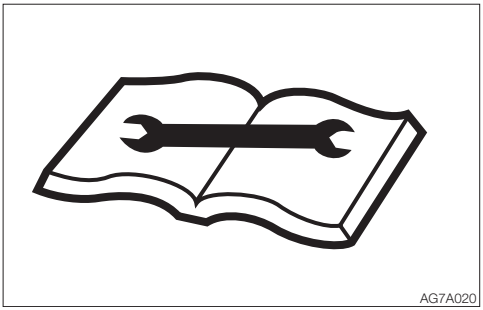
Always keep the machine clean

- Wipe off any oil, grease, mud, snow or ice, to prevent accidents due to slipping.
- Remove all loose objects and unnecessary devices from the machine.
- Remove any dirt, oil or grease from the engine area to prevent fires.
- Clean around the operator’s seat and remove any unnecessary object from the machine.

Perform inspection and maintenance every day



Failure to identify or repair the irregularities or damage on machine can lead to accidents.

- Before operating, perform the specified inspection and make prompt repairs where necessary.
- If a failure occurs and the operation becomes impossible or the engine fails, immediately stop the machine by following the shutdown procedure, and keep machine securely parked until the malfunction is corrected.

Cautions in the operator's compartment

- Remove mud and grease from shoe soles before entering the operator's compartment. Pedaling the machine with the shoes with mud and grease will cause a slip accident.
- Do not leave the parts or tools around the operator's seat.
- Do not leave any plastic bottles in the operator's compartment or attach any suction cups on the window glass. The plastic bottle or suction cup act as a lens and can cause fire.
- Do not use the mobile phone during traveling or working.
- Do not bring combustibles or explosives into the operator's compartment.
- Do not leave the cigarette lighter in the operator's compartment. When the room temperature rises, the lighter may explore.

PRECAUTIONS WHEN STARTING

Support your weight in a three point secure stance when getting on/off the machine

- Do not jump on or down from the machine. Never attempt to get on or off the moving machine.

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- Climb up/down the steps facing the machine and holding the handrail to support your weight in a three point secure stance (hand and feet).
- Never use the safety lock lever or control levers as hand holds.

Before starting the machine, ask any unauthorized personnel to leave the area

Do not start the engine until you are sure it is safe to start the machine by checking the following items.

- Walk around the machine and warn the person who is servicing the machine or is walking near the machine. Do not start the machine until you are certain that no one is around the machine.

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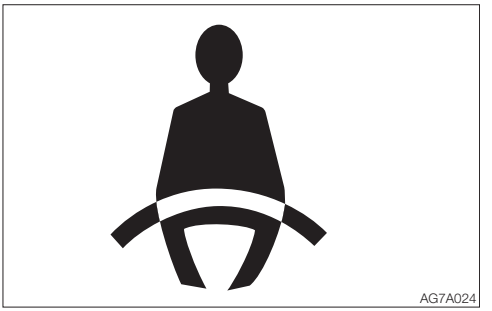
- Check if there is a “DO NOT OPERATE” alert sign or similar sign is on the cab door, controls or starter switch. If there is one, do not start the engine or touch any levers.
- Sound the horn to warn people around the machine.

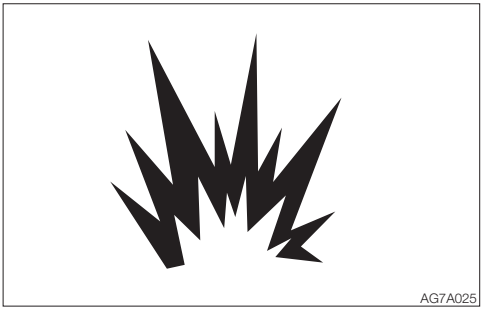
Sit in the operator’s seat and start the engine

- Adjust the seat to securely latch it.


AG7A024

- Fasten the seat belt.
- Check if the parking brake is on and all control levers and pedals are in the neutral position.
- Check if the safety lock lever is in the lock position.
- Make sure that no one is near the machine.
- Start and operate the machine only from the operator’s seat.
- Never attempt to start the engine by shorting across the starter terminals.

Starting with jumper cables



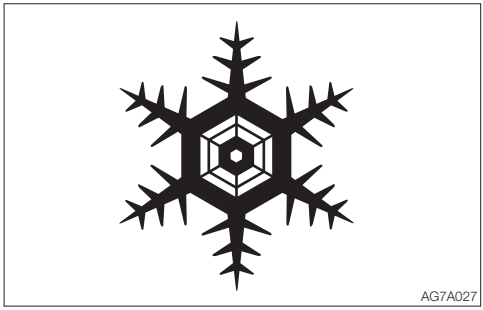
Use jumper cables only in the recommended manner. Improper use of jumper cables can result in battery explosion or unexpected machine motion.
Refer to “If the battery goes dead” for further instructions.

After starting the engine

After starting the engine, perform the operations and checks described below in a safe place with no persons or obstacles in the area. If any malfunction is found, follow the shutdown procedure and report the malfunction.

- Warm up the engine and hydraulic oil.
- Check if all gauges and warning devices are properly working.
- Check for any noises.
- Test the engine speed control.
- Operate each control to ensure they are properly working.

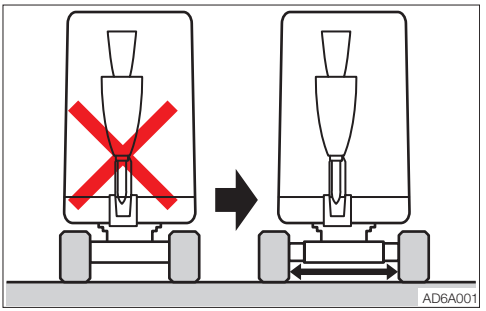
In cold climates



- Be careful of slippery conditions on freezing ground, steps and hand holds.
- In severe cold climates, do not touch any metal parts of the machine with bare hands. The skin will freeze to the metal, resulting in severe injury.
- Do not use ether or starting fluid on this engine. The starting fluids can cause explosion and serious injury or death.
- Warm up the engine and hydraulic oil. If the levers are operated without warming, the machine will not react or move promptly or properly, resulting in accident.

PRECAUTIONS WHEN OPERATING

Operate the machine with the maximum crawler width



- Always operate the machine with the crawler width extended to 1300 mm (51.2 in.) to maximize the machine stability. If the machine is operated with the crawler width narrowed (980 mm, 38.6 in.), the machine may tip over due to its poor stability.
- If the machine must be operated with the narrowed crawler width (980 mm, 38.6 in.), traveling should be done after folding the hoe attachment, lowering the boom to lower the center of gravity and keeping the machine facing forward.

Ensure good visibility

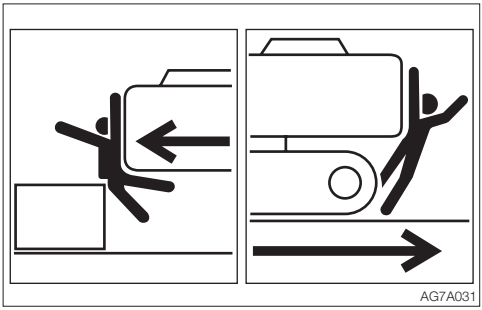
Check the field of view before operating the machine.

- When working in dark places, turn on the machine's working lights and headlights and additional lighting equipment installed, as necessary.
- When visibility is poor due to bad weather (fog, snow, rain or a cloud of dust), stop operating the machine and wait until visibility improves.
- Clean the windows, mirrors, lights and camera to ensure good visibility. Adjust the mirror and camera to the best positions so that the operator can see the rear view (blind spots) from the operator's seat.
- Unauthorized machine modifications or installation of unapproved attachments could impair the visibility. The operator's field of view must conform to ISO 5006.

Do not permit riders on the machine

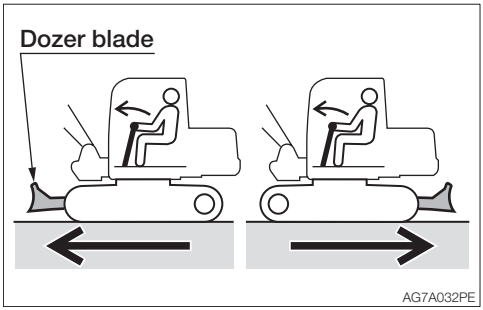
Do not allow anyone to ride on any part of the machine at any time while traveling or operating.

Check if the work area is safe and secure before operation



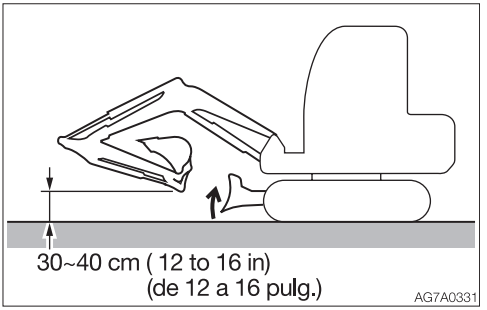
- Confirm the performance limits of the machine.
- Use a signal person at road shoulders, narrow places or where your vision is obstructed.
- Never allow anyone to enter the machine's slewing radius and path.
- Signal your intention to move by sounding the horn.
- There is a blind spot in the rear of the machine. Before traveling in reverse, check that the area is safe and clear.

Check the position of the undercarriage (tracks) before traveling

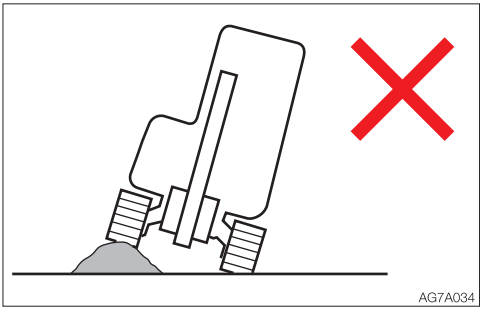


Before operating the travel levers/pedals, make sure that the dozer blade is to the front of the operator's seat. Remember that when the dozer blade is to the rear of the operator's seat, the travel levers/pedals must be operated in the reverse direction from when it is to the front.

Travel safely



- Travel with the dozer blade raised, the hoe attachment folded as shown on the figure above, and the bucket raised 30 to 40 cm (12 to 16 in.) above the ground.
- Do not slew while traveling. If you must operate the hoe attachment while traveling, operate at speeds slow enough so you have complete control at all times.
- When a load greater than a set value is applied during traveling in 2nd (high) speed, the speed will automatically slow down to 1st (low) speed. When the load becomes lighter, the speed will increase and return to 2nd (high) speed. It should be noted that the travel speed changes depending on the load condition (for machines with the automatic travel shift-down system).

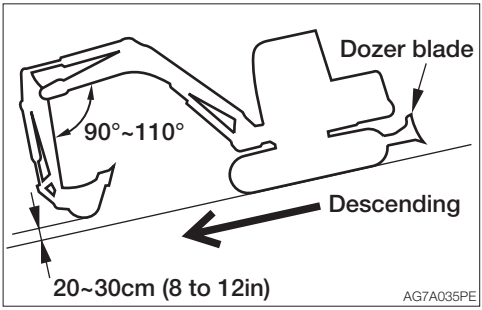


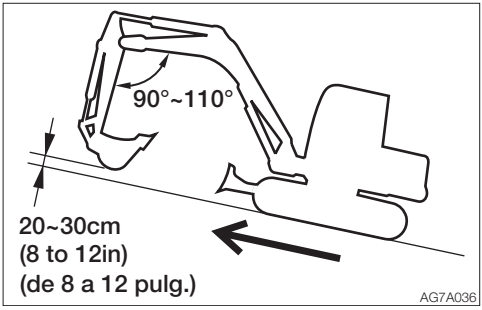
- Avoid crossing over obstacles whenever possible. If you must do so, keep the hoe attachment close to the ground level and travel slowly. Never cross obstacles which will tilt the machine to an angle of 10° or greater.
- On uneven ground, maintain the low speed and avoid starting, stopping or changing directions abruptly. Otherwise, the working equipment may come in contact with the ground, causing the machine to lose its balance and get damaged or to damage the structures in the surrounding area.

Cautions on traveling on slopes

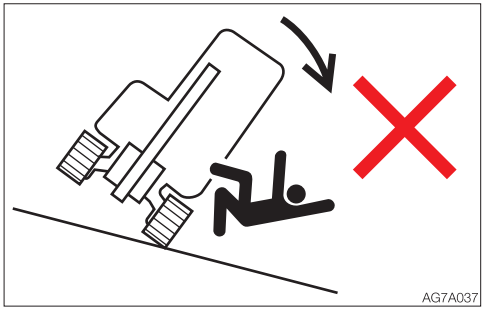
When traveling on slopes or grades, be careful that the machine does not tip (roll) over or slide.

- Never travel on slopes that are too steep for the machine to maintain its stability. Note that in reality, the machine's performance decreases on slopes due to its poor working condition.





- When climbing a hill, keep the operator's seat facing the hillside. When descending a hill, keep the operator's seat facing the downhill direction. In either case, travel must be done while paying attention to the ground in front of the machine.
- When traveling on slopes, lower the bucket to a height of 20 to 30 cm (8 to 12 in.) above the ground. When climbing a steep slope, extend the hoe attachment to the front. In emergencies, lower the bucket to the ground and stop the machine.
- When traveling on slopes or grades, drive slowly in 1st (low) speed. When descending a slope, slow down the engine speed.
- Do not descend slopes in reverse.

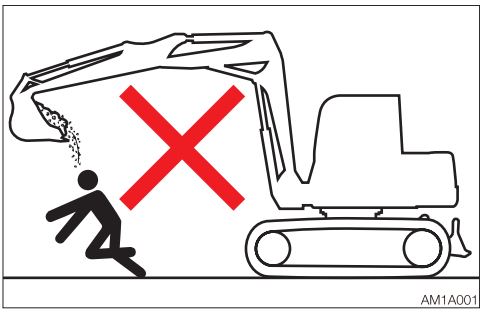


- Do not change directions on slopes or traverse slopes. First return to a flat surface, and then take an alternative path.
- The machine may slip sideways even on a slight slope if the ground is covered with grass or dead leaves, or when traveling on a wet metal plate or frozen surfaces. Make sure the machine is never positioned sideways on slopes.
- If the machine is stalled on the slope, return each operating lever to the neutral position before restarting the engine.

Operate the machine on snow or ice with extra care

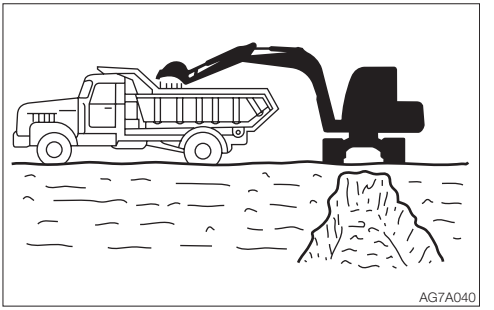
- When traveling on snow or on frozen surfaces, drive at a low speed and avoid starting, stopping or changing directions abruptly.
- In the snowy area, the road shoulder and objects placed beside the road are buried in the snow and cannot be seen. There is a hazard of the machine tipping over or hitting covered objects, so always carry out operations carefully.
- If the machine enters deep snow, there is a hazard that it may tip over or become buried in the snow.
  Be careful not to drive beyond the road shoulder or to get trapped in a snow drift.
- With frozen ground surfaces, the ground becomes soft when the temperature rises, and this may cause the machine to tip over, resulting in an operator trapped inside the machine.
- When parking the machine on an unstable ground, lower the dozer blade.

Do not move the bucket over the heads of people



Moving the bucket over the heads of people entails the danger of the load spilling or the sudden dropping of the bucket.

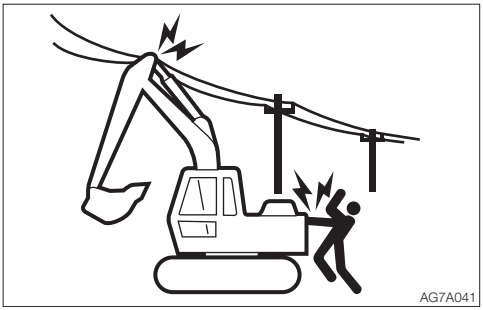
Ensure driver's safety when loading



Do not load a truck unless the truck driver is in a safe place.

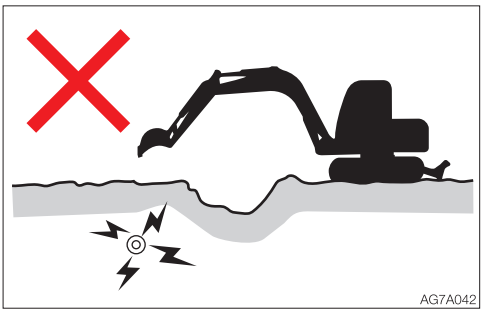
- Never swing or position the bucket over a person or the cab room.
- Load the truck from the rear.

Keep a safe distance from the overhead high-voltage cables



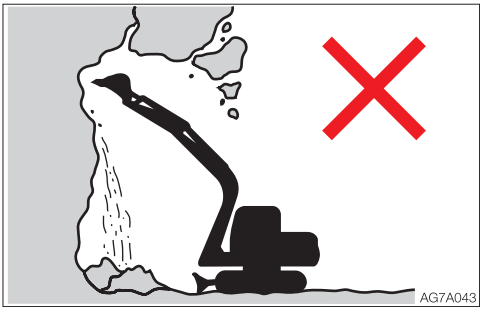
Never bring any part of the machine or loaded material to near to the high voltage cables unless all safety precautions required by the local and national authorities have been installed. If a person comes near to the machine that is discharging sparks or located near to or in contact with the power source, there is a hazard of electric shock and death.

- Always maintain a safe distance between the machine and the high-voltage electric cable.
- Check with the local power company about safe operating procedure before starting operations.
- Consider all cables to be high-voltage cables and treat all cables as energized even though it is known or believed that the power is shut off and the cables are visibly grounded.
- Use a signal person to give warning if the machine approaches too close to the high-voltage electric cables.
- Caution all personnel in the work area not to come close to the machine or the loaded material.

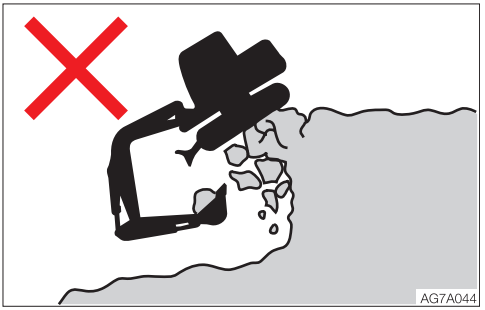


- Pay also careful attention to the high-voltage electric cables buried underground.

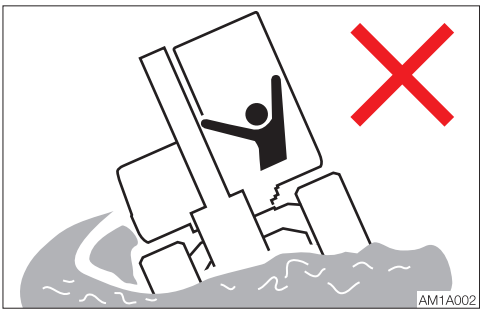
Watch out for hazardous working conditions



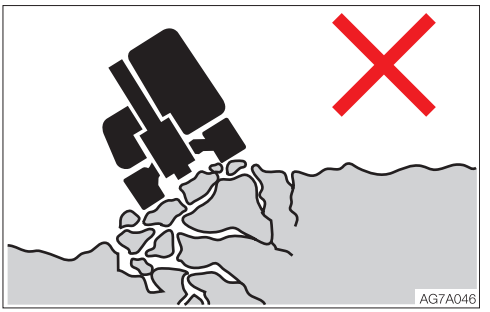
- Never undercut a high bank. Doing so is dangerous as it may cause ground collapse.
- Do not operate in places where there is a danger of falling rocks.



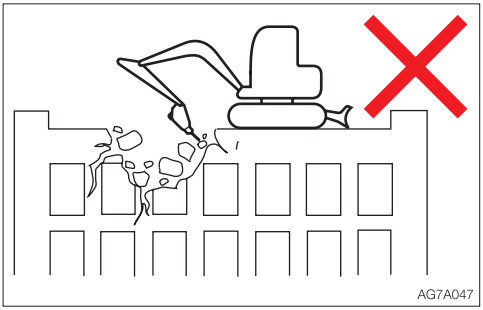
- Maintain a safe distance between the machine and the edge of the digging site. Do not dig the ground under the front of the machine.
- When working close to the cliffs or road shoulders, to make it easier to escape if there is any problem, set the crawlers at right angles to the cliff or road shoulder and the dozer blade to the front when carrying out operations.



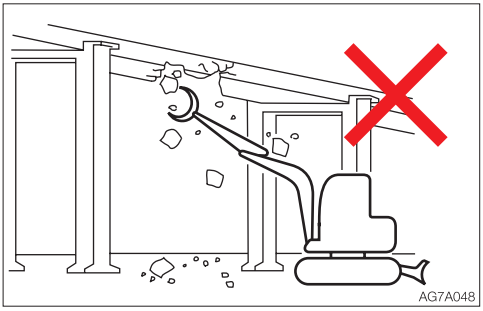
- Do not enter areas where there is soft ground. Doing so could cause the machine to tilt under its own weight, resulting in a machine tipping over or sinking into the ground.



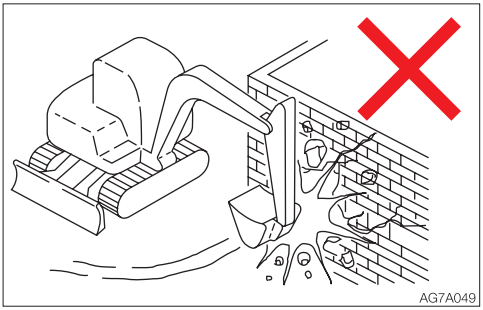
- Do not come close to unstable grounds (cliffs, road shoulders, deep ditches). If the ground should collapse under the weight or vibration of the machine, there is a hazard that the machine may fall or tip over.
  - Remember that the soil after heavy rain or blasting is weak.
  - The ground of top of the embankment and of the circumferences of the excavated ditches are also weak.



- Do not perform demolition work under the machine. There is a hazard that the machine may fall down, because the ground becomes unstable.
- When working on or from the top of buildings or other structures, check the strength and the structure before starting operations. If a building or structure collapses, serious injury or damage will result.



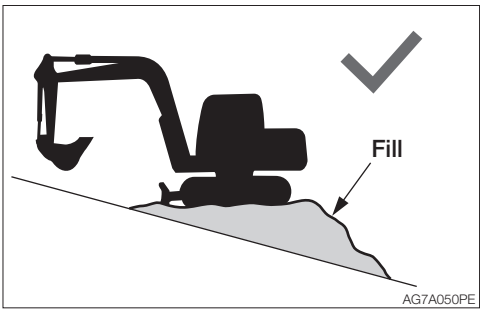
- When doing demolition work, do not perform demolition above your head. There is a hazard of broken parts falling or of the building collapsing and causing serious injury or damage.



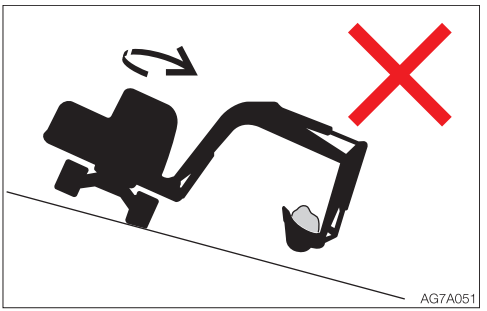
- Do not use the impact force of the hoe attachment for breaking work. There is a hazard of serious injury being caused by flying pieces of broken materials and by the damaged hoe attachment.

Operating on slopes is dangerous

When operating on slopes or grades, slewing or operation of working equipment may cause the machine to lose stability and tip over. Avoid operating on slopes whenever possible.

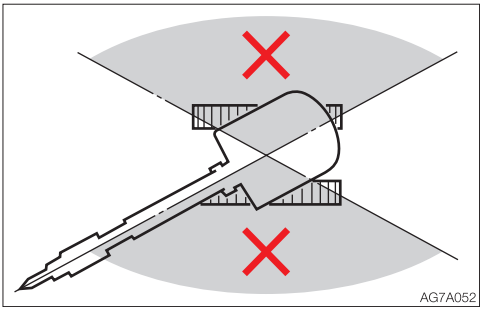


- Level off the work area.



- Avoid slewing to the downhill direction with the bucket full of loaded material. This will reduce the stability of the machine and may result in tipping over.

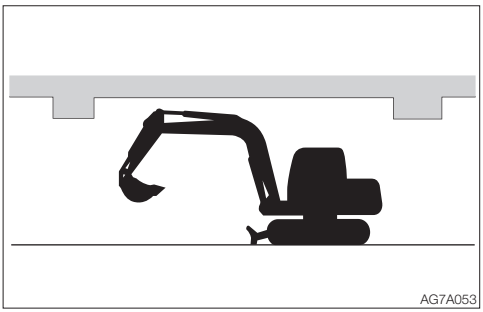
Never slew (swing) sideways with a heavy load



The machine can tip over more easily in the lateral direction than in the longitudinal direction.

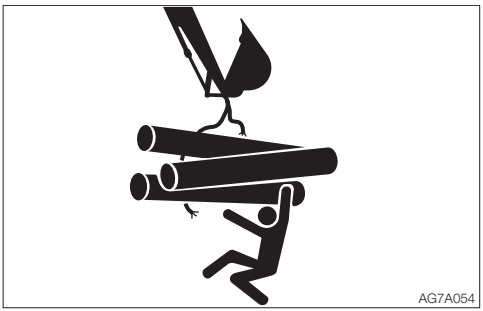
- Do not slew (swing) sideways with a heavy load at the tip of the hoe attachment. In particular, do not slew (swing) sideways on slopes.
- The tip of the attachment is heavier for machines equipped with breakers, crushers or long arms than for machines equipped with the standard bucket. For such machines with heavier tips, do not perform excavation with the digging arm (boom) facing the downhill direction or operate toward sideways.

Be careful with the overhead objects



When operating under bridges, in tunnels, near electric cables or indoors, be careful not to let the boom or arm hit overhead objects.

Excavators are not designed for lifting loads



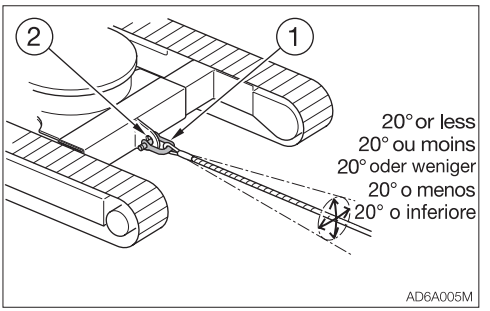
This machine is specifically designed for excavation work. Therefore, it has no safety equipment for crane operation. Extreme caution should be paid if the excavator is used for lifting.

- Never lift loads in excess of capacity. Overload will cause the machine to roll and can result in serious injury or death.
- All rated lift capacities are determined by using a machine placed on a stable and flat ground. For a safe lifting work, the user is expected to make due allowance for the particular job conditions. They include, soft or uneven ground, non-level condition, side loads, dynamic or jerked loads, hazardous conditions, and experience of personnel. The operator and other personnel should fully acquaint themselves with the operator's manual before operating this machine, and rules for safe operation of equipment shall be adhered to at all times.
- The bucket linkage or lifting device may fail if chains or lifting device are incorrectly attached, resulting in serious injury or death.
- Do not attempt to pull stumps out of the ground when using the machine as a crane. The loads imposed on the machine under this use are completely unknown.
- Do not allow anyone to stand on or under the lifted loads or come close to the work area.

Be careful with flying objects

This machine is not equipped with protective equipment to protect the operator from flying objects. Do not use this machine in places where there are risks of the operator being hit by flying objects.

Cautions when towing



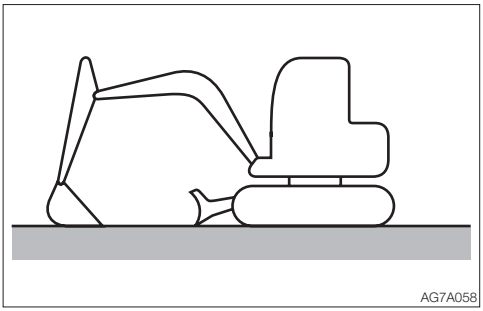
When towing, serious injury or death could result, if performed incorrectly or the wire rope being used is inappropriate or not properly inspected.

- It becomes dangerous if the wire rope breaks or becomes disengaged. Use a wire rope appropriate for the required tractive force.
- Do not use a wire rope that is kinked, twisted or otherwise damaged.
- Do not apply heavy loads abruptly to the wire rope.
- Wear safety gloves when handling the wire rope.
- Make sure there is an operator on the machine being towed as well as on the machine that is towing.
- Never tow on slopes.
- Do not let anyone come near to the wire rope while towing.

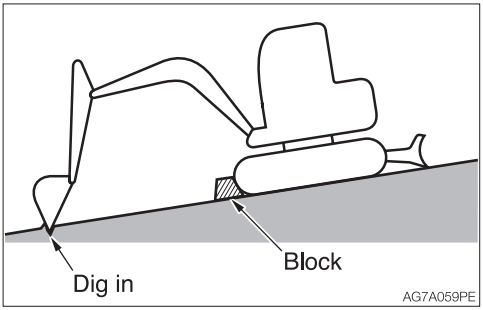
Refer to “Towing” for further instructions.

PRECAUTIONS WHEN STOPPING

Park safely

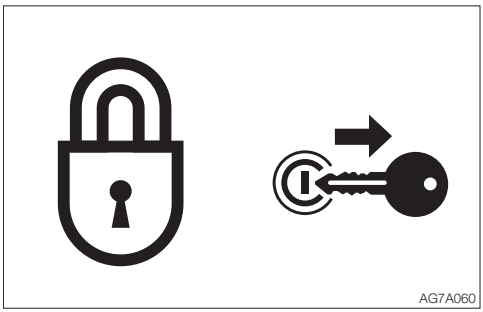


- Park the machine on a flat, rigid and safe ground. Set the parking brake.



If you must park on a slope or incline, park the machine securely and block the movement of the machine.

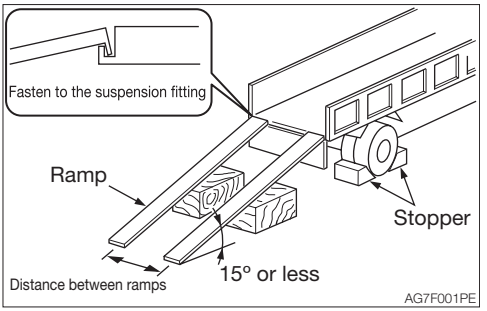
- When parking on a street, use barriers, caution signs, lights, etc., so that the machine can easily be seen even at night to avoid collision with other vehicles.



- Before leaving the machine, do the followings:
  1. Lower the bucket and the dozer blade to the ground.
  2. Raise the safety lock lever to the locked position.
  3. Stop the engine and remove the starter key.
  4. Lock the covers and take the key with you.

PRECAUTIONS WHEN TRANSPORTING

Load/unload the machine safely



The machine may roll or tip over or fall while being loaded or unloaded. Take the following precautions:

- Select a firm, level surface and keep sufficient distance from road shoulders.
- Secure the ramps of adequate strength and size to the truck bed. The slope of the ramps must not exceed 15°. If the rumps are bowed down too low, support them with poles or blocks.
- Never use the working equipment to load or unload the machine. Doing so may result in tipping over or falling down of the machine.
- Keep the truck bed and loading ramps clean of oil, soil, ice, snow, and other materials to prevent the machine from sliding sideways. Clean the crawlers.
- Chock the transporter wheels to prevent movement.
- When being loaded or unloaded, travel slowly in 1st (low) gear by following the signal from the signal person.
- Never change courses on the ramps.
- Do not slew/swing on the ramps. The machine may tip over.
- When slewing/swinging on the truck bed, do it slowly as the footing should be unstable.
- Chock the tracks and secure the machine to the truck bed with wire rope or chain.

Hoist the machine safely

- Know and use correct crane signals.
- Check the hoisting equipment for damaged or missing parts on a daily basis and replace as necessary.
- When hoisting, use a wire rope capable of lifting the machine mass.
- Hoist the machine in such a manner described in the procedure below. Do not do it in any other manner, as it may result in the machine losing its balance.
  Refer to “Hoisting the machine” for further instructions.
- Do not hoist the machine with an operator on it.
- When hoisting, hoist slowly so that the machine does not tip.
- Keep everyone out of the area when hoisting. Do not move the machine over the heads of the persons.

Transport the machine safely

- Know and follow the applicable safety rules, vehicle code and traffic laws when transporting the machine.
- Select the best transport route by considering the length, width, height and weight of the truck with the machine loaded on it.
- Never abruptly start or stop or run at a high speed at the sharp curves during transport. Doing so will move or lose the balance of the loaded machine.

PRECAUTIONS ON MAINTENANCE

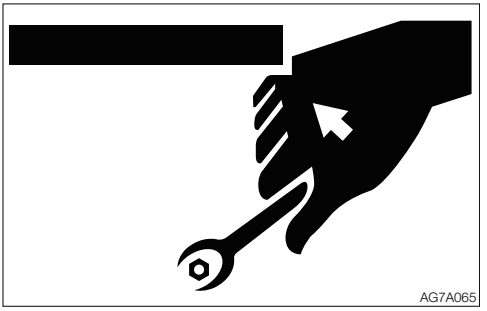
Display a “DO NOT OPERATE” alert sign

Severe injury could result if an unauthorized person should start the engine or touch controls during inspection or maintenance.

- Before performing maintenance, stop the engine, remove the key and take it with you.

- Display a “DO NOT OPERATE” alert sign on easy-to-see locations such as on the starter switch or on control levers.

Use the correct tools



Do not use damaged or weakened tools or tools designed for other purposes. Use tools appropriate for the work involved.

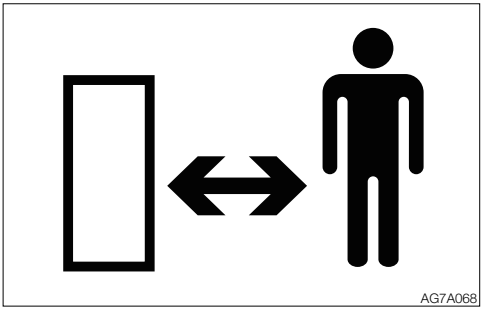
Replace safety-critical parts periodically

- Replace fuel hoses periodically. Fuel hoses wear out over time, even if they do not show any symptom of wear.
- Regardless of the replacement schedule, replace immediately if a symptom of wear is found.
  Refer to “List of safety-critical parts” for further details.

Explosionproof lighting

To prevent an ignition or explosion, use explosion-proof lights when inspecting fuel, oil, coolant or battery fluid. Otherwise, explosion could result causing serious injury or death.

Prohibit access by unauthorized persons

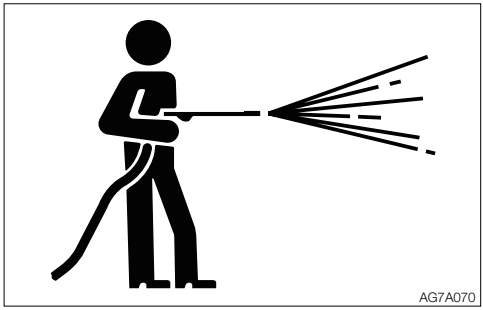


Do not allow unauthorized personnel in the work area while working. Be careful when grinding, welding or using a hammer. You could be injured by flying debris from the machine.

Prepare work area

- Select a firm, level work area. Make sure there is adequate light and, if indoors, ventilation.
- Clear obstacles and dangerous objects. Eliminate slippery areas.

Always keep the machine clean

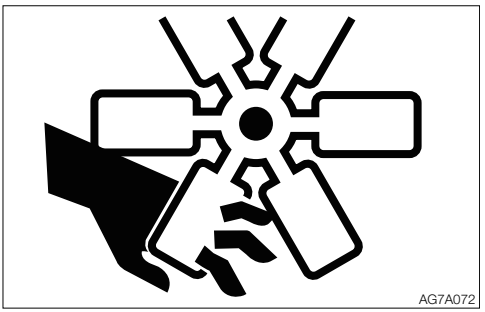


- Clean the machine before performing maintenance.
- Stop the engine before washing the machine. Cover the electrical parts so that water cannot enter. Water on electrical parts could cause short-circuits or malfunctions. Do not use water or steam to wash the battery, electronic control components, sensors, connectors or the operator's compartment.

Stop the engine before performing maintenance

- Avoid lubrication or mechanical adjustments while the machine is moving or while the engine is running when the machine is not moving.
- If maintenance must be performed with the engine running, always work as a two person team communicating each other.
  - One person must sit in the operator's seat so that he/she can immediately stop the engine when necessary. He/she must take care not to touch the lever or pedal unless necessary.
  - The one who performs maintenance must make sure to keep his/her body or clothing away from the moving part of the machine.

Stay clear of the moving parts



- Stay clear of all rotating and moving parts. If a hand or tool becomes trapped in the rotating or moving part, serious injury or death could result.
- If a tool or other objects is dropped or inserted in the fan or fan belt, it will be flown or cut in pieces. Do not drop or insert anything in the fan or fan belt.

Firmly secure the machine or any component that may fall

- Before performing maintenance or repairs under the machine, lower all moveable working equipment to the ground or in the lowermost position.
- Chock the tracks.
- If you must work beneath the raised machine or equipment, always use wood blocks, jack-stands or other rigid and stable supports. Never get under the machine or working equipment if they are not sufficiently supported. This procedure is especially important when working on hydraulic cylinders.

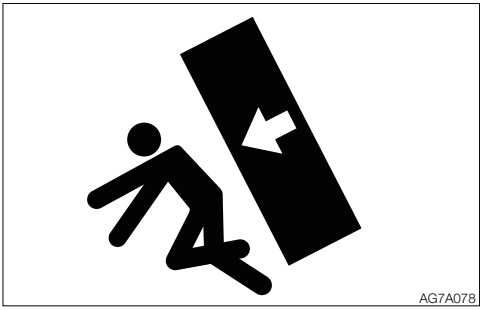
Secure the working equipment

To prevent unexpected movement, firmly secure the working equipment when repairing or replacing the bucket teeth or side cutter.

Secure the engine hood or cover when opened

Be sure to secure the engine hood or cover before working the inside. Do not keep the hood or cover open on a windy day or if the machine is parked on a slope.

Place heavy objects in a stable position



When it is necessary to temporally place a heavy object or an attachment on the ground during removal or installation, be sure to place it in a stable position. Keep unauthorized persons from the storage place for such object.

Cautions when refueling

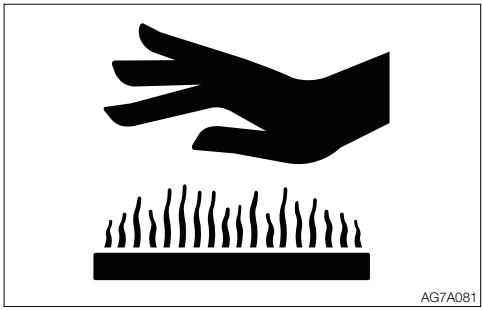
- Do not smoke or permit open flames while fueling or near fueling operations.
- Never remove the fuel cap or add fuel when the engine is running or still hot. Do not spill fuel on the hot surface of the machine.
- Fill the fuel tank in a well ventilated place.
- Do not fill the fuel tank to capacity. Allow room for oil expansion.
- Clean up spilled fuel immediately.
- Securely tighten the fuel filler cap. If the fuel cap is lost, replace it only with the genuine cap. Use of a non-approved cap without proper venting may result in pressurization of the tank.
- Never use fuel for cleaning.
- Use the correct grade of fuel for the operating season.

Handling of hoses

Oil leak or fuel leak can cause a fire.

- Do not twist, bend or hit the hoses.
- Never use twisted, bent or cracked pipes, tubes or hoses; otherwise, they may burst.
- Retighten loose connection.

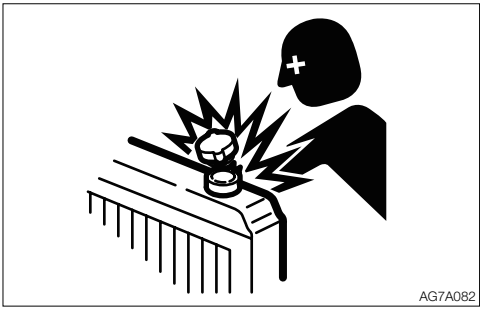
Be careful with hot and pressurized components



Stop the engine and allow the machine to cool down before performing maintenance.

- The engine, muffler, radiator, hydraulic lines, sliding parts and many other parts of the machine are hot immediately after the engine is stopped. Touching these parts will cause burns.
- The engine coolant, hydraulic oil and other oils are also hot and under high pressure. Be careful not to touch the hydraulic oil when loosening the cap or plug. Working on the machine under these conditions could result in burns or injuries due to the hot oil spurting out.

Be careful with hot cooling systems

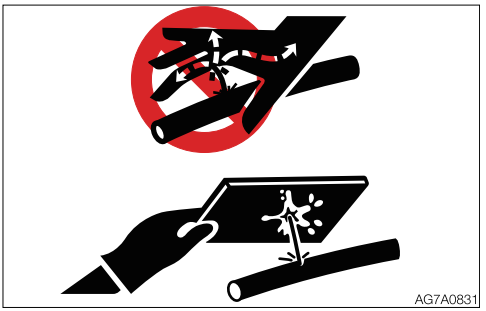


Do not remove the radiator cap or the drain plug when the cooling water is hot. Stop the engine and wait until the engine and the cooling water cool. Then, slowly loosen the radiator cap to release the internal pressure and remove it.

Be careful with oil internal pressure

Pressure is maintained in the hydraulic circuit long after the engine has been shut down.

- Completely relieve the internal pressure before performing maintenance work.



- The hydraulic oil is high enough pressure to penetrate the skin or eyes and cause serious injury, blindness or death. Remember that the hydraulic oil escaping from a small hole is almost invisible. When checking for leaks, wear protective goggle and thick gloves, and use a paperboard or plywood to keep your skin from oil spurting.
  If oil penetrates the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury.

Release pressure before working on the hydraulic system

Oil may spurt out if caps or filters are removed or pipes are disconnected before releasing the pressure in the hydraulic system.

- Gradually loosen the vent plug to relieve tank pressure.
- When removing plugs or screws, or when disconnecting hoses, stand to the side and loosen them slowly to gradually release the internal pressure before removing.
- Oil or plug may spurt out according to the pressure in the travel motor case. Loosen the plug slowly and release the internal pressure.

Be careful with debris when the hammer is being used

When using a hammer, pins may fly out or metal particles may be scattered. This may lead to serious injury.

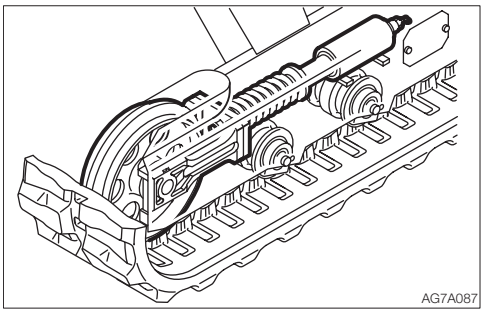
- If hard metal parts such as pins, bucket teeth, side cutter or bearings are hit with a hammer, wear protective gear such as safety goggles and gloves.
- When hitting pins or bucket teeth, always check that there is no one in the surrounding area.

Be careful with the high-pressure grease

In the track adjuster, the grease has been injected under high pressure. If the tension is adjusted without following the prescribed procedure, the grease discharge valve may fly off, resulting in injury.

- Never loosen the grease fitting.
- Loosen the grease discharge valve slowly. Do not turn it more than one turns.
- Do not put your face, arms, legs or body in front of the grease discharge valve.
- If grease does not come out when the grease discharge valve is loosened, the valve is faulty. Ask a Takeuchi service agent for repair.

Never disassemble the track adjuster



There is a very strong spring contained in the track adjuster. If the track adjuster is accidentally disassembled, the spring can pop out, resulting in serious injury Never disassemble the track adjuster.

Handling of the accumulator

Be sure to handle the high-pressure nitrogen gas enclosed in the accumulator with care. If handled incorrectly, it could explode and cause serious injury. Strictly observe the following precautions:

- Do not disassemble.
- Do not allow flame near or throw it into a fire.
- Do not drill, weld or fuse.
- Do not subject it to physical shock such as hitting, rolling or dropping.
- Before disposing of the unit, the sealed gas must be drained. Contact a Takeuchi service agent for help.

Disconnect the battery wiring

Disconnect the battery wiring before working on the electrical system or doing electric welding. Disconnect the negative (–) battery cable first. When reconnecting, connect the negative (–) battery cable last.

Use caution when handling batteries

- Batteries contain sulfuric acid which will damage the eyes or skin in case of contact.
  - If eye contact occurs, flush immediately with clean water and get prompt medical attention.
  - If accidentally swallowed, drink large quantities of water or milk and call a physician immediately.
  - If acid contacts skin or clothing, wash off immediately with a lot of water.
- Wear protective goggle and gloves when working with batteries.
- Batteries generate flammable hydrogen gas which may explode. Keep away from flame, sparks, fire or lighted cigarettes.
- When checking the level of the battery fluid, use a flashlight.
- Be sure to stop the engine by turning off the starter switch before inspecting or handling the battery.
- Be careful not to let metal tools or any metal objects come into contact with the battery terminals and cause a short circuit.
- Loose battery terminals may result in sparks. Be sure to fasten terminals tightly.
- Make sure the battery caps are tightened securely.
- Do not charge a battery or jump-start the engine if the battery is frozen; otherwise it may explode. Warm the frozen battery to 15°C (60°F) before use.
- Do not use the battery when the fluid level is below the lower level limit. Doing so will hasten the deterioration of the internal portions of the battery and shorten the battery life. It also can cause rupturing (explosion).
- Do not add the distilled water above the upper level limit. Doing so could cause the fluid to leak. This fluid can cause skin damage if contacted, or can cause the machine components to corrode.
- Use a dampened cloth to clean around the fluid level line and check the fluid level. Do not clean with a dry cloth; otherwise it could cause static electricity to build up, resulting in ignition or explosion.

Periodically replace the safety-critical parts

- To use the machine safely for a longer period, periodically add oil and perform inspection and maintenance. To improving the safely, replace the safety-critical parts like hoses and seat belts periodically. Refer to “Safety-critical parts to be replaced periodically” for further details.
- The “Safety-critical parts to be replaced periodically” are the parts which deteriorate, wear and fatigue after repeated use and whose properties change over time. While these characters of these parts could cause serious physical or personal damage, judging the remaining life of these part are difficult from external inspection or the feeling when operating.
- Replace the “Safety-critical parts to be replaced periodically” if any defect is found from external inspection, even when they have not reached the time specified interval.

Jump starting with booster cables

- When starting the engine using the booster cables, be sure to connect the cables in the proper order described below. Wrongly connected cables can result in sparking and battery explosion.
  - Do not allow the “machine in trouble” and “rescue machine” to touch each other.
  - Do not allow the positive (+) and negative (–) clips of the booster cables to touch each other or to come in contact with the machine.
  - When connecting, attach the positive booster cable to the positive (+) terminals first. When disconnecting, remove the negative cable from the negative (–) terminal (ground) first.
  - Be sure to connect the clips securely.
  - Connect the last clip of the booster cable to a point as far away from the battery as possible.
- Always wear the protective goggle and gloves when starting the engine by using the booster cables.
- Use the booster cables and clips of a size suited to the capacity of battery. Do not use damaged or corroded booster cables and clips.
- Be sure that the battery of the “rescue machine” has the same capacity as the battery of the “machine in trouble”.

Have a Takeuchi service agent repair welding

If welding must be performed, make sure that it is done by a qualified person in a properly equipped workplace. To prevent any part from breaking down or being damaged due to overcurrent or sparks, observe the following.

- Disconnect the wiring from the battery before doing electric welding.
- Do not continuously apply 200 V or more.
- The earth ground must be connected within one meter from the welding section. Do not connect the earth ground near to an electronically controlled device/ instrument or connectors.
- Make sure that there are no seals or bearings between the welding section and the earth ground.
- Do not connect the earth ground around the pins for the working equipment or hydraulic cylinders.
- When welding is to be done on the machine body, disconnect the connectors for the electronically controlled devices before working.

Vibrations operators are subject to

According to the results of the tests conducted to determine the vibrations transmitted to the operator by the machine, the upper limbs are subjected to vibrations lower than 2.5 m/s^2 (8.2 ft/s^2) while the seated part of the body is subjected to vibrations lower than 0.5 m/s^2 (1.64 ft/s^2).

Checks after maintenance

- Gradually increase the engine speed from a low idle to maximum speed and check that there is no oil or water leaking from the serviced parts.
- Operate each control lever and check that the machine is operating properly.

Disposing of wastes

- Always collect oil that is drained from the machine in containers. Improperly disposed waste oil can cause environmental harm.
- Follow appropriate laws and regulations when disposing of harmful objects such as oil, fuel, coolant, solvent, filters and batteries.

