

# OPERATOR'S MANUAL

Original instructions

Serial No. 12000010~



Book No.AC9EN006

OENTB20e\_F-XG

**MINI EXCAVATOR**

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**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.