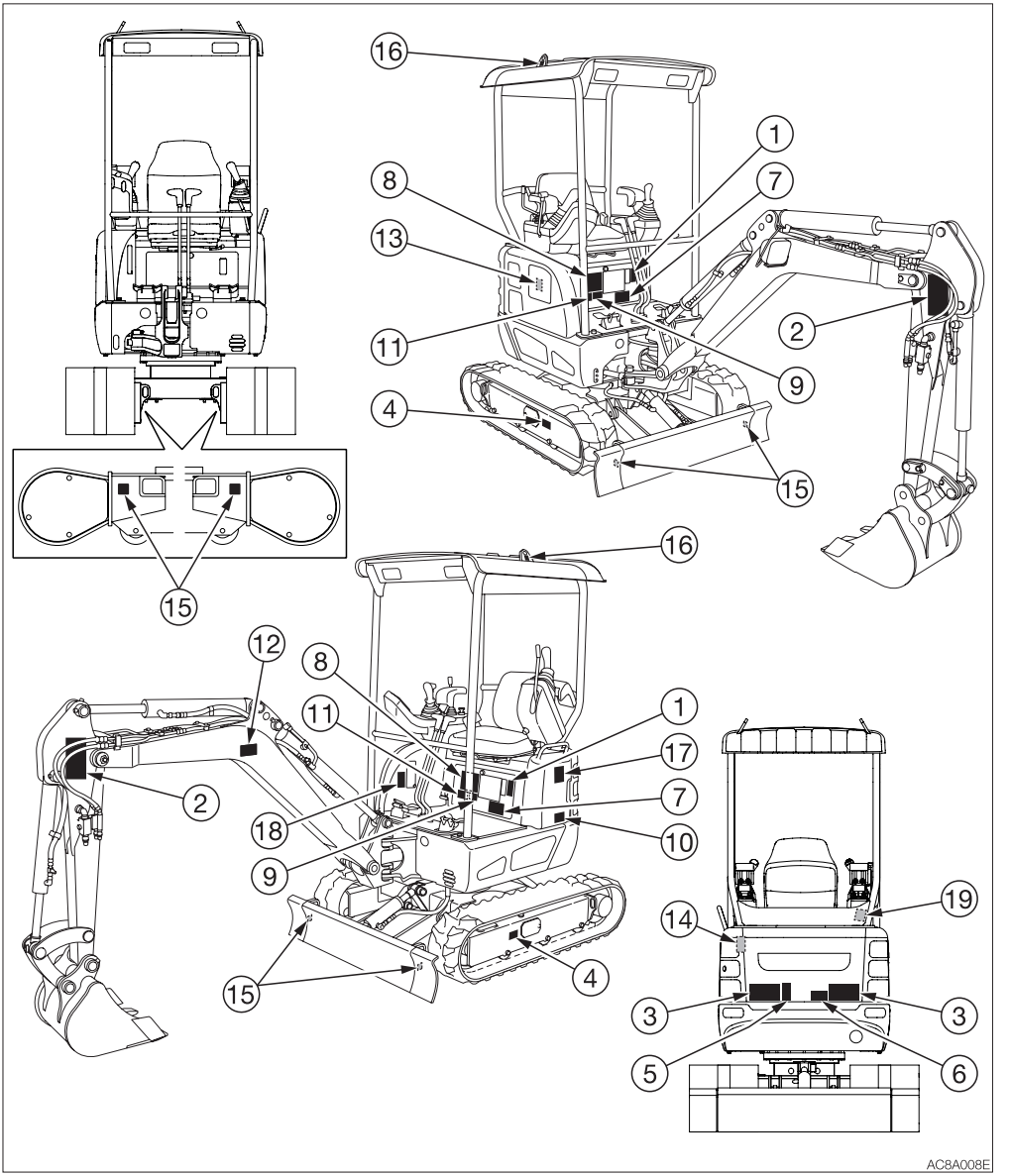
Handling of poisonous chemicals

Poisonous chemicals will cause serious injury if directly contacted.
Poisonous chemistry used in this machine includes grease, battery solution, coolant, paint and adhesive agent.
Handle the poisonous chemicals properly with care.

SAFETY SIGNS (DECALS)

For the safety of the operator and the personnel working around the site, safety signs (decals) are placed at certain locations on the machine as shown below. Walk around the machine with this manual, and check the content and location of these safety signs. Review these signs and the operating instructions in this manual with your machine operators.

- Keep the signs clean and legible. If any of the safety labels is peeling or damaged and becomes difficult to read, replace it with a new one. Please include your product serial number when ordering a new sign from the Takeuchi service agent.
- When a part/unit to which a safety sign is attached is replenished, a new sign must be attached to the new part/unit.


16
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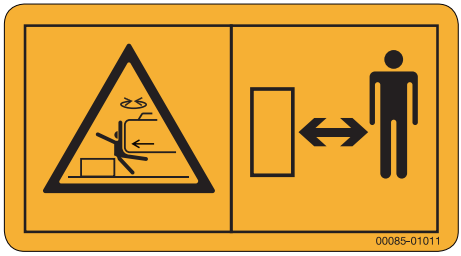
AC8A008E

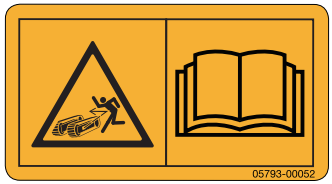
1. No.08810-31556
   Warning
   Read and understand this manual before performing any operation, inspection or maintenance on this machine.

2. No.05793-00049
   Safety Distance
   Hazard of being hit by the working device of the machine.
   Keep away from machine during operation.

3. No.00085-01011
   Safety Distance
   Do not get near or stand within the machine working area.



4. No.05793-00052
   Hazard of a flying plug from track adjuster
   Read manual before adjusting track for safe and proper handing.



5. No.05793-03630
   Sign indicates a burn hazard from touching heated parts, such as engine, pump, or muffler during or right after operation.
   Never touch when hot.

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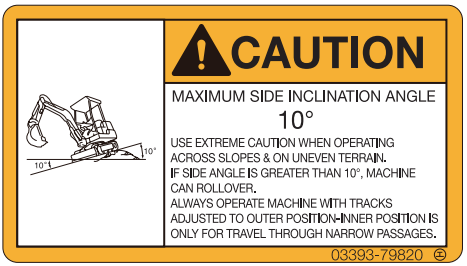
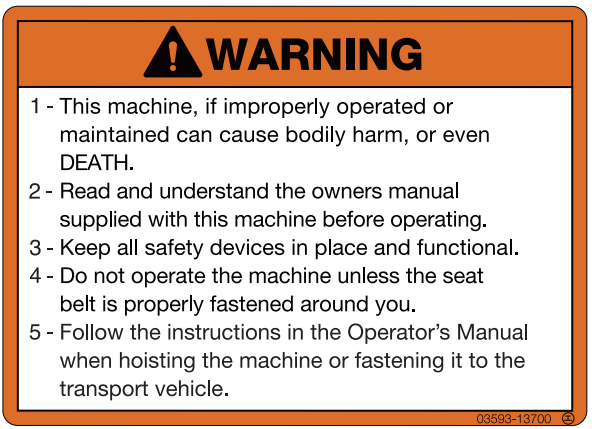
6. No.03793-66006
Hazard of rotating parts
Turn off before inspection and maintenance.

7. No.03393-79820



8. No.03593-13700



9. No.03393-75040

10. No.03393-75050

11. No.03593-47020

12. No.03593-47010 (if equipped)

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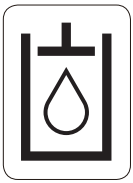
13. No.03593-06600
Diesel fuel

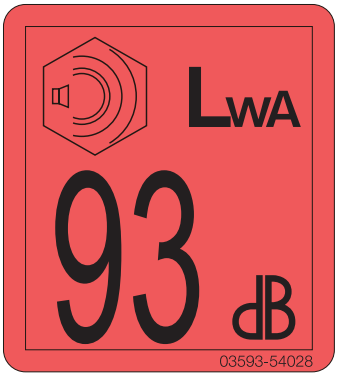
14. No.03593-06700
Hydraulic oil



15. No.08810-31549
Tie down point

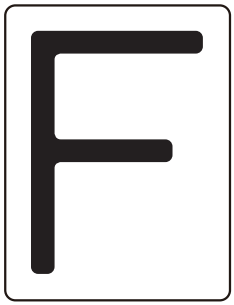
16. No.03993-00500
Position of hoisting

17. No.03593-54028
Noise Outside the Cab (if equipped)
This value indicates the noise level outside the machine and refers to the noise perceived by the persons who are in the vicinity of the work area.



18. No.03393-00070
Keep the boom and blade separated
Be careful not to let the boom come in contact with the blade when the boom is lowered.

<Applicable machine models
215001850 or later>
19. No.03993-00400
For EU
Position of Fire extinguisher



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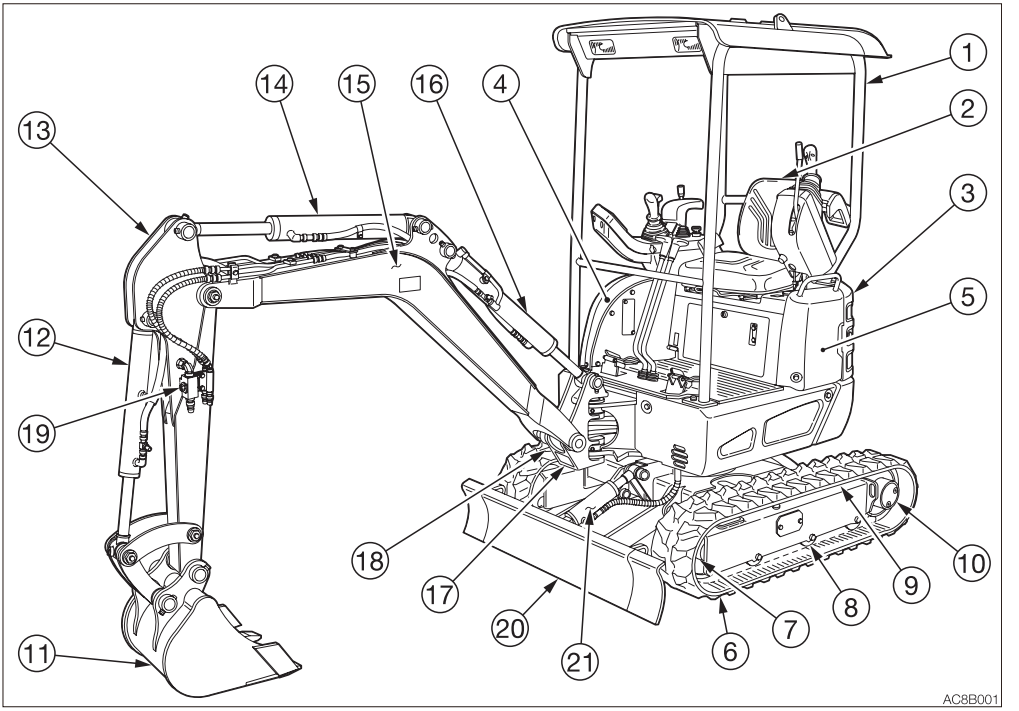
CONTROLS

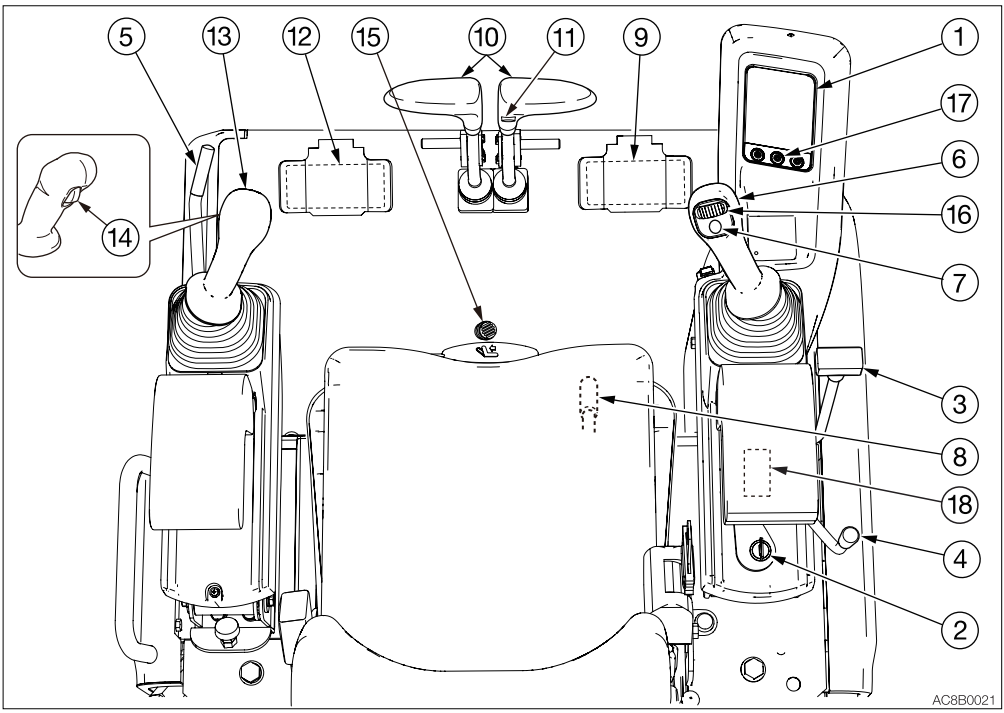
NAMES OF COMPONENTS



Upperstructure
1. Canopy
2. Seat
3. Engine hood
4. Fuel tank
5. Hydraulic oil tank

Undercarriage
6. Crawler belt
7. Idler
8. Track roller
9. Shoe slide
10. Travel motor

Working equipment
11. Bucket
12. Bucket cylinder
13. Arm
14. Arm cylinder
15. Boom
16. Boom cylinder
17. Boom bracket
18. Swing cylinder
19. Auxiliary hydraulic lines
20. Dozer blade
21. Blade cylinder

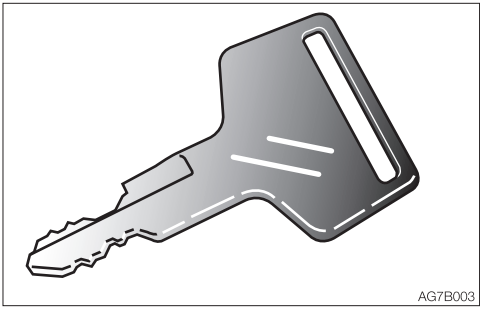


1. Instrument cluster
2. Starter switch
3. Blade lever
4. Throttle lever
5. Safety lock lever
6. Right operating lever
7. Horn button
8. Selector lever
9. Boom swing pedal
10. Travel levers/Pedals
11. Travel speed switch
12. Auxiliary hydraulic pedal
13. Left operating lever
14. Third auxiliary hydraulic botton*
15. Third auxiliary hydraulic switch*
16. Auxiliary 2nd switch*
17. Light switch
18. Lift overload warning switch*

*: Subject to the specifications or optional products selected

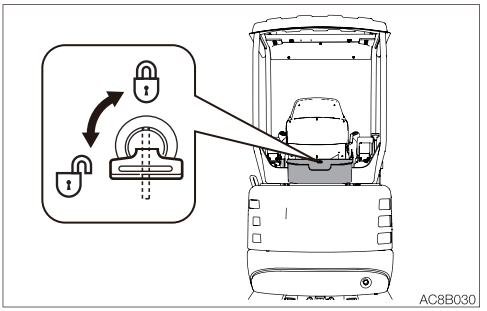
COVERS

STARTER KEY



The starter key is used to start and stop the engine, as well as to lock and unlock the following components:
- Fuel lid
- Manual storage compartment
- Engine hood
- Covers

TOOL CASE

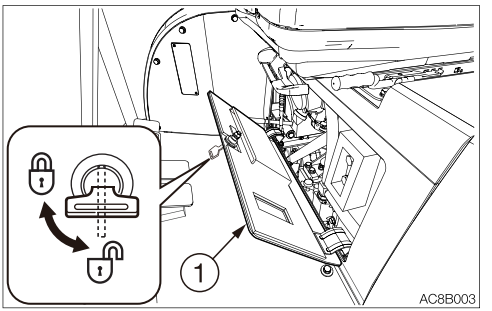


1. Insert the starter key and turn it counterclockwise to unlock the box.

MAINTENANCE COVER A

Open this cover to perform a maintenance operation of the engine or to switch the selector valve.

Opening

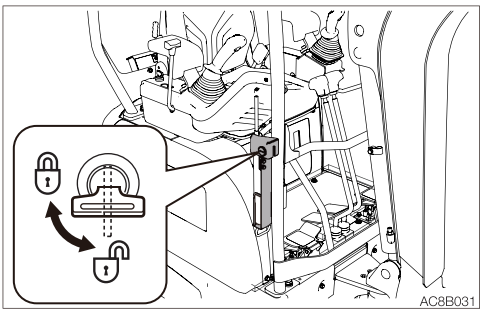


1. Insert the starter key and turn it counterclockwise to unlock the maintenance cover A (1).

Closing

1. Close the maintenance cover A (1).
2. Insert the starter key and turn it clockwise to lock the maintenance cover A (1).

GREASE GUN HOLDER



1. Insert the starter key and turn it counterclockwise to unlock the box.

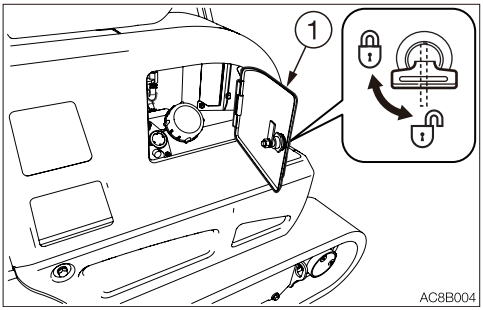
FUEL LID

⚠ CAUTION

When opening and closing the fuel lid, be careful not to get your hands caught by the lid.

For adding fuel, open this cover.

Opening



1. Insert the starter key and turn it counterclockwise to unlock the fuel lid (1).

Closing

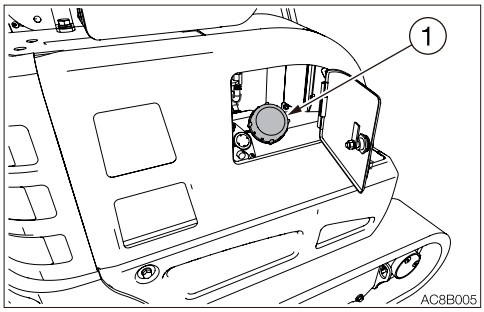
1. Close the fuel lid (1).
2. Insert the starter key and turn it clockwise to lock the fuel lid (1).

FUEL FILLER PORT

⚠ WARNING

- **Do not smoke and keep away from heat or flame while filling the fuel tank.**
- **Fill the fuel tank in a well ventilated place, with the engine turned off.**
- **Clean up spilled fuel immediately.**
- **Do not fill the fuel tank to capacity. Allow room for oil expansion.**
- **Securely tighten the fuel filler cap.**

Opening



1. Open the fuel lid.
2. Turn the fuel cap (1) counterclockwise and remove it.

Closing

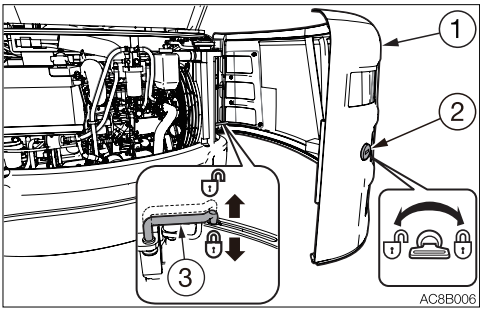
1. Turn the fuel cap (1) it clockwise and close it.
2. Close the fuel lid and lock it.

ENGINE HOOD

⚠ WARNING

- **Before opening the engine hood, be sure to stop the engine. If a hand or tool becomes trapped in the rotating or moving part, serious injury could result.**
- **When opening or closing the engine hood, be careful not to get your hands or other parts of your body caught by it.**

Opening



1. Insert the starter key and turn it counterclockwise to unlock the engine hood (1).
2. Push in the key hole (2) with your thumb and open the engine hood (1).
3. Open the engine hood (1) all the way until it is fastened. (It is fastened automatically.)

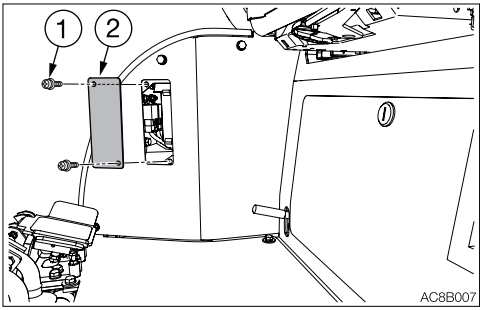
Closing

1. Support the engine hood (1) by hand them pull up the stay (3) to release the engine hood (1).
2. Close the engine hood (1).
3. Insert the starter key and turn it clockwise to lock the engine hood (1).

MAINTENANCE COVER B

For inspection and maintenance of the fuse, open this cover.

Opening



1. Remove the screws (1).
2. Remove the maintenance cover B (2).

Closing

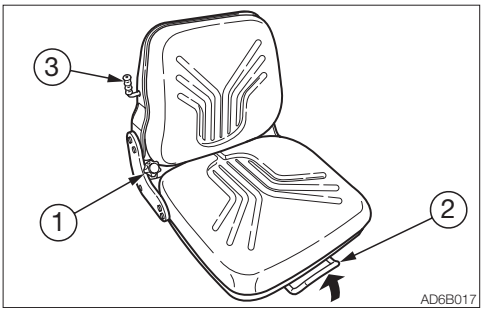
1. Install the maintenance cover B (2) and secure it with the screws (1).

SEAT AND SEAT BELT

SEAT (IF EQUIPPED)

⚠ WARNING

Adjust and secure the seat.



(A) Adjusting the backrest angle

1. Sit up and sit back in the seat.
2. Set the backrest to the desired angle by turning the handle (1).

(B) Fore-and-aft adjustment

1. Pull up the lever (2) and slide the seat backward or forward to the desired position for operation of machine.
2. Release the lever (2) at the desired position to secure the seat.
   Adjustment range: 10 positions, in 150 mm (5.9 in.)

(C) Adjusting according to operator's weight

1. Move the lever (3) to set it according to the weight of operator.

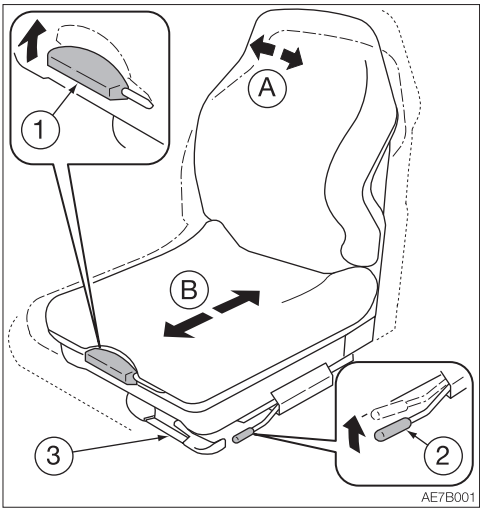
Position of the lever (3)

Upper..... Light weight operator
Middle ..... Medium weight operator
Lower..... Heavy weight operator

HIGH-BACK SEAT (IF EQUIPPED)

⚠ WARNING

Adjust and secure the seat.

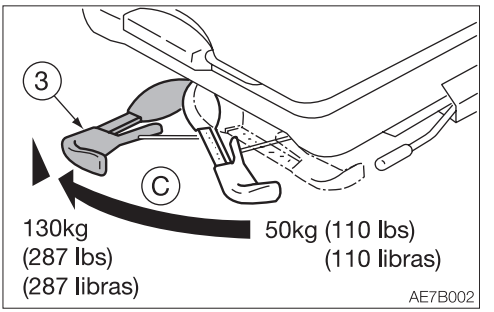


(A) Adjusting the backrest

1. Sit up and sit back in the seat.
2. Pull up the lever (1), recline the backrest by using the spring force. Release the lever (1) at the desired angle to secure the backrest.

(B) Fore-and-aft adjustment

1. Pull up the lever (2) and slide the seat backward or forward to the desired position for operation of machine.
2. Release the lever (2) at the desired position to secure the seat.
   Adjustment range: 10 positions, in 150mm (5.9in.)



(C) Adjusting according to operator's weight

1. Turn the handle (3) until the display indicates the weight of operator.
   Adjustment range: 50 to 130 kg (110 to 287 lbs)
2. When adjusting for a weight lower than the currently set weight, first turn the handle (3) as far as it goes to cancel the setting, then readjust.

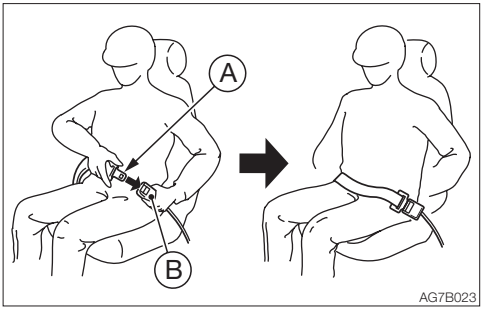
SEAT BELT

⚠ WARNING

Be sure to fasten the seat belt securely before starting the engine.

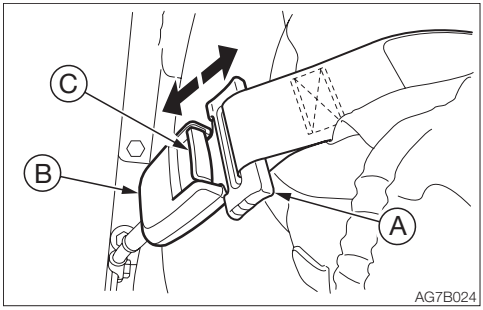
Fastening the seat belt

1. Adjust the seat to the desired position for operation, sit up and sit back in the chair.
2. Pull the seat belt to the desired length.



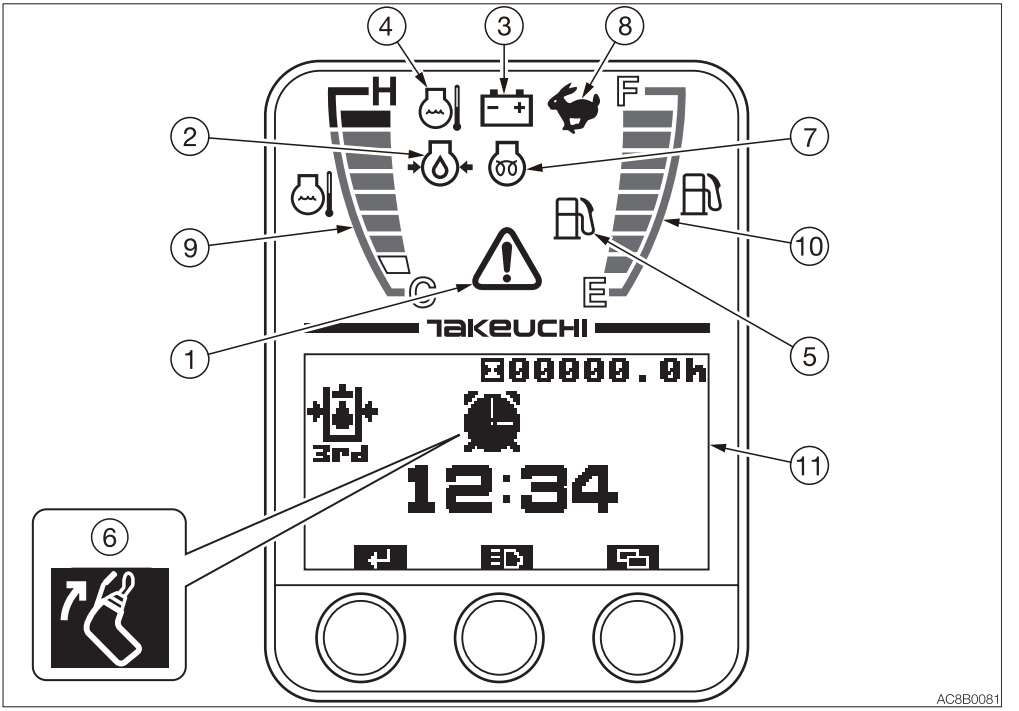
3. Make sure that the belt is not twisted and then insert the tongue plate (A) into the buckle (B) of the seat belt until you hear a clicking sound as it locks in place.
4. Check if the belt is securely locked by pulling it, and arrange the belt around your waist.

Releasing the seat belt



1. Grasp the tongue plate (A) and press the button (C) on the buckle (B).
   The seat belt retracts back into its original position.

INSTRUMENT CLUSTER



Once the starter switch is turned to ON, all lamps on the instrument cluster light up and the alarm sounds.
Then, the battery charge warning lamp (3) and the engine oil pressure warning lamp (2) start flashing and an alarm sounds. The machine system is normal if the lamps turn off after the engine is started.
If any lamp is not lit when the starter switch is turned to ON, there is something wrong in the machine. Consult your sales or service dealer.

WARNING LAMPS

IMPORTANT: If a warning lamp flashes and an alarm is sounded, immediately stop all operations and check the corresponding component.
Refer to "If a warning lamp flashes" on page 6-9.

1. Engine emergency lamp
This lamp flashes and an alarm sounds if there is a problem with the engine or charging system.

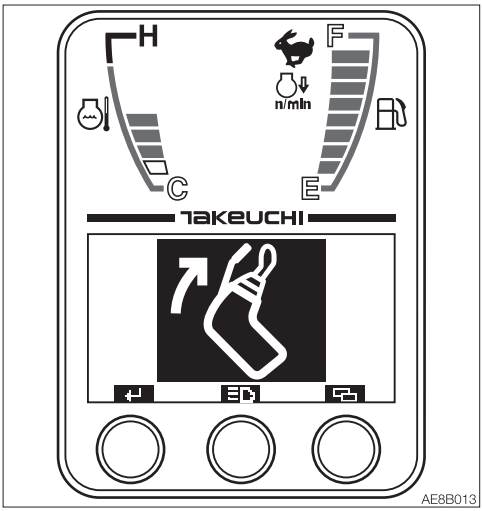
2. Engine oil pressure warning lamp
This lamp flashes and an alarm is sounded if the lubricant oil pressure abnormally low while the engine is running.

3. Battery charge warning lamp
This lamp flashes and an alarm is sounded if a problem rises in the charging system while the engine is running.

4. Coolant temperature warning lamp
This lamp flashes and an alarm is sounded if the engine coolant temperature becomes abnormally high while the engine is running.

5. Fuel level warning lamp
This lamp turns on if the fuel level becomes low while the starter switch is in the ON position.

6. Safety start warning lamp



This lamp appears enlarged on the display and the buzzer sounds if the engine is started when the safety lock lever is in the unlock position. The engine cannot be started. First, set the safety lock lever to the lock position, and then start the engine.

INDICATORS

7. Glow lamp
This lamp goes out when the engine preheating is completed.

8. Travel speed lamp
This lamp turns on when the travel speed button is set to the 2nd (high) speed.

METERS

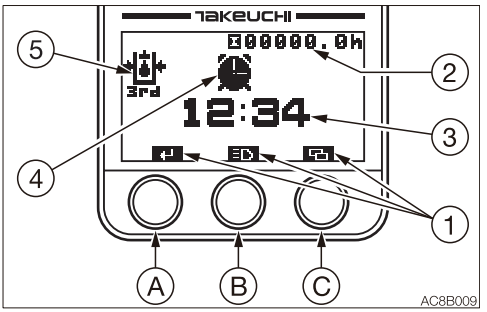
9. Water temperature gauge
Indicates the temperature of the engine coolant water.
The LED should be within the green range during machine operation.
The red range indicates overheating.

10. Fuel Gauge
Indicates the amount of fuel in the tank. Be sure to top off the tank before running out of fuel.

MULTI-DATA DISPLAY

11. LCD (liquid crystal display)
It displays various data on hour meter, trip meter and the machine.

Home screen



1. Key function display
The key function display changes depending on the screens (Home, Menu and each setting)
For actual operation, use the buttons, “A”, “B” and “C”, located beneath each symbol. Refer to “Operating each key” on page 2-12 to 2-17.

2. Hour meter/Trip meter

- Hour meter
  Displays the total engine running time in hours.
  The rightmost digit indicates tenths of hours (6 minutes).
  Set the inspection and maintenance intervals according to the time displayed on the hour meter.

- Trip meter
  Three patterns of desired operating hours can be displayed.
  Refer to “B. Work light/meter switching” on page 2-13.

3. Time display
Displays the time set.
Refer to “Time setting” on page 2-16.

4. Alarm indicator lamp
The clock symbol appears when the alarm function is turned on.
Refer to “Alarm setting” on page 2-16.

5. Auxiliary 3rd hydraulic pressure warning lamp (If equipped)
This lamp lights up and an alarm sounds if the fixed side (left “e”) pressure of the auxiliary 3rd drops abnormally while the engine is running or if the quick-hitch is being removed or installed.

FUNCTION OF EACH KEY

The functions are as below in the Home screen. The different functions appear in the other screens.

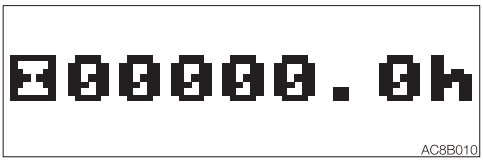
A. Stopping alarm

Pressing the (A) key stops alarm.

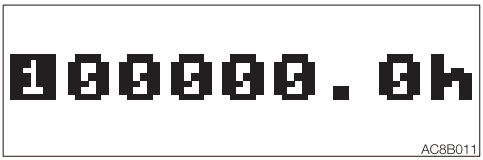
B. Work light/meter switching

- Pressing the (B) key turns on or off the work light.
- Pressing and holding the (B) key for two seconds or more each time the display changes as follows:

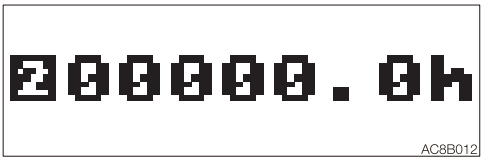
1. Hour meter



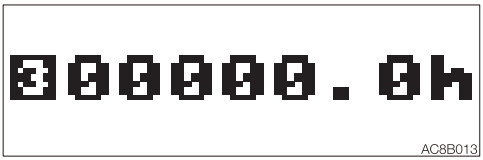
2. Trip meter 1



3. Trip meter 2



4. Trip meter 3

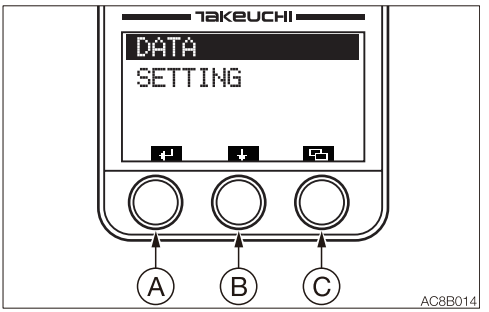


5. Returns to the hour meter

C. Menu/trip meter reset

- Pressing the (C) key switches to the Menu screen.
- Pressing and holding the (C) key for three seconds or more while the trip meter is displayed returns the trip meter to “0”.

MENU SCREEN

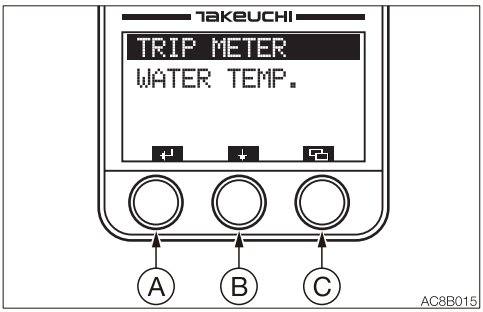


Press the (A) key to proceed to the screen selected by the bar.
Press the (B) key to move the selection bar.
Press the (C) key to return to the Home screen.

- **DATA**
  Shows the coolant temperature and the trip meter for inspection and maintenance.
  Unlike the trip meter displayed on the Home screen, data items on the engine oil, hydraulic oil and coolant are included so that you can use them as a guideline for replacement.

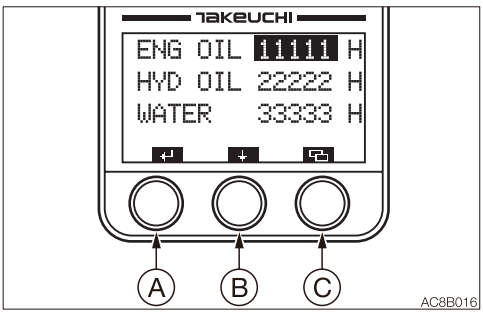
- **SETTING**
  Time, alarm and contrast can be set.

DATA SCREEN (DATA)



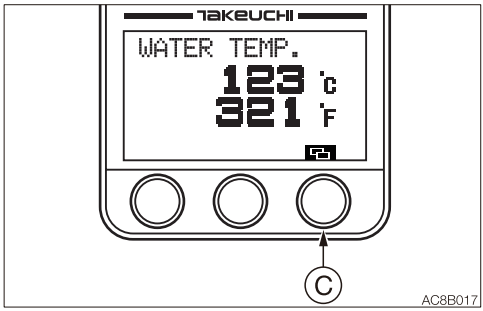
Press the (A) key to proceed to the screen selected by the bar.
Press the (B) key to move the selection bar.
Press the (C) key to return to the Menu screen.

- **Trip meter (TRIP METER) for maintenance**
  The trip meters for the engine oil, hydraulic oil or coolant are displayed.



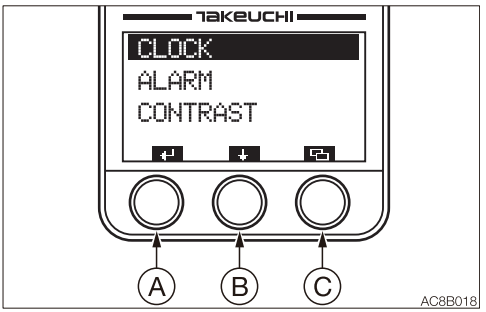
Press and hold the (A) key for at least five seconds resets the selected trip meter to "0".
Press the (B) key to move the selection bar.
Press the (C) key to return to the DATA screen.

- **Coolant temperature (WATER TEMP)**
  Displays the coolant temperature in Celsius °C or Fahrenheit °F.



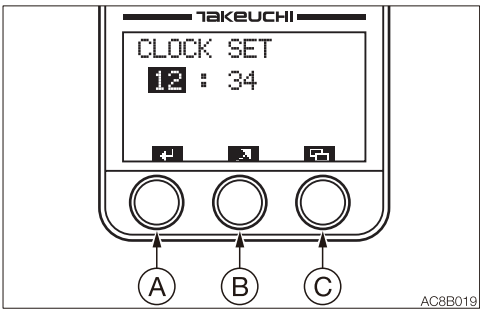
Press the (C) key to return to the Data screen.

SETTING SELECTION SCREEN (SETTING)



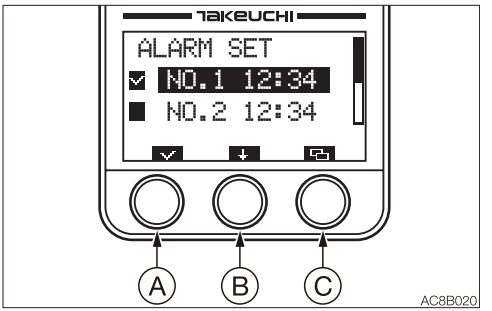
Press the (A) key to proceed to the screen selected by the bar.
Press the key (B) to move the selection bar.
Press the (C) key to return to the Menu screen.

- **Time setting (CLOCK)**
  The time to be displayed on the Home screen can be set here.



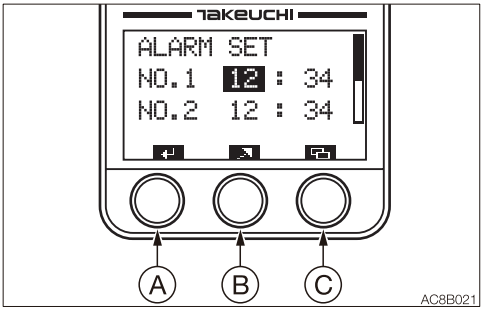
a. When the selection bar is at CLOCK, press the (A) key to proceed to the time setting screen (CLOCK SET).
b. Pressing the (A) key in this screen moves the selection bar and flashes the figures on the bar.
   Setting range: hours, 1 to 24; minutes, 00 to 59
c. Press the (B) key to increase the number value selected.
   Press and hold the (B) key to rapidly increase the number value selected.
d. Press and hold the (A) key for at least two seconds to complete the setting and to return to the Setting Selection screen.
e. Press the (C) key cancels editing and to return to the Setting Selection screen.

- **Alarm setting (ALARM)**
  Five patterns of alarm setting are available.
  Alarm function can be set to on or off within the five patterns.



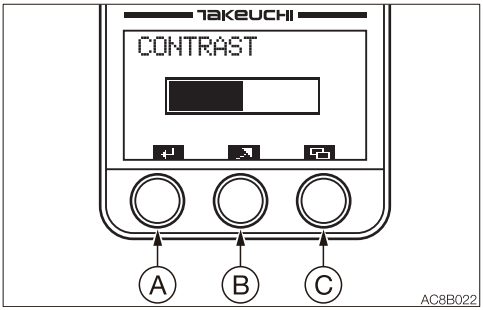
a. When the selection bar is at ALARM, press the (A) key to proceed to the alarm setting screen (ALARM SET).
b. Press the (A) key in this screen to place a checkmark in the box at the left of the setting bar. Press the (A) key again to remove the checkmark.
   The alarm setting cannot be changed only by placing or removing a checkmark.
c. Press and hold the (A) key for at least two seconds to complete the setting and to return to the Setting Selection screen.
   Be sure to perform the above operation when you wish to set the alarm.
   A clock symbol is displayed on the Home screen.
d. Press the (B) key to move the selection bar.
e. Press and hold the (B) key for at least three seconds to enter the alarm time setting mode.
f. Press the (C) key to cancel editing and to return to the Setting Selection screen.
   Checked ..... On
   Unchecked .. Off

• **Alarm time setting mode**
Sets the time for alarm.



a. Select the item to be set in the alarm setting screen (ALARM SET).
b. Press and hold the (B) key for at least three seconds to enter the alarm time setting mode.
c. Press the (A) key in this screen to move the selection bar and to flash the figures on the bar.
Setting range: hours, 1 to 24; minutes, 00 to 59
d. Press the (B) key to increase the number value selected.
Press and hold the (B) key to rapidly increase the number value selected.
e. Press and hold the (A) key for at least two seconds to complete the setting and to return to the Setting Selection screen.
f. Press the (C) key to cancel editing and to return to the Setting Selection screen.

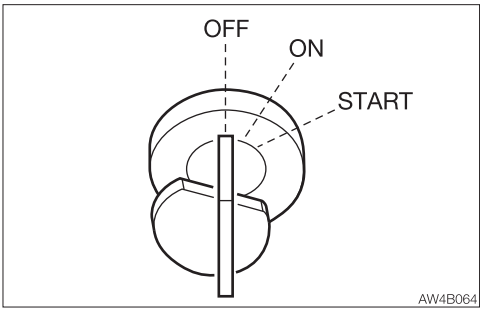
• **Contrast setting (CONTRAST)**
Adjust the LCD contrast.



a. When the selection bar is at CONTRAST, press the (A) key to proceed to the contrast setting screen (CONTRAST).
b. To increase contrast, press the (B) key. The bar advances to the right.
Press and hold the (B) key to rapidly advance the bar.
Once the bar reaches the right end (highest contrast), it returns to the left end (lowest contrast).
c. Press and hold the (A) key for at least three seconds to complete the setting and to return to the Setting Selection screen.
d. Press the (C) key to cancel editing and to return to the Setting Selection screen. The changes made to the setting are reflected, but they will be removed when the starter switch is turned off.

SWITCHES

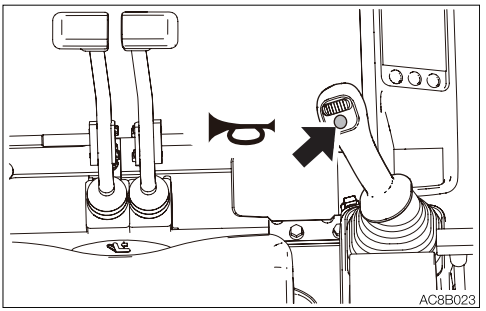
STARTER SWITCH



IMPORTANT: Do not repeatedly switch the key from OFF to ON and ON to OFF over a short period. Doing so will cause engine breakdown.

OFF ..... Position for stopping the engine and inserting or removing the key.
ON ..... Position in which the engine is running. At this position, all the electrical equipment is functional. When the coolant temperature is too low, the engine is automatically preheated.
START ..... Position for starting the engine. When the key is released, the switch automatically returns to the ON position.

HORN BUTTON

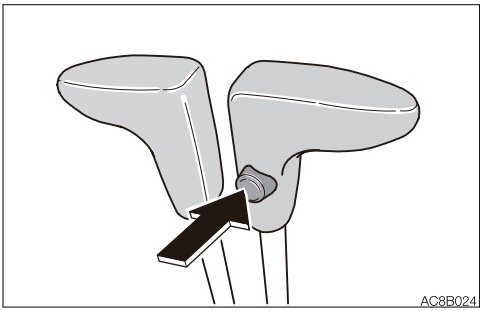


Press the button situated on the right operating lever to blow the horn.

TRAVEL SPEED SWITCH

⚠ WARNING

When a load greater than a set value is applied during traveling in 2nd (high) speed, the speed will automatically slow down to 1st (low) speed. When the load becomes lighter, the speed will increase and return to 2nd (high) speed. It should be noted that the travel speed changes depending on the load condition (for machines with the automatic travel shift-down system).



Press this switch to set the travel speed to 2nd (high) speed. Press it again to return to 1st (low) speed.

SECOND AUXILIARY HYDRAULIC SWITCH

Refer to “Second auxiliary hydraulic switch” on page 2-26.

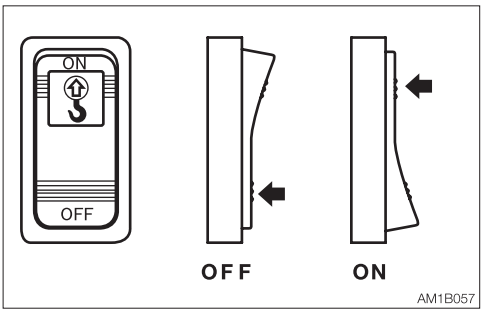
THIRD AUXILIARY HYDRAULIC SWITCH AND BUTTON

Refer to “Third auxiliary hydraulic switch and button” on page 2-26.

LIFT OVERLOAD WARNING SWITCH (IF EQUIPPED)

⚠ WARNING

If the overload is not removed after the overload warning horn is sounded, the machine may tip over. If the horn starts sounding, stop operating the machine and lighten the load.



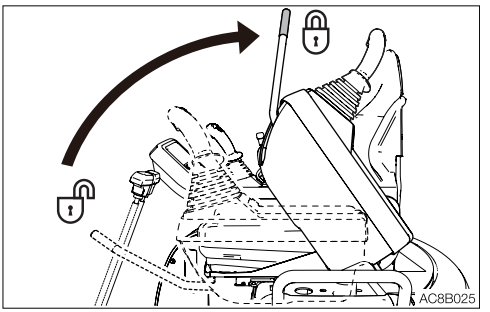
If a weight greater than the lifting capacity is applied or lifted, the overload warning device is activated and the horn sounds. (When the lift overload warning switch is turned on.)
OFF ..... Off
ON ..... On

LEVERS AND PEDALS

SAFETY LOCK LEVER

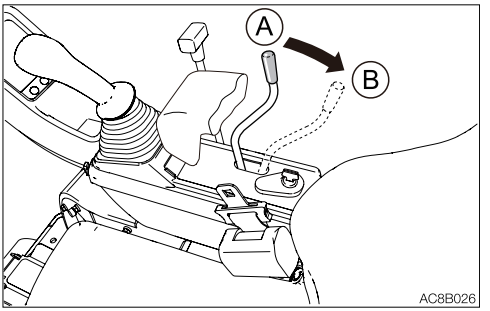
⚠ WARNING

- **Before standing up from the operator's seat to, for example, adjust the operator's seat, lower the working equipment to the ground, raise the safety lock lever to the lock position and then stop the engine. If any control is accidentally touched when the safety lock lever is lowered (unlocked), the machine will suddenly move and cause serious injury or death.**
- **Note that the dozer blade, boom swing and auxiliary hydraulic controls cannot be locked, even when the safety lock lever is set to the locked position. Do not carelessly touch these controls.**
- **Be careful not to touch the operating levers when raising or lowering the safety lock lever.**
- **Before leaving the operator's seat, lower the working equipment to the ground, raise the safety lock lever to engage the lock and stop the engine. Also, be sure to remove the key, lock the door and covers, take it with you and store it in a specified place.**



This device is for locking the hoe attachment, slewing and traveling.
When the lever is raised, the lever stand springs up and the controls are locked.
Note:
When the lever is in the unlock position, the engine cannot be started.

THROTTLE LEVER

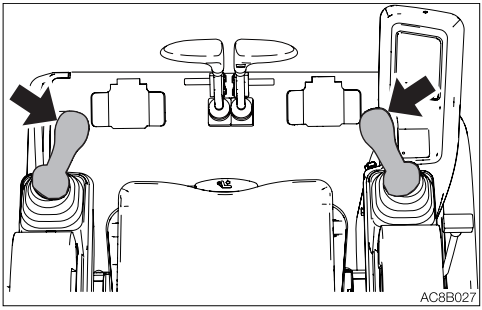


This controls the engine speed.
(A).....Low idling
(B) .....Maximum speed

OPERATING LEVERS

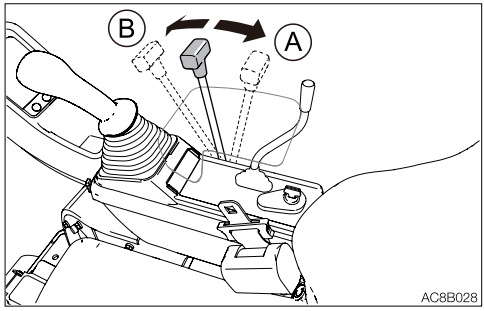
⚠ WARNING

- **Before starting operation, carefully check which lever pattern you are going to use.**
- **It is described using the ISO pattern in this manual.**



Use these levers to operate the boom, arm, bucket and upperstructure.
Refer to “Lever pattern” on pages 3-6 and 3-7.
Refer to “Operating the working equipment” on pages 3-16 and 3-17.

BLADE LEVER

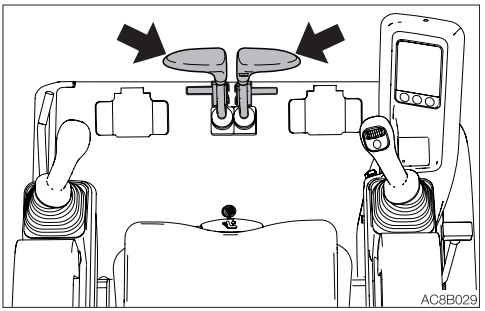


Use this lever to operate the dozer blade.
(A).....Blade up
(B) .....Blade down
Refer to “Operating the dozer blade” on page 3-17.

TRAVEL LEVERS/PEDALS

⚠ WARNING

- **Before operating the travel levers/pedals, make sure that the dozer blade is to the front of the operator's seat. Remember that when the dozer blade is to the rear of the operator's seat, the travel levers/pedals must be operated in the reverse direction from when it is to the front.**
- **Do not rest your foot on the pedal unless operating it for traveling. If the pedal is accidentally stepped while working, the machine may suddenly move and cause serious injury or death.**

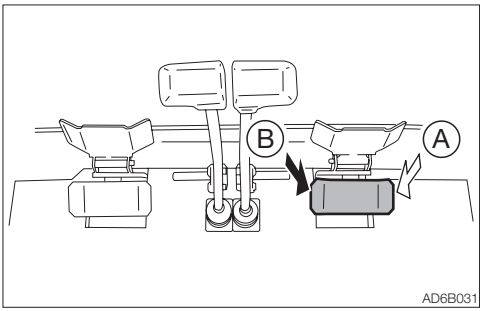


Use these levers/pedals to move forward or backward and to change directions. Fold the pedals when not being used.
Refer to "Operating the travel levers" on page 3-12.

BOOM SWING PEDAL

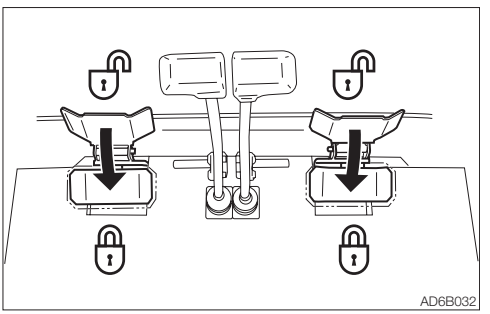
⚠ WARNING

Keep the pedal cover to the locked position when not using the pedal. Stepping on a pedal accidentally when it is not locked may cause accidents.



Use this pedal to operate the boom swing.
(A).....Boom swing right
(B) .....Boom swing left
Refer to "Operating the boom swing" on page 3-17.

Pedal lock

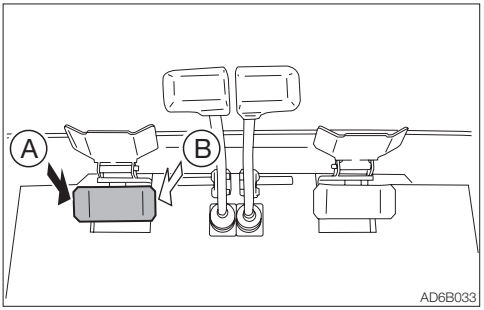


Set the pedal cover over the pedal to lock it. Open the pedal cover from the pedal to unlock it.

AUXILIARY HYDRAULIC PEDAL

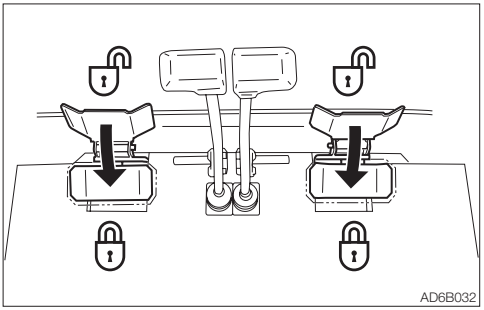
⚠ WARNING

Keep the pedal cover to the locked position when not using the pedal. Stepping on a pedal accidentally when it is not locked may cause accidents.



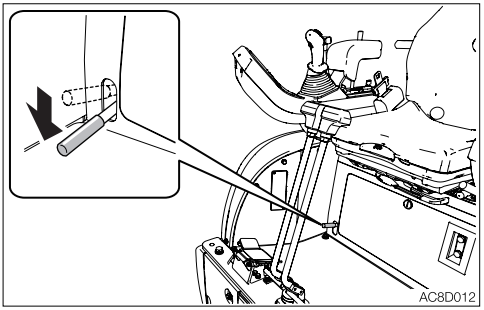
This pedal controls the flow of the oil in the auxiliary hydraulic circuit.
(A).....Hydraulic oil flows to left auxiliary hose.
(B) .....Hydraulic oil flows to right auxiliary hose.
Refer to “Auxiliary hydraulic lines” on page 2-24.

Pedal lock



Set the pedal cover over the pedal to lock it. Open the pedal cover from the pedal to unlock it.

SELECTOR LEVER



This lever is used to change the crawler width. The operation of the dozer blade cylinder and the span cylinder is switched with this lever.
1. Change the crawler width by moving the blade lever while depressing this lever.

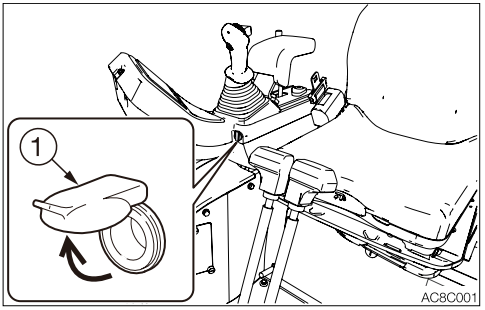
MEMO

ACCESSORIES

POWER SOCKETS

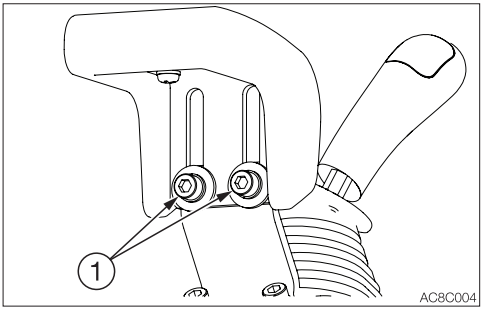
⚠ WARNING

Use only those electric products which comply with the specifications of this socket.



This socket is used to supply power. Be sure to use this socket for devices which require power supply voltage/current less than 12V/5A.
To use, open the cap (1).

ARMREST

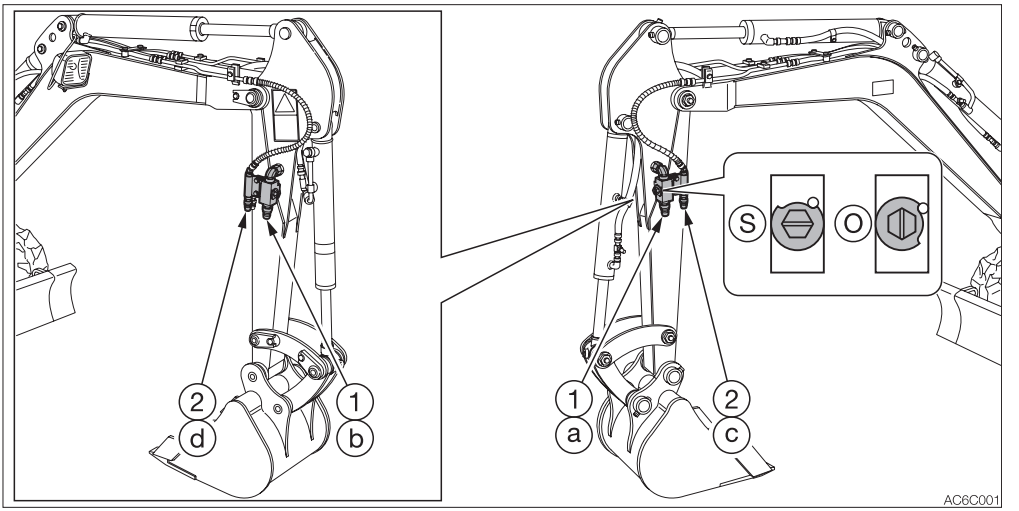


Adjusting the height

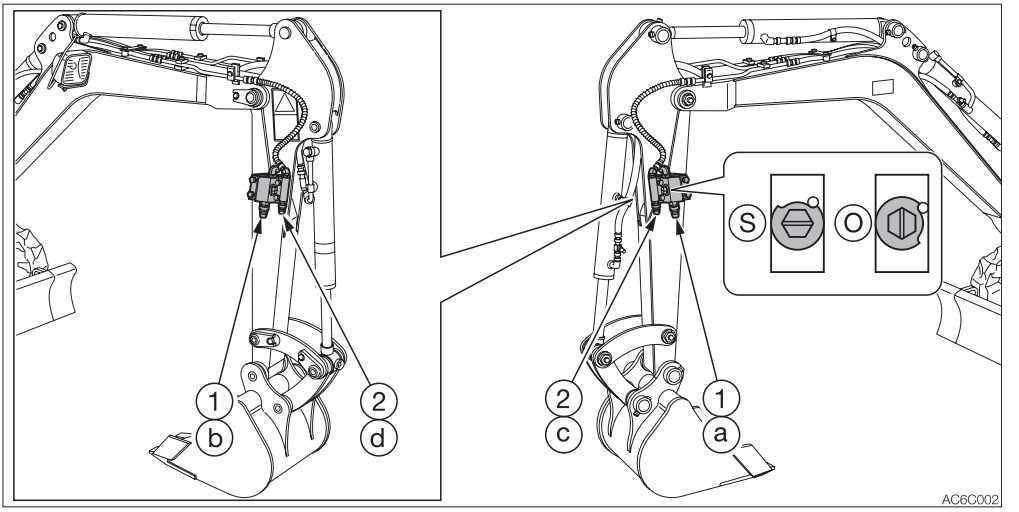
1. Loosen the lock by turning the bolts (1) counterclockwise.
2. Set the armrest to your desired position, and turn the bolts (1) clockwise to lock the armrest.

AUXILIARY HYDRAULIC LINES (IF EQUIPPED)

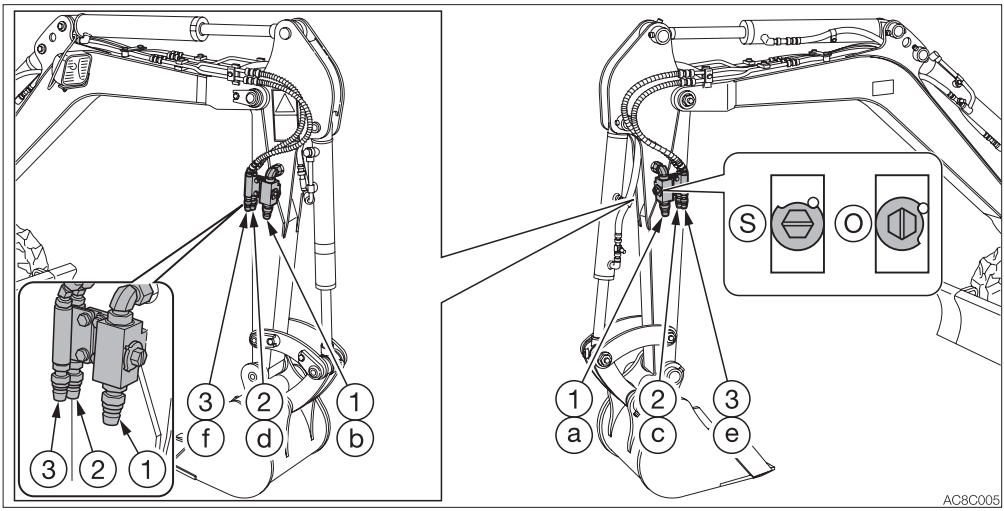
First / second auxiliary hydraulic line 1



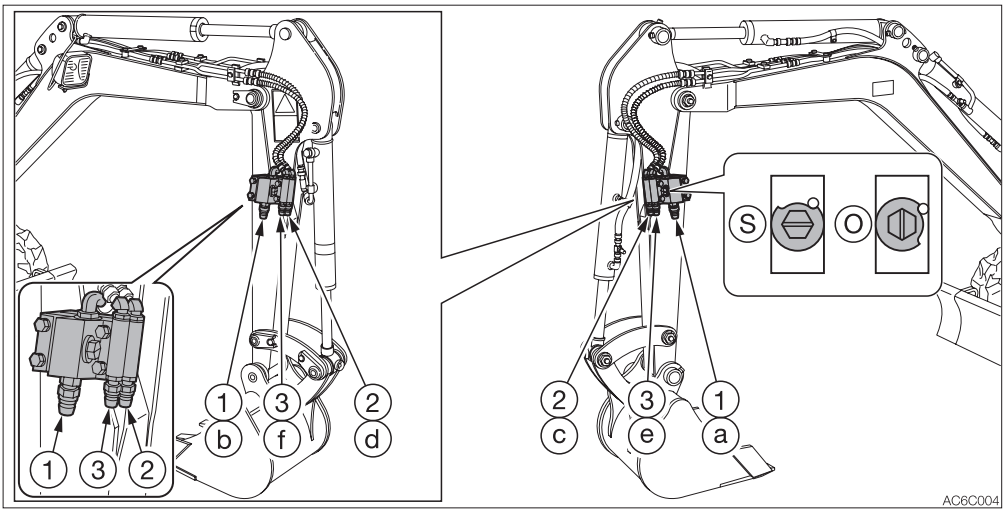
First / second auxiliary hydraulic line 2



Third auxiliary hydraulic line 1



Third auxiliary hydraulic line 2



⚠ WARNING

Oil may spurt out if pipes disconnected before releasing the pressure in the hydraulic system.

- Immediately after the engine is stopped, press each auxiliary hydraulic pedal and second auxiliary switch several times to release the pressure from the auxiliary hydraulic circuit.
- Slowly loosen the air bleeding plug to relieve the internal pressure of the hydraulic oil tank.

- **When disconnecting hoses, stand to the side and loosen them slowly to gradually release the internal pressure before removing.**

These lines deliver the hydraulic oil necessary for operating a hydraulic breaker, crusher or other attachments.

(1).....First auxiliary hydraulic lines
(2).....Second auxiliary hydraulic lines
(3).....Third auxiliary hydraulic lines

Stop valve
(S) : Close
(O) : Open

Connecting the hydraulic circuits

To connect the attachment hydraulic lines, observe the following procedures:

1. Release the pressure remaining in the lines, and then close the stop valve. Refer to “Releasing the residual pressure” on page 2-26.
2. Remove the plugs.
3. Connect the attachment hydraulic lines to ports (a/c) and (b/d). When installing a hydraulic breaker, connect the supply circuit to the port (a) and the return circuit to port (b).
4. Open the stop valves. When installing a hydraulic breaker, open the selector valve (1). Refer to “Selector valve” on page 2-26.
5. When connecting is complete, purge air from the hydraulic lines.
   a. Start the engine and run it at a low idle speed with no load for 10 minutes.
   b. With the engine running in low idle, operate the auxiliary hydraulic pedal or switches repeatedly (approx. 10 times) to purge air from the hydraulic lines.
   c. Stop the engine and wait for at least 5 minutes until bubbles escape from the hydraulic oil in the tank.

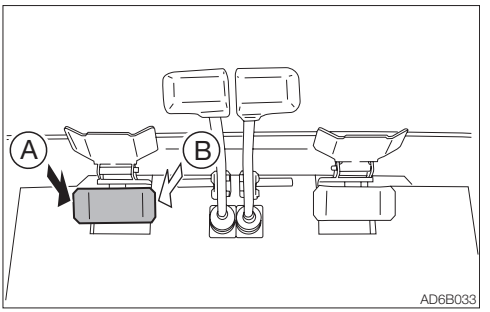
IMPORTANT: Follow the procedures for purging air as instructed by the attachment manufacturer, if applicable.

6. Check for oil leaks.

Disconnecting the hydraulic circuits

1. Release the pressure remaining in the lines, and then close the stop valve. Refer to “Releasing the residual pressure” on page 2-26.
2. Disconnect the lines from the ports (a/c) and (b/d).
3. Install the plugs.

Operating



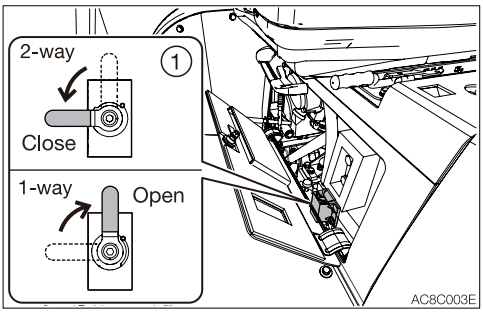
Press this pedal to control the flow of the oil in the auxiliary hydraulic lines.
(A).....Hydraulic oil flows to left auxiliary line (a).
(B) .....Hydraulic oil flows to right auxiliary line (b).

Releasing the residual pressure

After the auxiliary hydraulic circuits have been used, pressure remains in the circuits. This is called the residual pressure. Release this residual pressure before disconnecting the lines.

1. When the engine is stopped, depress the auxiliary hydraulic pedals from side to side several times.

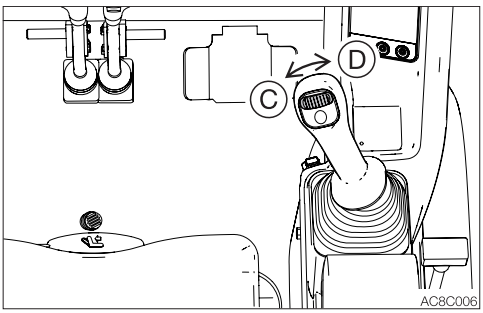
Selector valve (Option)



Open ..... When using a hydraulic breaker (1-way flow)
Close..... When using a reversible attachment (2-way flow)
Change the direction of the hydraulic oil flow by opening or closing the selector valve (1) on the machine body.

Second auxiliary hydraulic switch

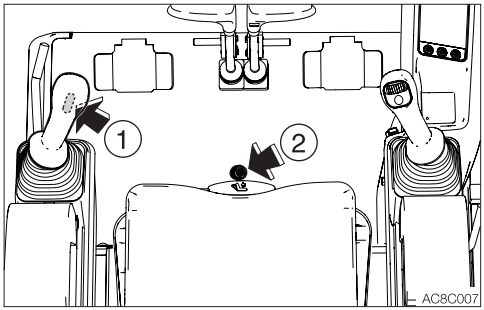
Slider switch
(Proportional control)
Proportional control allows for slow-to-fast/ fast-to-slow movement of attachment. Example: If you move the slider switch half way, the attachment will move at approximately one-half the speed.



Move this switch to control the flow of the oil in the second auxiliary hydraulic lines.
(C): .... Hydraulic oil flows to the left auxiliary line (c).
(D): .... Hydraulic oil flows to the right auxiliary line (d).

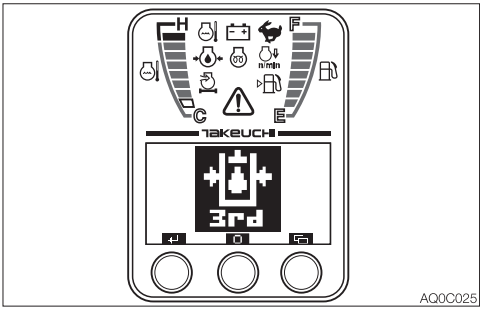
Releasing the residual pressure
Refer to “Accumulator” on page 2-31.

Third auxiliary hydraulic switch and button



The third auxiliary hydraulic lines are normally used to control the “quick attachment” installed to connect/disconnect the bucket. When the safety lock lever is released after the engine is started, hydraulic oil flows into the pipe (e). This allows the pressure in the (e) side to increase and to prevent the pin inserted on the bucket from coming out. If the pressure in the (e) side drops, the alert that the bucket may come out is indicated by the warning lamp and the alarm. For a safety reason, the bucket can be disconnected only when the button (1) and the switch (2) are pressed at the same time. When they are pressed, the hydraulic oil flows into the line (f) to increase the pressure there. As the result, the pin on the bucket comes out and the bucket is removed from the machine.

Third auxiliary hydraulic warning lamp

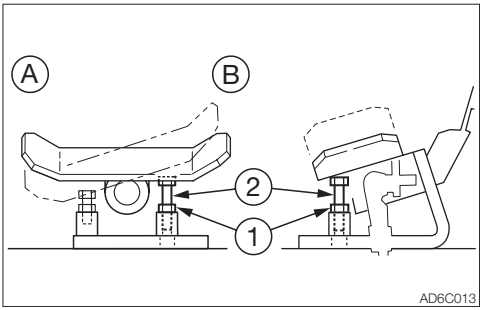


This lamp illuminates and an alarm sounds if the auxiliary 3rd hydraulic pressure drops abnormally while the engine is running

Adjusting the stroke of auxiliary hydraulic pedal

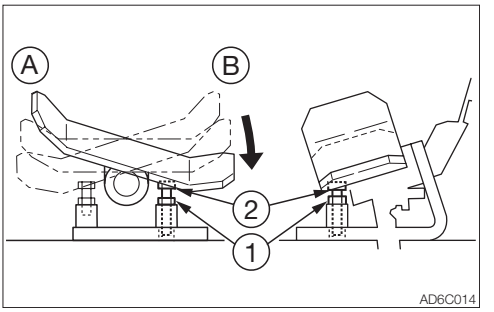
When a breaker is used, the pedal stroke must be adjusted so as not to activate the right auxiliary hydraulic line even if the B side of the pedal is accidentally depressed. When a general attachment is used, the pedal stroke must be readjusted. Adjust it so that the right auxiliary hydraulic line is activated when the B side of the pedal is depressed.

When using a hydraulic breaker (1-way flow)



1. Make sure that the auxiliary hydraulic pedal is in the neutral position.
2. Loosen the lock nut (1).
3. Loosen the adjustment bolt (2) until it touches the pedal.
4. Fasten the lock nut (1) to secure the adjustment bolt (2).

When using a reversible attachment (2-way flow)



1. Loosen the lock nut (1) and screw in the adjustment bolt (2) to the end.
2. Depress the B side of the auxiliary hydraulic pedal to the stroke end and hold its position.
3. Loosen the adjustment bolt (2) until it touches the pedal.
4. Fasten the lock nut (1) to secure the adjustment bolt (2).

ACCUMULATOR (IF EQUIPPED)

Operating the machine with an accumulator

⚠ WARNING

Be sure to handle the high-pressure nitrogen gas enclosed in the accumulator with care. If handled incorrectly, it could explode and cause serious injury. Strictly observe the following precautions:

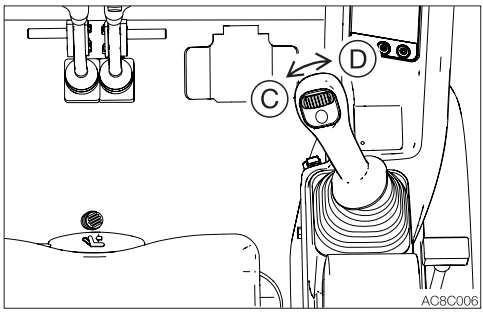
- **Do not disassemble.**
- **Do not allow flame near or throw it into a fire.**
- **Do not drill, weld or fuse.**
- **Do not subject it to physical shock such as hitting, rolling or dropping.**
- **Before disposing of the unit, the sealed gas must be drained. Contact a Takeuchi service agent for help.**

For a machine with an accumulator, the residual pressure in the auxiliary hydraulic circuit or the working equipment circuit can be released even after the engine is stopped.

Releasing residual pressure

Residual pressure refers to the pressure that remains in the hydraulic circuit after the operation. Release the residual pressure as necessary by using the following steps. Perform the residual pressure releasing within 10 minutes after the engine stopping.

1. Return the throttle lever to idle the engine at low speed.
2. Lower the bucket and dozer blade to the ground.
3. Check that the safety lock lever is in the released position.
4. Stop the engine.
5. Turn the starter switch to the ON position.



6. Move the auxiliary 2nd switch several times to release the residual pressure in the circuitry. (If equipped)
7. Move all the control levers and pedals several times in all directions to release the pressure from the working equipment circuitry.
8. Raise the safety lock lever to engage the lock.

Lowering the boom when the engine has stopped

Perform this operation within 10 minutes after the engine stopping.

1. Check that the safety lock lever is in the released position.
2. Check that the starter switch is in the ON position.
3. Slowly push the operating lever forward to lower the boom.

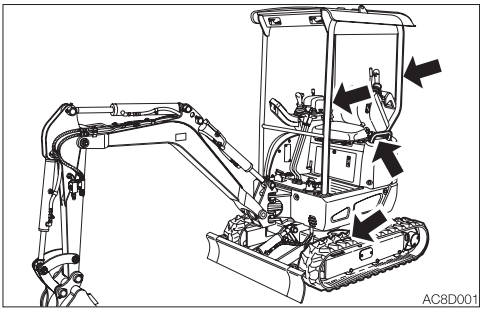
OPERATION

BEFORE STARTING OPERATION

GETTING ON OR OFF THE MACHINE

⚠ WARNING

- **Do not jump on or down from the machine. Never attempt to get on or off the moving machine.**



- **Climb up/down the steps holding the handrail to support your weight in a three point secure stance (hand and feet).**
- **Never use the safety lock lever or control levers as hand holds.**

WALK-AROUND INSPECTION

Perform the walk-around inspections once a day before starting the engine for the first time that day.
Refer to “MAINTENANCE, Walk-around inspection”, on pages 5-14 and 5-15.

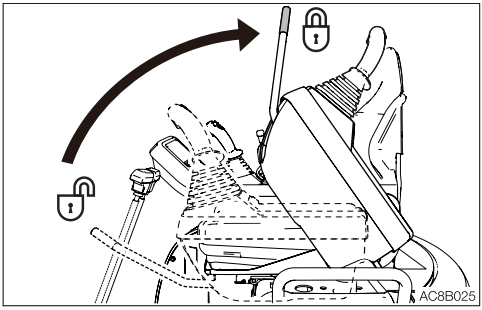
DAILY INSPECTION

Perform the daily inspections once a day before starting the engine for the first time.
Refer to “MAINTENANCE, Daily inspection”, on pages 5-16 to 5-21.

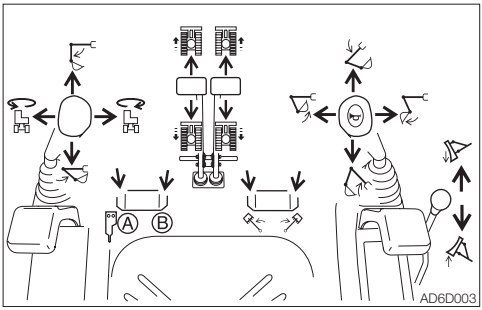
STARTING AND STOPPING THE ENGINE

BEFORE STARTING THE ENGINE

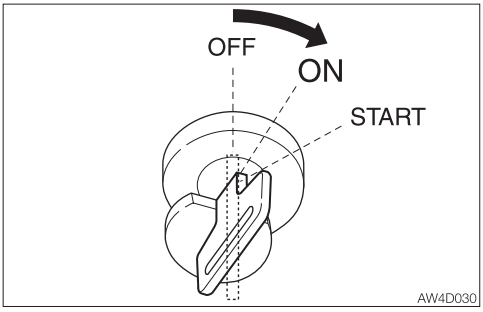
1. Adjust the seat for a comfortable operating position.
2. Fasten the seat belt.



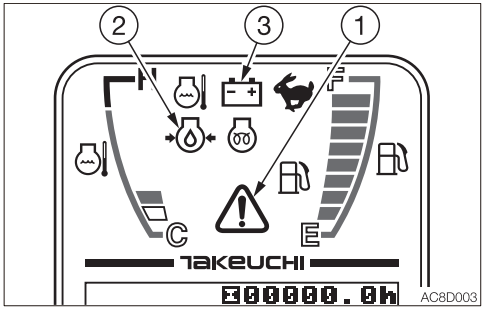
3. Check that the safety lock lever is in the locked position.



4. Check that all levers and pedals are in the neutral position.



5. Insert the key into the starter switch, turn it to the ON position, then perform the following inspections:



- All warning lamps flash for one second and an alarm is sounded for ten seconds. The meters also start functioning. After two seconds, only the battery charge warning lamp (3), the engine oil pressure warning lamp (2) and the engine emergency lamp (1) start flashing, and the other lamps turn off.
- Press the light switch to check that the boom light, front light and meter lights turn on.

If a lamp does not light or the alarm is not sounded, the bulb may be burnt out or a wire may be damaged. Ask a Takeuchi service agent for repair.

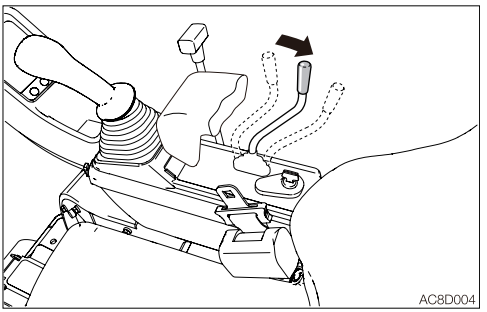
STARTING THE ENGINE

⚠ WARNING

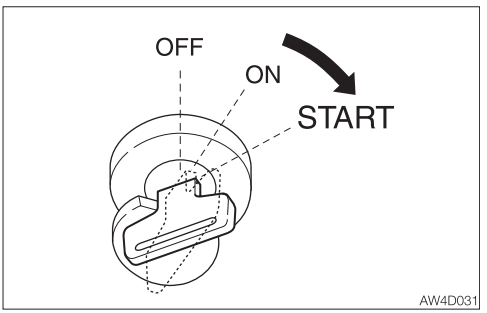
- **Clear all personnel from the work area.**
- **Sound the horn to warn people around the machine.**

IMPORTANT: Do not run the starter motor for more than 15 consecutive seconds. If the engine fails to start, wait for 30 seconds, and then try again to start the engine.
IMPORTANT: If the engine stalls due to fuel shortage, add fuel, turn the key to the ON position for 60 seconds, and then turn it to the START position. Running the starter for a long time before there is enough fuel is going through can cause the starter to fail.

Normal starting



1. Pull the throttle lever to the middle position.



2. Turn the starter key to the START position and start the engine.

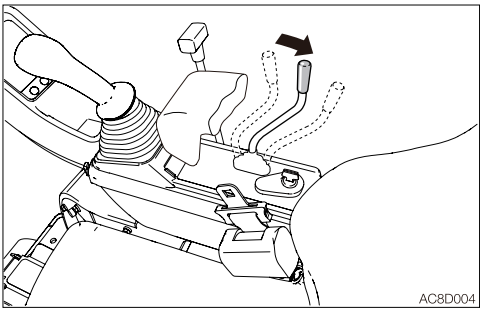
Note:
The engine does not start unless the safety lock lever is in the locked position at this point.

3. Once the engine starts, release the key. The key automatically returns to the ON position.
4. Check that the warning lamps are off.
5. Return the throttle lever and warm up the engine.
   Refer to “Warming up the engine” on page 3-5.

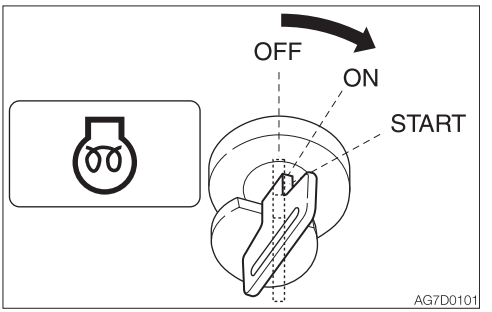
Starting in cold climates

⚠ WARNING

Never use starting fluid on this engine, as the starting fluid could cause an explosion.



1. Pull the throttle lever to the middle position.



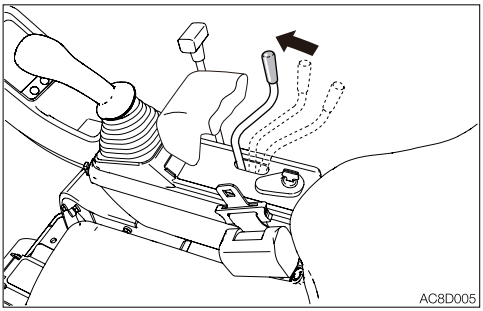
2. Turn the starter key to the ON position, and confirm that the glow lamp is on. (The glow lamp stays lit for up to three seconds when the coolant temperature is 5°C (41°F).)
3. After the glow lamp goes out, turn the key to the START position to start the engine.

Note:
The engine does not start unless the safety lock lever is in the locked position at this point.

4. Once the engine starts, release the key. The key automatically returns to the ON position.
5. Check that the warning lamps are off.
6. Return the throttle lever and warm up the engine.
   Refer to “Warming up the engine”.

WARMING UP THE ENGINE

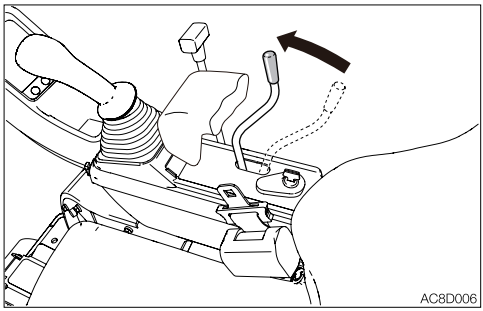
IMPORTANT: Avoid racing the engine until it has warmed up.
Do not warm up the engine for a long time (20 minutes or more). When idling is required, occasionally place a load or run the engine at medium speed.



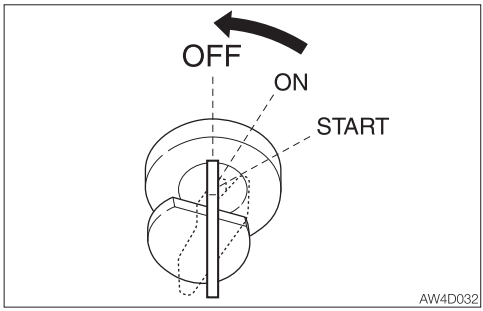
1. Return the throttle lever, then run the engine at a low idle speed with no load for 5 minutes.

STOPPING THE ENGINE

IMPORTANT: Do not stop the engine suddenly when operating with heavy loads or at the maximum speed. Doing so may cause the engine to overheat or seize. Never stop running the engine suddenly except in emergency.



1. Return the throttle lever.
2. Idle the engine for about 5 minutes to gradually let it cool.



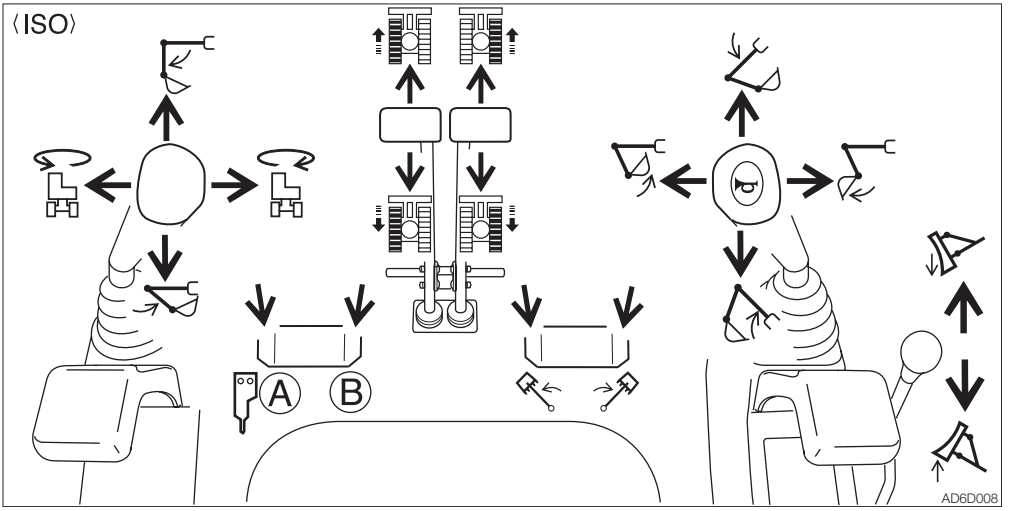
3. Turn the starter key to the OFF position to stop the engine.

OPERATING THE MACHINE

LEVER PATTERN (ISO PATTERN)

⚠ WARNING

- Before starting operation, carefully check which lever pattern you are going to use.
- It is described using the ISO pattern in this manual.

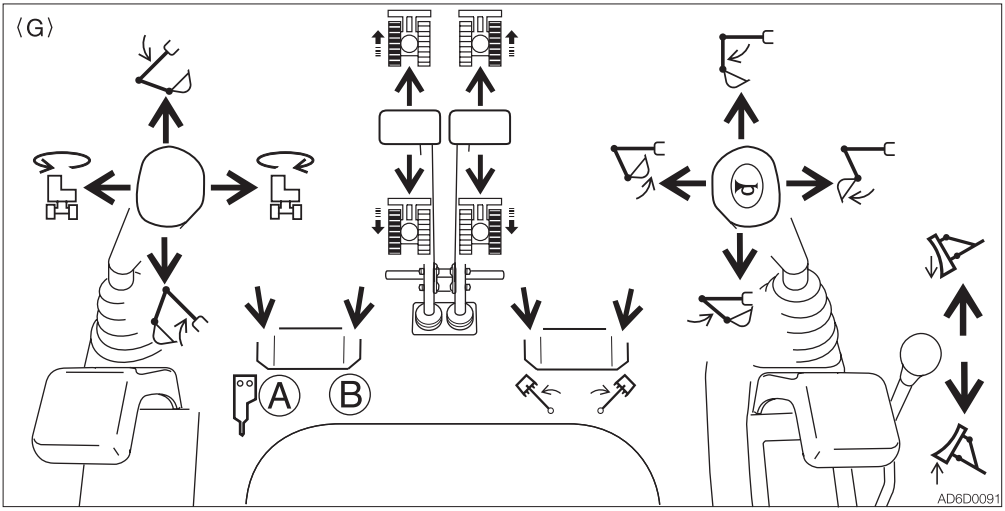


	Left crawler forward		Right crawler forward
	Left crawler reverse		Right crawler reverse
	Arm out		Boom lower
	Arm in		Boom raise
	Upperstructure slew left		Bucket load
	Upperstructure slew right		Bucket dump
	Boom swing left		Dozer blade lower
	Boom swing right		Dozer blade raise

LEVER PATTERN (G PATTERN) (IF EQUIPPED)

⚠ WARNING

- **Before starting operation, carefully check which lever pattern you are going to use.**
- **It is described using the ISO pattern in this manual.**



	Left crawler forward		Right crawler forward
	Left crawler reverse		Right crawler reverse
	Boom lower		Arm out
	Boom raise		Arm in
	Upperstructure slew left		Bucket load
	Upperstructure slew right		Bucket dump
	Boom swing left		Dozer blade lower
	Boom swing right		Dozer blade raise

Refer to “Selecting a lever pattern” on page 8-5.

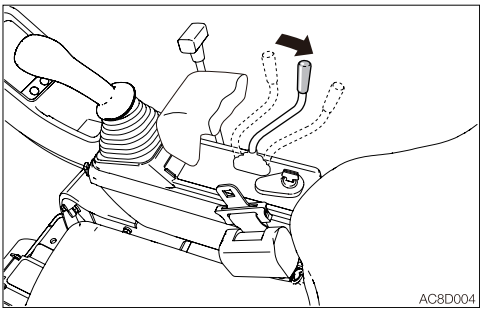
WARMING UP THE MACHINE (HYDRAULIC OIL)

⚠ WARNING

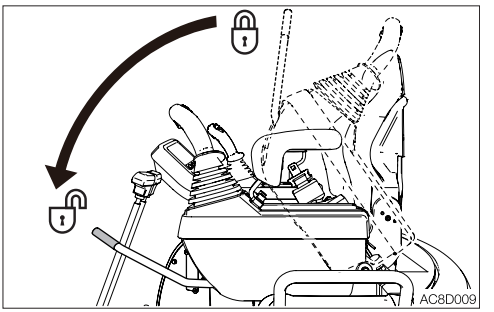
Operating the working equipment without warming up the machine (hydraulic oil) is dangerous, as the working equipment cannot response to controls quickly or may move in unexpected ways, and the safety devices may not operate properly. Be sure to sufficiently warm up the machine.

IMPORTANT: Do not operate the levers too quickly when the hydraulic oil temperature is below 20°C (68°F). The proper hydraulic oil temperature during operation is 50 to 80°C (122 to 176°F). If operations must be performed at lower temperatures, heat up the hydraulic oil to at least 20°C (68°F).

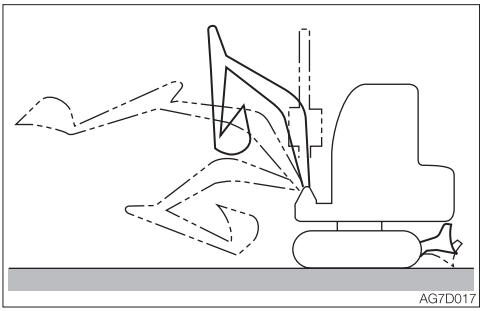
Normal warm-up



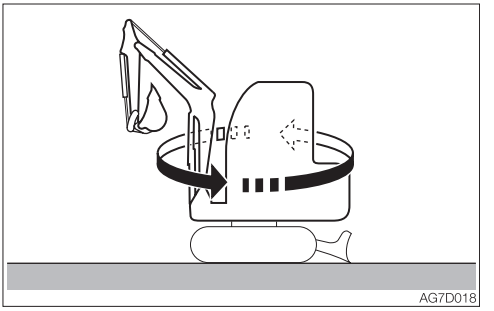
1. Pull the throttle lever to the middle position, then run the engine at medium speed for about 5 minutes with no load.



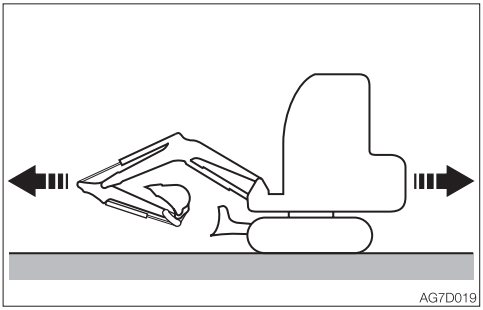
2. Fully lower the safety lock lever to disengage the lock and lift the bucket from the ground.



3. Extend and retract each of the cylinders slowly several times with no load.



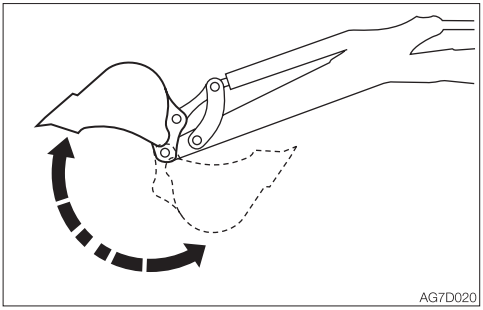
4. Slew slowly to the left and the right several times.



5. Travel slowly forward and in reverse several times.

Warm-up in cold climates

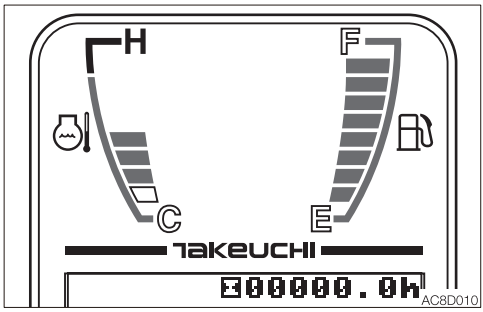
1. Perform the normal warm-up procedure.



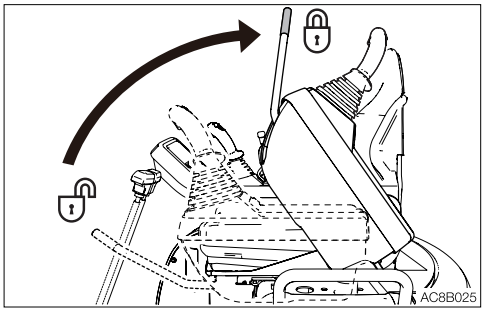
2. Set the bucket cylinder at the stroke end and keep it there.
   Do not keep this condition for more than 30 seconds.
3. Repeat Step 2 until the bucket operating speed becomes normal.

INSPECTION AFTER WARM-UP

After warming up the engine and machine (hydraulic oil), perform the checks and inspections described below, and repair if necessary.



1. Check that the warning lamps and meters are as follows:
   · Are all warning lamps off?
   · Is the LED on water temperature gauge seen within the green range?
2. Check that there are no irregularities in the exhaust color, sound and vibrations.



3. Raise the safety lock lever to the locked position, and then check that the operating and travel levers are locked.

CRAWLER WIDTH SWITCHING

⚠ WARNING

Operate the machine with the maximum crawler width

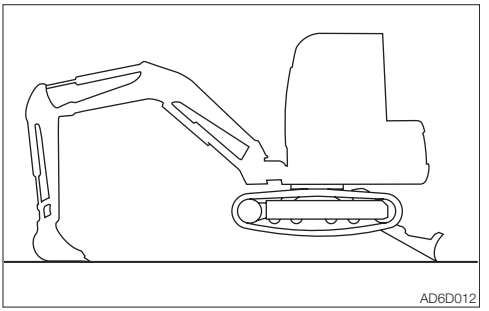
- **Always operate the machine with the crawler width extended to 1300 mm (51.2 in.) to maximize the machine stability. If the machine is operated with the crawler width narrowed (980 mm, 38.6 in.), the machine may tip over due to its poor stability.**
- **If the machine must be operated with the narrowed crawler width (980 mm, 38.6 in.), traveling should be done after folding the hoe attachment, lowering the boom to lower the center of gravity and keeping the machine facing forward.**

IMPORTANT: All debris, mud, soil, stones, etc. must be removed from the track frame before switching the crawler width. Do it in a safe manner and do not work under the machine.

This machine is able to change the crawler width. Normally, it is best to operate with the crawler width extended for machine's stability.

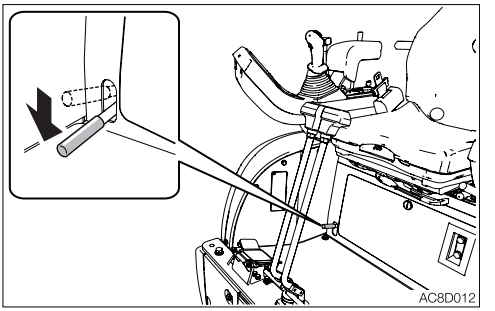
Switching the crawler width

Perform the operation on a flat and rigid ground where no obstacles around.

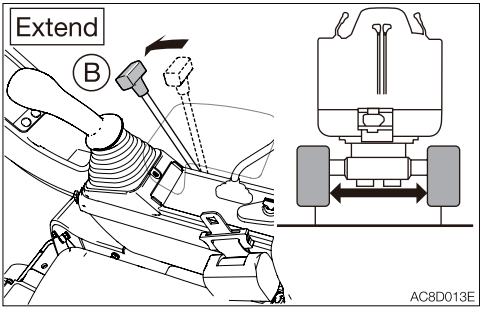


1. Raise the machine body by using the hoe attachment and the dozer blade.

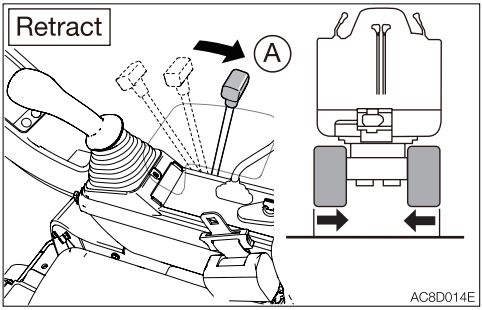
IMPORTANT: Be sure to raise the machine body before switching the crawler width. If the operation is attempted when the crawler is rested on the ground, the travel frame or span cylinder may be damaged.



2. Depress the selector lever.

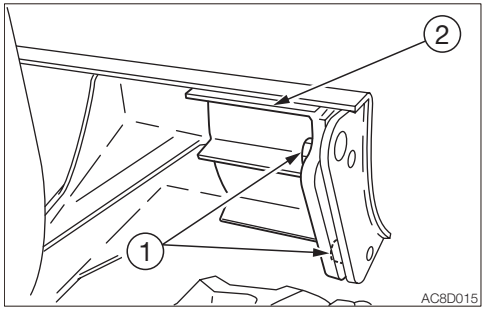


3. Push the blade lever forward (B) to increase the crawler width (1300 mm or 51.2 in.).
   If necessary, extend the blade width by changing the plate (2).
   Refer to "Switching the blade width" on page 3-11.

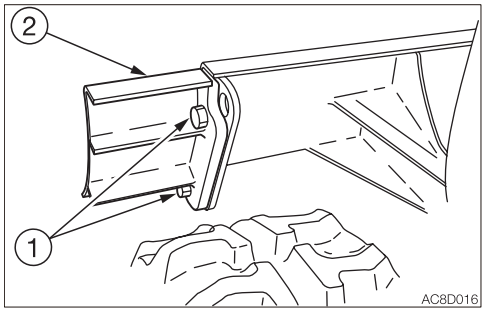


4. Pull the blade lever toward you (A) to decrease the crawler width (980 mm or 38.6 in.).

SWITCHING THE BLADE WIDTH



1. Loosen bolts (1) and remove plate (2).

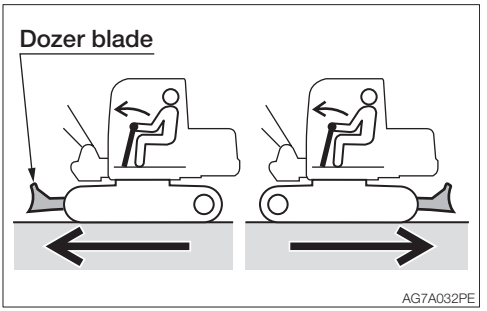


2. Attach the right plate (2) to the left, the left plate (2) to the right.
3. Tighten the plate (2) with bolts (1).

OPERATING THE TRAVEL LEVERS/ PEDALS

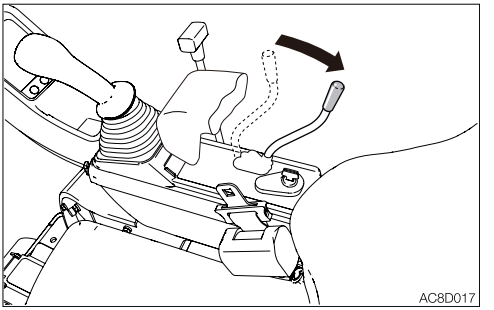
⚠ WARNING

- Never allow anyone to enter the machine's slewing radius and path.
- Signal your intention to move by sounding the horn.
- There is a blind spot in the rear of the machine. Before traveling in reverse, as necessary, swing the cab around in reverse to check that the area is safe and clear.

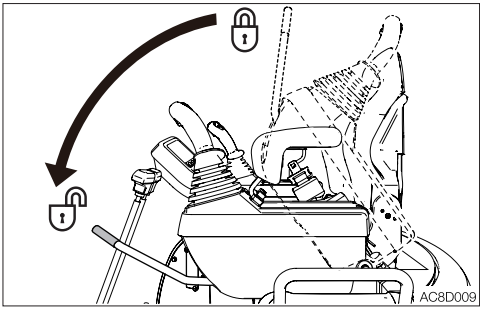


- Before operating the travel levers/ pedals, make sure that the dozer blade is to the front of the operator's seat. Remember that when the dozer blade is to the rear of the operator's seat, the travel levers/pedals must be operated in the reverse direction from when it is to the front.
- Clear all obstacles from the path of the machine.

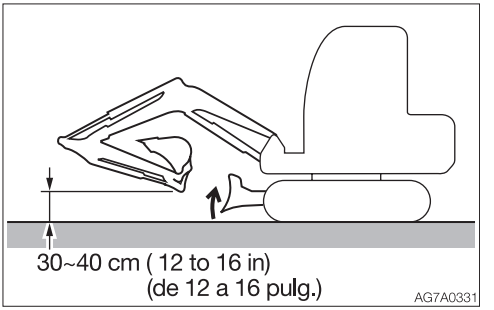
Moving the machine forward and backward



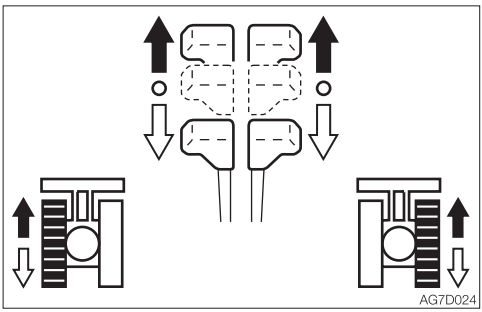
1. Pull the throttle lever and increase the engine speed.



2. Fully lower the safety lock lever to disengage the lock.



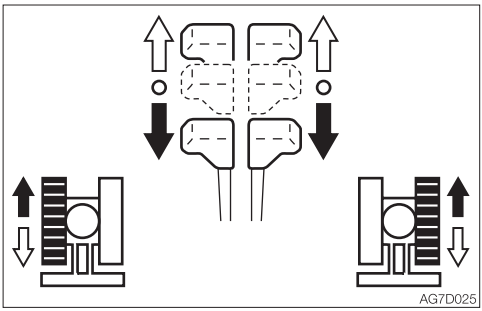
3. Fold the hoe attachment and lower it 30 to 40 cm (12 to 16 in.) above the ground.
4. Lift the dozer blade.
5. Operate the left and right travel levers as below.



When the dozer blade is in front of the operator's seat:

➡ To move forward:
Tilt the levers forward.

⇨ To move backward:
Tilt the levers backward.



When the dozer blade is behind the operator's seat:

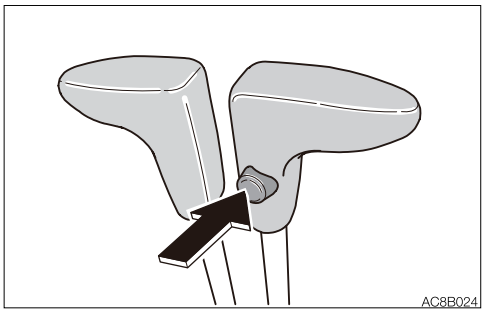
➡ To move forward:
Tilt the levers backward.

⇨ To move backward:
Tilt the levers forward.

Traveling in 2nd (High) speed

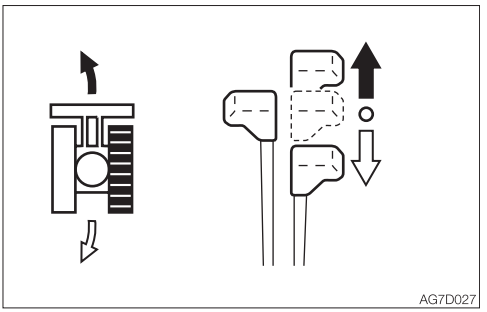
⚠ WARNING

When a load greater than a set value is applied during traveling in 2nd (high) speed, the speed will automatically slow down to 1st (low) speed. When the load becomes lighter, the speed will increase and return to 2nd (high) speed. It should be noted that the travel speed changes depending on the load condition (for machines with the automatic travel shift-down system).



Press the travel speed switch on the right travel lever to switch to 2nd (high) speed, and press it again to return to 1st (low) speed.

Pivot turn

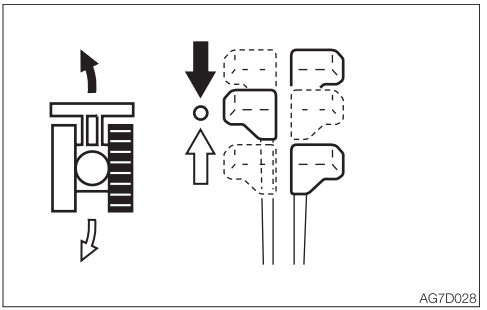


Turning to the left when stopped:

➡ To turn forward to the left:
Tilt the right lever forward.

⇨ To turn backward to the left:
Tilt the right lever backward.

To turn to the right, operate the left lever in the same way as for the right lever.



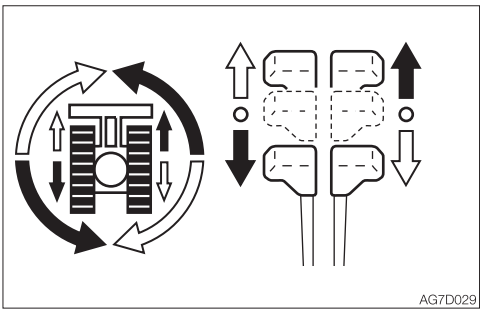
Turning to the left while traveling:

➡ To turn left while traveling forward:
Set the left lever to neutral.

⇨ To turn left while traveling backward:
Set the left lever to neutral.

To turn to the right while traveling, operate the right lever in the same way as for the left lever.

Spin turn



➡ To spin left:
Tilt the left lever backward and the right lever forward.

⇨ To spin right:
Tilt the right lever backward and the left lever forward.

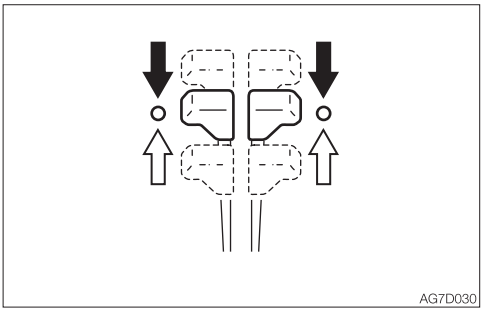
STOPPING TRAVEL

⚠ WARNING

- Park the machine on a flat, rigid and safe ground. Set the parking brake. If you must park on a slope, chock the tracks to block the machine.
- If any control is accidentally touched when the safety lock lever is not locked, the machine may suddenly move and cause serious injury or death.
- Note that the dozer blade, boom swing and auxiliary hydraulic controls cannot be locked, even when the safety lock lever is set to the locked position. Do not carelessly touch these controls.

⚠ CAUTION

Never stop running the machine suddenly except in emergency. Stop in good time, if possible.

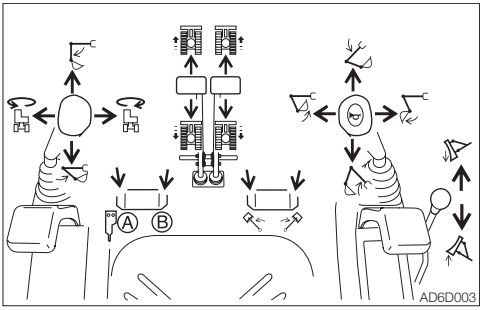


1. Set the left and right travel levers slowly to the neutral position. The machine stops.

OPERATING THE WORKING EQUIPMENT

⚠ WARNING

- **Before starting operation, carefully check which lever pattern you are going to use.**
- **It is described using the ISO pattern in this manual.**



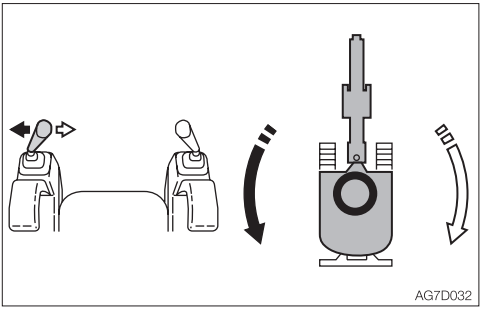
Use the right operating lever to operate the boom and bucket.
Use the left operating lever to operate the arm and slewing.
Return the operating levers to the neutral position to stop the hoe attachments.

1. Lower the safety lock lever to the unlocked position.
2. Set the pedal cover to the unlocked position.

Slewing

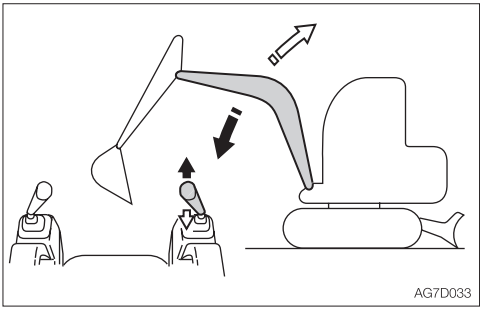
⚠ WARNING

Check the surrounding area for safety before slewing.



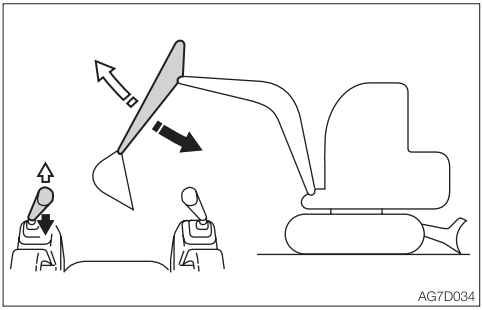
➡ Upperstructure slew left:
Tilt the left operating lever to the left.
⇨ Upperstructure slew right:
Tilt the left operating lever to the right.

Operating the boom



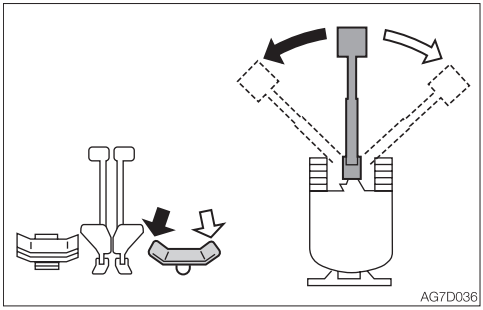
➡ Boom lower:
Tilt the right operating lever forward.
⇨ Boom raise:
Tilt the right operating lever backward.

Operating the arm



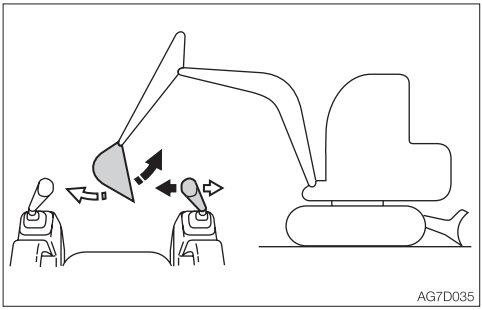
➡ Arm in:
Tilt the left operating lever backward.
⇨ Arm out:
Tilt the left operating lever forward.

Operating the boom swing



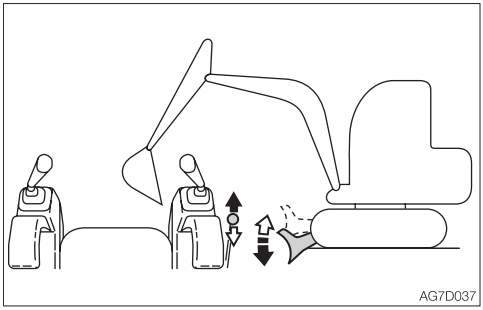
➡ Boom swing left:
Step on the left side of the pedal.
⇨ Boom swing right:
Step on the right side of the pedal.

Operating the bucket



➡ Bucket load:
Tilt the right operating lever to the left.
⇨ Bucket dump:
Tilt the right operating lever to the right.

Operating the dozer blade



➡ Dozer blade lower:
Tilt the lever forward.
⇨ Dozer blade raise:
Tilt the lever backward.

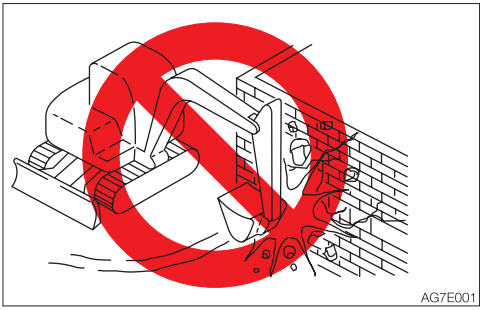
OPERATING PROCEDURES

PROHIBITED OPERATIONS

⚠ WARNING

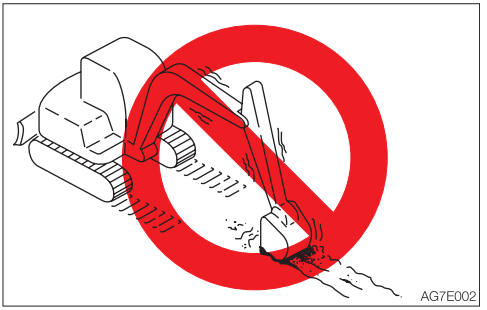
- **Do not operate on bedrock (hard or soft).**
- **Do not slew/swing while traveling. If you must operate the hoe attachment while traveling, operate at speeds slow enough so you have complete control at all times.**

Do not perform demolition or leveling using slew force



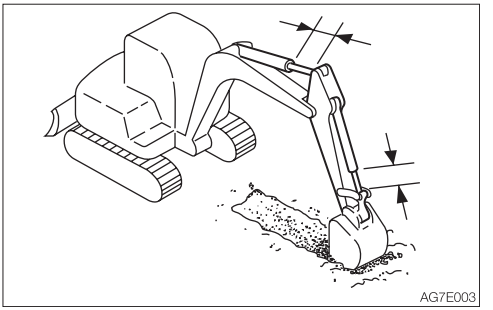
Do not demolish walls or level ground using slew force. Also, do not dig the bucket teeth into the ground during slewing. Doing so will damage the hoe attachment.

Do not dig while traveling

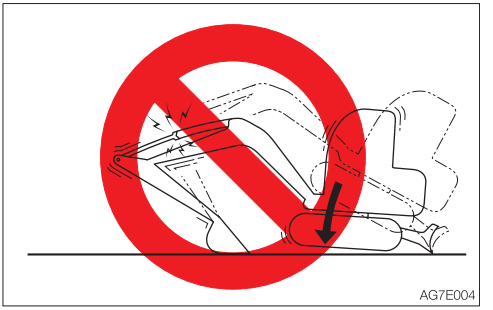


Do not dig the bucket into the ground and use the traveling force to dig.

Be gentle when using the hydraulic cylinder

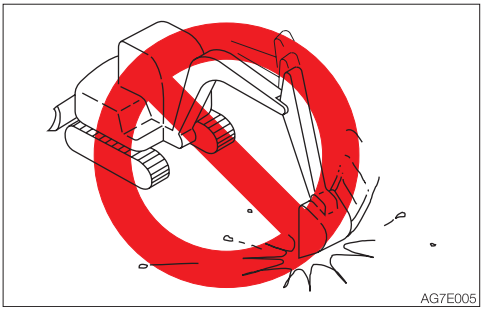


Do not extend the hydraulic cylinders to the stroke ends. Operate them with leeway.



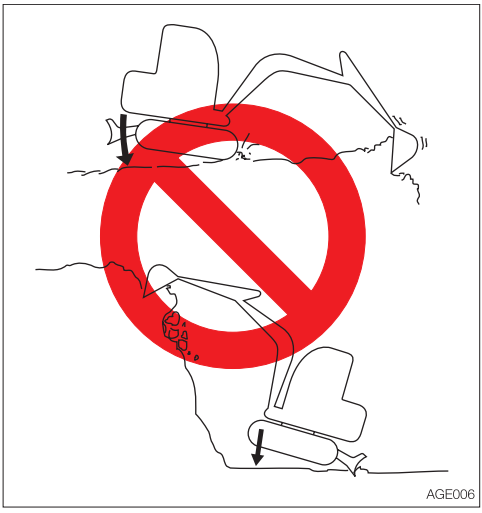
Do not support the machine body with the hoe attachment when the body is lowering with the arm cylinder fully extended. Doing so concentrates the load on the arm cylinder and could damage the arm cylinder.

Do not drive piles with the bucket or dig by banging the bucket



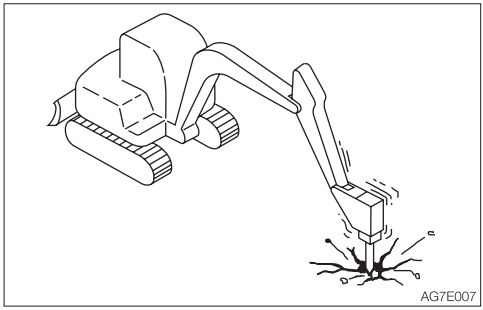
Doing so will shorten the service life of the hoe attachment. Use the hydraulic force to dig.

Do not perform operations using the machine's dropping force



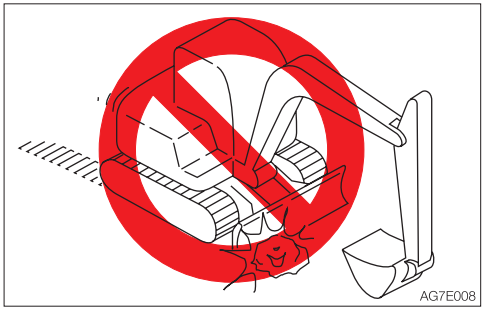
Putting excessive strain on the machine will shorten its service life. When digging, use the hydraulic force of the cylinders and the shallow and long strokes.

Digging bedrock



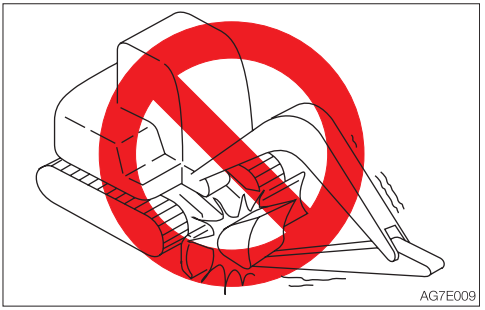
For hard base rock, break the rock up into small pieces with a breaker, etc., before digging. This prevents damage to the machine and is thus more economical in the end.

Caution on exposing the dozer blade to shocks



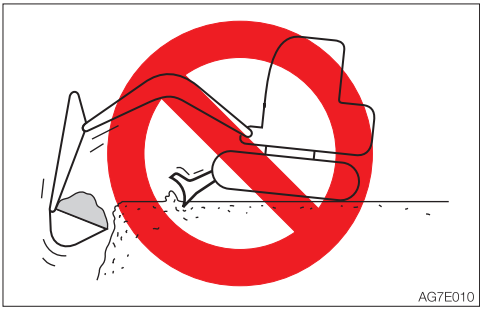
Hitting the dozer blade against rocks, etc., could damage the dozer blade or the blade cylinder.

Caution on folding the hoe attachment

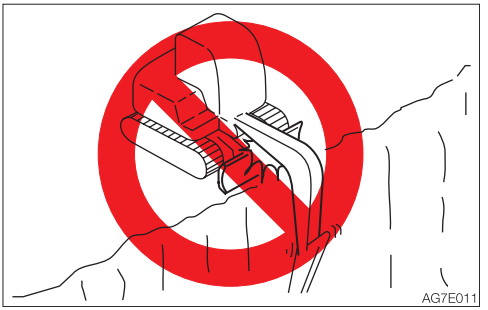


Be careful not to let the bucket to hit the dozer blade when the hoe attachment is being folded.

Do not use the dozer blade as an outrigger

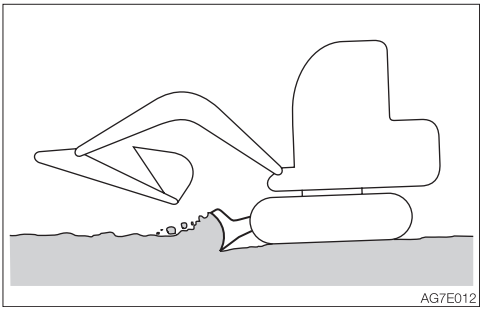


Pay attention to the dozer blade when digging



When digging deeply with the dozer blade positioned at the front, be careful that the boom and bucket do not hit the dozer blade. Operate with the dozer blade at the rear whenever possible.

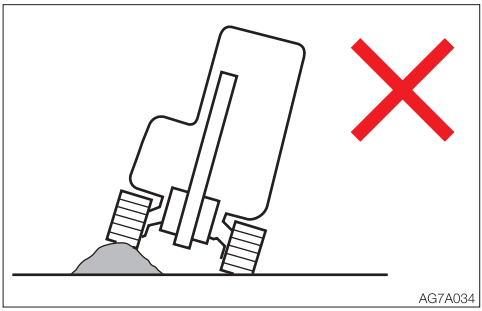
Caution on digging down with the dozer blade



This dozer blade is designed for simple earth pushing. Do not dig down deeply with the dozer blade. Doing so could damage the dozer blade and undercarriage.

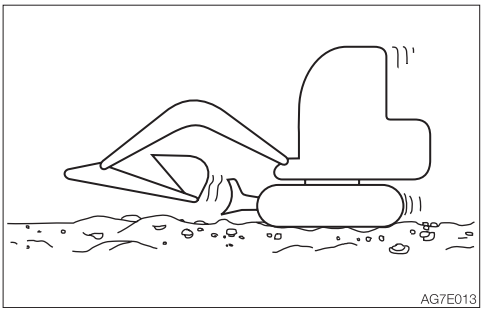
CAUTIONS ON OPERATING

Cautions on traveling



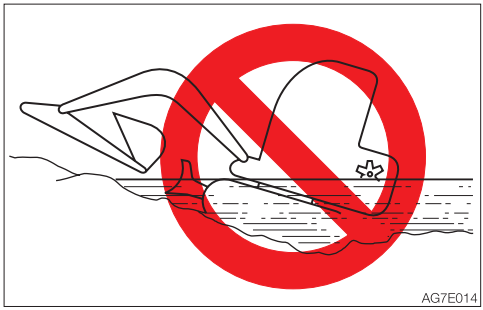
Traveling over obstacles (rocks, stumps, etc.) may put a great load on the machine body and may cause damage to it. Avoid crossing over obstacles whenever possible. If you must do so, keep the hoe attachment near the ground, travel at a low speed, and go over the obstacle at the center of the crawler.

Cautions on traveling in 2nd (High) speed

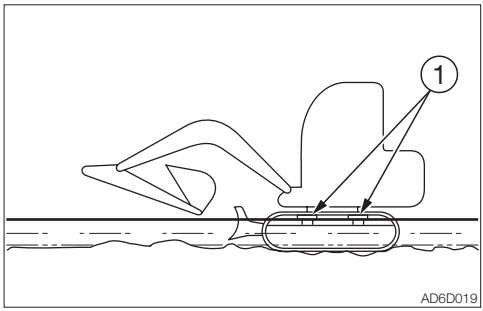


- On uneven ground, maintain the low speed and avoid starting, stopping or changing directions abruptly.
- When a load greater than a set value is applied during traveling in 2nd (high) speed, the speed will automatically slow down to 1st (low) speed. When the load becomes lighter, the speed will increase and return to 2nd (high) speed. It should be noted that the travel speed changes depending on the load condition (for machines with the automatic travel shift-down system).
- When traveling in 2nd speed, do so with the dozer blade at the front.

Cautions on using machine in water



If the rear of the machine is submerged in water as shown in the figure above, it causes the radiator fan to turn in water, resulting in damage to the fan. The rear of the machine must not be submerged.

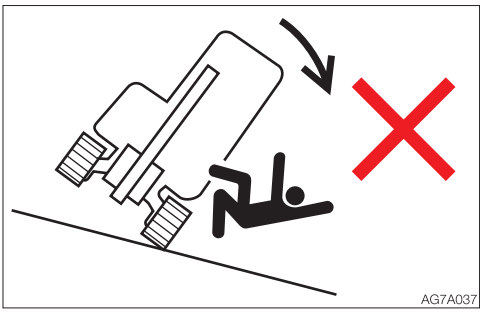


- Allowable water depth
  Use the machine in water only when the water is up to the middle of the shoe slide (1).
- For those parts used in water for a long time, apply enough grease until the old grease is expelled.
- Never submerge the slew bearing or main body in water or sand. If submerged, contact a Takeuchi service agent for inspection.

CAUTIONS ON TRAVELING ON SLOPES

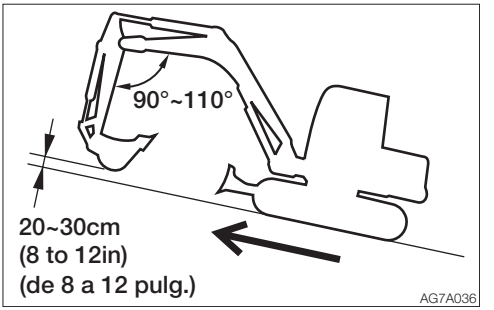
⚠ WARNING

- Never travel on slopes that are too steep for the machine to maintain its stability. Note that in reality, the machine's performance decreases on slopes due to its poor working condition.
- When traveling on slopes, lower the bucket to a height of 20 to 30 cm (8 to 12 in.) above the ground. When climbing a steep slope, extend the hoe attachment to the front. In emergencies, lower the bucket to the ground and stop the machine.
- When traveling on slopes or grades, drive slowly in 1st (low) speed.
- When climbing a hill, keep the operator's seat facing the hillside. When descending a hill, keep the operator's seat facing the downhill direction. In either case, travel must be done while paying attention to the ground in front of the machine.
- Do not descend slopes in reverse.



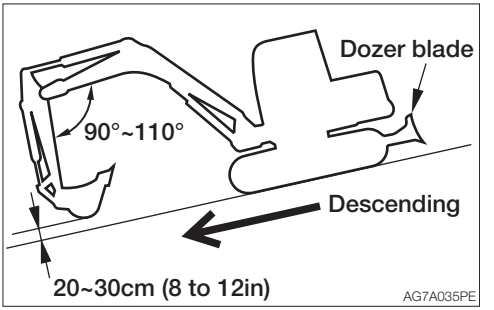
- Do not change directions on slopes or traverse slopes. First return to a flat surface, and then take an alternative path.
- The machine may slip sideways even on a slight slope if they are covered with grass or dead leaves, or when traveling on a wet metal plate or frozen surfaces. Do not allow the machine to position sideways to slopes.

Traveling posture on slopes
Climbing slopes



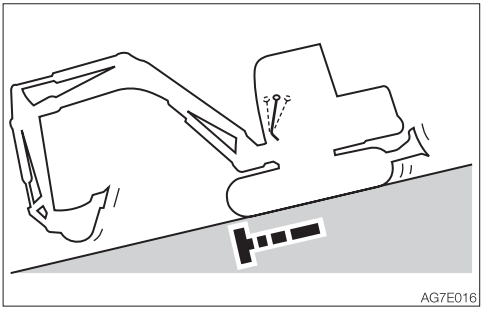
When climbing slopes of 15° or more, maintain the machine posture as shown in the figure above.

Descending slopes



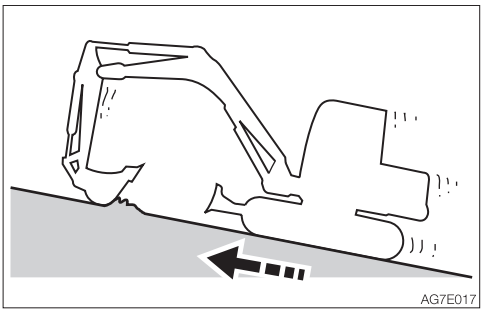
When descending slopes of 15° or more, slow down the engine speed and maintain the machine posture as shown in the figure above.

Braking when descending slopes



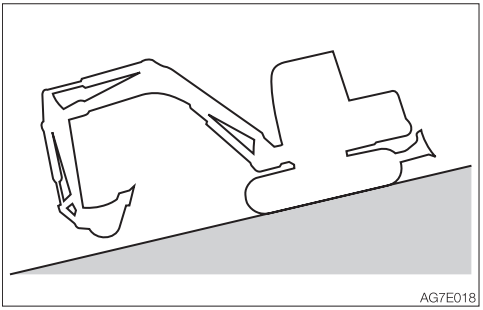
When descending slopes, the brakes are applied automatically once the travel levers are returned to the neutral position.

If the crawler slips



If the crawler slips while climbing a slope and impossible to travel, use the pulling force of the arm to climb the slope.

If the engine stops

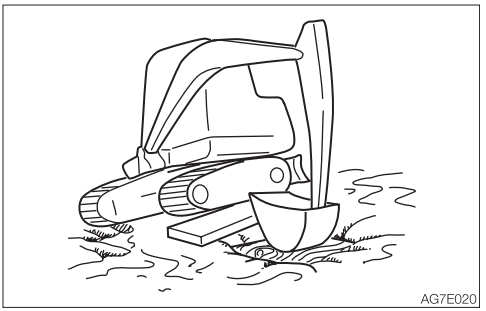


If the engine stops when descending a slope, set the travel levers to the neutral position, stop the machine, then start the engine.

GETTING OUT OF MUD

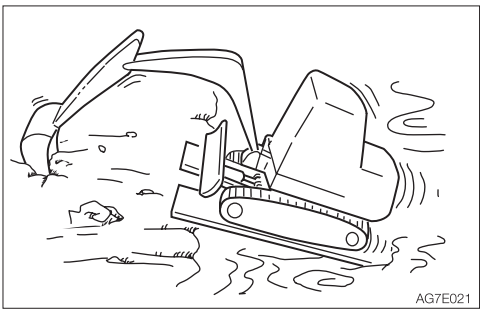
If the machine gets stuck in mud, use the procedure below to get it out.

If one crawler is stuck



1. Swing the bucket to the side of the crawler being stuck.
2. Set the arm and boom to an angle of 90 to 110°.
3. Press the bottom of the bucket (not the teeth) against the ground.
4. Place a plank or the like under the lifted crawler.
5. Lift the bucket and slowly move the machine out of the mud.

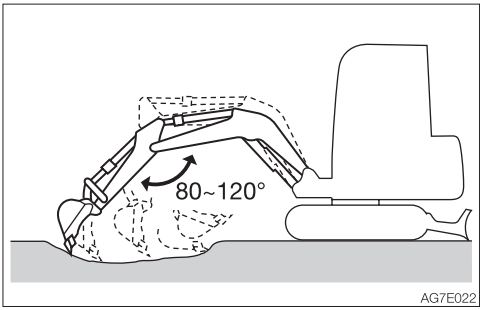
If both crawlers are stuck



1. Perform the steps 1 to 4 above for both crawlers.
2. Dig the bucket into the ground in front of the machine.
3. Pull with the arm while traveling forward to slowly move the machine out.

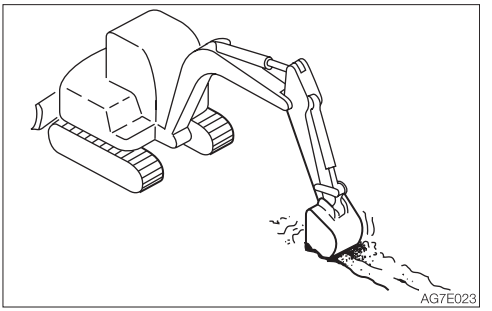
OPERATIONS POSSIBLE WITH THIS MACHINE

Excavating



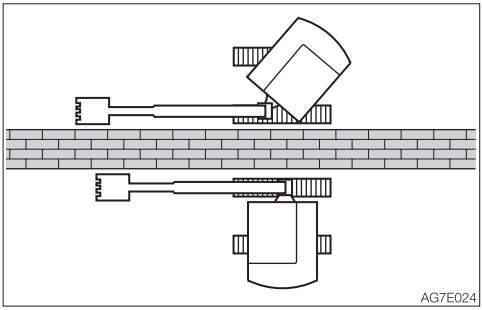
1. Set the dozer blade on the side opposite to the side you want to dig on.
2. Use the arm and bucket and dig with shallow, long strokes. The maximum digging force can be obtained when the boom and arm angle is 80 to 120°. Use this angle for effective digging.

Digging ditches



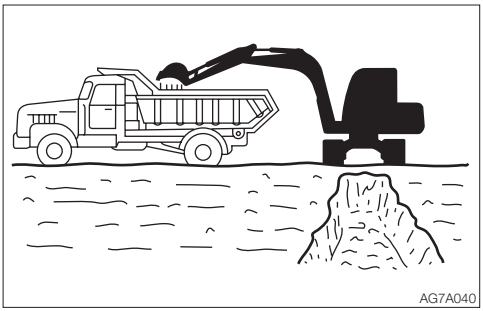
Install a bucket suited for digging ditches and set the crawlers parallel to the ditch to be dug for greater efficiency.
When digging wide ditches, dig the sides first, and then dig the center.

Digging side drains



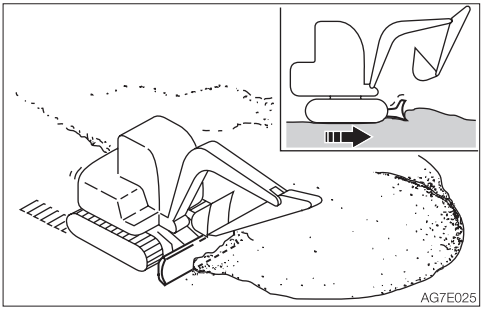
Use the boom swing function to dig side ditches as shown in the figure.

Loading



When loading dirt onto a truck bed, load from the back of the truck, as it is easier and able to load more load than doing it from the front.
Also, use a small slewing angle for greater efficiency.

Leveling

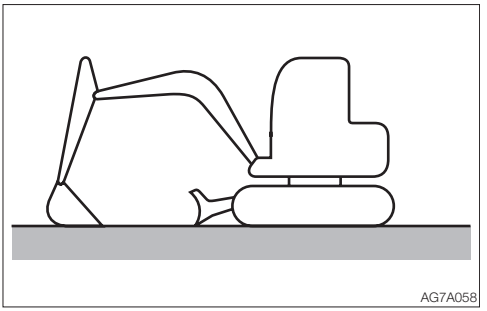


1. Bring the hoe attachment close to the body.
2. Gradually remove the dirt from the side of the mound.
3. Once the mound is low, remove the dirt from the top. If the load becomes too heavy for the machine body, adjust by raising or lowering the dozer blade.

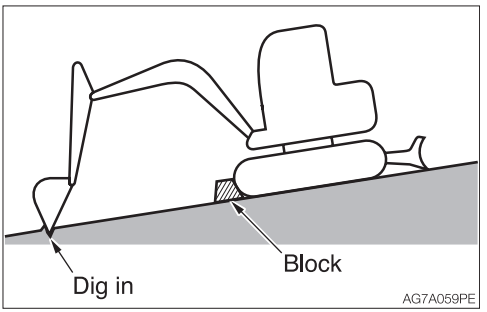
PARKING THE MACHINE

PARKING

⚠ WARNING



- **Park the machine on a flat, rigid and safe ground. Set the parking brake.**



If you must park on a slope or incline, park the machine securely and block the movement of the machine.

- **When parking on a street, use barriers, caution signs, lights, etc., so that the machine can easily be seen even at night to avoid collision with other vehicles.**
- **Before leaving the operator's seat, raise the safety lock lever to engage the lock and stop the engine. Also, be sure to remove the key, lock the door and covers, take it with you and store it in a specified place.**

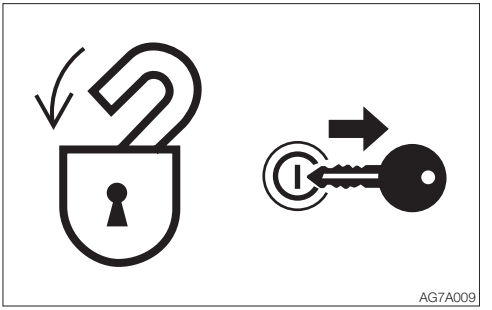
1. Set the left and right travel levers to the neutral position.
2. Return the throttle lever to idle the engine at low speed.
3. Lower the bucket and the dozer blade to the ground.
4. Raise the safety lock lever to the locked position.
5. Stop the engine and remove the key. Refer to "Stopping the engine" on page 3-5.

INSPECTION AND CHECKS AFTER STOPPING THE ENGINE

1. Check for oil or water leak and inspect the working equipment, covers and undercarriage. If any irregularities are found, repair.
2. Fill up the fuel tank. Refer to "Inspecting the fuel level" on page 5-18.
3. Remove any paper scraps or dirt from the engine room.
4. Remove any mud from the undercarriage.

Locking

Be sure to lock the following places:



- Fuel lid
- Manual storage compartment
- Engine hood
- Covers

HANDLING IN COLD CLIMATES

PREPARING FOR COLD CLIMATES

Starting engine in cold climates is not easy, and it becomes more difficult if the coolant freezes. Prepare for cold-climate problems as follows.

Replacing the fuel and lubricant
Replace the hydraulic oil, engine oil and fuel with those intended for cold climates.
Refer to “Fuel and lubricant table” on page 5-4.

Engine coolant

⚠ WARNING

The engine coolant is combustible. Keep away from flame.
Use long-life coolant (antifreeze) and tap water for the engine coolant.

Note: New machines are delivered with JIS Type 2 long-life coolant (antifreeze) at a concentration of 50%.
Refer to “Fuel and lubricant table” on page 5-4.

Battery
As the temperature drops, the battery performance decreases.
Inspect the battery. If it is discharging, contact a Takeuchi service agent to have the battery recharged.
Refer to “Inspecting the battery fluid level and replenishing” on page 5-30.

CAUTIONS AFTER OPERATIONS

Observe the following cautions to prevent mud, water, or the undercarriage from freezing and making it impossible for the machine to move.

- Remove all mud and water from the machine body. In particular, wipe the hydraulic cylinder rod clean to prevent damage to the seal caused by mud or dirt on the rod surface getting inside the seal together with drops of water.
- Park the machine on hard and dry ground. If this is impossible, park the machine on a wooden board placed on ground.
- Drain any water in the fuel tank to prevent it from freezing.
  Refer to “Draining the water from the fuel tank” on page 5-29.
- As the battery capacity drops markedly in low temperatures, cover the battery or remove it from the machine and keep it in a warm place.
  If the electrolyte level is low, add distilled water in the morning before beginning work. To prevent the battery electrolyte from freezing in the night, do not add water after the day’s work.

AFTER THE COLD CLIMATE

When the climate becomes warmer, do as follows:

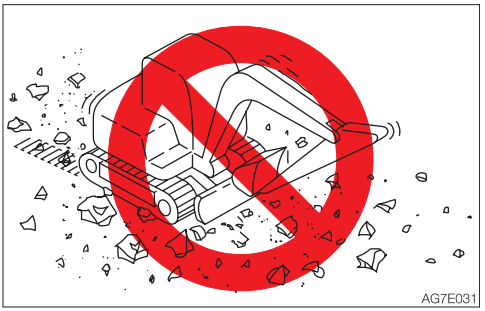
- Replace the fuel and oil for all parts with those specified in the “Fuel and lubricant table”.
  Refer to “Fuel and lubricant table” on page 5-4.
- If a coolant of “one season type” is used, drain the cooling system completely, clean out the inside of the cooling system thoroughly, and fill with tap water.
  Refer to “Cleaning the engine cooling system” on page 5-44.

HANDLING RUBBER CRAWLERS

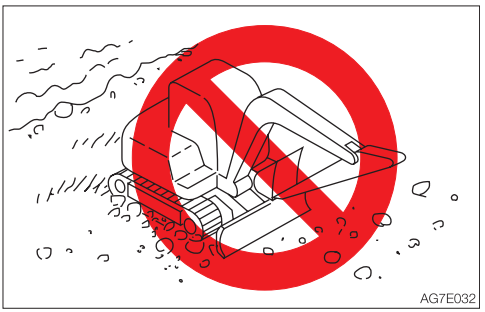
Rubber crawlers have an inherent weakness, lack of strength, due to their use of rubber. Be sure to observe the prohibitions and cautions below to prevent the crawlers from being damaged or coming off.

PROHIBITIONS

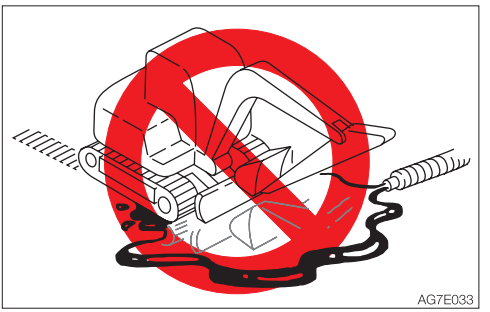
Do not travel or operate the machine in the following places:



- Traveling and slewing on crushed rock, extremely rough hard rock, steel beams, scrap iron, or near the edges of steel plates will cause damage to the rubber crawlers.



- Traveling on riverbeds or places where there are large numbers of boulders may cause the stones to get caught and damage the crawler or make the crawler come off.
- Do not use the machine on the seashore. The salt may corrode the steel core.

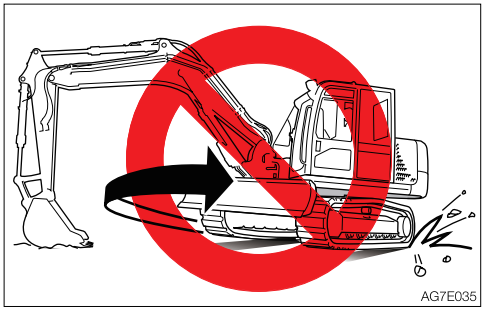


- Do not let fuel, oil, salt or chemical solvents get on the crawlers. These substances may corrode the bonding of the steel cores on the crawlers, resulting in rust or peeling. If any of these substances gets on the crawler, immediately clean it off with water.

- It will cause an irregular wear or damage to the lugs, if the machine travels on irregular surfaces such as recently paved with asphalt, exposed to a bonfire or of hot iron sheets under the blazing sun.
- Do not move earth in places where the rubber crawlers may slip. Doing so may speed up lug wear.

CAUTIONS

Observe the following cautions when operating the machine: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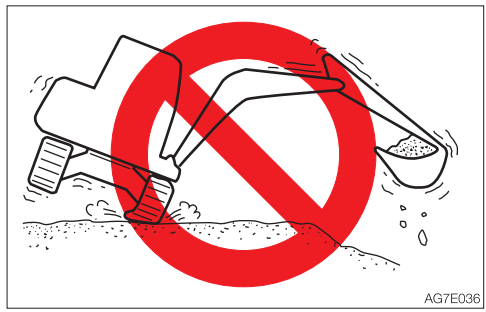
- Do not turn the undercarriage with the front of the machine body lifted using the hoe attachment (the upperstructure is not turned). Doing so will twist the crawlers with the load concentrated on a single point on the crawler belt, causing rapid damage to the crawlers.
- Avoid changing course abruptly or spin-turning on concrete surfaces whenever possible. Doing so may wear or damage the rubber crawlers.
- Avoid drops that may expose the rubber crawlers to strong shocks.
- Salt, potassium chloride, ammonium sulfate, potassium sulfate, and triple superphosphate of lime can damage the crawler belts. If any of these substances gets on the crawler belts, wash if off thoroughly with water.
- Do not let the sides of the rubber crawlers rub against concrete or walls.
- Do not damage the rubber crawlers by hitting the bucket against them.
- Be especially careful on snowy or frozen surfaces in winter, as the crawler belts tend to slip in such conditions.
- Use rubber crawler belts at temperatures between –25°C to +55°C (–14°F to 131°F).
- When storing the rubber crawlers for long periods of time (three months or more), do so indoors in a place not exposed to direct sunlight or rain.

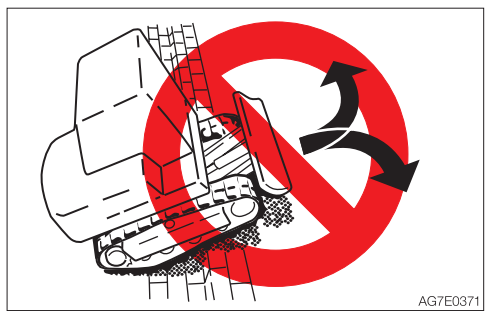

AG7E036

- Rubber crawler belts are not as stable as steel crawler belts since the entire lugs are made of rubber. Be very careful when slewing and swinging sideways.

PREVENTING THE RUBBER CRAWLERS FROM COMING OFF

Observe the following cautions to prevent the crawler from coming off:

- Always keep the crawlers at the proper tension.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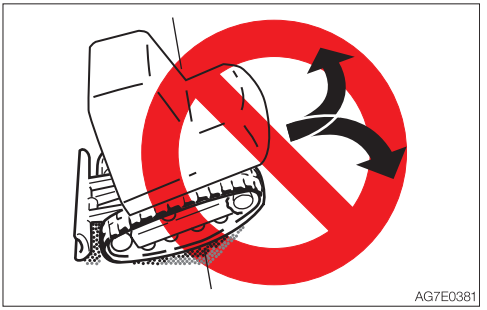
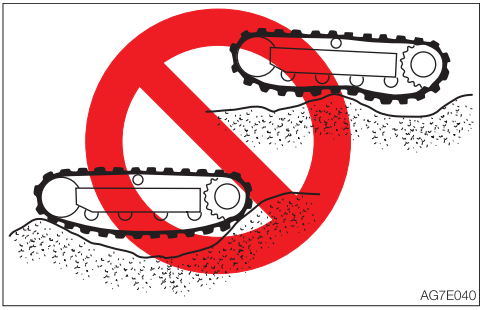
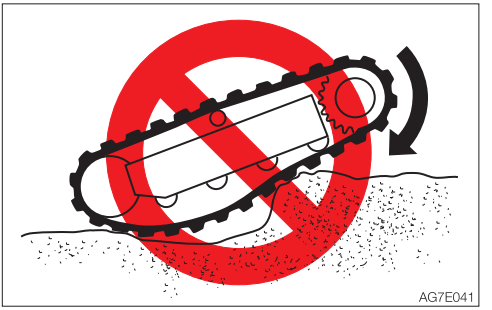
- When traveling over a large step such as a cobblestone or rock (20 cm (8 in.) or deeper), climb up the step at the right angle and do not change courses on top of the step.



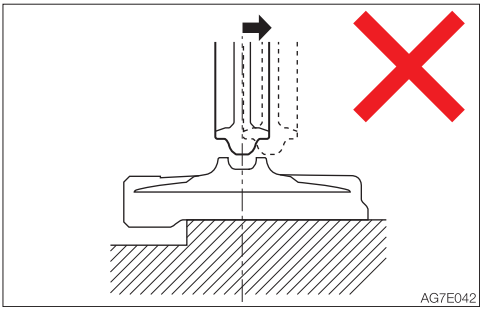
• When climbing in reverse, do not change directions at the point where the slope starts.

• Avoid traveling by setting one crawler on a slope or projecting portion and the other crawler on a flat surface (with the machine at a tilt of 10° or more). Travel with both crawlers set on flat surfaces.

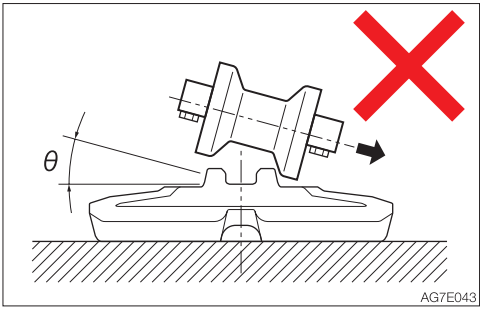




• Do not change directions when the crawler belts are slack as shown in the figure.



• The rubber crawler belts will come off if the machine travels backward in this condition.



• The rubber crawler belts will come off if the machine turns in this condition.

TRANSPORT

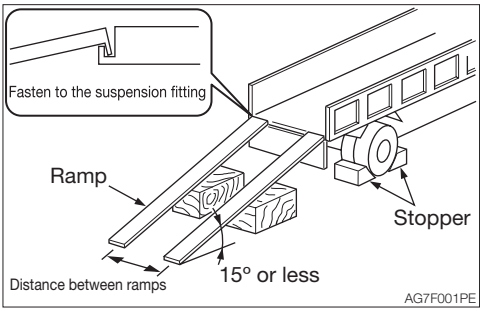
LOADING AND UNLOADING

⚠ WARNING

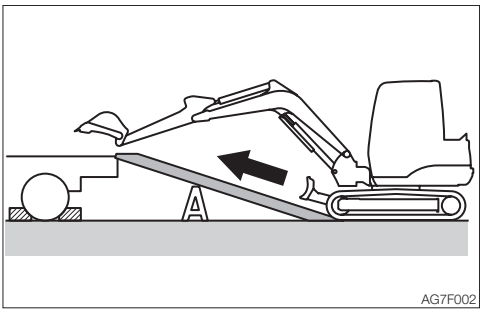
The machine may roll or tip over or fall while being loaded or unloaded. Take the following precautions:

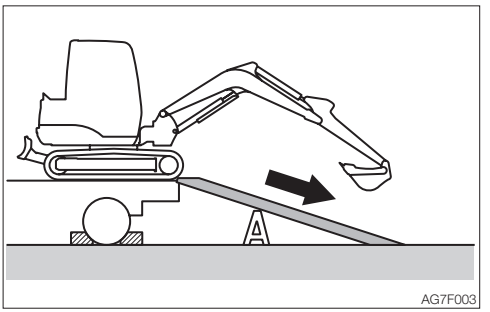
- **Select a firm, level surface and keep sufficient distance from road shoulders.**
- **Secure the ramps of adequate strength and size to the truck bed. The slope of the ramps must not exceed 15°. If the rumps are bowed down too low, support them with poles or blocks.**
- **Never use the working equipment to load or unload the machine. Doing so may result in tipping over or falling down of the machine.**
- **Keep the truck bed and loading ramps clean of oil, soil, ice, snow, and other materials to prevent the machine from sliding sideways. Clean the crawlers.**
- **Chock the transporter wheels to prevent movement.**
- **When being loaded or unloaded, travel slowly in 1st (low) gear by following the signal from the signal person.**
- **Never change courses on the ramp.**
- **Do not slew/swing on the ramp. The machine may tip over.**
- **When slewing/swinging on the truck bed, do it slowly as the footing should be unstable.**
- **Chock the tracks and secure the machine to the truck bed with wire rope or chain.**

When loading or unloading the machine, be sure to use ramps or a platform and follow the procedure below.



1. Set the parking brake on the transporter and chock the wheels.
2. Fix the ramps securely to the truck bed. The slope of the ramps must not exceed 15°.
3. Align the center of the truck bed with the center of the machine, and of the ramp with the center of the crawler.
4. Make sure the dozer blade does not hit the ramps.
5. Lower the hoe attachment as far as possible without letting it touch the transporter.
6. Decrease the engine speed.





7. Drive the machine straight toward the ramps and travel up or down the ramps at 1st (low) speed, by following the signal from the signal person.
8. Load the machine at the specified position on the transporter.
   Refer to “Transporting posture” on page 4-5.

HOISTING THE MACHINE

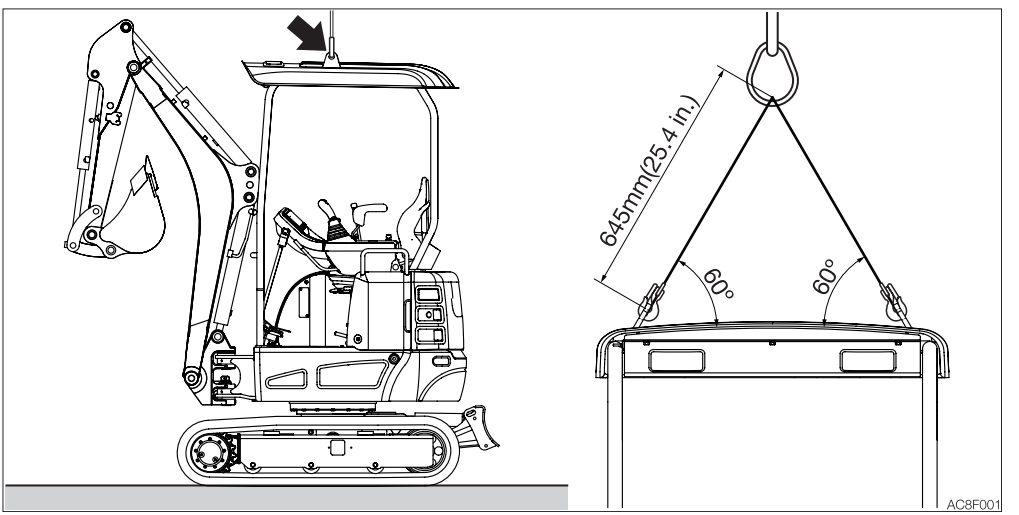
⚠ WARNING

- **Know and use the correct crane signals.**
- **Check the hoisting equipment for damaged or missing parts on a daily basis and replace as necessary.**
- **When hoisting, use a wire rope capable of lifting the machine mass.**
- **Hoist the machine in only as manner described in the procedure below. Do not do it in any other manner. Doing so is dangerous as it may result in the machine losing its balance.**
- **Do not hoist the machine with an operator on it.**
- **When hoisting, hoist slowly so that the machine does not tip.**
- **Keep everyone out of the area when hoisting. Do not move the machine over the heads of the persons.**

IMPORTANT: This hoisting method applies to machines with standard specifications. The center of gravity differs according to the attachments and optional equipment installed.
Contact your Takeuchi service agent for details.

Hoisting

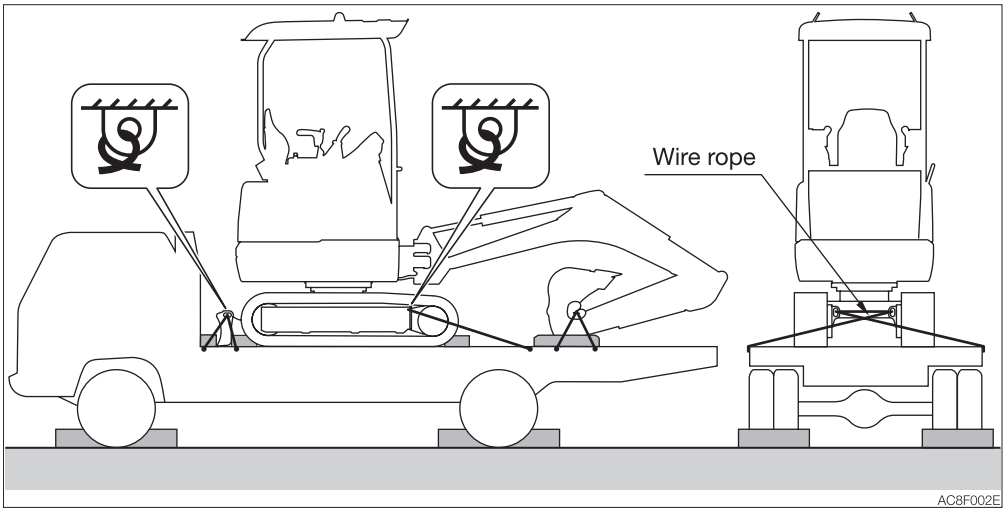
1. Slew the upperstructure so that the dozer blade is at the rear of the machine (set the upperstructure parallel to the track frame).
2. Raise the dozer blade fully.
3. Extend the bucket cylinder and arm cylinder fully to raise the boom to its uppermost position.
4. If the boom is swung to either the left or right side, set it in the neutral position.
5. Raise the safety lock lever to the locked position.
6. Stop the engine, remove the starter key and get off the machine.
7. Install the wire ropes as shown on the figure below. The hoisting angle must be 60°; otherwise, the hook may be damaged.
8. Hoist the machine slowly until it leaves the ground.
9. Stop hoisting until the machine becomes stable, and then start hoisting the machine slowly again.



SECURING THE MACHINE

After loading the machine at the specified position, secure it as described below.

Transporting posture



1. Lower the dozer blade.
2. Extend the bucket cylinder and arm cylinder fully, and then lower the boom.
3. Raise the safety lock lever to the locked position.
4. Stop the engine, remove the starter key and lock all locks.
5. Place the stoppers (chocks) in front and behind the crawlers.
6. Install a chain or wire rope over the lower frame of the machine and fasten it securely to prevent the machine from slipping sideways.
7. Secure the bucket with a chain or wire rope.

IMPORTANT: Place a wooden block under the bucket to protect the floor from damage caused by the bucket.

Precautions to be taken during transportation

⚠ WARNING

- **Know and follow the applicable safety rules, vehicle code and traffic laws when transporting the machine.**
- **Select the best transport route by considering the length, width, height and weight of the truck with the machine loaded on it.**
- **Never abruptly start or stop or run at a high speed at the sharp curves during transport. Doing so will move or lose the balance of the loaded machine.**

MAINTENANCE

GENERAL

MAINTENANCE OVERVIEW

To keep the machine in good condition and use if for a long period, perform the inspection and maintenance properly and safely following the procedures recommended by this manual.

The inspection and maintenance items are divided into groups according to the machine's total operating time: every 10 hours (walk-around and daily inspection), every 50 hours, every 250 hours, etc. Refer to the hour meter readings to determine when to schedule an inspection and maintenance. Items for which it is not possible to determine the inspection and maintenance interval are included under "When Required".

When operating the machine in extremely harsh environments (with high dust levels or high temperatures), inspection and maintenance should be performed earlier than the times specified on the Maintenance List.

CAUTIONS ON MAINTENANCE

Do not perform any other inspection and maintenance works than those listed in this manual.
For works not listed in this manual, ask your sales or a service dealer for help.

Keep the machine clean
- Clean the machine before performing inspection and maintenance and try to keep it clean.
- Stop the engine before washing the machine. Cover the electrical parts so that water cannot enter. Water on electrical parts could cause short-circuits or malfunctions. Do not use water or steam to wash the battery, electronic control components, sensors, connectors or the operator's compartment.

Fuel, lubricant and grease
- Choose fuel, lubricant and grease by following to the "Fuel and lubricant table".
- Use fuels, lubricants and greases which do not contain water, and be careful to keep dirt out when changing or replenishing fuel, lubricant or grease.
- Store fuels, lubricants and greases in the prescribed places and in such a way that no water or dirt can get in them.

Cautions on refueling
- If the port includes a strainer, do not remove the strainer when fueling.
- After fueling, be sure to securely tighten the fuel filler cap.
- Do not add more than the specified amount of fuel.

Do not use fuel to clean parts
Do not use fuel to clean parts. Use a non-combustible cleaning agent.

Keep dirt out
When mounting and removing parts, do so in a place where there is no dust, clean the working area and the part, and keep dirt out.

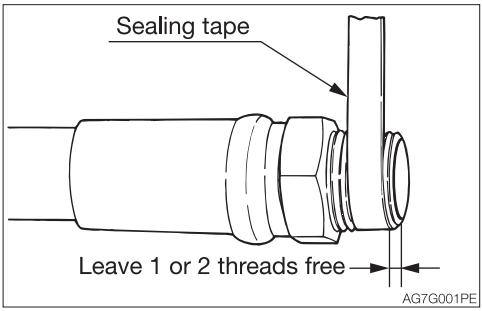
Clean the installation surfaces

When installing and removing parts, be sure that the surfaces of contact of the parts are clean. If the sealing grooves of the surface of contact are damaged, consult your sales or service dealer for repair or release.

Seals and split pins

- Be sure to replace all seals and cotter pins with new ones.
- When installing, be careful not to damage or twist the seal.

Sealing tape



- When wrapping the plug with sealing tape, remove any old sealing tape from the threads and clean the threads.
- Wrap the thread tight with seal tape starting 1 or 2 threads away from the thread end.

Disposing of wastes

- Always collect oil that is drained from the machine in containers. Improperly disposed waste oil can cause environmental harm.
- Follow appropriate laws and regulations when disposing of harmful objects such as oil, fuel, cooling water, coolant, filters and batteries.

Check after maintenance

- Gradually increase the engine speed from a low idle to maximum speed and check that there is no oil or water leaking from serviced parts.
- Operate each control lever and check that the machine is operating properly.

Cautions on handling of battery wiring

- Disconnect the wiring from the both terminals (+ and –) on the battery before working on the electrical system or doing electric welding.
  Always disconnect it from the earth side (–). When connecting, connect the earth side last.
- Do not disconnect the battery wiring while the engine is moving. Otherwise, the electric circuits of the rotary converter or others may be damaged.

SERVICE DATA

FUEL AND LUBRICANT TABLE

Select the appropriate fuel, lubricant and grease according to the temperature by referring to the table below.

- Regardless of the specified time, change the oil if it becomes too dirty or degraded.
- When refilling, never mix oils of different brands. If a brand is to be changed, replace the whole fuel/oil.

Fuel

Diesel fuel specifications

Diesel fuel should comply with the following specifications. The table lists several worldwide specifications for diesel fuels.

Diesel fuel specification	Area	Diesel fuel specification	Area
ASTM D975 No.1D S15 No.2D S15	USA Canada	EN590: 2009	European union
Bio-diesel fuel Biodiesel blends up to B7 ASTM D6751, D7467		Bio-diesel fuel Biodiesel blends up to B7 EN14214, EN590	
ISO 8217DMX	International	BS2869-A1 or A2	United kingdom

Fuel tank	**Diesel fuel**	To maintain the performance and service life of the engine, always use clean and high-quality fuel. • To avoid freezing in cold climates, use a diesel fuel that still functions when the temperature is at least 12°C (21.6°F) below the lowest expected ambient temperature. • Use a diesel fuel that has a cetane number of 45 or higher. When operating at a very low temperature or at a high altitude, a higher cetane number fuel will be required. • Use fuel with sulfur content of less than 0.5% by volume. Especially in the U.S.A. and Canada, ultra-low sulfur fuel should be used. A higher sulfur content fuel may cause sulfuric acid corrosion in the cylinders of the engines. • Never mix kerosene, used engine oil, or residual fuel with the diesel fuel. Use of kerosene is prohibited. • Poor quality fuel can reduce engine performance and / or cause engine damage. • Fuel additives are not recommended. Some fuel additives may cause poor engine performance.
		Precautions when using bio-diesel fuel The warranty of the engine manufacturer may be voided by using a bio-diesel fuel that does not meet the standard or that is deteriorated.

Lubricant

Location	Type	Type by air temperature -4 14 32 50 68 86 104°F -20 -10 0 10 20 30 40°C	When to replace
Engine oil pan	Diesel engine oil API: CD class ACEA: E-3, E-4 or E-5	SAE 10W-30 SAE 15W-40	Every 250 hrs.
Hydraulic oil tank	Takeuchi genuine hydraulic oil 46	ISO VG46	Every 4000 hrs.***
	Anti-wear hydraulic oil	ISO VG32 ISO VG46 ISO VG68	Every 2000 hrs.***
Engine cooling system	Cooling water (water + coolant)** SAE: J814C or J1034	Mixture of 50% coolant Mixture of 30% coolant	Every 2000 hrs. or every two years (whichever comes first)
Travel reduction gear	Gear oil API: GL-4	SAE 90	Every 1000 hrs after the initial 250 hrs*.
Slew motor pinion	Lithium based grease EP-2 NLGI No.2	—	Every 50 hrs.
Slew bearing			Every 50 hrs.
Working equipment			Daily or every 10 hrs.
Levers			When required

* : If the ratio of traveling time to total operating time is high, replace the gear oil earlier than the specified time.

** : For water, use tap water (soft). Do not use well or river water. When the ambient temperature drops below 0°C (32°F), add coolant (antifreeze). Follow the coolant manufacturer's instructions to determine the mixture ratio.

*** : The hydraulic oil replacement interval depends on the type of hydraulic oil being used. New machine are delivered with Takeuchi genuine hydraulic oil 46, and the hydraulic oil replacement intervals indicated in this manual assume that Takeuchi genuine hydraulic oil 46 is being used. When using conventional antiwear hydraulic oil, the hydraulic oil should be replaced every 2000 hours.

API standard: American Petroleum Institute
ACEA standard: Association des Constructeurs Européens d'Automobiles
SAE standard: Society of Automotive Engineers

Volume

Engine oil pan	Engine cooling system	Hydraulic oil tank	Fuel tank	Travel reduction gear
Upper limit 2.8 L (3.0 US qt.) Lower limit 1.5 L (1.6 US qt.)	3.9 L (4.1 US qt.)	System 24 L (6.3 US gal.) Tank 16.1 L (4.3 US gal.)	Level capacity 22 L (5.8 US gal.)	0.33L X 2 (0.35 US qt.) X 2

REGULARLY REPLACE THE HYDRAULIC OIL

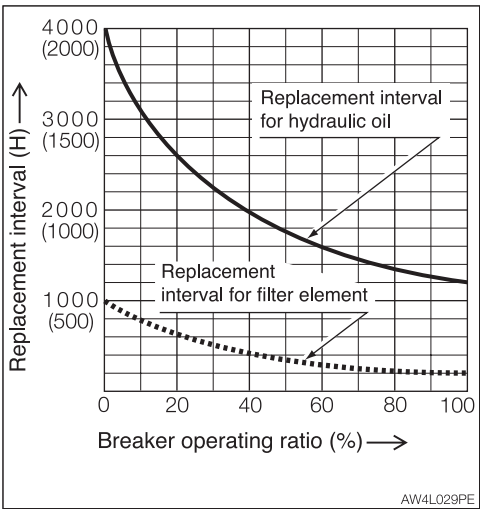
When a hydraulic breaker is used, the oil deteriorates more quickly than that used for a usual excavation operation. Be sure to replace the hydraulic oil and the return filter elements.

- Failure to replace these in time can lead to damage to the machine and the breaker hydraulic system. To prolong the service life of the hydraulic devices, properly replace the hydraulic oil and the return filter elements according to the table below.
- When replacing the hydraulic oil, clean the suction strainer.

Replacement interval (hours)

Item	Hydraulic oil	Filter element
1st time	—	25
2nd time	—	100
Periodically	1200 (600)	200

When the breaker operating ratio is 100%.
Refer to “Hydraulic breaker” on page 8-7.



( ): When a conventional antiwear hydraulic oil is used.

LIST OF CONSUMABLES

Periodically replace consumables such as filters and elements according to the table below.

System	Item	Part name	Part No.	When to replace
Hydraulic system	Hydraulic oil return filter	Element	15511-01300	Every 500 hrs after the initial 50 hrs.
Engine lubrication system	Engine oil filter	Cartridge	Y119305-35151	Every 250 hrs.
Fuel system	Water separator filter	Element	Y171081-55910	Every 500 hrs.
	Fuel filter*	Element	Y119810-55650	Every 500 hrs.
		Cartridge	Y129004-55801	Every 250 hrs.
Air cleaner system	Air cleaner	Primary (Outer) element	Y119655-12560	Every 1000 hrs. or after 6 cleanings (whichever comes first)
		Secondary (Inner) element	19111-01342	When the primary elements are replaced.

*: The filter installed differs depending on the region of sale.
Be sure to check the filter type when ordering.
For the element type, refer to “Replacing the fuel filter (element type)” on page 5-39.
For the cartridge type, refer to “Replacing the fuel filter (cartridge type)” on page 5-37.

LIST OF TOOLS

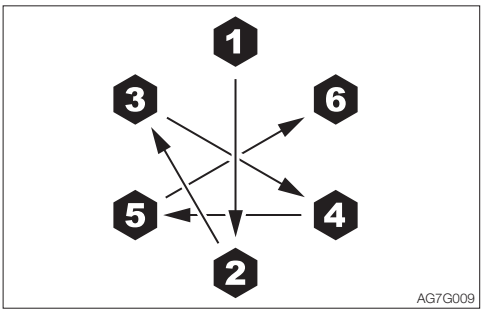
Code	Part name	Part No.	Remarks
1	Spanner	19100-47081	10 - 12
2	Spanner	19100-47082	14 - 17
3	Screwdriver	19100-06112	(+) (–) replaceable shank
4	Filter wrench	19100-96081	
5	Monkey wrench	16904-00250	250 mm
6	Pliers	16905-00200	200 mm
7	Spanner	16901-00013	13
8	Spanner	16900-01922	19 - 22
9	Spanner	16909-00019	19
10	Tool case	16914-00005	
11	Grease gun	16910-60600	600 cc
12	Drain connector	15545-12201	

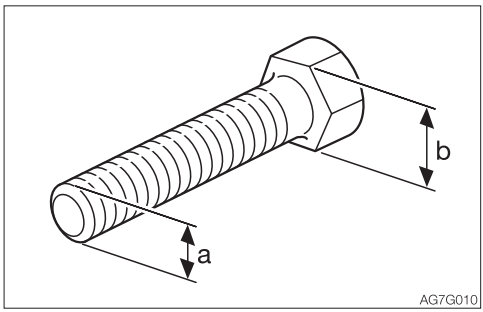
LIST OF TIGHTENING TORQUES

Nuts and Bolts (for ISO strength category 10.9)

Tighten nuts and bolts at the torques shown on the table below, unless otherwise specified.

- The tightening torques used for the mounted plastic covers are not listed in the table below. Consult your sales or service dealer for details. They will be damaged if over tightened.
- When replacing nuts and bolts, replace them with nuts and bolts of the same size and standards.
- Tighten nuts and bolts alternately (top, bottom, left then right) or in 2 or 3 times so that they are evenly tightened.





Classification	Head width (b)	Size (a) x pitch	Tightening torque	
			General connection points	
	mm	mm	N·m	ft-lb.
Coarse	10	M6 x 1.0	9.8±0.5	7.2±0.4
	12, 13	M8 x 1.25	22.6±1.1	16.6±0.8
	14, 17	M10 x 1.5	47.1±2.4	34.7±1.7
	17, 19	M12 x 1.75	83.4±4.1	61.5±3.0
	19, 22	M14 x 2.0	134.4±6.7	99.1±4.9
	22, 24	M16 x 2.0	207.9±10.4	153.3±7.7
	27, 30	M20 x 2.5	410.9±20.5	303.1±15.1
Fine	12, 13	M8 x 1.0	24.5±1.2	18.1±0.9
	14, 17	M10 x 1.25	50±2.5	36.9±1.8
	17, 19	M12 x 1.5	87.3±4.3	64.4±3.2
	19, 22	M14 x 1.5	135.3±6.8	99.8±5.0
	22, 24	M16 x 1.5	220.6±11	162.7±8.1
	27, 30	M20 x 1.5	452.1±22.6	333.4±16.6

SAFETY-CRITICAL PARTS

To use the machine safely, periodically perform inspection and maintenance. The safety-critical parts listed below must be periodically replaced for an increased safety.
Serious injury or a fire could result if they are worn or damaged.

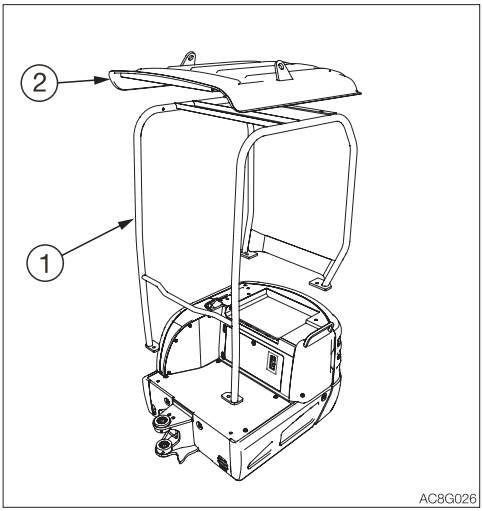
List of safety-critical parts

Unit		Safety-critical parts to be replaced periodically	When to replace
Fuel system		Fuel hoses	Every 2 years
		Packing on fuel filler cap	
Cooling system		Rubber hoses	
Hydraulic system	Main body	Hydraulic hoses (pump - delivery)	
		Hydraulic hoses (pump - suction)	
		Hydraulic hoses (slew motor)	
		Hydraulic hoses (travel motor)	
	Working equipment	Hydraulic hoses (boom cylinder piping)	
		Hydraulic hoses (arm cylinder piping)	
		Hydraulic hoses (bucket cylinder piping)	
		Hydraulic hoses (swing cylinder)	
		Hydraulic hoses (blade cylinder)	
		Hydraulic hoses (span cylinder)	
		Hydraulic hoses (pilot valve)	
		Hydraulic hoses (auxiliary piping)	
		Seat belt	Every 3 years
		Non-slip sheet	

The material of the safety-critical part listed above tends to change over time and cause wear or deterioration. It is difficult to determine the degree of deterioration at the periodic inspection, and thus they need to be replaced with new ones after a certain time to maintain their proper performance even if they appear in good condition. Note that regardless of the replacement schedule, replacement must be performed immediately if a symptom of wear is found. If a hose clamp is deformed or cracked, replace it together with the hose immediately. When replacing the safety-critical parts, ask your sales or service dealer.
In addition to the safety-critical parts, inspect the hydraulic hoses and retighten or replace as necessary. When replacing the hydraulic hoses, replace the O-rings and seals at the same time.
Check the fuel and hydraulic hoses according to the periodic schedule described below. Refer to “Maintenance”.

Type of inspection	Inspection item
Daily inspection	Leakage from the connecting parts of hydraulic or fuel hoses Damage to cab or canopy - replace*
Monthly inspection	Leakage from the connecting parts of hydraulic or fuel hoses Damaged hydraulic or fuel hoses (cracks, wear and tear)
Annual inspection	Leakage from the connecting parts of hydraulic or fuel hoses Deteriorated, twisted, damaged hydraulic or fuel hoses (cracks, wear and tear) or hoses in contact with other parts of the machine

*: Canopy parts No.(1) 03384-00031
*: Canopy parts No.(2) 03384-00039



MAINTENANCE LIST

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*: If the percentage of the traveling time within the total operating time is high, replace the gear oil earlier than the specified time.

Inspection and maintenance item	Page
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*: If the percentage of the traveling time within the total operating time is high, replace the gear oil earlier than the specified time.

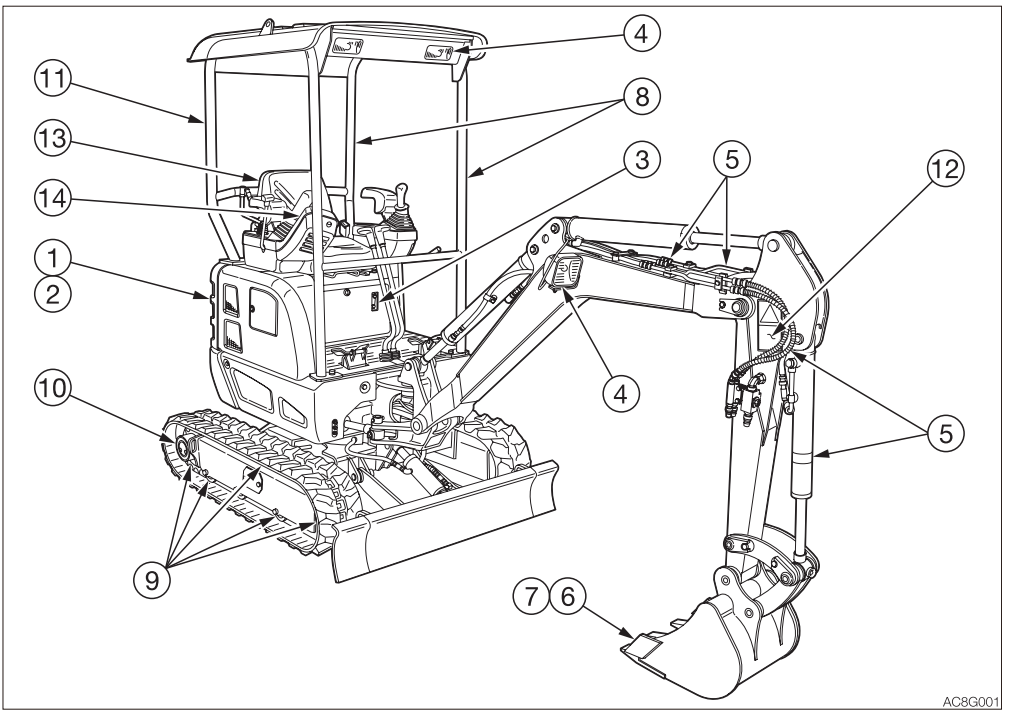
WALK-AROUND INSPECTION

Perform the following inspections every day before starting the engine for the first time.

⚠ WARNING

- **Before operating, perform the walk-around inspections and make repairs immediately where necessary.**
- **Be sure to secure the engine hood or cover before working the inside. Do not keep the hood or cover open on a windy day or if the machine is parked on a slope.**

Before starting the engine, look around the machine and clean any combustibles from the surroundings of the engine. Also, inspect if oil or water is leaking and any nuts, bolts or electric wiring are loosened or damaged.



INSPECTING BY OPENING THE ENGINE HOOD AND COVERS

1. Check for any twigs, leaves, oil or other combustible materials around the engine and battery.
2. Check for oil or engine coolant water leakage around the engine.
3. Check for oil leakage from the hydraulic oil tank, hydraulic devices, hoses or connections.

INSPECTING BY WALKING AROUND THE MACHINE

4. Check lights for dirt, damage and burnt out bulbs.
5. Check attachments and hoses for damage.
6. Check the bucket, bucket teeth and side cutter for wear, damage and looseness.
7. Check the hook, slip stopper and hook mount of buckets with hooks for damage. (Option)
8. Check the handrail, the steps and the slip-resistant surfaces for damage and loose bolts.
9. Check the crawlers, shoe slides, track rollers, idlers and sprockets for damage, wear and loose bolts.
10. Check for oil leakage from the travel motor.
11. Check the canopy and guard for damage and loose nuts and bolts.
12. Check the labels for dirt and damage.

INSPECTING WHILE SITTING IN THE OPERATOR'S SEAT

13. Check the seat and seat belt for dirt or damage.
    Check the operator's seat for dirt, oil or other combustible materials.
14. Check the monitor, instruments and switches for dirt or damage.

DAILY INSPECTION (EVERY 10 HOURS)

Perform the following inspections every day before starting the engine for the first time.

⚠ WARNING

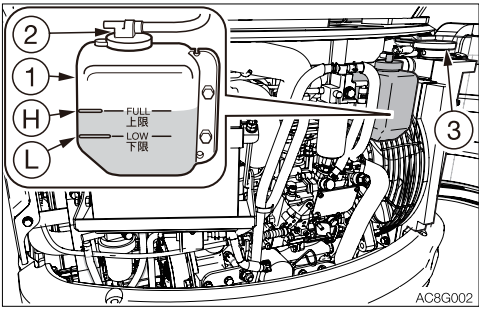
- **Before operating, perform the daily inspections and make repairs immediately where necessary.**
- **Be sure to secure the engine hood or cover before working the inside. Do not keep the hood or cover open on a windy day or if the machine is parked on a slope.**

INSPECTING AND REPLENISHING THE COOLANT

⚠ WARNING

- **Do not remove the radiator cap or the drain plug when the cooling water is hot. Stop the engine and wait until the engine and the radiator cool before slowly loosening the radiator cap and the drain plug to remove them.**
- **Always wear the protective goggle and gloves when handling coolant (antifreeze). If any coolant (antifreeze) comes in contact with eyes or skin, wash it off with clean water. Otherwise, it could result in injures.**

Inspection



1. Open the engine hood.
2. Inspect the cooling water level in the reserve tank (1).
   The level should be between the upper limit (H) and the lower limit (L).
   If it is below the lower limit (L), replenish.

Replenishing

1. Remove the cap (2) of the reserve tank (1).
2. Add cooling water up to the upper limit (H) of the reserve tank (1).
   If the reserve tank (1) is found empty at the inspection, check for water leakage and then the water level in the radiator (3). Add water to the radiator (3) as required, and then to the reserve tank (1).
3. Install the cap (2).

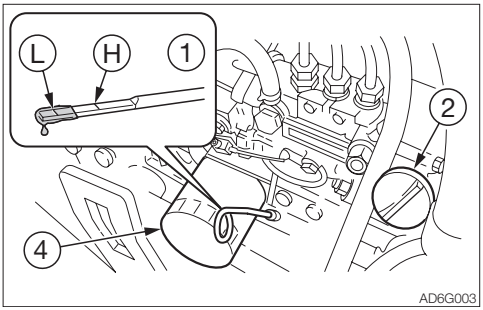
Note: Use only clean water (soft water) to replenish the cooling water loss due to evaporation. Use coolant (antifreeze) and clean water (soft water) of the specified mixing ratio to replenish the cooling water loss due to leaking.

INSPECTING AND REPLENISHING THE ENGINE OIL

⚠ WARNING

Stop the engine and allow the machine to cool down before performing maintenance.

Inspection



1. Open the engine hood.
2. Take out the dipstick (1) and wipe the oil off with a rag.
3. Fully reinsert the dipstick (1), and then pull it back out.
4. Check the oil on the dipstick (1).
   The level should be between the upper limit (H) and the lower limit (L).
   If it is below the lower limit (L), replenish.

Replenishing

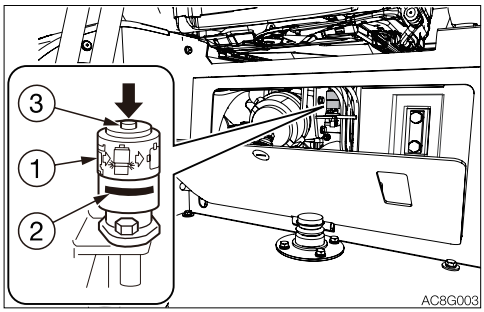
1. Remove the oil filler cap (2).
2. Add oil up to between the upper limit (H) and the lower limit (L) of the dipstick (1).
   Problems could arise if the oil level is either too low or too high.
3. Tighten the oil filler cap (2).
4. Start the engine, run it at low idle for about 5 minutes, then stop it.
5. After about 10 minutes, inspect the oil level.

INSPECTING THE DUST INDICATOR

⚠ WARNING

Stop the engine and allow the machine to cool down before performing maintenance.

The dust indicator is the equipment to be used to find out if there is clogging in the air cleaner.

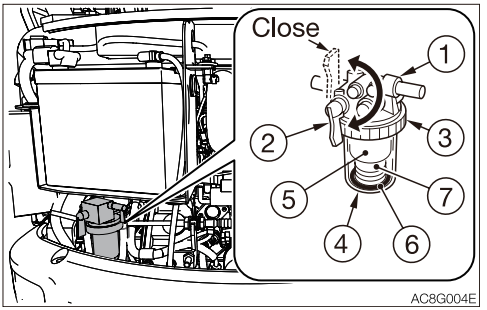


1. Open the maintenance cover A.
2. Check that if the red piston (2) is shown in the dust indicator (1).
3. If the red piston (2) is visible, immediately clean or replace the element.
   Refer to “Cleaning the air cleaner” on page 5-35.
4. After cleaning/replacement, push the button (3) on the dust indicator to reset the red piston (2).

INSPECTING THE WATER SEPARATOR

⚠ WARNING

- Do not smoke or permit open flames while handling fuel or working on the fuel system.
- Stop the engine in a well-ventilated place and allow it to cool down before performing maintenance.
- Clean up spilled fuel immediately.

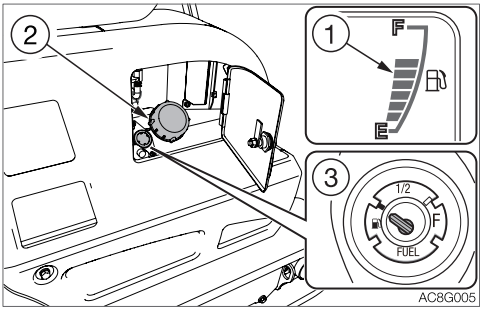


1. Open the engine hood.
2. Inspect the water separator (1).
   If the red indicator ring (6) is sunk to the bottom of case (4), no water is mixed in.
   If the red indicator ring (6) is floating, there is water up to the ring. Drain the water and clean.
   Refer to “Cleaning the water separator” on page 5-32.
   Refer to “Bleeding air from the fuel system” on page 6-8.

INSPECTING THE FUEL LEVEL

⚠ WARNING

- Do not smoke or permit open flames while handling fuel or working on the fuel system.
- Never remove the fuel cap or add fuel when the engine is running or still hot. Do not spill fuel on the hot surface of the machine.
- Fill the fuel tank in a well ventilated place.
- Clean up spilled fuel immediately.
- Do not fill the fuel tank to capacity. Allow room for oil expansion.
- Securely tighten the fuel filler cap.
- Use the correct grade of fuel for the operating season.



1. Check the fuel level using the fuel gauge (1).
   F: Tank is full.
   E: Tank is empty.
2. If the fuel level is low, open the fuel lid.
3. Add fuel from the fuel filler port (2) while watching the sight gauge (3).
   Use this gauge (3) to check the full state when adding fuel. For checking the remaining amount, use the gauge in the instrument cluster.
   Refer to “Fuel filler port” on page 2-5.

INSPECTING THE HYDRAULIC OIL TANK LEVEL AND REPLENISHING

⚠ WARNING

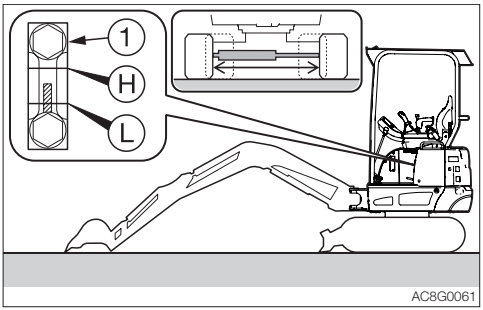
Oil may spurt out if caps or filters are removed or pipes are disconnected before releasing the pressure in the hydraulic system.

- **Press the air breather button to relieve the internal pressure from the tank.**

Inspection

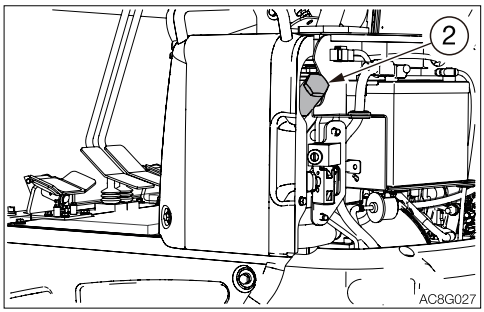
The oil level changes with the oil temperature. Inspect the oil by maintaining the machine at posture shown in the figure at the next.

- Machine posture for inspecting the hydraulic oil level



1. Start the engine and run it at low speed.
2. Fully extend the crawler width.
3. Fully retract the cylinders (arm and bucket), and lower the bucket to the ground.
4. Lower the dozer blade, and then stop the engine.
5. Inspect the oil level using the sight gauge (1).
   - When the oil temperature is about 20°C (68°F):
     The level should be between the upper limit (H) and the lower limit (L).
     If it is below the lower limit (L), replenish.
   - When the oil temperature is about 50 to 80°C (122 to 176°F):
     The level should be slightly below the upper limit (H).

Replenishing



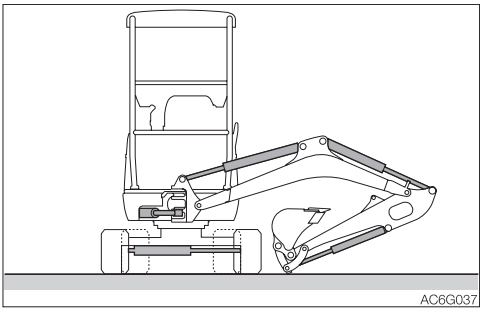
IMPORTANT: Do not fill up to the level higher than the upper limit (H). It will damage the hydraulic circuits or result in oil spurting. If accidentally done, stop the engine and wait the hydraulic oil to cool, and then let the excessive oil to drain from the drain plug.

IMPORTANT: Do not forget to apply pressure to the hydraulic oil tank to avoid damage to the pump caused by air sucking.

1. Open the engine hood.
2. Slowly loosen the air bleeding plug (2) to relieve the internal pressure, and then remove it.
3. Add the hydraulic oil up to the middle of the sight gauge (1).
4. Pressurize the hydraulic oil tank as follows.

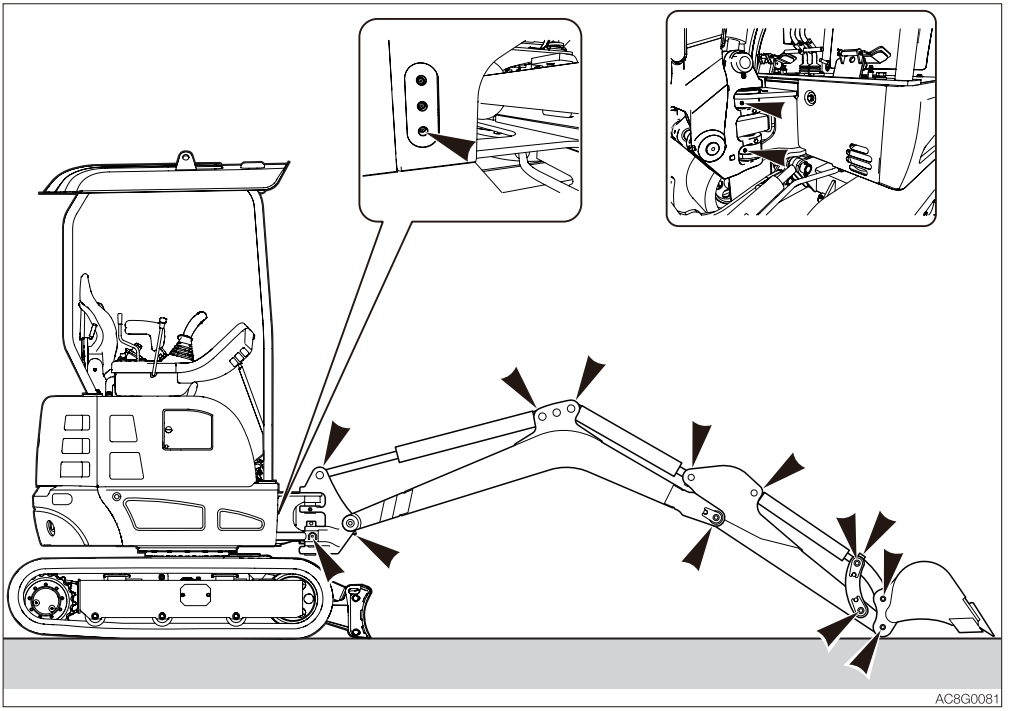
Pressurizing the hydraulic oil tank

1. Start the engine and run it at low speed.
2. With the vent plug (2) removed, set the safety lock levers to the released position.
   · Hydraulic oil tank pressurization posture



3. Fully extend the bucket, arm, boom, swing and span cylinders.
4. Stop the engine and raise the left safety lock lever to engage the lock.
5. Tighten the vent plug (2), and then pressurize by retracting the cylinders.

LUBRICATING THE WORKING EQUIPMENT



1. Keep the machine configuration as shown in the diagram above, lower the working equipment to the ground, and then stop the engine.
2. Use the grease gun to lubricate the grease fittings.
3. Wipe off the excess grease.

Note: It is not necessary to lubricate the dozer blade, as it is using a “self-lubrication bush”.

MEMO

AFTER THE INITIAL 50 HOURS (ONLY FOR NEW MACHINES)

INSPECTING AND ADJUSTING THE FAN BELT

⚠ WARNING

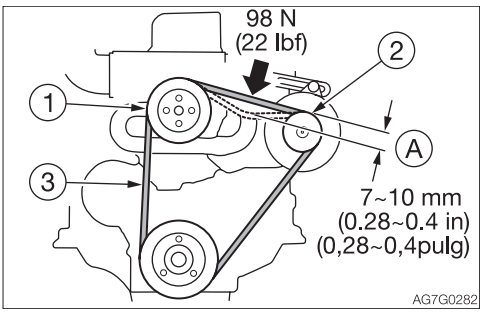
Stop the engine and allow the machine to cool down before performing maintenance.

- **The engine, muffler, radiator, hydraulic lines, sliding parts and many other parts of the machine are hot immediately after the engine is stopped. Touching these parts will cause burns.**

IMPORTANT: The loose belts could result in bad battery charge, overheat of engine or early wear of belt. Too tight belts could damage the water pump or bearing and belt used to drive the alternator.
IMPORTANT: Do not let any oil or grease get on the belt.

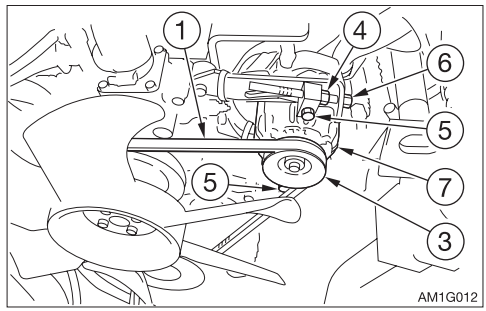
Inspection

1. Open the maintenance cover A.



2. Press at the center of the fan pulley (1) and alternator pulley (2) to check the tension (approx. 98 N or 22 lbf).
   The slack (A) should be 7 to 10 mm (0.28 to 0.4 in).
3. Inspect the fan belt (3) and replace if it is as follows.
   - There are cuts or cracks.
   - The belt is worn and touches the bottom of the V groove in the pulley.
   - The belt stretched too loose to be adjusted.

Adjustment



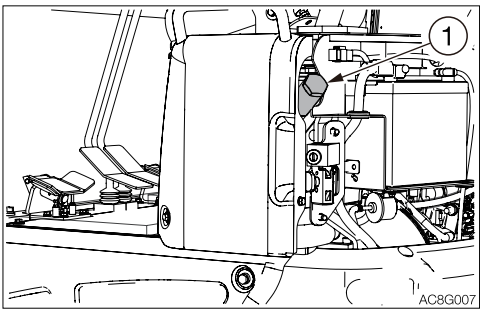
1. Loosen the bolt (5) and locking nut (4).
2. Turn the adjustment bolt (6) to move the alternator (7) and to adjust the tension of the fan belt (1).
   - Tighten: Clockwise
   - Loosen: Counterclockwise
3. Tighten the bolt (5) and locking nut (4).

Note: When replacing with a new belt, run the engine at low idle speed for about 3 to 5 minutes to break in the new belt, before adjusting the tension.

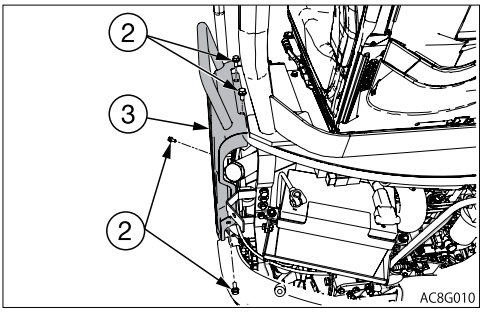
REPLACING THE HYDRAULIC OIL RETURN FILTER

⚠ WARNING

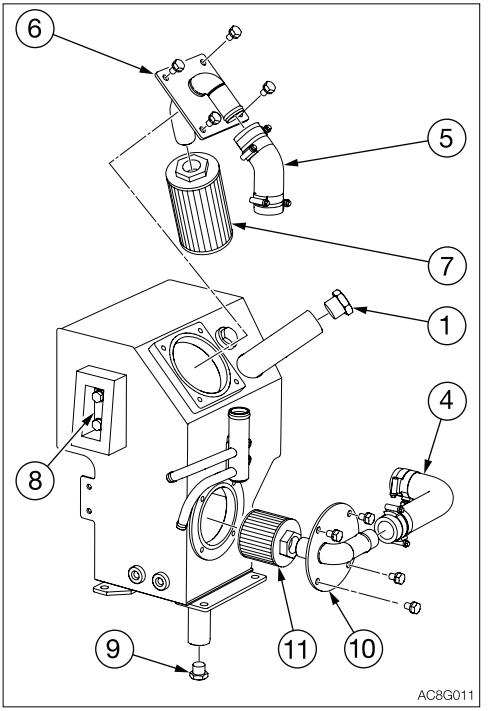
- Stop the engine and allow the machine to cool down before performing maintenance.
  - The engine and the hydraulic system and many other parts of the machine are hot immediately after the engine is stopped. Touching these parts will cause burns.
  - The hydraulic oil is also hot and under high pressure.
    Be careful not to touch the hydraulic oil when loosening the cap or plug. Working on the machine under these conditions could result in burns or injuries due to the hot oil spurting out.
- Oil may spurt out if caps or filters are removed or pipes are disconnected before releasing the pressure in the hydraulic system.
  - Gradually loosen the vent plug to relieve tank pressure.
  - When removing plugs or screws, or when disconnecting hoses, stand to the side and loosen them slowly to gradually release the internal pressure before removing.



1. Open the engine hood.
2. Slowly loosen the air bleeding plug (1) to relieve the internal pressure, and then remove the plug.



3. Loosen the bolts (2) and remove the cover (3).



4. Loosen the hose bands and remove the hose (5) from the flange (6).
5. Loosen the bolts to take out the flange (6).
6. Remove the return filter (7).
7. Install a new return filter.
8. Reassemble the flange (6) and the hose (5).
9. Inspect the level with the sight gauge (8), and replenish if the level is too low.
   Refer to “Inspecting the hydraulic oil tank level and replenishing” on page 5-19.

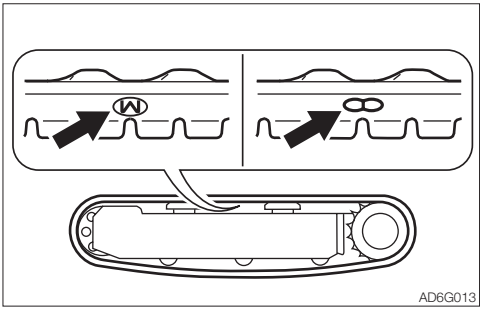
EVERY 50 HOURS

INSPECTING AND ADJUSTING THE CRAWLER TENSION

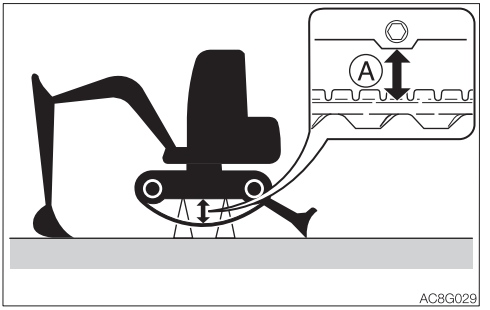
⚠ WARNING

- If you must work beneath the raised machine or working equipment, always use wood blocks, jack-stands or other rigid and stable supports. Never get under the machine or working equipment if they are not sufficiently supported. This procedure is especially important when working on hydraulic cylinders.
- Be careful with the high-pressure grease In the track adjuster, the grease has been injected under high pressure. If the tension is adjusted without following the prescribed procedure, the grease discharge valve may fly off, resulting in injury.
  - Never loosen the grease fitting.
  - Loosen the grease discharge valve slowly. Do not turn it more than one turns.
  - Do not put your face, arms, legs or body in front of the grease discharge valve.
  - If grease does not come out when the grease discharge valve is loosened, the valve is faulty. Ask a Takeuchi service agent for repair.

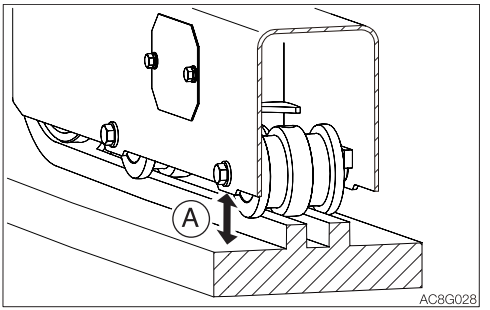
Inspection



1. For rubber crawlers, move the machine so that the “M” or “∞” mark at the joint is at the top center of the crawler frame.



2. Use the working equipment to lift the machine body. Operate the levers slowly.

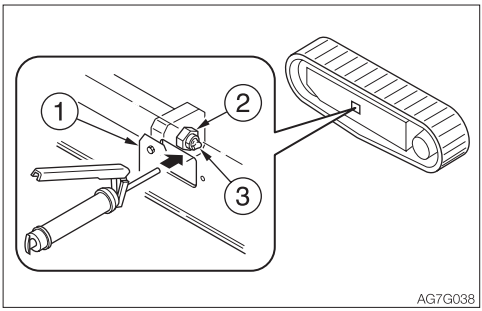


3. Inspect the gap between the bottom surface of the frame at the center of the crawler frame and the top surface of the crawler.
   The gap must be within the following range:

(A) Rubber crawler
59 to 64 mm (2.3 to 2.5 in.)

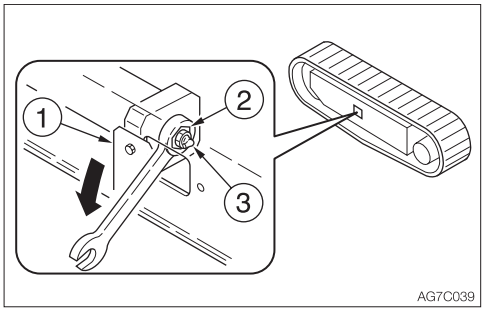
Adjustment

Increasing the tension



1. Remove the cover (1).
2. Inject grease through the grease fitting (3) of the grease discharge valve (2) with a grease gun.
3. Inspect the crawler tension.

Decreasing the tension

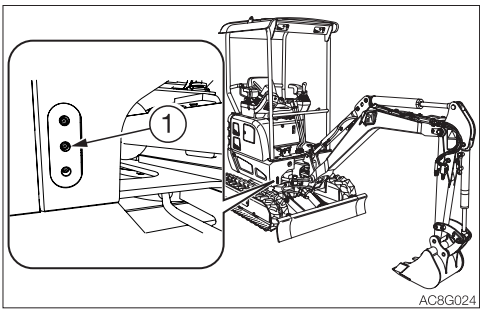


1. Remove the cover (1).
2. Slowly loosen (one turn) the grease discharge valve (2) with a spanner to discharge grease. If grease does not come out well, move the machine back-and-forth.
3. Tighten the grease discharge valve (2).
   · Tightening torque: 59 to 88 N·m (43.5 to 64.9 ft-lb.)

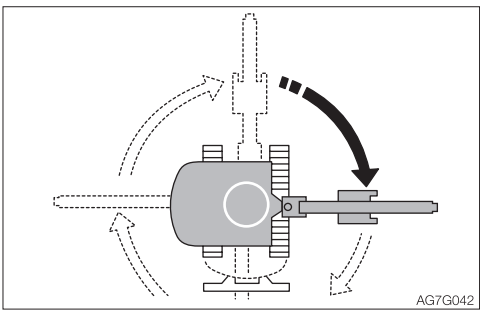
LUBRICATING THE SLEW BEARING

⚠ WARNING

Do not slew while lubricating. Doing so is dangerous, as you may get caught in the machine.

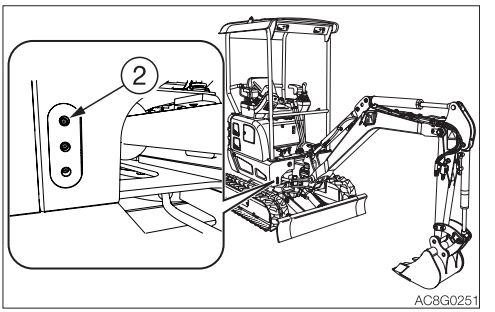


1. Stop the engine with the machine in the posture shown on the figure above.
2. Use the grease gun to grease the grease fitting (1).



3. Start the engine, lift the bucket and slew clockwise 90°.
4. Lower the bucket to the ground, and then stop the engine.
5. Repeat the steps 2 to 4 above three times.
6. Wipe off the grease expelled from the slew bearing and grease fitting.

LUBRICATING THE SLEW MOTOR PINION



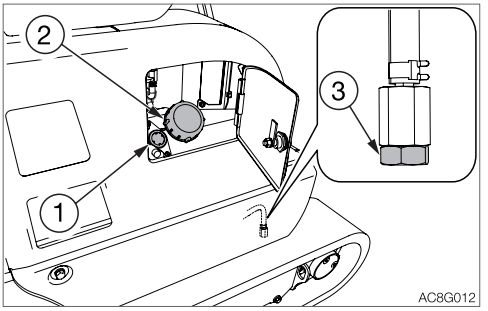
1. Use the grease gun to lubricate the grease fitting (2).
2. Wipe off the excess grease.

DRAINING THE WATER FROM THE FUEL TANK

⚠ WARNING

- **Do not smoke or permit open flames while handling fuel or working on the fuel system.**
- **Never remove the fuel cap or add fuel when the engine is running or still hot. Do not spill fuel on the hot surface of the machine.**
- **Fill the fuel tank in a well ventilated place.**
- **Do not fill the fuel tank to capacity. Allow room for oil expansion.**
- **Clean up spilled fuel immediately.**
- **Securely tighten the fuel filler cap.**
- **Use the correct grade of fuel for the operating season.**

Do the draining operation before starting the machine.



1. Slew the upperstructure to the position for easy draining.
2. Remove the fuel filler cap (2).
3. Place a pan under the drain plug (3).
4. Loosen the drain plug (3) to drain water and sediment buildup in the bottom of the tank.
5. Tighten the drain plug (3).
6. Add fuel while watching the sight gauge (1).
7. Tighten the fuel filler cap (2) and lock it.
8. Bleed air.

Bleeding air from the fuel system

Refer to “Bleeding air from the fuel system” on page 6-8.

Note: Air in the fuel system causes the engine to fail to start or to have problems. Bleed air when the fuel tank is emptied, using the same procedure above.

INSPECTING THE BATTERY FLUID LEVEL AND REPLENISHING

DANGER

- Do not use the battery when the fluid level is below the lower level limit. Doing so will hasten the deterioration of the internal portions of the battery and shorten the battery life. It also can cause rupturing (explosion).
- Batteries generate flammable hydrogen gas which may explode. Keep away from flame, sparks, fire or lighted cigarettes.
- Use a dampened cloth to clean above the fluid level line and check the fluid level. Do not clean with a dry cloth; otherwise it can cause static electricity to build up, resulting in ignition or explosion.

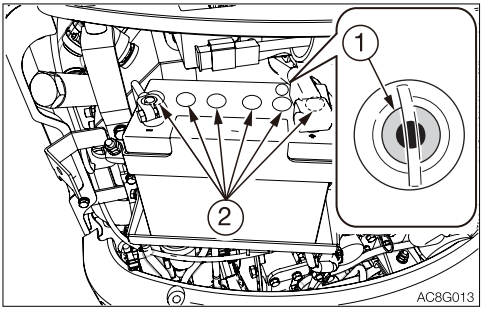
WARNING

- Wear protective goggle and clothing when working with batteries.
- Do not add the distilled water above the upper level limit. Doing so could cause the fluid to leak. This fluid can cause skin damage if contacted, or can cause the machine components to corrode.
- Batteries contain sulfuric acid which will damage eyes or skin if contacted.
  - If eye contact occurs, flush immediately with clean water and get prompt medical attention.
  - If accidentally swallowed, drink large quantities of water or milk and call a physician immediately.
  - If acid contacts skin or clothing, wash off immediately with a lot of water.

Inspection

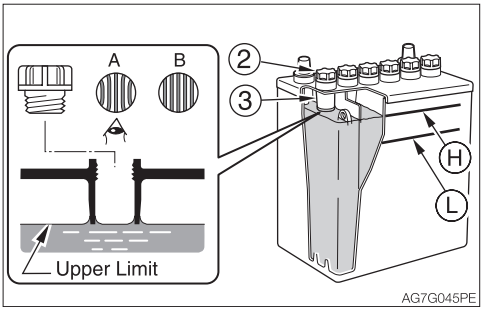
IMPORTANT: Check the fluid level of all cells following the steps below, even when the fluid level can be checked using the indicator.

1. Open the engine hood.



2. Inspect the indicator (1).
   - Blue: Good
   - White: Charging needed
   - Red: Insufficient battery fluid
3. Inspect the fluid level.
   The fluid level must be between the upper level line (H) and lower level line (L). If not, add distilled water up to the line (H).

- If the fluid level cannot be checked by fluid level lines:



Remove the caps (2) and look into the fluid filler holes to check the fluid level. If the fluid is below the sleeve (3), be sure to add distilled water up to the bottom edge of the sleeve (3).

Proper level (A)
If the fluid reaches up to the bottom edge of the sleeve (3), the surface tension causes the fluid to swell and the plate appears as if it is distorted.

Level too low (B)
If fluid does not reach up to the bottom edge of the sleeve (3), the plate looks laminar, not distorted.

4. Check the terminals for looseness and dirt.

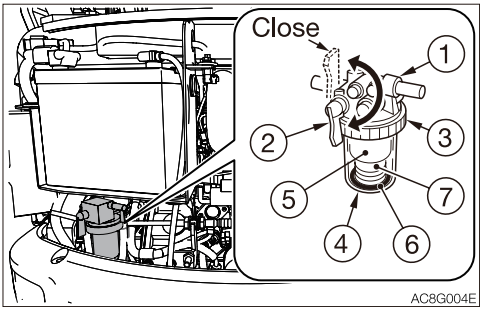
Replenishing
When adding distilled water, do so before starting operations in order to prevent freezing.
1. Remove the caps (2), and add distilled water until the upper level (H).
2. Check that the indicator (1) turns blue.
3. Clean the exhaust hole on the cap, then tighten the caps (2) securely.

EVERY 100 HOURS

CLEANING THE WATER SEPARATOR

⚠ WARNING

- Do not smoke or permit open flames while handling fuel or working on the fuel system.
- Stop the engine in a well-ventilated place and allow it to cool down before performing maintenance.
- Clean up spilled fuel immediately.

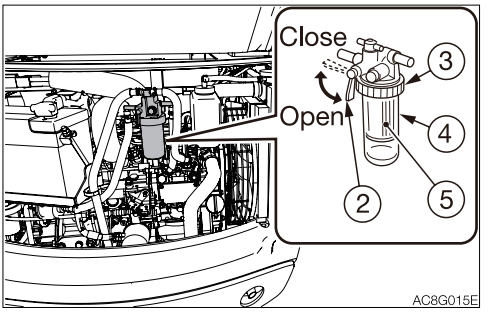


1. Open the engine hood.
2. Close the valve (2).
3. Loosen the ring (3), and then remove and clean the case (4), element (5) indicator ring (6) and spring (7).
4. Inspect the O-ring and the element (5). If there are any scratches or other irregularities, replace them.
5. Install the indicator ring (6), spring (7), element (5) and case (4), and then tighten the ring (3).
6. Open the valve (2) to bleed air.
   Refer to “Bleeding air from the fuel system” on page 6-8.

CLEANING THE FUEL FILTER

⚠ WARNING

- Do not smoke or permit open flames while handling fuel or working on the fuel system.
- Stop the engine in a well-ventilated place and allow it to cool down before performing maintenance.
- Clean up spilled fuel immediately.



1. Open the engine hood.
2. Close the valve (2).
3. Loosen the ring (3), remove and clean the case (4) and the element (5).
4. Inspect the O-ring and the element (5). If there are any scratches or other irregularities, replace them.
5. Install the element (5) and the case (4) and tighten them with the ring (3).
6. Open the valve (2) to bleed air.
   Refer to “Bleeding air from the fuel system” on page 6-8.

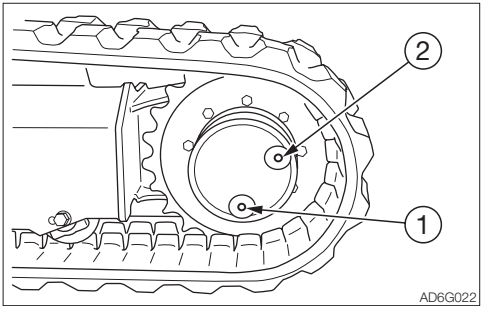
AFTER THE INITIAL 250 HOURS (ONLY FOR NEW MACHINES)

REPLACING THE TRAVEL MOTOR GEAR OIL

⚠ WARNING

- Stop the engine and allow the machine to cool down before performing maintenance.
  - The travel motor is hot immediately after the engine is stopped. Touching it will cause burns.
  - The gear oil is also hot and under high pressure immediately after the engine is stopped.
    Be careful when loosening the plugs. Working on the machine under these conditions could result in burns or injuries.
- The pressure in the reduction gear case of travel motor may cause oil or the plug to fly out. Loosen the plug slowly to release the pressure.

IMPORTANT: If the percentage of the traveling time within the total operating time is high, replace the gear oil earlier than the specified time.



1. Set the travel motor so that plug (1) is at the very bottom.
2. Place a pan under the plug (1).
3. Remove the plugs (1) and (2) and drain the oil.
4. Rewrap the plugs with new sealing tape.
5. Tighten the plug (1).
6. Add oil through the hole of the plug (2) until oil flows out of the hole of the plug (2).
7. Tighten the plug (2).

EVERY 250 HOURS

INSPECTING AND ADJUSTING THE FAN BELT

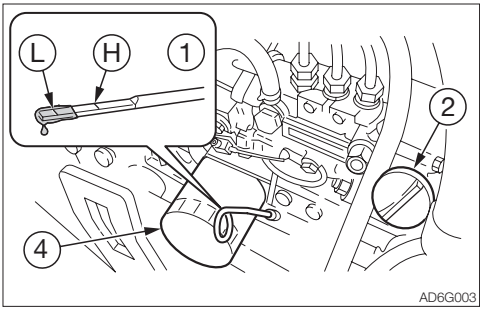
Refer to “Inspecting and adjusting the fan belt” on page 5-23.

REPLACING THE ENGINE OIL AND THE OIL FILTER

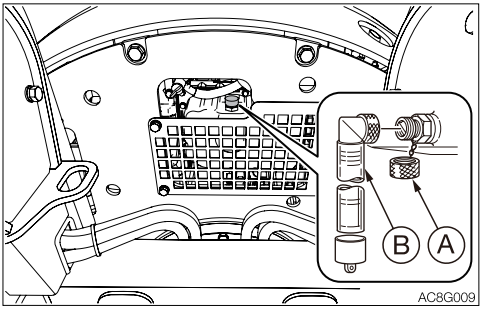
⚠ WARNING

Stop the engine and allow the machine to cool down before performing maintenance.

- **The engine, muffler, radiator, hydraulic lines, sliding parts and many other parts of the machine are hot immediately after the engine is stopped. Touching these parts will cause burns.**
- **The engine oil is also hot. Be careful not to touch the hydraulic oil when loosening the cap or plug. Working on the machine under these conditions could result in burns or injuries.**



1. Open the engine hood and remove the oil filler cap (2).



2. Place a pan for catching the waste oil under the drain plug (3).
3. Remove the cap (A), install connector (B) and drain the oil. (The oil comes out when the screw is tightened.)
4. Remove the connector (B) and install the cap (A).

IMPORTANT: Check the waste oil for metal powder. If it contains large amounts of metal powder, consult your sales or service dealer.

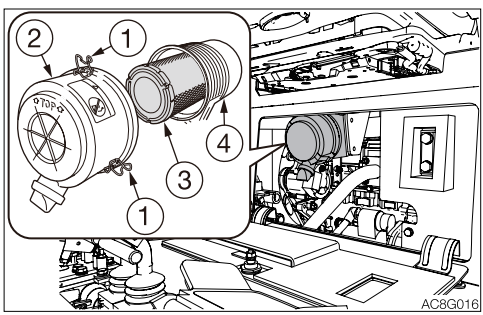
5. Turn the filter (4) counterclockwise with the filter wrench and remove it.
6. Clean the surface of installation of the filter stand.
7. Apply a thin layer of oil on the packing of the new filter.
8. Install the new filter by hand.
9. Tighten one more turn (with the filter wrench) after the filter packing comes in contact with the surface of installation. (Torque when tightening with filter wrench: 19.6 to 23.5 N·m or14 to 17 ft-lb)
10. Add oil up to between the upper limit (H) and the lower limit (L) of the dipstick (1). Problems could arise if the oil level is either too low or too high.
11. Tighten the oil filler cap (2).
12. Start the engine, run it at low idle for about 5 minutes, then stop it.
13. After about 10 minutes, inspect the oil level.

CLEANING THE AIR CLEANER

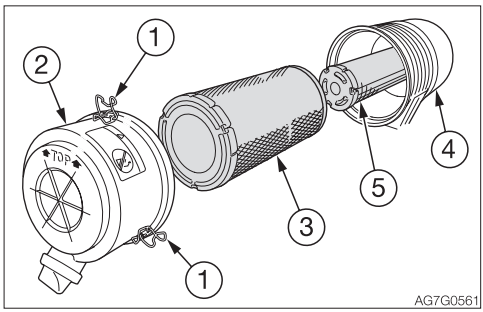
⚠ WARNING

- **Stop the engine and allow the machine to cool down before performing maintenance.**
  - **The engine, muffler, radiator and many other parts of the machine are hot immediately after the engine is stopped. Touching it will cause burns.**
- **Wear required appropriate equipment such as protective goggle and filter mask when using compressed air, as metal fragments or other objects can fly and cause serious injury.**

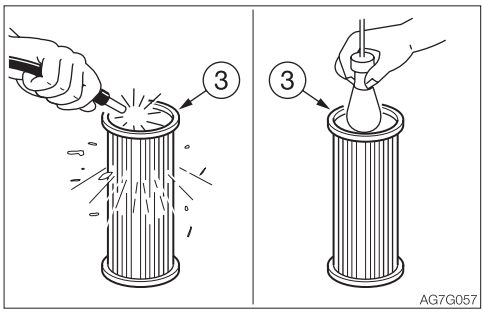
IMPORTANT: Be careful not to scratch the element. Do not use an element if it is damaged.
IMPORTANT: When operating the machine in very dusty places, perform inspection and maintenance operations every day.
IMPORTANT: Be sure to install the element and dust cap securely. If not, dust could be drawn into the cylinder, damaging the engine.



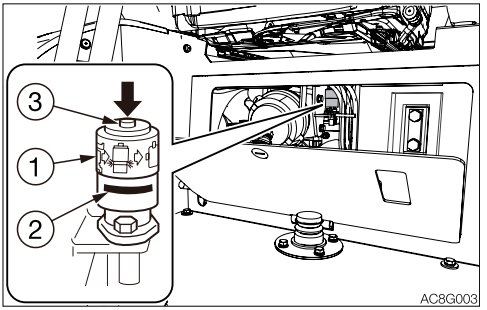
1. Open the maintenance cover A.
2. Loosen the clamps (1) and remove the dust cup (2).



3. Clean the inside of the dust cup (2).
4. Remove the primary element (3).
5. Cover the intake hole at the back of the body (4) with cloth or tape to prevent dirt from getting in.
   <If equipped with the secondary element>
   To prevent dirt from getting inside the engine, do not remove the secondary element (5).
6. Clean the inside of the body (4).



7. Clean the primary element (3) with dried compressed air (294 to 490 kPa or 43 to 71 psi).
   First blow the air from the inside of the element along the pleats. Then blow the air from the outside and finally from the inside again.
8. Light up the inside of the primary element (3) with a light bulb, inspect it, and replace it if there are small holes or thin spots.
9. Remove the cloth or tape applied in step 5.
10. Install the primary element (3).
11. Install the dust cup (2) with its "⬆ TOP ⬆" mark facing up, and then fasten it with the clamps (1).



12. Push the button (3) on the dust indicator to reset the red piston (2).

CLEANING THE RADIATOR FINS AND THE OIL COOLER FINS

⚠ WARNING

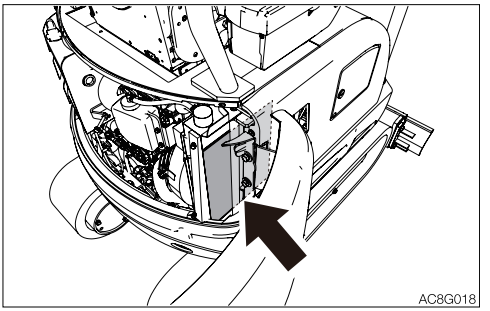
Wear required appropriate equipment such as protective goggle and filter mask when using compressed air, as metal fragments or other objects can fly and cause serious injury.

IMPORTANT: Be careful not to damage the fins when cleaning.

- **When using compressed air or pressurized water, make sure the pressure is no higher than 200 kPa (28 psi) and hold the nozzle sufficiently away from the fins.**

IMPORTANT: When using water, cover the electrical system to prevent water from getting in.

IMPORTANT: When operating the machine in very dusty places, perform inspection and maintenance operations every day.

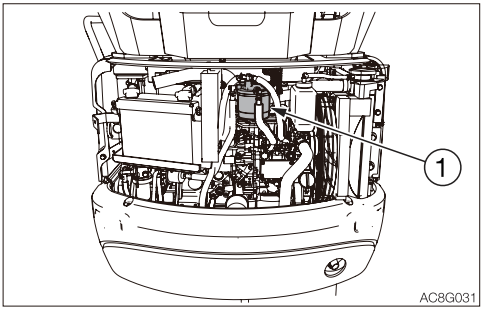


1. Open the engine hood.
2. Blow compressed air on the fins to remove mud and dirt stuck on them.

REPLACING THE FUEL FILTER (CARTRIDGE TYPE)

⚠ WARNING

- **Do not smoke or permit open flames while handling fuel or working on the fuel system.**
- **Stop the engine in a well-ventilated place and allow it to cool down before performing maintenance.**
- **Clean up spilled fuel immediately.**



1. Open the engine hood.
2. Turn the filter (1) counterclockwise with the filter wrench and remove it.
3. Clean the surface of installation of the filter stand.
4. Apply a thin layer of oil on the packing of the new filter.
5. Install the new filter by hand.
6. Tighten one more turn after the filter packing comes in contact with the surface of installation. (Torque when tightening with filter wrench: 20 to 24 N·m or 15 to 18 ft-lb.)
7. Bleed the air.
   Refer to “Bleeding air from the fuel system” on page 6-8.

EVERY 500 HOURS

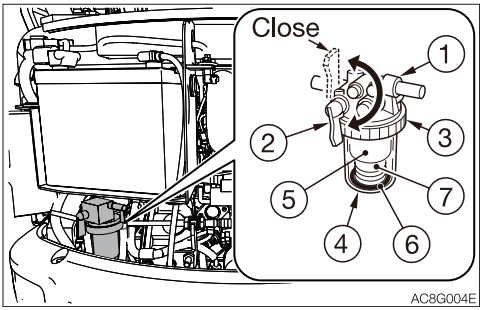
REPLACING THE HYDRAULIC OIL RETURN FILTER

Refer to “Replacing the hydraulic oil return filter” on page 5-24.

REPLACING THE WATER SEPARATOR FILTER

⚠ WARNING

- **Do not smoke or permit open flames while handling fuel or working on the fuel system.**
- **Stop the engine in a well-ventilated place and allow it to cool down before performing maintenance.**
- **Clean up spilled fuel immediately.**

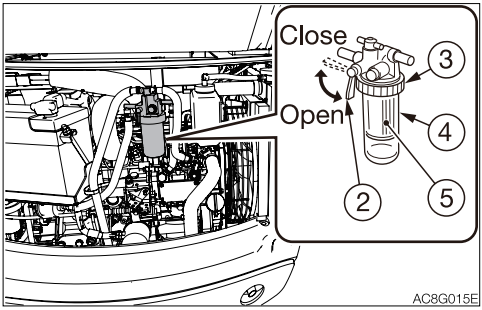


1. Open the engine hood.
2. Close the valve (2).
3. Loosen the ring (3) and remove the case (4).
4. Remove the spring (7) and the indicator ring (6) from the case (4).
5. Clean the case (4).
6. Inspect the O-ring. If there are any scratches or other irregularities, replace it.
7. Replace the element (5) with a new one.
8. Install the indicator ring (6) and the spring (7) in the case (4).
9. Install the case (4) to the bracket and tighten the ring (3) by hand.
10. Open the valve (2) to bleed air.
    Refer to “Bleeding air from the fuel system” on page 6-8.

REPLACING THE FUEL FILTER (ELEMENT TYPE)

⚠ WARNING

- **Do not smoke or permit open flames while handling fuel or working on the fuel system.**
- **Stop the engine in a well-ventilated place and allow it to cool down before performing maintenance.**
- **Clean up spilled fuel immediately.**



1. Open the engine hood.
2. Close the valve (2).
3. Loosen the ring (3) and remove the case (4).
4. Clean the case (4).
5. Inspect the O-ring. If there are any scratches or other irregularities, replace it.
6. Replace the element (5) with a new one.
7. Install the case (4) to the bracket and tighten the ring (3) by hand.
8. Open the valve (2) to bleed air.
   Refer to “Bleeding air from the fuel system” on page 6-8.

EVERY 1000 HOURS

REPLACING THE TRAVEL MOTOR GEAR OIL

Refer to “Replacing the travel motor gear oil” on page 5-33.

REPLACING THE AIR CLEANER ELEMENT

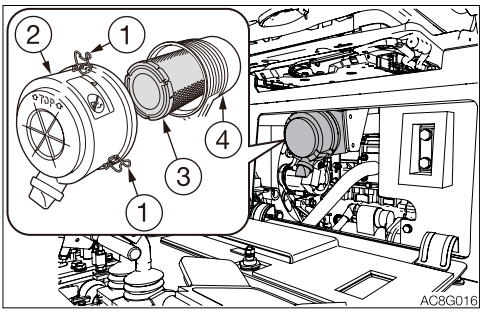
⚠ WARNING

Stop the engine and allow the machine to cool down before performing maintenance.

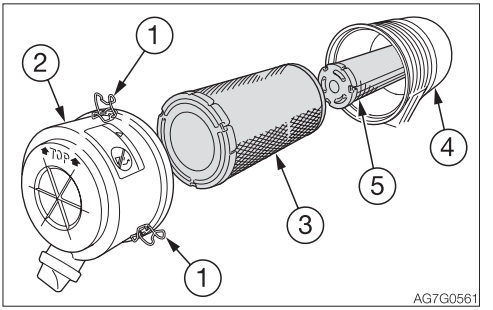
- **The engine, muffler, radiator and many other parts of the machine are hot immediately after the engine is stopped. Touching these parts will cause burns.**

IMPORTANT: Do not use an element if its pleats, gaskets or seals are damaged.
IMPORTANT: Be sure to install the element and dust cap securely. If not, dust could be drain into the cylinder, damaging the engine.

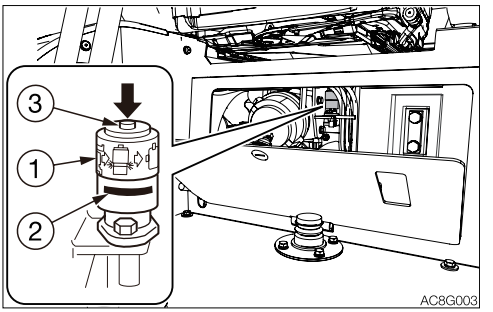
1. Open the maintenance cover A.



2. Loosen the clamps (1) and remove the dust cup (2).
3. Clean the inside of the dust cup (2).



4. Remove the primary element (3).
5. Cover the intake hole at the back of the body (4) with cloth or tape to prevent dirt from getting in.
   <If equipped with the secondary element>
   Do not yet remove the secondary element (5).
6. Clean the inside of the body (4).
7. Remove the cloth or tape applied in step 5.
   <If equipped with the secondary element>
   Remove the secondary element (5).
8. Install the new elements.
9. Install the dust cup (2) with its “⬆ TOP ⬆” mark facing up, and then fasten it with the clamps (1).



10. Push the button (3) on the dust indicator to reset the red piston (2).

INSPECTING AND ADJUSTING THE ENGINE VALVE CLEARANCE

This operation requires experience. Ask your sales or service dealer for it.

EVERY 1500 HOURS

INSPECTING, CLEANING AND CHECKING THE OPERATION OF THE ENGINE FUEL INJECTORS (IF NECESSARY)

This operation requires experience. Ask your sales or service dealer for it.

INSPECTING THE CRANKCASE BREATHER SYSTEM

This operation requires experience. Ask your sales or service dealer for it.

EVERY 2000 HOURS

LAPPING THE ENGINE VALVE SEATS (IF NECESSARY)

This operation requires experience. Ask your sales or service dealer for it.

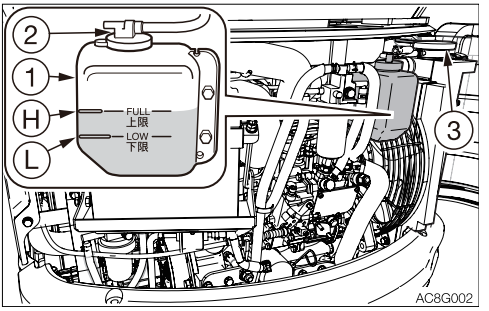
CLEANING THE ENGINE COOLING SYSTEM

⚠ WARNING

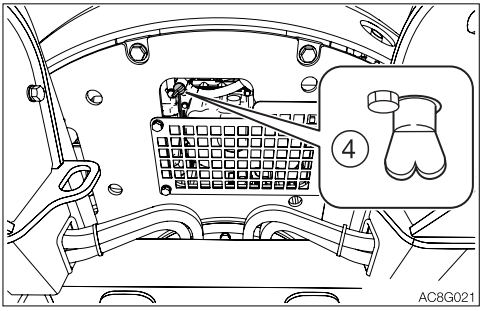
- **Stop the engine and allow the machine to cool down before performing maintenance.**
  - **The engine, muffler, radiator and many other parts of the machine are hot immediately after the engine is stopped. Touching these parts will cause burns.**
  - **The engine coolant is also hot and under high pressure immediately after the engine is stopped. Be careful when loosening the caps or plugs. Working on the machine under these conditions could result in burns or injuries due to the hot coolant spurting out.**
- **If maintenance must be performed with the engine running, always work as a two person team communicating each other.**
  - **One person must sit in the operator's seat so that he/she can immediately stop the engine when necessary. He/she must take care not to touch the lever or pedal unless necessary.**
  - **The one who performs maintenance must make sure to keep his/her body or clothing away from the moving part of the machine.**
- **Standing at the back of the machine while the engine is running is extremely dangerous, as the machine could move suddenly. Never stand at the back of the machine while the engine is running.**
- **Do not remove the radiator cap or the drain plug when the cooling water is hot. Stop the engine and wait until the engine and the cooling water cool. Then, slowly loosen the radiator cap and the drain plug to remove them.**

When cleaning, if the temperature of the coolant is low, the thermostat will be closed and the coolant will not circulate in the radiator. Heat the coolant water to at least 90°C (194°F) before cleaning.

1. Open the engine hood.



2. Gradually loosen the radiator cap (3) to release the internal pressure, and then remove the cap.



3. Place a pan for catching the waste coolant under the drain plug (4), and then loosen the drain plug (4) to drain the coolant.
4. Tighten the drain plug (4).
5. Add tap water to the radiator through the coolant fill port up to the top of the port. Take time and slowly add water, so that no air enters the radiator.
6. Close the radiator cap (3).
7. Start the engine and run it at a speed slightly above low idling. Raise the water temperature to at least 90°C (194°F), and then run the engine for about 10 minutes with the thermostat open.

8. Stop the engine, wait until the cooling water temperature becomes lower, and then remove the drain plug (4) to drain the water.
9. After draining, clean the cooling system using a cleaning agent. When using the cleaning agent, follow the instructions included with the agent.
10. Repeat the steps 4 to 8 to rinse the cooling system.
11. Tighten the drain plug (4).
12. Take time and slowly add the new coolant (mixture of antifreeze and tap water) to the radiator through the fill port until it is full.
13. Close the radiator cap (3).
14. Warm up the engine. Use the meters to check that there are no irregularities in the cooling system at this time.
15. Increase the water temperature to at least 90°C (194°F). Then, run the engine for about 10 minutes with the thermostat kept open.
16. Stop the engine, wait until the cooling water temperature becomes lower, and then check the level of coolant in the radiator.
    If necessary, add cooling water until the radiator is full.
17. Close the radiator cap (3).
18. Clean the interior of the reserve tank (1), and then add coolant to the upper limit (H).
19. When the coolant has been replaced, inspect the coolant level once again after operating the machine.
    Once the machine is operated, the coolant is distributed throughout the entire system, resulting in the lower coolant level.
    Replenish the cooling water that has been used.

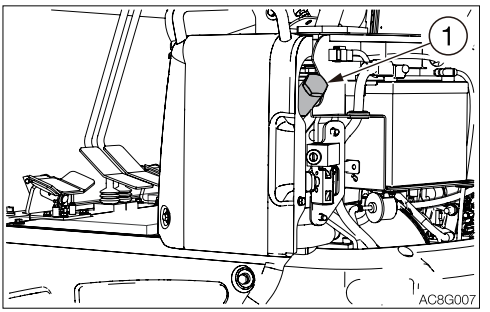
EVERY 4000 HOURS

REPLACING THE HYDRAULIC OIL AND CLEANING THE SUCTION STRAINER

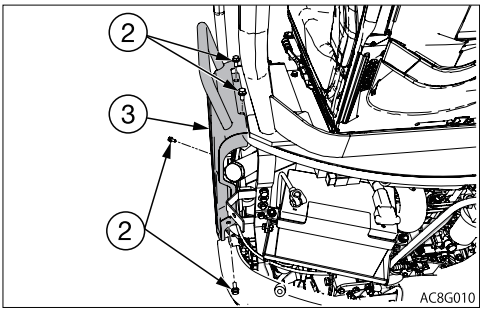
⚠ WARNING

- **Stop the engine and allow the machine to cool down before performing maintenance.**
  - **The engine and the hydraulic system and many other parts of the machine are hot immediately after the engine is stopped. Touching these parts will cause burns.**
  - **The hydraulic oil is also hot and under high pressure immediately after the engine is stopped.**
    Be careful when loosening the caps or plugs. Working on the machine under these conditions could result in burns or injuries due to the hot oil spurting out.
- **Oil may spurt out if caps or filters are removed or pipes are disconnected before releasing the pressure in the hydraulic system.**
  - **Gradually loosen the vent plug to relieve tank pressure.**
  - **When removing plugs or screws, or when disconnecting hoses, stand to the side and loosen them slowly to gradually release the internal pressure before removing.**

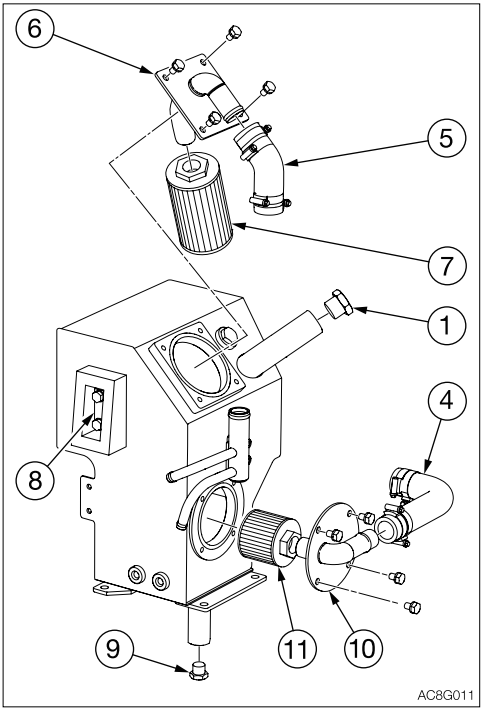
1. Set the machine to the hydraulic oil level inspection posture.
   Refer to “Inspecting the hydraulic oil tank level and replenishing” on page 5-19.
2. Raise the safety lock lever to the locked position.



3. Open the engine hood.
4. Slowly loosen the air bleeding plug (1) to relieve the internal pressure, and then remove the plug.



5. Loosen the bolts (2) and remove the cover (3).
6. Loosen the hose bands and remove the hose (5) from the flange (6).
7. Loosen the bolts to take out the flange (6).



8. Remove the return filter (7).
9. Place a pan for catching the waste oil under the drain plug (9).
10. Loosen the drain plug (9) and drain the hydraulic oil.
11. Loosen the hose bands and remove the hose (4).
12. Loosen the bolts and remove the flange (10).
13. Remove the suction strainer (11) and clean it.
14. Clean the inside of the hydraulic oil tank.
15. Install the suction strainer (11) to the flange (10).
16. Reinstall the flange (10) and the hose (4) to their original positions.
17. Install a new return filter to the flange (6).
18. Reinstall the flange (6) to their original positions.
19. Tighten the drain plug (9).
20. Add hydraulic oil from the hole of plug (1) up to the level between the upper limit (H) and the lower limit (L) in the sight gauge (8).
21. Tighten the plug (1).
22. Bleed air from the hydraulic oil circuit following “Bleeding air” below.
23. Set the machine to the hydraulic oil level inspection posture and inspect the oil level when the oil temperature drops. Refer to “Inspecting the hydraulic oil tank level and replenishing” on page 5-19.

Bleeding air

IMPORTANT: After replacing the hydraulic oil or hydraulic devices, or after performing maintenance of the hydraulic devices, bleed air from the hydraulic circuits and hydraulic devices. Failure to do so may damage the hydraulic devices.

• Cylinders

1. Start the engine, let it run at a low-idling speed for 10 minutes.
2. Maintain the engine at low idle, then extend and retract each cylinder 4 or 5 times, without let them reach the stroke end.
3. Run the engine at high speed, then extend and retract each cylinder 4 or 5 times, without let them reach the stroke end.
4. Set the engine back to a low idle, then extend and contract all the cylinders 4 or 5 times to the stroke ends.

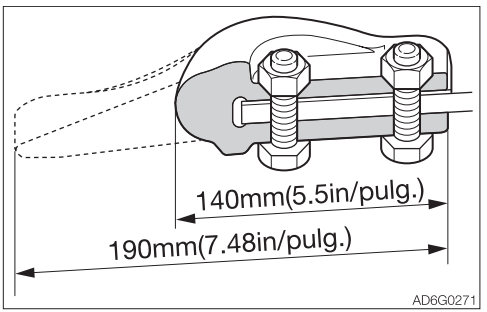
WHEN REQUIRED

REPLACING THE BUCKET TEETH

Replace the bucket teeth if the tooth points are worn. Do not wait until the bucket is damaged.

⚠ WARNING

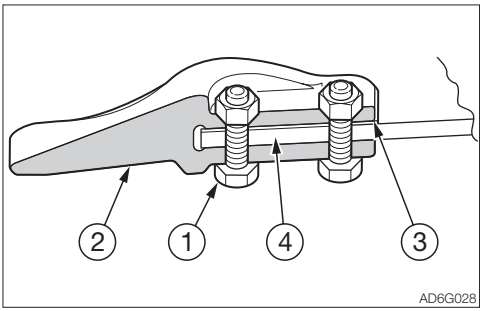
- **Before performing maintenance or repairs under the machine, lower all moveable working equipment to the ground or in the lowermost position.**
- **To prevent unexpected movement, firmly secure the working equipment when repairing or replacing the bucket teeth or side cutter.**
- **When using a hammer, pins may fly out or metal particles may be scattered. This may lead to serious injury.**
  - **If hard metal parts such as pins, bucket teeth, side cutter or bearings are hit with a hammer, wear protective gear such as safety goggles and gloves.**
  - **When hitting pins or bucket teeth, always check that there is no one in the surrounding area.**
- **Do not allow unauthorized personnel in the work area while working.**



Replace the teeth if they are worn to 140 mm (5.5 in.).

Removal

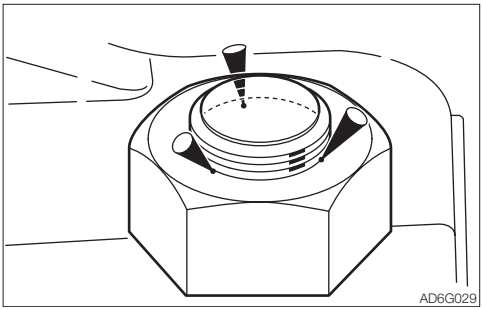
1. Clean the bucket and park the machine in a flat, safe place where the ground is hard.
2. Set the bottom surface of the bucket flat and lower it on a block so that the bolt (1) can be taken out.
3. Remove the starter key, and then check that the bucket is stable.



4. Remove the bolt (1).
5. Remove the teeth (2) and the shim (3).

Installation

1. Clean the section where the teeth are to be installed. If there is gravel or mud on the section, the tooth point may not go in all the way.
2. Put the teeth into the bucket.
3. If the teeth are not secured, insert a shim to reduce the clearance.
4. Insert the bolt from the outside of the bucket and tighten it with the nut.
   · Tightening torque: 102 N·m (75.2 ft-lb)



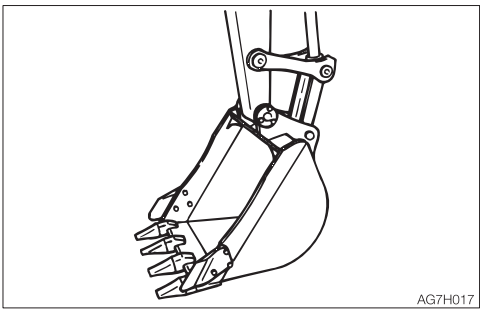
5. Caulk the bolt with a punch or weld it at three spots on the threaded portion (nut side).

REPLACING THE BUCKET

⚠ WARNING

- **Before performing maintenance or repairs under the machine, lower all working equipment to the ground or in the lowermost position.**
- **If maintenance must be performed with the engine running, always work as a two person team communicating each other.**
  - **One person must sit in the operator's seat so that he/she can immediately stop the engine when necessary. He/she must take care not to touch the lever or pedal unless necessary.**
  - **The one who performs maintenance must make sure to keep his/her body or clothing away from the moving part of the machine.**
- **When using a hammer, pins may fly out or metal particles may be scattered. This may lead to serious injury.**
  - **If hard metal parts such as pins, bucket teeth, side cutter or bearings are hit with a hammer, wear protective gear such as safety goggles and gloves.**
  - **When hitting pins or bucket teeth, always check that there is no one in the surrounding area.**
- **When aligning the pin holes, always do so by checking them visually. Do not insert your finger in the pin hole, or you could lose your finger.**

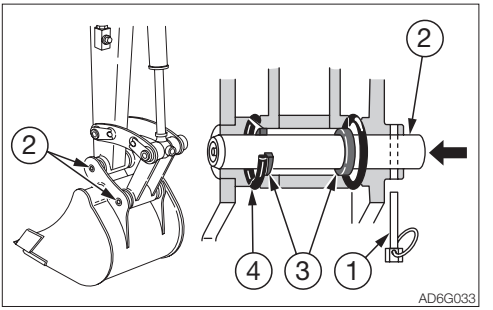
Removing



1. Lower the bucket to the ground as shown on the figure above in a stable position.

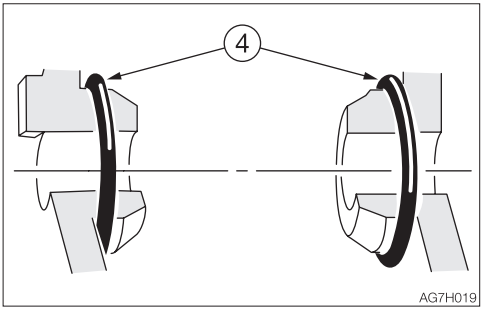
Note: When removing pins, set the bucket so that it is barely touching the ground. If the bucket is firmly touching the ground, the resistance will be great and it will be difficult to remove the pin.

2. Set the safety lock lever to the locked position and stop the engine.

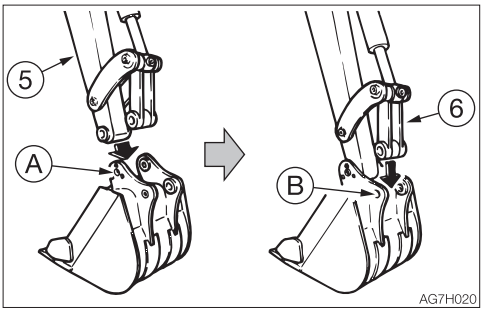


3. Disengage the ring of the lock pin (1) and remove the lock pin (1).
4. Hammer the pin (2) out of the bucket.
5. Remove the bucket.
   Inspect the pin seal (3) and replace it if it is deformed or damaged. (See next page.)

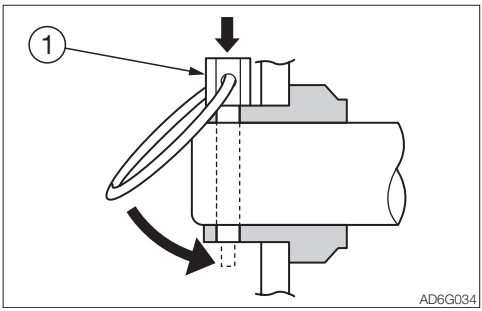
Installation



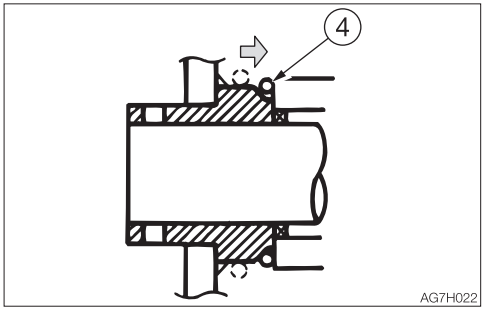
1. Set the O-ring (4) on the bucket as shown on the figure above.



2. Align the pin hole (A) on the bucket with the pin hole on the arm (5), and install the pin (2).
3. Operate the cylinder, align the pin hole (B) on the bucket with the pin hole on the link arm (6), and install the pin (2).

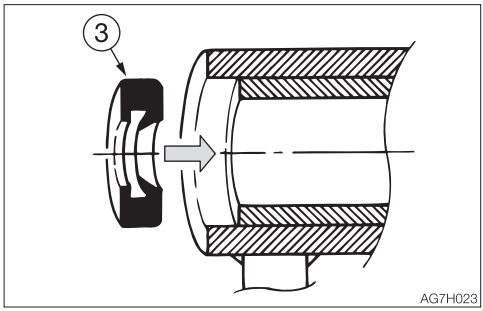


4. Align the turn prevention holes, install the lock pin (1), and then engage the ring inside.



5. Slide the O-ring (4).

Replacing the pin seal



1. Set the pin seal (3) in the direction shown on the figure above.
2. Use a mallet to slowly press the pin seal in. Be careful not to damage the seal.

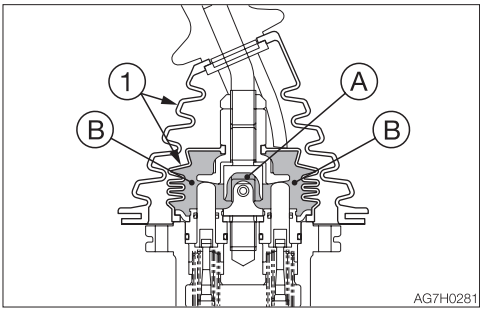
LUBRICATING THE LEVERS

⚠ WARNING

Set the machine to the parking posture, stop the engine, remove the starter key and store it. Failure to do so may result in the machine moving abruptly, leading to serious injury or death.

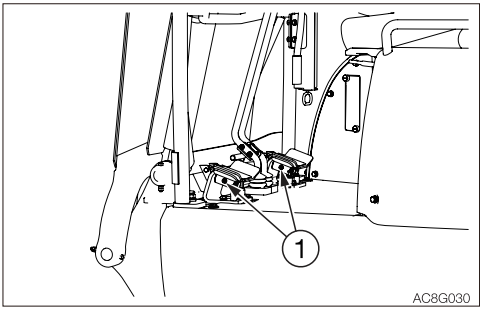
If the levers or pedals no longer move smoothly, grease them.

Operating levers



1. Remove the lower mount section of the boot (1) and turn it upward.
2. Wipe off the old grease.
3. Apply grease to points (A) and (B).
4. Set the boot (1) back as it was.

Pedals



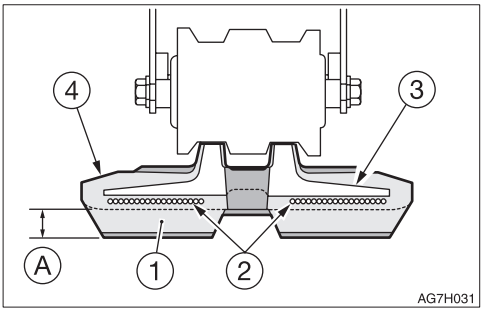
1. Use the grease gun to lubricate the grease fitting (1).
2. Wipe off the excess grease.

INSPECTING THE RUBBER CRAWLERS

Repair or replace the rubber crawlers if their condition becomes as described below. Consult your sales or service dealer for repair or replacement.

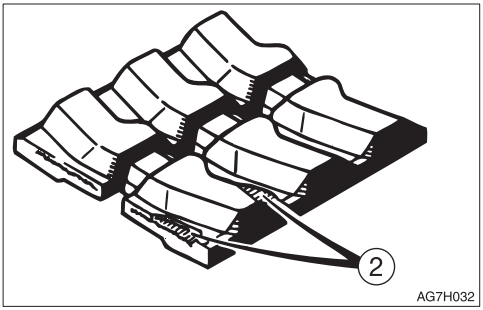
Rubber crawler
Replace the crawler if the entire crawler is stretched and cannot be adjusted.

(1) Lug



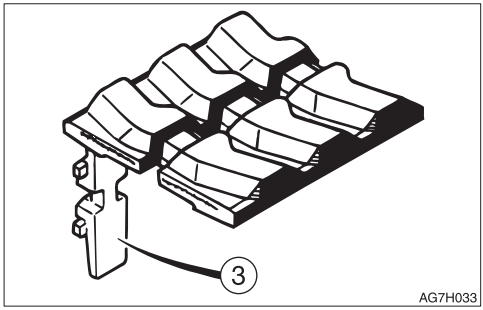
Replace if the height of (A) is 5 mm (0.2 in.) or below.

(2) Steel cord



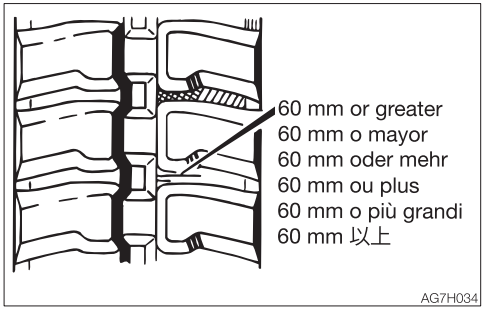
Replace if the steel cord is exposed for two links or more.
Replace if the half or more of the steel cords on one side are cut.

(3) Metal core



Replace if even one metal core is off.

(4) Rubber



Repair if there are cracks of 60 mm (2.4 in.) or greater in length.
If the steel cord is visible, repair as soon as possible, regardless of the length of the crack.

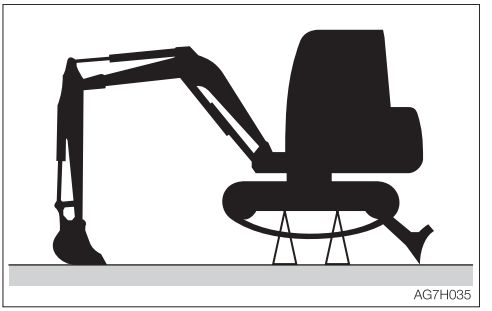
REPLACING THE RUBBER CRAWLERS

⚠ WARNING

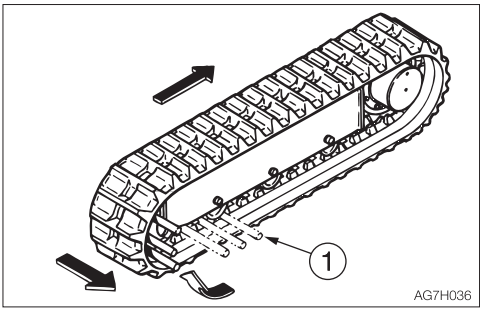
- **If you must work beneath the raised machine or working equipment, always use wood blocks, jack-stands or other rigid and stable supports. Never get under the machine or working equipment if they are not sufficiently supported.**
- **If maintenance must be performed with the engine running, always work as a two person team communicating each other.**
  - **One person must sit in the operator's seat so that he/she can immediately stop the engine when necessary. He/she must take care not to touch the lever or pedal unless necessary.**
  - **The one who performs maintenance must make sure to keep his/her body or clothing away from the moving part of the machine.**

Removal

1. Fully release the tension of the rubber crawler.
   Refer to "Inspecting and adjusting the crawler tension" on page 5-26.



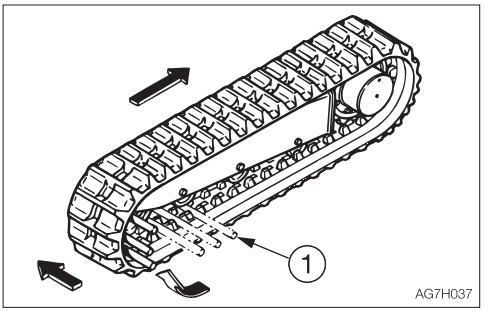
2. Use the working equipment to lift the body.



3. Set an iron pipe (1) in the rubber crawler and turn the sprocket slowly in the reverse direction.
4. Turn until the iron pipe (1) is directly next to the idler and the rubber crawler lifts away from the idler, then stop turning the sprocket.
5. Slide the rubber crawler sideways and remove it from the crawler frame.
   Remove the other rubber crawler using the same procedure.

Installation

1. Use the working equipment to lift the body.



2. Set the rubber crawler on the sprocket.
3. Set an iron pipe (1) in the rubber crawler and turn the sprocket slowly in the reverse direction.
4. Turn until the iron pipe (1) is directly next to the idler and the rubber crawler lifts away from the idler, then stop turning the sprocket.
5. Slide the rubber crawler inward, engage it on the idler, then pull out the iron pipe.
6. Check that the rubber crawler is securely engaged on the sprocket and idler.
7. Tighten the rubber crawler to the standard tension.
   Refer to “Inspecting and adjusting the crawler tension” on page 5-26.
8. Install the other rubber crawler using the same procedure.

MAINTENANCE DURING EXTENDED STORAGE PERIOD

Storage procedures

If the machine is to be stored for 30 days or more, store it indoors. If it must be stored outdoors, park the machine on a surface laid with lumber on a flat ground, and place a waterproof cover over it so that it stays dry.

1. Clean the machine.
2. Inspect for oil leakage, water leakage, cracks and loose nuts and bolts.
3. Add fuel and replace the hydraulic oil and oil.
4. To prevent rusting and freezing, replace the engine coolant with long-life coolant (LLC).
   Refer to “Cleaning the engine cooling system” on page 5-44.
5. Use the grease gun to lubricate the grease fittings.
6. Fully retract the bucket and arm cylinders and lower the bucket and dozer blade to the ground.
7. Apply rust-inhibiting oil to the hydraulic cylinder rods.
8. Disconnect the negative cable from the battery and cover the battery to prevent freezing.

During storage

⚠ WARNING

- **Do not operate the machine in an enclosed area without adequate ventilation.**
- **If natural ventilation is not possible, install ventilators, fans, exhaust extension pipes or other venting devices.**

1. To prevent rusting, operate the machine once a month so that the oil can be circulated throughout the system.
2. Inspect the battery and recharge it as necessary.
   Ask your sales or service dealer for recharging.

Starting the machine after storage

IMPORTANT: If the above “Storage procedures” have not been followed during the extended storage periods, consult your sales or service dealer before starting the machine again.

1. Wipe off the rust-inhibiting oil that was applied on the piston rods of the hydraulic oil cylinders.
2. Add oil or grease as necessary.

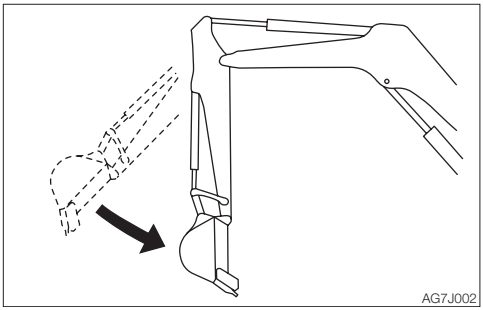
Returning the engine to service

1. Perform the daily checks.
2. The engine should be pre-oiled before startup.
   a. Crank the engine, leaving the fuel system shut off so the engine will not start, for 15 seconds.
   b. Then pause for 30 seconds.
   c. Repeat the procedure until you have cranked the engine for a total of one minute. This will circulate the oil in the engine’s lubrication system.
3. Prime the fuel system.
4. Start the engine. Allow the engine to idle for approximately 15 minutes while you check for:
   - Proper oil pressure
   - Fuel, engine oil or coolant leaks
   - Proper operation of the indicators and/or gauges
5. Avoid prolonged operation at minimum or maximum engine speeds and loads for the remainder of the first hour of operation.

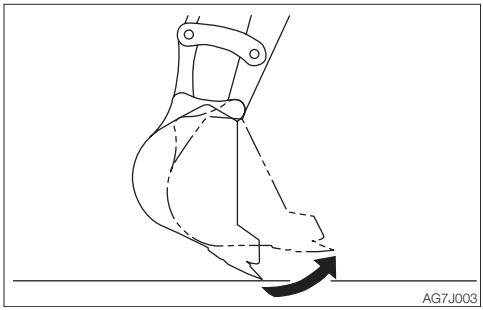
TROUBLESHOOTING

SYMPTOMS THAT ARE NOT MALFUNCTIONS

The symptoms listed below are not malfunctions.



- The arm retracting speed momentarily slows down when it reaches an almost vertical position while the engine is running at low speed.



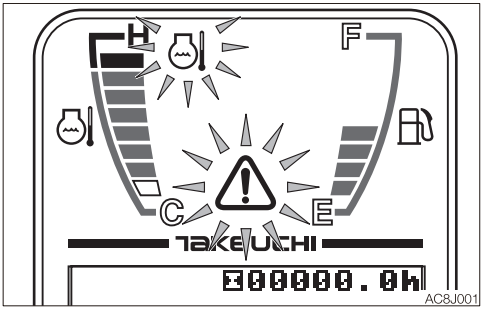
- The bucket teeth moving speed momentarily slows down when it reaches an almost horizontal position while the engine is running at low speed.
- The slew motor produces noise at the beginning and end of the slewing.
- The travel motor produces noise when stopped suddenly from its high speed traveling.
- The control valve produces noise if excessive force is applied to the working equipment or when it moved to the stroke end.
- It becomes less easy to operate the machine when an attachment weighing more than a standard arm or bucket is installed.

IF THE ENGINE OVERHEATS

⚠ WARNING

- **Do not open the engine hood and covers when steam is coming from it. The steam or hot water may spurt out and cause burns.**
- **Do not try to remove the radiator cap or the drain plug when the cooling water is hot. Stop the engine, wait until the engine and the radiator cool, and then slowly loosen the radiator cap to release the internal pressure.**
- **Before performing maintenance, stop the engine and allow the machine to cool down.**

The symptoms listed below indicate overheating.



- An alarm is sounded and the engine emergency lamp and the coolant temperature warning lamp start flashing.
- The water temperature gauge LED is in the red zone.
- Steam comes from the engine room.

Remedy procedure

1. Park the machine in a safe place.
2. Check if steam is coming out of the closed engine hood and covers.
3. If there is steam, stop the engine immediately and contact your sales or service dealer for repair. If steam, is not coming out run the engine at low idle and let the water temperature cool down.
4. When the water temperature gauge LED drops in the green zone, stop the engine.
5. Perform the inspections and the remedies listed below once the engine cools down.
   - Fan belt slack..... Adjust
     Refer to page 5-23.
   - Coolant level ..... Add
     Refer to page 5-16.
   - Water leakage..... Repair
   - Radiator fins..... Clean
     Refer to page 5-36.
   - Sediment in cooling system
     ..... Clean
     Refer to page 5-44.

If the problem persists after the above remedies, contact your sales or service dealer for repair.

IF THE BATTERY GOES DEAD

The symptoms below indicate that the battery is dead.
- The starter motor does not turn or fails to start the engine.
- The horn is too weak.

Remedy procedure

Start the engine using the booster battery on the other vehicle (booster vehicle) and the jumper cables.

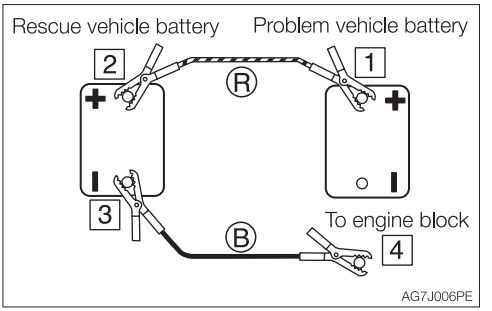
⚠ WARNING

- **When starting the engine using the jumper cables, be sure to connect the cables by following the proper steps. Improper use of jumper cables can result in battery explosion or unexpected machine motion.**
  - **Do not allow the booster vehicle and the machine with a dead battery (dead machine) to touch each other.**
  - **Do not allow the positive (+) and the negative (–) clips of the jumper cables to touch each other.**
  - **When connecting, attach the jumper cable to the positive (+) terminals first. When disconnecting, remove the cable from the negative (–) terminal (ground) first.**
  - **Connect the last clip of the jumper cable to a point as far away from the battery as possible.**
- **Always wear the protective goggle when jump starting the engine by using the jumper cables.**

IMPORTANT: Use the jumper cables and clips of a size suited to the capacity of battery. Do not use damaged or corroded jumper cables and clips.
IMPORTANT: Be sure that the battery of the booster vehicle has the same capacity as the battery of the dead machine.
IMPORTANT: Be sure to connect the clips securely.

Connecting the jumper cables

IMPORTANT: Set the starter keys of the booster vehicle and the dead machine to the OFF position.



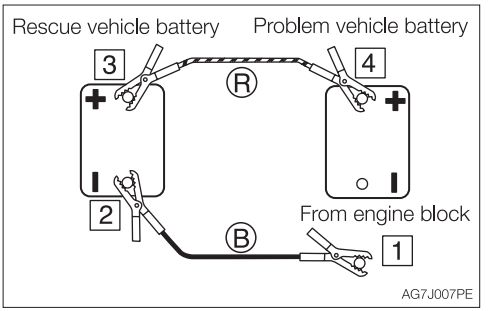
1. Connect the clip of jumper cable (R) to the positive (+) battery terminal of the dead machine.
2. Connect the other clip of jumper cable (R) to the positive (+) battery terminal of the booster vehicle.
3. Connect the clip of jumper cable (B) to the negative (–) battery terminal of the booster vehicle.
4. Connect the other clip of jumper cable (B) to the engine block of the dead machine. Connect the clip to a place as far from the battery as possible.

Starting the engine

1. Check that the clips are securely connected to the terminals.
2. Start the engine of the booster vehicle and run it at high speed.
3. Start the engine of the dead machine.

Disconnecting the jumper cables

Once the dead machine is successfully running, remove the jumper cables by following the same steps as for connection in the reverse order.



1. Disconnect the clip of jumper cable (B) from the engine block of the dead machine.
2. Disconnect the other clip of jumper cable (B) from the negative (–) battery terminal of the booster vehicle.
3. Disconnect the clip of jumper cable (R) from the positive (+) battery terminal of the booster vehicle.
4. Disconnect the clip of jumper cable (R) from the positive (+) battery terminal of the dead machine.

Recharging

Ask your sales or service dealer for recharging the dead battery.

IF A FUSE BLOWS

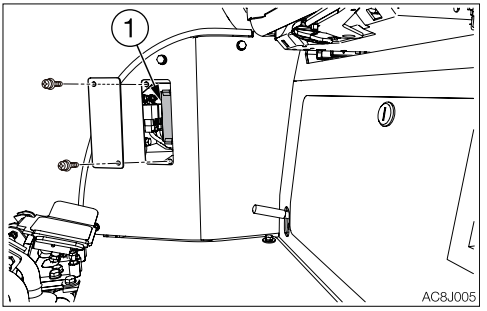
If a light does not come on or the electrical system does not work, a fuse may be blown. Inspect the fuses.

INSPECTING AND REPLACING THE FUSE

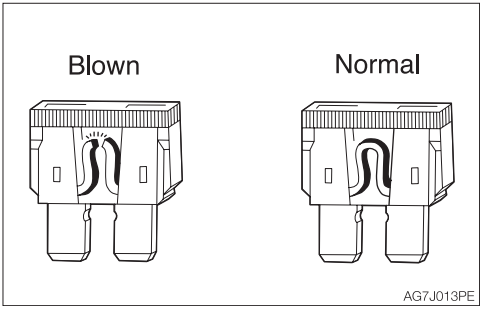
⚠ WARNING

If the fuse blows again soon after replacement, then the electric system is likely faulty. It may pose a fire hazard if not properly repaired. Contact your sales or service dealer for advice.

1. Turn the starter key to the OFF position to stop the engine.
2. Open the maintenance cover B.



3. Open the fuse box cover (1).
4. Check for any blown fuses.

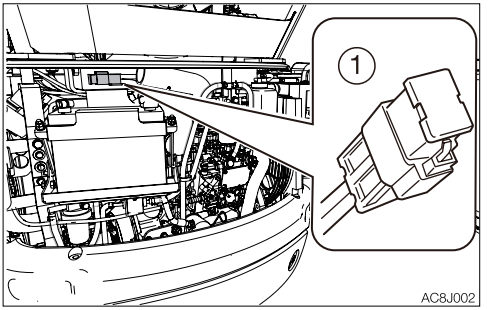


5. If a fuse is blown, replace it with a spare fuse of the same capacity.

Fuse layout and circuits protected

Capacity	Symbol	Protected circuit
25A		Starter switch
10A	AUX3	Third auxiliary hydraulic
5A		Lever lock
15A		Light
15A		Feed pump
15A	OPT	Option
10A		Horn
15A		Instrument cluster

INSPECTING THE FUSIBLE LINK



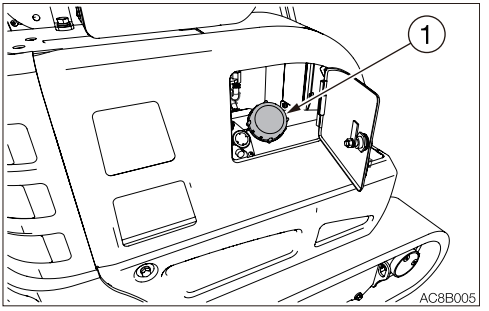
If the machine is not turned on after turning the starter switch to the ON position, the cartridge type fusible link (1) is likely blown. Open the engine hood and inspect. If the fusible link is blown, please contact your sales or service dealer.

Note: Fusible links are large type fuses used in high current applications. Like a regular fuse, they act as fuses by protecting the electric components and wirings from damage caused by excessive current draw.

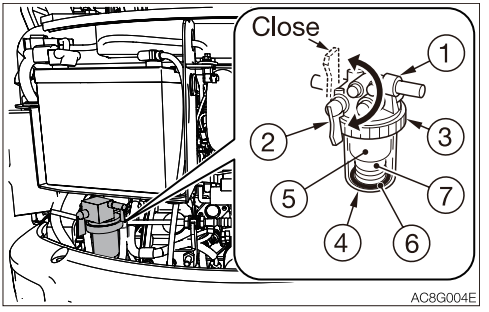
RESTARTING AFTER ADDING FUEL

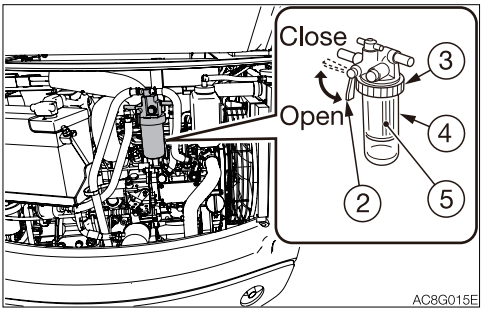
BLEEDING AIR FROM THE FUEL SYSTEM

IMPORTANT: NEVER use the starter motor to crank the engine in order to prime the fuel system. This may cause the starter motor to overheat and damage the coils, pinion gear and/or ring gear.
IMPORTANT: If the engine stalls due to fuel shortage, add fuel, turn the key to the ON position for 60 seconds, and then turn it to the START position. Running the starter for a long time before there is enough fuel is going through can cause the starter to fail.

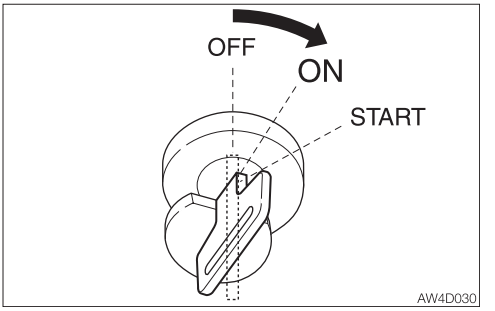


1. Add fuel.





2. Open the valve (2) of the water separator and the fuel filter.

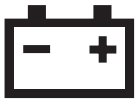


3. Turn the starter key to the ON position and hold it for about 60 seconds.
   The automatic air bleeder bleeds air from the fuel system.

Note: Air in the fuel system causes the engine to fail to start or to have other problems. Always bleed air when the fuel tank is emptied or when there is air in the fuel system.

IF A WARNING LAMP FLASHES

If an alarm is sounded or a warning lamp starts flashing during operation, park the machine in a safe place and perform the remedy procedures described below.

Warning lamp	Lamp name	Causes and remedies
AW4J007	**Engine emergency lamp**	There is a problem in the engine. Refer to the respective warning lamp below.
 AG7J019	**Battery charge warning lamp**	There is a problem with the fan belt or charger. Check the fan belt for slack or breakage and adjust as necessary. If the lamp continues flashing after maintenance, there is likely a problem with the charger. Consult your sales or service dealer for help. Refer to “Inspecting and adjusting the fan belt” on page 5-23.
AG7J017	**Engine oil pressure warning lamp**	A problem has occurred in the engine lubrication system. Inspect the engine oil level. If the lamp is flashing when the oil is normal or if it continues flashing after replenishment of oil, consult your sales or service dealer. Refer to “Inspecting and replenishing the engine oil” on page 5-17.
AG7J018	**Coolant temperature warning lamp**	The coolant temperature is too high and the engine is overheating. Refer to “If the engine overheats” on page 6-3.
AW4J010	**Fuel level warning lamp**	The fuel level is too low. Add fuel. Refer to “Inspecting the fuel level” on page 5-18.

OTHER SYMPTOMS

For symptoms not included in the table below or if the problem persists after the proper remedies have been taken, consult your sales or service dealer.

Symptoms	Major causes	Remedies
Left and right operating levers do not move smoothly	• Insufficient grease on the left and right operating levers	• Grease the levers. Refer to page 5-52.
Blade lever and throttle lever do not move smoothly	• Wire is stretched too lose	• Adjust or replace (ask your sales or service dealer).
Hoe attachment, slewing or traveling operation not possible	• Safety lock lever is raised (locked)	• Lower (release) the safety lock lever. Refer to page 2-19.
	• Fuse is blown	• Replace the fuse. Refer to page 6-6.
	• Adjustment of travel lock is faulty	• Adjust the travel lock (ask your sales or service dealer).
Digging force is insufficient	• Hydraulic oil level too low	• Add to the specified level. Refer to page 5-19.
	• Hydraulic oil is not warm enough	• Perform the warm-up. Refer to page 3-8.
	• Air cleaner is clogged	• Clean the air cleaner. Refer to page 5-35.
	• Hydraulic oil is not of suitable type	• Replace the hydraulic oil. Refer to page 5-46.
Traveling is not possible or not smooth	• Stones or foreign objects are stuck	• Remove the foreign object.
Machine veers to the right/left	• Stones or foreign objects are stuck	• Remove the foreign object.
	• Faulty crawler tension adjustment	• Adjust the crawler to the prescribed tension. Refer to page 5-26.
Travel speed cannot be changed	• Fuse is blown	• Replace the fuse. Refer to page 6-6.

Symptoms	Major causes	Remedies
Slewing is not possible or not smooth	• Insufficient grease on slew bearing	• Grease the bearing. Refer to page 5-28.
Hydraulic oil temperature is too high	• Hydraulic oil level too low	• Add up to the specified level. Refer to page 5-19.
Starter motor turns but engine does not start	• Insufficient fuel	• Add fuel. Refer to page 5-18.
	• Air in fuel system	• Bleed air. Refer to page 6-8.
	• Water in fuel system	• Drain water. Refer to page 5-29.
Crawlers come off	• Crawlers too loose	• Increase the tension. Refer to page 5-26.
Engine exhaust is white or bluish	• Excessive engine oil	• Adjust to the specified level. Refer to page 5-17.
	• Poor fuel	• Replace the fuel.
Engine exhaust is occasionally black	• Air cleaner is clogged	• Clean the air cleaner. Refer to page 5-35.
Irregular noise is produced from the engine (combustion or mechanical noise)	• Low quality fuel is being used	• Replace the fuel.
	• Engine is overheating	• Refer to “If the engine overheats” on page 6-3.
	• Damage inside the muffler	• Replace the muffler. For replacement, ask your sales or service dealer.

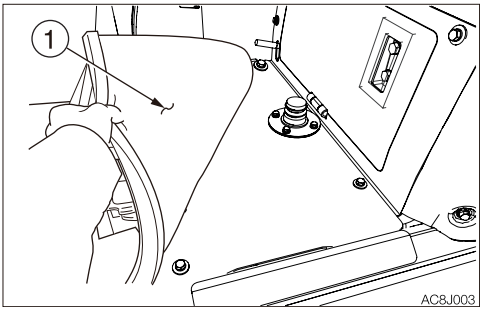
LOWERING THE BOOM TO THE GROUND

If the hoe attachment must be lowered to the ground while the engine is stopped, use the following procedure.
This operation is dangerous and requires experience. Ask your sales or service dealer for it.

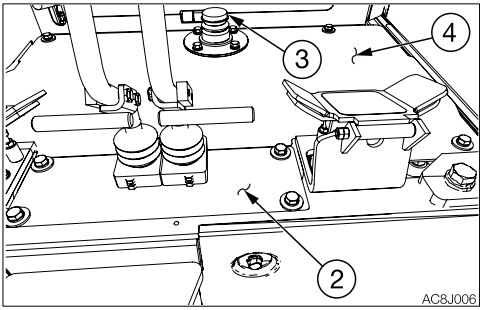
Procedure

⚠ WARNING

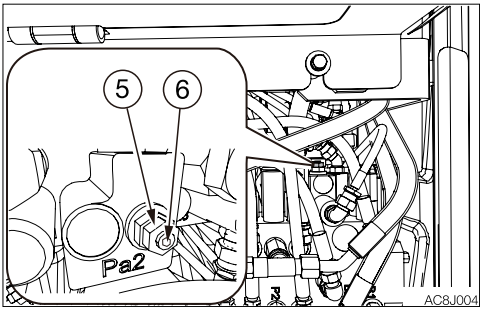
- **Keep away from the working area when the hoe attachment is lowered. You may be hit by dirt falling out of the bucket or the hoe attachment as it drops.**
- **Gradually lower the boom slowly by slowly turning the set screw on the shut-off valve. Do not turn the screw more than the specified amount.**



1. Remove the floor mat (1).



2. Remove the cover (2).
3. Remove the cover (4). Remove the harness of the auxiliary 3rd switch (3) together with the cover (4).



4. Loosen the lock nut (5) while holding the adjust screw (6) in place with a hexagonal wrench so that the adjust screw (6) will not be loosened together with the lock nut (5).
5. Turn the adjust screw (6) slowly 1/4 turn to lower the boom.
6. Check for safety and stability of the machine.
7. Return the adjust screw (6) to the original position.
8. Tighten the lock nut (5) while holding the adjust screw (6) in place with a hexagonal wrench so that the adjust screw (6) will not be loosened together with the lock nut (5).
   - Lock nut (5) tightening torque: 12.4 to 13.6 N·m (9.1 to 10 ft-lb.)
   - Adjust screw (6) tightening torque: 6.3 to 7.5 N·m (4.6 to 5.5 ft-lb.)
9. Reinstall the floor mat (1), cover (2), cover (4) and the harness of the auxiliary 3rd switch (3).

TOWING

⚠ WARNING

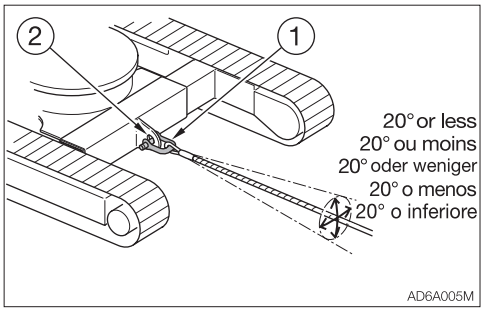
When towing, serious injury or death could result, if performed incorrectly or the wire rope being used is inappropriate or not properly inspected.

- **It becomes dangerous if the wire rope breaks or becomes disengaged. Use a wire rope appropriate for the required tractive force.**
- **Do not use a wire rope that is kinked, twisted or otherwise damaged.**
- **Do not apply heavy loads abruptly to the wire rope.**
- **Wear safety gloves when handling the wire rope.**
- **Make sure there is an operator on the machine being towed as well as on the machine that is towing.**
- **Never tow on slopes.**
- **Do not let anyone come near to the wire rope while towing.**

IMPORTANT: Do not tow a machine if its engine does not start or if the machine does not run. Doing so could damage the machine being towed.
IMPORTANT: Be sure to follow the steps below closely when using the towing hole to tow. Failure to heed even one of the steps may cause damage to the towing hole or other parts of the frame.

Towing the machine

Use the procedure described below to tow heavy objects or the machine itself if it should get stuck in the mud and not be able to get out on its own.



- Permissible forces: 23.2 kN (5208 lbf)

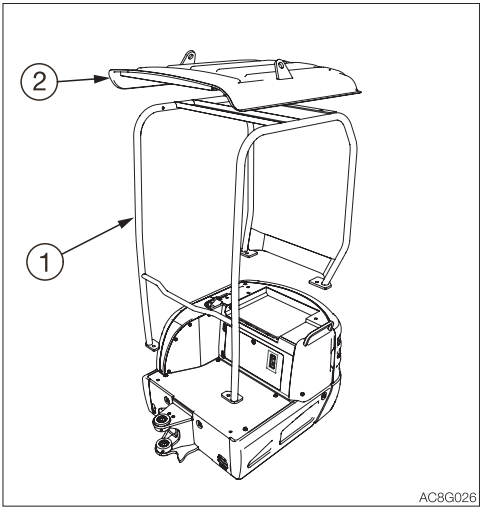
1. Attach the wire rope to the shackle (1).
2. Fasten the shackle (1) to the towing holes (2).
3. Make sure that the wire rope is at a cone angle of 20° or less to the travel frame.
4. Move the machine to tension the wire rope.
5. Move the machine at a low speed of 2 km/h (1.24 mph) or less to a place (convenient location for repair) a short distance from the site.

IF THE CAB OR CANOPY IS DAMAGED

⚠ WARNING

Immediately replace the damaged cab or canopy. Serious injury or death may occur if the machine is operated with damaged cab/canopy.
Do not operate the machine until the replacement is complete. Do not try to repair the damaged cab or canopy by welding. Doing so could endanger the safety of the cab/canopy.

Canopy parts No.(1): 03384-00031
Canopy parts No.(2): 03384-00039



SPECIFICATIONS

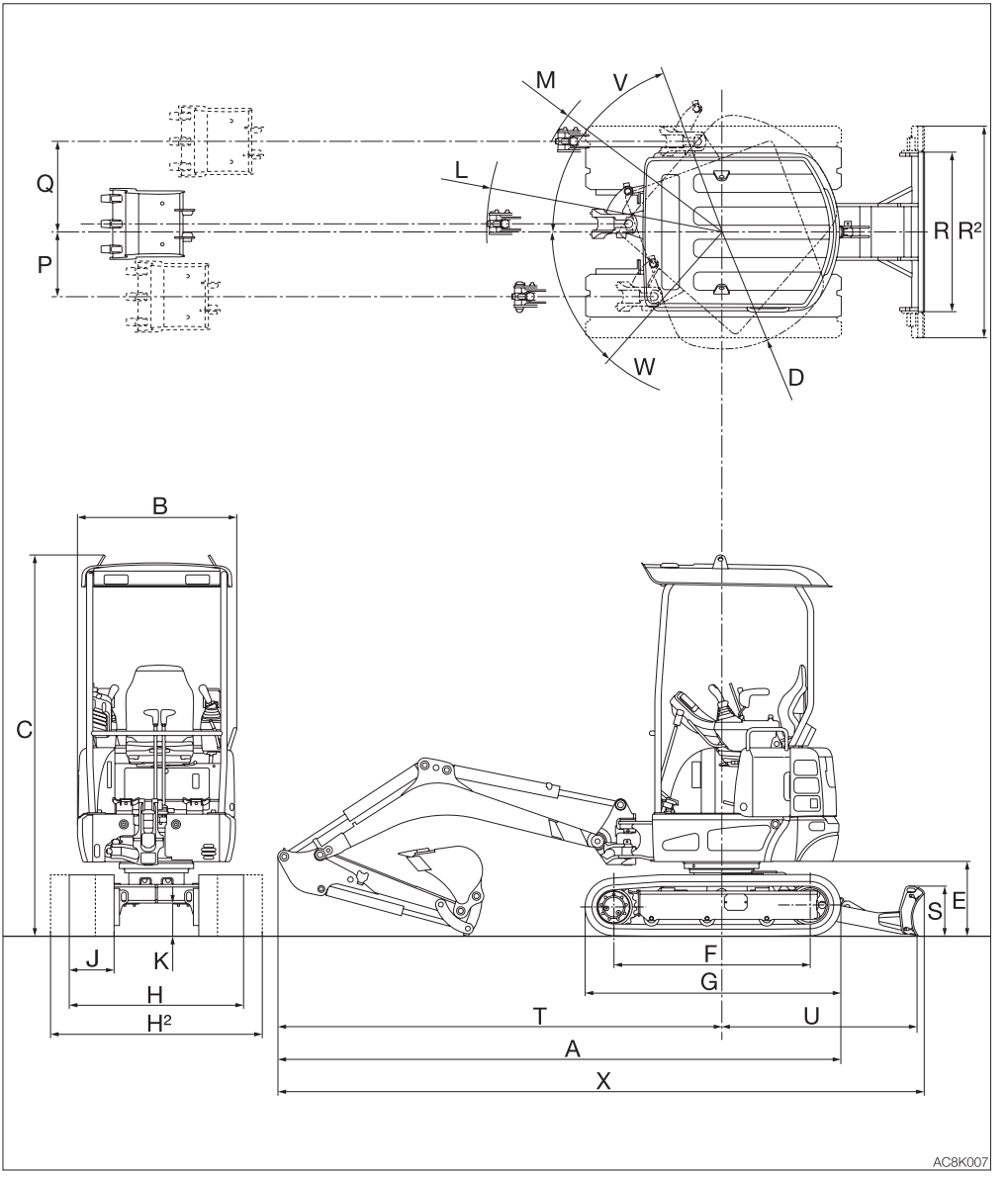
BASIC SPECIFICATIONS

Type				Canopy
MASS				
Operating mass	kg (lb)	Rubber crawlers		1610 (3550)
PERFORMANCE				
Bucket capacity (Standard bucket)	m^3 (cu. ft.)	Heaped		0.038 (1.34)
		Struck		0.028 (0.99)
Slew speed	min^{-1} (rpm)			9.2 (9.2)
Travel speed	km/h (mph)	Rubber crawlers	1st	2.2 (1.37)
			2nd	4.2 (2.61)
Gradeability	(degrees)			15
Ground pressure	kPa (psi)	Rubber crawlers		26 (3.77)
Noise level	dB (A)	Sound power level		L_{WA} 93
		Emission sound pressure level at the operator's position (ISO 6396, 2008:)		L_{pA} 80
ENGINE				
Manufacturer and model				Yanmar 3TNV70-PTB1R
Rated output		Net (ISO 14396) kW/min^{-1} (hp/rpm)		11.5/2400 (15.4/2400)
		Net (ISO 9249/SAEJ 1349) kW/min^{-1} (hp/rpm)		11.0/2400 (14.6/2400)
Displacement	ml (cu.in.)			854 (52.1)
Amount of CO^2 emission*	g/kWh			995
Starter	V-kW			12-1.0
Alternator	V-kW			12-0.48
Battery (IEC 60095-1)	V-A·h			12-48

*: The amount of CO^2 emission refers to the value obtained by testing the parent engine representing the engine type (engine family member) being used; it shall not guarantee the performance of the machine.

MEMO

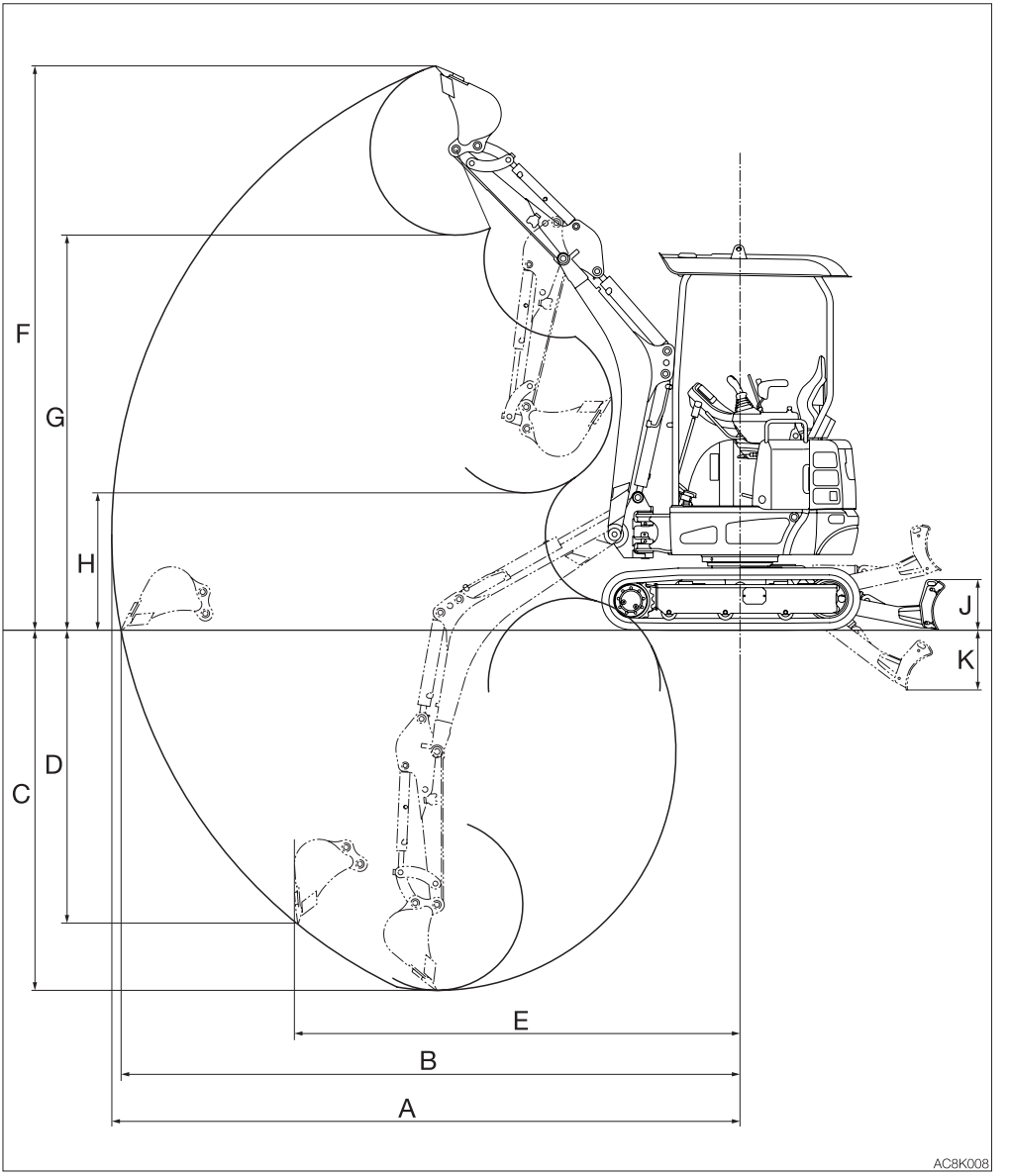
MACHINE DIMENSIONS



Unit: mm (inch)

	Item	Rubber crawlers
A	Overall length	3455 (136)
B	Upperstructure overall width	980 (38.5)
C	Overall height	2345 (92.2)
D	Slew radius	720 (28.3)
E	Clearance height under upperstructure	460 (18.1)
F	Crawler base	1205 (47.4)
G	Crawler overall length	1570 (61.8)
H	Crawler overall width (narrow)	980 (38.6)
H[2]	Crawler overall width (wide)	1300 (51.2)
J	Crawler shoe width	230 (9.1)
K	Ground clearance of undercarriage	205 (8.0)
L	Minimum radius of equipment and attachment	1450 (57.0)
M	Minimum radius of equipment at maximum front offset	1185 (46.7)
P	Offset distance of bucket (right swing)	395 (15.6)
Q	Offset distance of bucket (left swing)	555 (21.9)
R	Dozer blade width (narrow)	980 (38.6)
R[2]	Dozer blade width (wide)	1300 (51.2)
S	Dozer blade height	310 (12.2)
T	Front distance to axis of rotation	2725 (107.3)
U	Dozer blade distance to axis of rotation	1200 (47.2)
V	Boom swing angle (Left)	70°
W	Boom swing angle (Right)	50°
X	Overall length (dozer blade at rear)	3970 (156.3)

OPERATING RANGES



Unit: mm (inch)

	Item	Rubber crawlers
A	Maximum reach	3815 (150.2)
B	Maximum reach at ground reference plane	3760 (148.0)
C	Maximum digging depth	2190 (86.2)
D	Maximum vertical digging depth	1780 (70.1)
E	Reach at maximum vertical digging depth	2705 (106.5)
F	Maximum height of cutting edge	3430 (135.1)
G	Maximum dumping height	2400 (94.6)
H	Minimum dumping height	835 (32.9)
J	Dozer blade maximum lifting	360 (14.2)
K	Dozer blade maximum lowering	365 (14.4)

MEMO

LIFTING CAPACITIES

Rated lift capacity chart

- The loads in the charts do not exceed 87% of hydraulic lift capacity or 75% of tipping load.
- Figures marked with an asterisk (*) are hydraulically-limited capacities.
- The mass of slings and any other lifting devices shall be deducted from the rated load to determine the net load that may be lifted.
- The load point is the bucket hinge pin, and the bucket posture is with the standard bucket completely retracted under the arm.
- Unit: daN (lbs)

Load hooking system

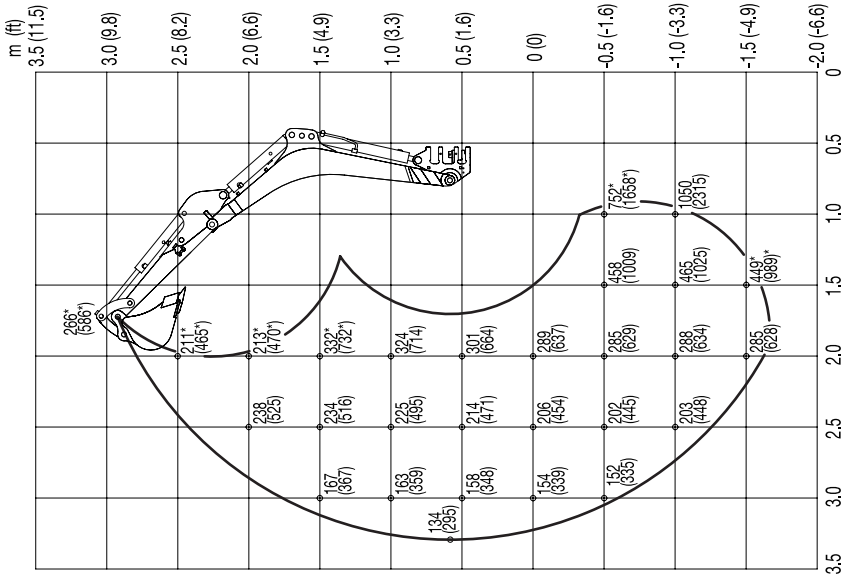
A load hooking system must be provided with the following capabilities.

1. A system which can withstand two-and-a-half times the rated lift capacity no matter at what position the load is applied.
2. A system that poses no risk of the lifted load falling from the hooking device. For example, equipped with a hook slippage prevention device.
3. A system that poses no risk of the hooking system slipping from the hoe attachment.

⚠ WARNING

- **Do not attempt to lift or hold any load that is greater than these rated values at their specified load radii and height.**
- **The rated lift capacities are based on the machine being level and situated on a firm supporting surface. For safe lifting, the operator is expected to make due allowance for the particular job conditions such as soft or uneven ground, non-level condition, side loads, hazardous conditions, experience of personnel, etc. The operator and other personnel should fully acquaint themselves with the operator's manual furnished by the manufacturer before operating this machine. When operating the machine, the safety rules of the equipment must also be followed.**
- **Do not travel while lifting a load; It is very dangerous.**

Over Front ; Dozer Blade Up



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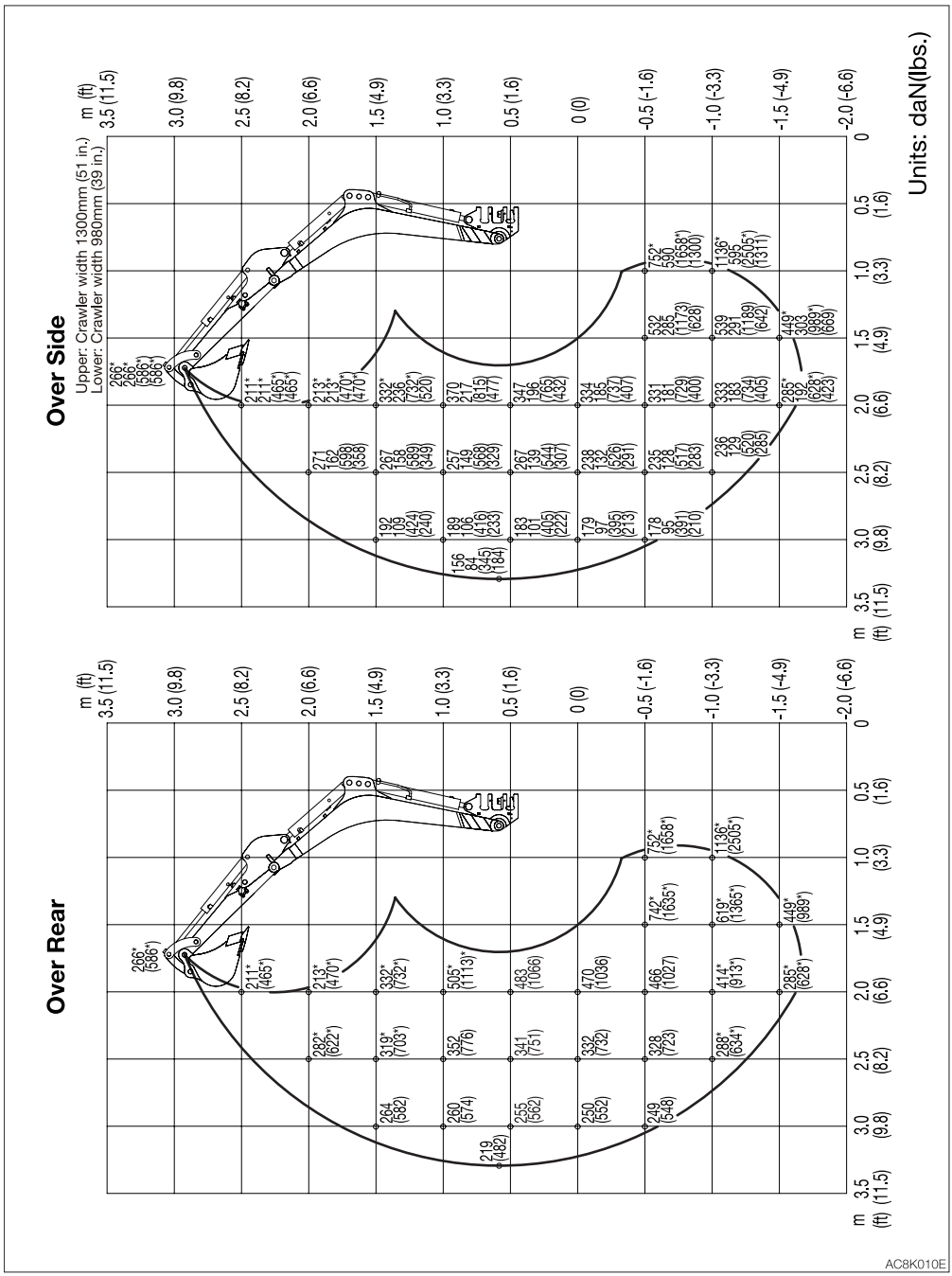

Over Rear
Over Side
Upper: Crawler width 1300mm (51 in.)
Lower: Crawler width 980mm (39 in.)
m (ft)
3.5 (11.5)
3.0 (9.8)
2.5 (8.2)
2.0 (6.6)
1.5 (4.9)
1.0 (3.3)
0.5 (1.6)
0 (0)
-0.5 (-1.6)
-1.0 (-3.3)
-1.5 (-4.9)
-2.0 (-6.6)
Units: daN(lbs.)
AC8K010E

OPTIONS

GENERAL PRECAUTIONS

SAFETY PRECAUTIONS

⚠ WARNING

When removing or installing an attachment or optional part, take the following precautions.

- Consult with Takeuchi before installing an optional attachment.
- Do not use any attachments not approved by Takeuchi. Doing so may cause safety problems. Or, it may adversely affect the machine's operation or service life.
- We will not be held responsible for any injuries, accidents or damage to its products caused by the use by a non-approved attachment.
- Select a firm, level work area. Also, be sure to park in a well ventilated place.
- Clear obstacles and dangerous objects, and clean up spilled fuel immediately.
- When hoisting, be sure to designate a person to act as a signalman. Follow the instructions of the signalman regarding the procedure and measures.
- When it is necessary to temporally place a heavy object or an attachment on the ground during removal or installation, be sure to place it in a stable position.
- Keep everyone out of the area when hoisting. There is a hazard of objects falling or contacting with people in the area.
- Use a crane to move heavy objects (25 kg (55 lb.) or greater).
- Before removing a heavy object, be sure to put a support to it. When lifting with a crane, pay attention to the center of gravity of the load to keep the machine in balance.
- Do not operate the machine while the load is lifted by a crane stand.
- Use the proper procedure when mounting a boom or arm; otherwise serious damage could result. Consult your sales or service dealer for help.

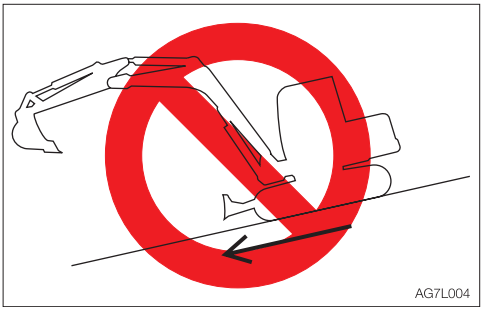
CAUTIONS WHEN INSTALLING ATTACHMENTS

Be sure to perform a test operation after an optional or other special attachment has been replaced. Inspect the hydraulic oil level and recharge it as necessary. Consult your sales or service dealer for detailed procedures on installing/removing attachments.

CAUTIONS WHEN OPERATING ATTACHMENTS

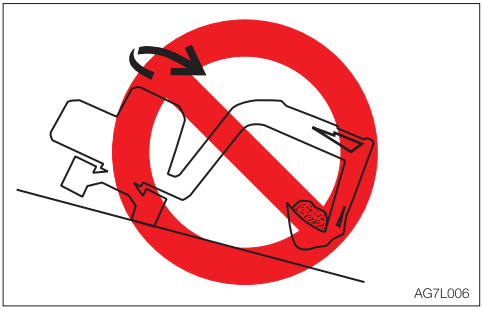
⚠ WARNING

Long attachments reduce stability of the machine. The machine may tip over if it loses the balance when traveling or slewing on slopes.
Never perform the operations listed below as they are extremely dangerous.



- Traveling down the slopes with the attachment raised

- Traveling across slopes



- Slewing on slopes
- If there is a heavy attachment is installed, the machine takes longer distance than usual to come to a complete stop when the stopping operation is performed. Carefully judge the distance so as not to bump into an object around the machine. Keep a safe distance from surrounding obstacles. When a heavy attachment is installed, natural drop (the gradual dropping of the attachment under its own weight when it is stopped in midair) increases.
- The machine can tip over more easily in the lateral direction than in the longitudinal direction.
  - Do not slew sideways with a heavy load at the how attachment. In particular, do not slew sideways on slopes.
  - The attachment is heavier for machines equipped with breakers or crushers than for machines equipped with the standard bucket. Do not operate such machines sideways, especially digging downhill.

ATTACHMENT COMBINATION TABLE

The table below shows which bucket should be installed when the machine is using a standard arm or long arm. Select a proper bucket by following the table.

⚠ WARNING

- **Consult with Takeuchi before installing an optional attachment.**
- **Do not use any attachments not approved by Takeuchi. Doing so may cause safety problems. Or, it may adversely affect the machine's operation or service life.**

√ :Can be used.
Δ :Can be used only for light operations (digging and loading of dry and loose soil or mud)
— :Cannot be used.

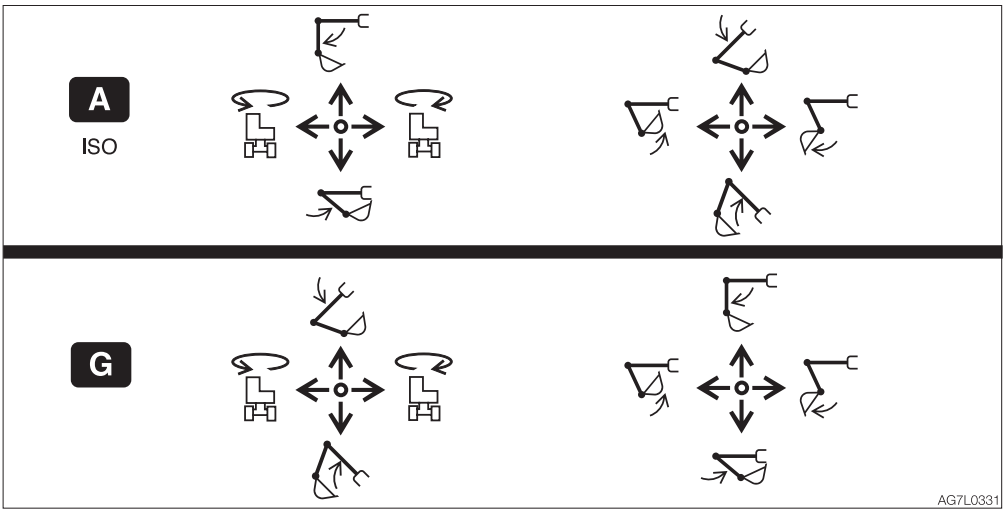
Bucket	Rated capacity m^3 (cu. yd.)	Bucket cutting width mm (inch)	Standard arm 930mm (37 in.)
260W	0.020 (0.026)	265 (10.4)	√
350W	0.027 (0.035)	335 (13.2)	√
450W (Standard)	0.038 (0.049)	435 (17.1)	√
500W	0.043 (0.056)	485 (19.1)	√
3-hole bucket	0.049 (0.064)	457 (18.0)	—
Total bucket mass =Within 116 kg (255 lb.)		Within 485 (19.1)	√
Hydraulic Breaker (TKB-72)			√

SELECTING A LEVER PATTERN (A-G)

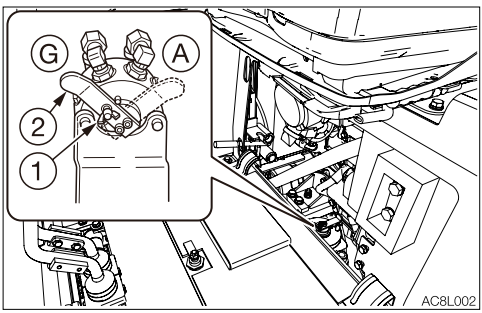
The operating pattern of the left and right operating levers can be changed.

⚠ WARNING

Before starting the engine, check the selector to see which operating pattern the left and right operating levers are set.



SWITCHING THE LEVER PATTERN



(A) : ISO pattern
(G) : G pattern

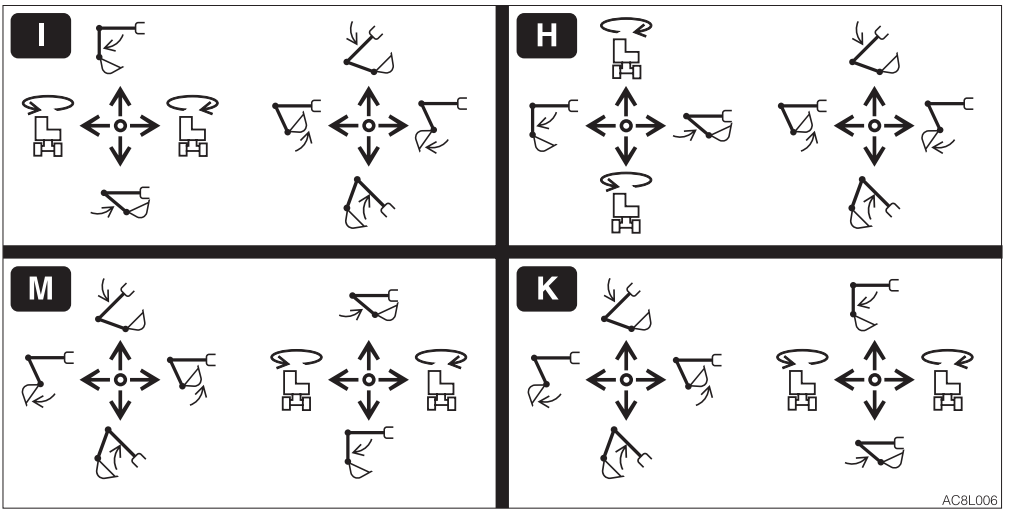
1. Park the machine on a flat and rigid ground, and stop the engine.
2. Open the maintenance cover A.
3. Loosen the wing bolt (1).
4. Turn the selector valve lever (2) to switch the pattern.
5. Tighten the wing bolt (1) and fasten the lever (2) in place.
6. Close the maintenance cover A.
7. Confirm the lever pattern.

SELECTING A LEVER PATTERN (I-H-M-K)

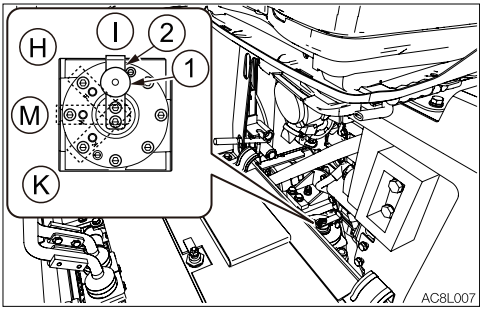
The operating pattern of the left and right operating levers can be changed.

⚠ WARNING

Before starting the engine, check the selector to see which operating pattern the left and right operating levers are set.



SWITCHING THE LEVER PATTERN



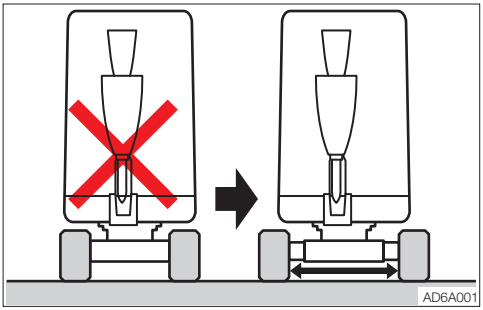
(I) : I pattern
(H) : H pattern
(M) : M pattern
(K) : K pattern

1. Park the machine on a flat and rigid ground, and stop the engine.
2. Open the maintenance cover A.
3. Pull out the knob (1).
4. Turn the selector valve lever (2) to switch the pattern.
5. Tighten the wing bolt (1) and fasten the lever (2) in place.
6. Close the maintenance cover A.
7. Confirm the lever pattern.

HYDRAULIC BREAKER

For handling of the breaker, read the hydraulic breaker's manual, provided separately.

⚠ WARNING



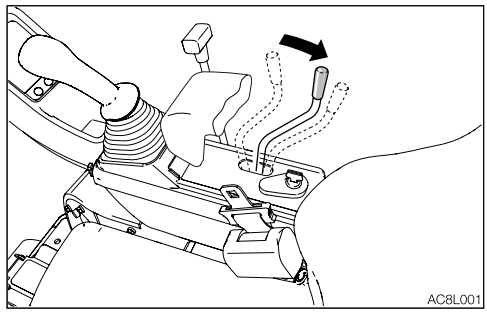
Do not use the breaker when the crawler width is narrowed!

- **Always operate the machine with the crawler width extended to 1300 mm (51.2 in.) to maximize the machine stability. If the machine is operated with the crawler width narrowed (980 mm, 38.6 in.), the machine may tip over due to its poor stability.**
- **If the machine must be operated with the narrowed crawler width (980 mm, 38.6 in.), traveling should be done after folding the hoe attachment, lowering the boom to lower the center of gravity and keeping the machine facing forward.**

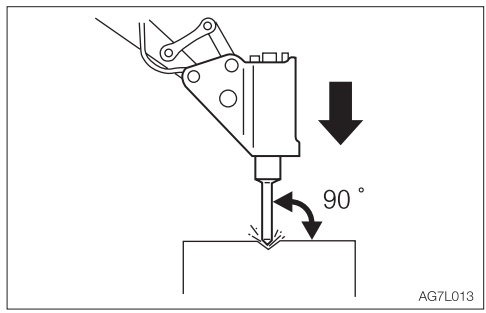
When an optional attachment, such as a breaker, tilted bucket or clamshell, is operated, be sure that the crawler width is extended to 1300 mm (51.2 in.).

IMPORTANT: When installing an attachment, make sure that it is appropriate for the machine being used. Contact your sales or service dealer for advice on selecting attachments.

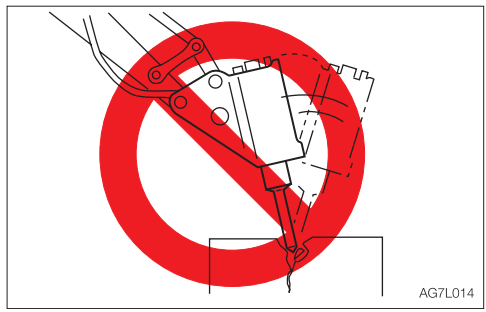
Cautions on operating



- Start the engine and run it at 75% of the maximum speed.

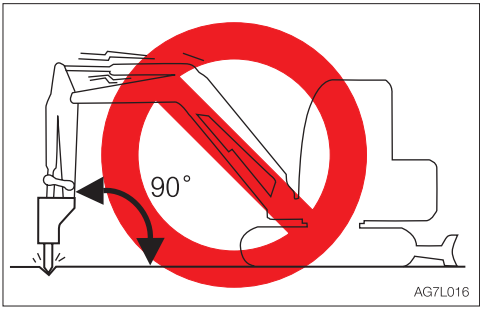


- Pound with the chisel pressed perpendicular to the surface to be pounded.
- When pounding, press the chisel properly against the object to be broken so as to avoid pounding the air.

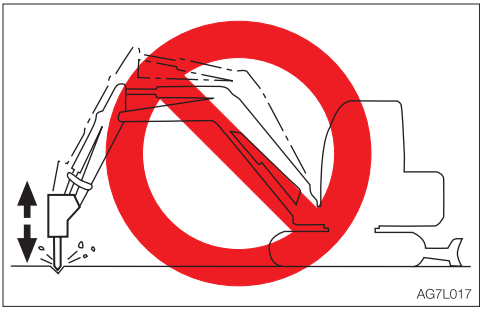


- Do not pry with the chisel or do not pry while pounding.
- Do not move the chisel while pounding.
- Do not pound continuously for over 30 seconds on the same surface.

- Do not pound with the cylinder fully extended or retracted (at the stroke end). Leave a margin of at least 50mm(2 in).



- Do not pound with the arm placed perpendicular to the ground surface.



- Do not drop the breaker itself on the object to be broken in order to break it.
- Do not move objects to be broken or rocks with the breaker itself.
- Slew the machine occasionally to cool the engine.
- If a hydraulic hose is vibrating abnormally, nitrogen gas may be leaking from the accumulator. Ask for an inspection early.

REPLACING THE HYDRAULIC OIL REGULARLY

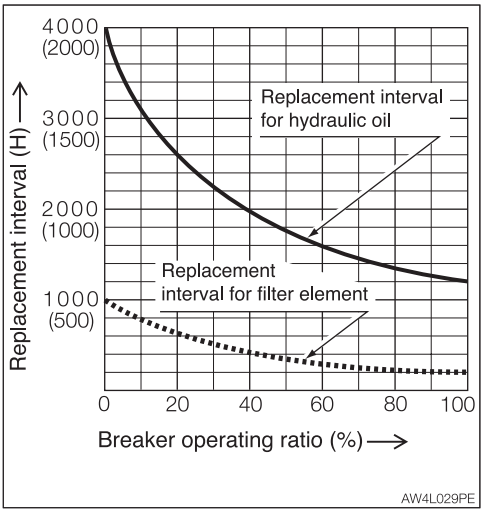
When a hydraulic breaker is used, the oil deteriorates more quickly than that used for a usual operation. Be sure to replace the hydraulic oil and the return filter elements.

- Failure to replace these in time can lead to damage to the machine and the breaker hydraulic system. To improve the service life of the hydraulic systems, be sure to replace the hydraulic oil and return filter element after the number of hours shown on the diagram below.
- When replacing the hydraulic oil, clean the suction strainer.

Replacement interval (hours)

Item	Hydraulic oil	Filter element
1st time	—	25
2nd time	—	100
Periodically	1200 (600)	200

When the breaker operating ratio is 100%.



( ): When using conventional antiwear hydraulic oil.

BIODEGRADABLE OIL

Biodegradable oil is a new type of hydraulic oil that is decomposed into carbon dioxide and water by microorganisms in the soil and water. It is highly safe for living organisms and offers advantages in term of environmental protection.

- Recommended biodegradable oil: Mobile EAL Envirosyn 46H (an ester synthetic oil). When replacing the hydraulic oil with biodegradable oil, use the above or an equivalent oil.
  Note that other oils, even other brands of ester synthetic oils, may damage O-rings, packings and seals. Takeuchi products shipped with the optional biodegradable oil are shipped with the above brand of oil.
- When switching from a mineral oil to a biodegradable oil, the parking brake torque decreases by about 30%.

REPLACING THE HYDRAULIC OIL WITH BIODEGRADABLE OIL

Mixing mineral oil with biodegradable oil will result in a decrease of the hydraulic oil's performance as well as a decrease in biodegradability and safety. The hydraulic oil system must be flushed as described below before supplying the biodegradable oil. This operation is dangerous and requires experience. Have it performed by a Takeuchi sales or service outlet.

Flushing

To be performed by a Takeuchi sales or service outlet

1. Drain the hydraulic oil (mineral oil) from the hydraulic oil tank and clean the inside of the tank and suction strainer.
   Refer to "Replacing the hydraulic oil and cleaning the suction strainer" on page 5-46.
2. Remove the cylinder hoses and drain the hydraulic oil (mineral oil) from inside the cylinders.
3. Supply new biodegradable oil to the hydraulic oil tank.
4. Bleed the air from the hydraulic oil system.
5. Operate the hydraulic devices for 30 minutes.
6. Drain the biodegradable oil from the tank and cylinders.
7. Replace the hydraulic oil return filter with a new filter.
8. Repeat steps 3 and 4.
9. Operate the hydraulic devices for 30 minutes.
10. Drain the biodegradable oil from the tank and cylinders.
11. Repeat steps 3 and 4.
12. Operate the hydraulic devices for 1 hour.
13. Drain the biodegradable oil from the tank and cylinders.
14. Replace the return filter with a new filter.
15. Repeat steps 3 and 4.
16. Operate the hydraulic devices, then check for oil leakage.

There is no need to flush the hydraulic oil system when switching from biodegradable to mineral hydraulic oil.

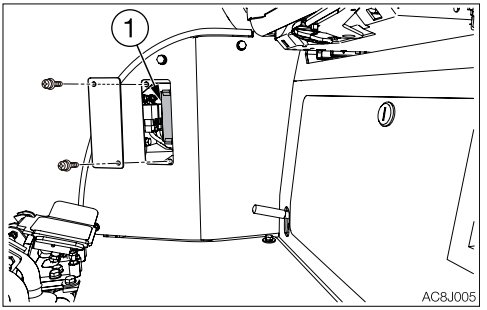
TRAVEL ALARM

The alarm sounds while the machine is traveling and stops when the machine stops traveling.
If the alarm does not sound when the machine travels, the fuse may be blown. Inspect the fuses.

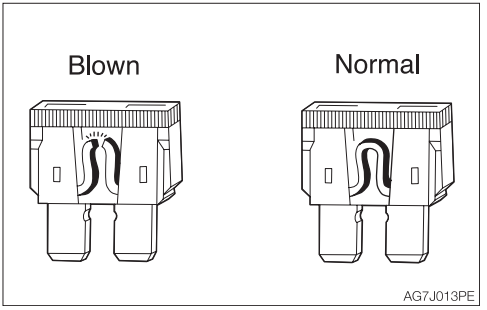
⚠ WARNING

If the fuse blows again soon after replacement, then the electric system is likely faulty. It may pose a fire hazard if not properly repaired. Contact your sales or service dealer for advice.

1. Turn the starter key to the OFF position to stop the engine.
2. Open the maintenance cover B.



3. Open the fuse box cover (1).
4. Check for fuse.



5. If a fuse is blown, replace it with a spare fuse of the same capacity.

Fuse layout and circuits protected

Capacity	Symbol	Protected circuit
25A		Starter switch
10A	AUX3	Third auxiliary hydraulic
5A		Lever lock
15A		Light
15A		Feed pump
15A	OPT	Option, **Travel alarm**
10A		Horn
15A		Instrument cluster

LOAD SAFETY DEVICE

The load safety devices include an emergency shut-off valve and an overload warning device. The emergency shut-off valve prevents the boom or arm from falling. The overload warning device sounds an alarm when an excessive load is detected.

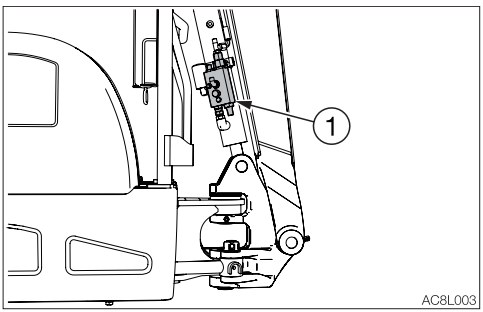
EMERGENCY SHUT-OFF VALVE

If the boom or arm cylinder hose for lifting is ruptured, the emergency shut-off valve is activated to prevent the boom or arm from falling rapidly.

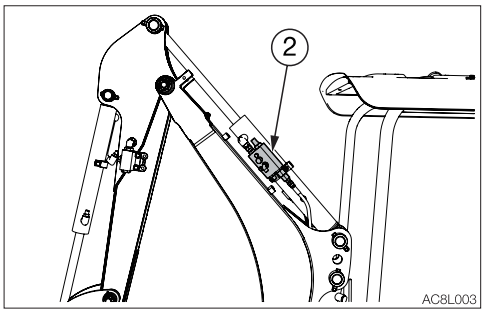
⚠ WARNING

- **If the boom or arm falls and the emergency shut-off valve is activated, immediately move away from the load being lifted.**
- **Since the emergency shut-off valve (1) and (2) is a safety device, you must not disassemble it and/or replace or adjust its internal part. Takeuchi shall not be held responsible for any injuries, accidents or product malfunction caused by disassembly.**

Boom



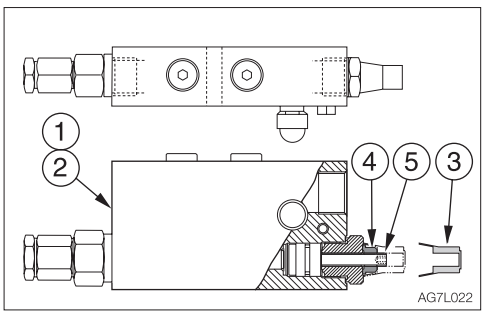
Arm



If the emergency shut-off valve (1) or (2) is activated, immediately set the operating levers to the neutral position. Do not move the operating lever to the boom or arm lowering side. Ask your sales or service dealer for repair.

If the engine can be started without problems, the boom or arm can be lowered with the operating lever. Slowly lower the boom or arm while ensuring safety.

If the engine fails to start, lower the boom or arm by performing the following steps.



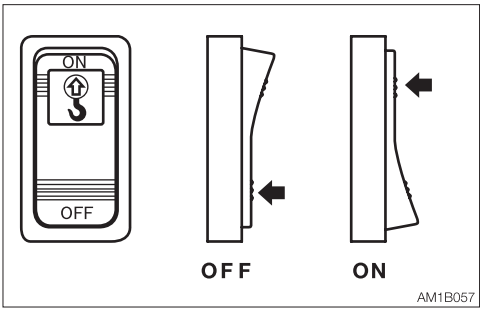
1. Check that the load being lifted and the machine are secure and the work area is safe.
2. Remove the cap (3).
3. Loosen the lock nut (4).
4. Tighten the stem (5) slowly to lower the boom or arm.
5. Check that the load and the hoe attachment are secure.
6. Loosen the stem (5) and secure it with the lock nut (4).

OVERLOAD WARNING DEVICE

If a weight greater than the lifting capacity is applied or lifted, the overload warning device is activated and the horn sounds. (When the lift overload warning switch is turned on.)

⚠ WARNING

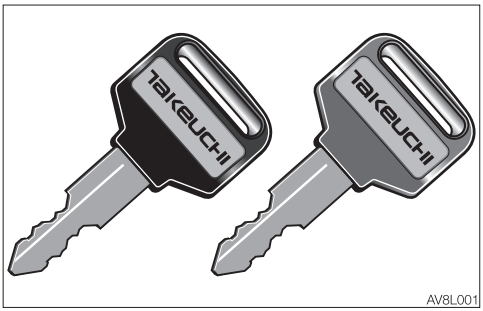
If the overload is not removed after the overload warning horn is sounded, the machine may tip over or the emergency shut-off valve may be activated. If the horn starts sounding, stop operating the machine and lighten the load.



TAKEUCHI SECURITY SYSTEM

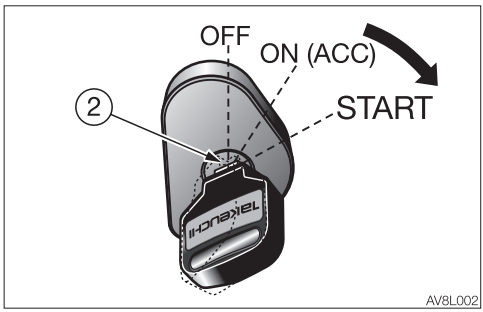
The Takeuchi Security System is a system that allows only registered starter keys to be used for starting the engine.
The engine cannot be started with any unregistered or counterfeit starter keys. If a registered starter key is lost or stolen, you can set the system to delete the registered key information, so that the lost or stolen key cannot be used to start the engine. Although machine theft cannot be completely prevented, the system certainly helps reduce the risk of theft.

STARTER KEY



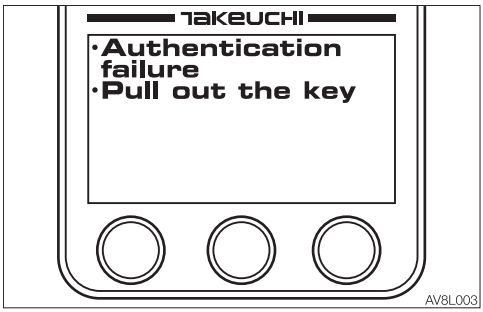
There are two types of starter key, red and black, which can be registered in the Takeuchi Security System.
The red key is the master key. The black key is the starting key.

STARTING THE ENGINE



The engine can be started using the normal method with a registered BLACK key.
The engine cannot be started using the RED master key.
Refer to Chapter 3, “Starting and stopping the engine”.

If an attempt is made to start the engine with an unregistered key:



If an unregistered starter key is turned from the OFF to the ON (ACC) position, the message “Authentication failure” appears and the alarm starts sounding.
If this attempt is repeated five times in a row, the horn sounds for two minutes, and the engine cannot be started. The horn stops when the key is turned to the OFF position.

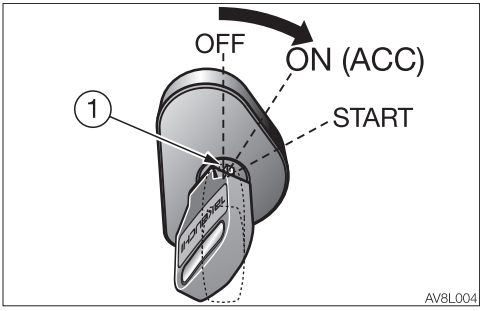
REGISTERING AND DELETING THE STARTER KEY

⚠ WARNING

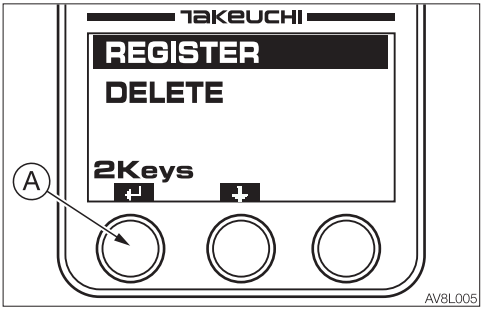
- **Sit on the operator's seat.**
- **Raise the safety lock lever to the locked position.**
- **Clear all people from the machine and the area.**
- **Sound the horn to warn people around the machine.**

Registration may fail if the starter key is on a keyring or keychain; remove it before starting registration.
A malfunction could occur if multiple starter keys are brought near to the key cylinder. Be sure that no starter keys other than the correct key are near the key cylinder during registration.

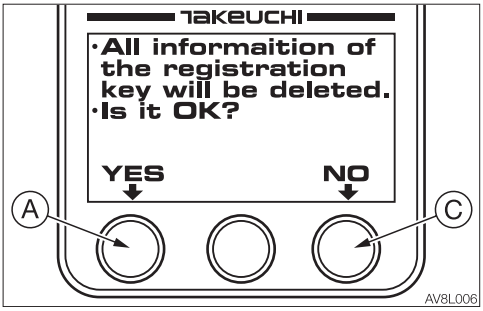
Starter key registration procedure
For Steps 1 to 6 below, complete each step and proceed to the next one within five minutes. If no operation is performed for five minutes during this procedure, the system returns to the initial state.
From Step 7 onward, the system automatically ends the operation if no operation is performed for five minutes.



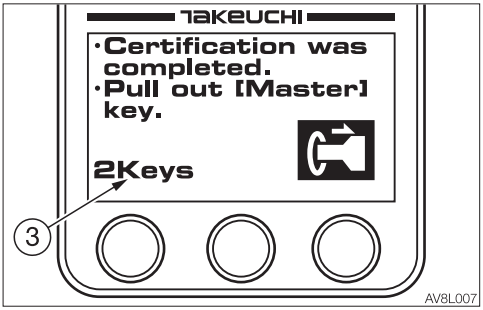
1. Insert the master key (1) into the starter switch and turn the key from the OFF to the ON (ACC) position.

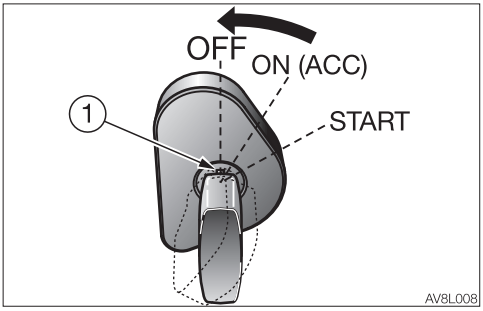


2. On the LCD, select “REGISTER” and press (A).

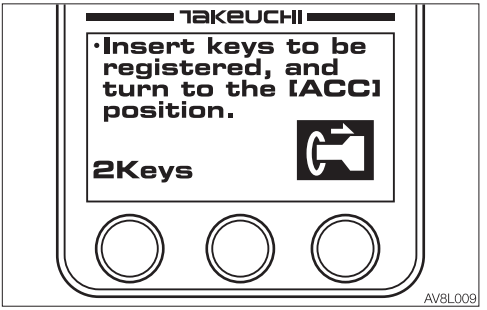


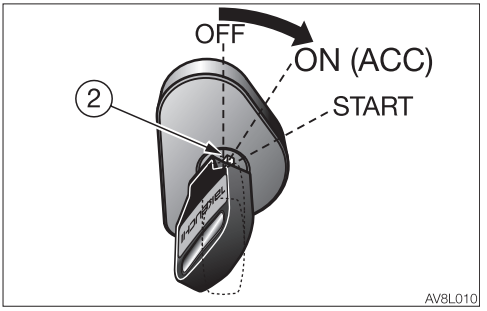
3. Select whether to delete all of the existing registration information.
   YES (A): All registration information will be deleted; register a new key.
   NO (C): A new starter key registration will be added to the existing registration information.
   Do not remove the master key (1) before making a selection, otherwise registration could fail.



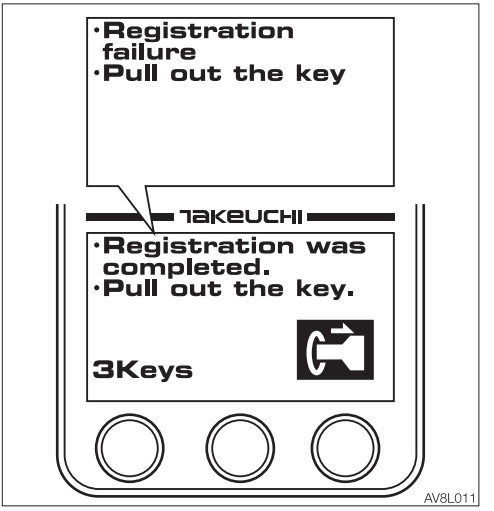


4. When the message “Certification was completed” appears on the LCD, turn the master key (1) from the ON (ACC) to the OFF position, and then remove it from the starter switch.
   The number (3) in the lower left indicates the number of starter keys currently registered. Up to 13 starter keys can be registered.

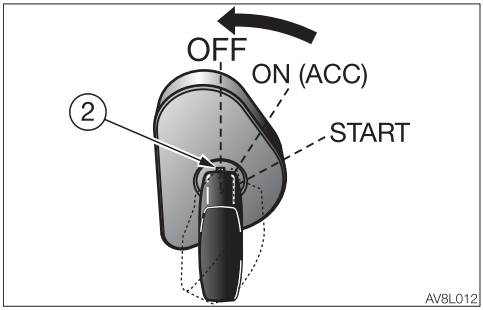


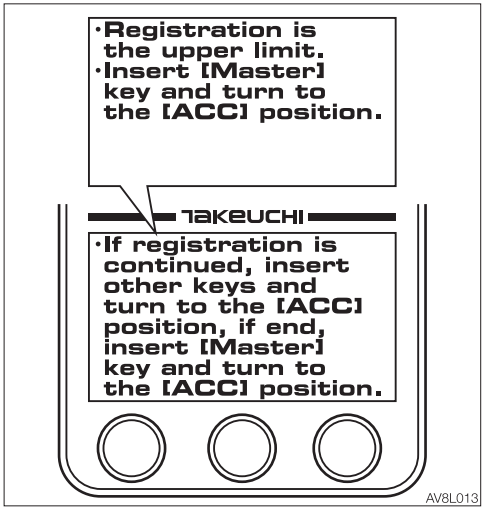


5. Insert the starter key (2) to be registered into the starter switch and turn the key from the OFF to the ON (ACC) position.

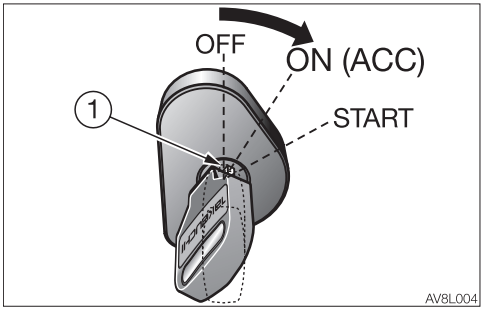


6. If the registration was successfully completed, the message “Registration was completed” appears. This means that the starter key (2) currently inserted has been registered.
   If the registration fails, the message “Registration failure” appears.

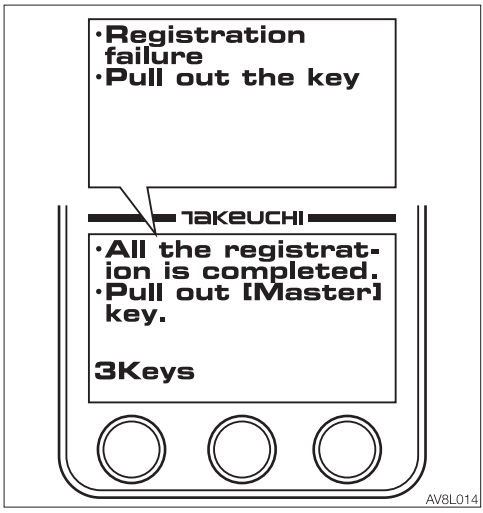




7. Turn the starter key (2) from the ON (ACC) to the OFF position, and then remove it from the starter switch.
   To continue registration, repeat the steps from Step 5.
   To end registration, proceed to Step 8.

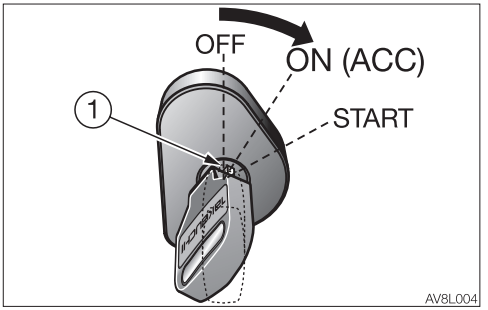


8. Insert the master key (1) into the starter switch and turn the key from the OFF to the ON (ACC) position. Or, wait for five minutes or more.

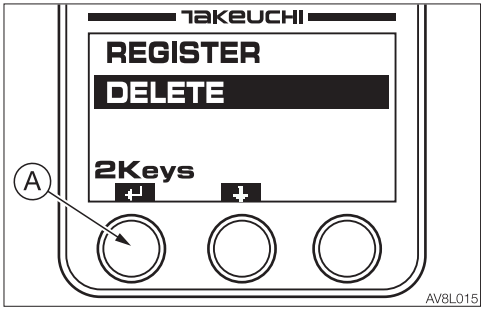


9. If any starter key has been registered, the message “All the registration is completed” appears. Turn the master key (1) from the ON (ACC) to the OFF position, and then remove it from the starter switch to complete the registration.
   If no starter key has been registered, the message “Registration failure” appears, and the registration information is returned to the initial state.

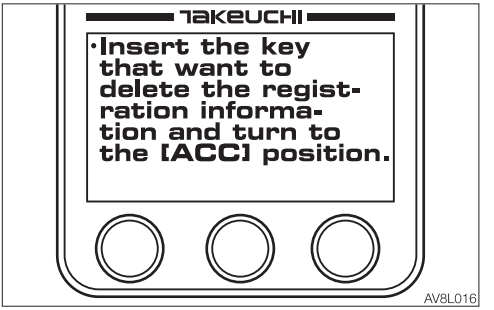
Deleting a registered starter key
The information of each registered starter key can be deleted to cancel its ability to start the engine.

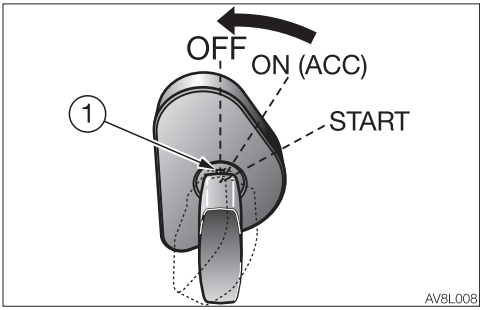


1. Insert the master key (1) into the starter switch and turn the key from the OFF to the ON (ACC) position.

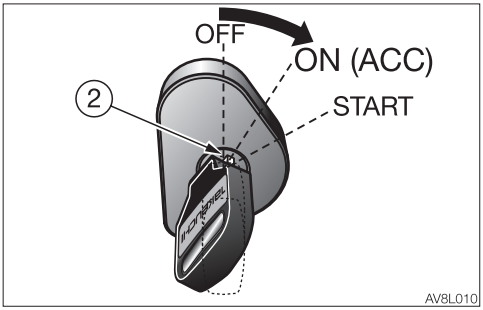


2. On the LCD, select “DELETE” and press (A).

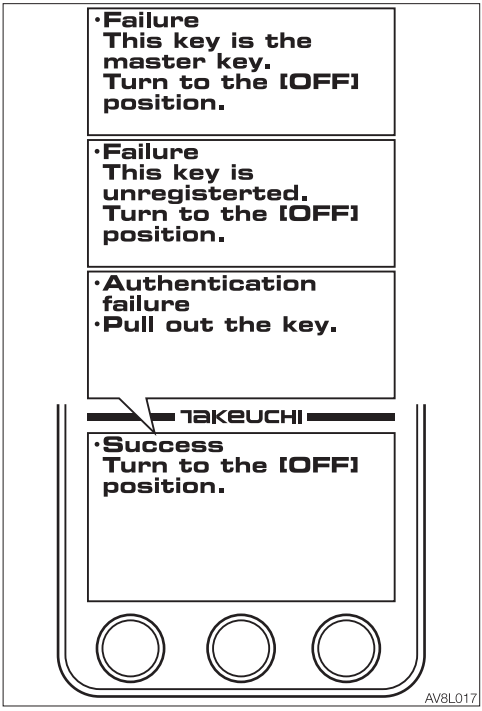




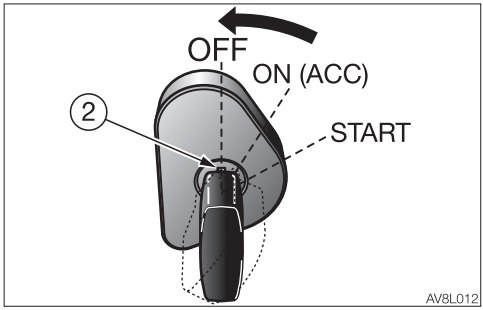
3. When the display shown as the illustration appears on the LCD, turn the master key (1) from the ON (ACC) to the OFF position, and then remove it from the starter switch.
Note: If the registered key is lost and you want to delete all registration information, please refer to STEP 3 (A) on page 8-15.



4. Insert the starter key (2) to be deleted into the starter switch and turn the key from the OFF to the ON (ACC) position.



5. If the deletion is successful, the message “Success” appears. This means that the information registered for the starter key (2) currently inserted has been deleted. If the deletion fails, the message “Failure” or “Authentication failure” appears on the LCD. Remove the starter key, and then repeat the steps from Step 1 again.



6. Turn the starter key (2) from the ON (ACC) to the OFF position, and then remove it from the starter switch.
To continue deletion, repeat the steps from Step 1.

IF THE MASTER KEY IS LOST

If you lose your master key, contact your service or sales dealer for assistance.

COUNTRIES WHERE THE SYSTEM CAN BE USED

To use the Takeuchi Security System, “radio wave authentication” must be obtained in the country where the system is to be used. The system can be used in the countries listed below, as of January 2017. Do not use the system in other countries. For details on how to disable the system, please contact your service or sales dealer for assistance.

Countries where the system can be used:
Ireland, Italy, UK, Estonia, Austria, Holland, Cyprus, Greece, Croatia, Sweden, Spain, Slovakia, Slovenia, Czech, Denmark, Germany, Hungary, Finland, France, Bulgaria, Belgium, Poland, Portugal, Malta, Latvia, Lithuania, Rumania, Luxemburg, Iceland, Norway, Liechtenstein, Switzerland, Turkey

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OPERATOR'S MANUAL

TB215R Mini excavator

Edited and issued by TAKEUCHI MFG. CO., LTD.

Printed in Japan by STATION M Co., Ltd.

ASAHI DENSO

6-2-1 Somejidai, Hamakita-ku, Hamamatsu, Shizuoka 434-0046, Japan

EU DECLARATION of CONFORMITY (DoC)

This declaration of conformity is issued under the sole responsibility of the manufacturer:

Name:	ASAHI DENSO CO.,LTD
Address:	6-2-1 Somejidai, Hamakita-ku, Hamamatsu, Shizuoka, 434-0046 Japan

We declare that the DoC is issued under our sole responsibility and belongs to the following product.

Object of the declaration:

Product Name	Meter panel Immobilizer
Model Name	CZ131,CZ131A
Accessories	N/A

The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

Radio Equipment (RE) Directive (2014/53/EU)

The following harmonized standards and technical specifications have been applied:

Health & Safety (Article 3.1(a)):	EN 60065: 2014
EMC (Article 3.1(b)):	EN 301 489-1 V2.1.1 EN 301 489-3 V2.1.1 (Final draft)
Radio Spectrum (Article 3.2):	EN 300 330 V2.1.1

Japan, Shizuoka	May 29, 2017	Tomohiro Yaguchi
Place of Issue:	Date of Issue:	Tomohiro Yaguchi Section chief Engineering Department

Declaration of Conformity

We herewith declare that following named machine, based on its conception and design and in the form brought into service is in accordance with the relevant, basic safety and health requirements of the following EU directives. In case of any alteration of the machine not coordinated with us, this certificate loses its validity.

Designation of the machine	Compact Excavator
Manufacturer	TAKEUCHI MFG. CO., LTD 205 Uwadaira, Sakaki-machi, Hanishina-gun, Nagano 389-0605, Japan

Model	TB215R
Engine type	3TNV70-PTB1R (e13*2016/1628*2017/656EV2/D*0040*Δ)
Engine power	11.5 kW @ 2400 rpm

The machine is in accordance with the requirements of EU directives:

1) Machine directive 2006/42/EC and appendix
2) Electromagnetic compatibility-regulation 2014/30/EU and appendix
3) Noise directive 2000/14/EC (Evaluation procedure according to appendix VI), 2005/88/EC and appendices.
4) Regulations on engine emissions: Regulation (EU) 2016/1628, as last amended by Regulation 2017/656.

Harmonized norms: EN474-1:2006+A1:2009, EN474-5:2006+A2:2012.

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Issued in Sakaki, Japan
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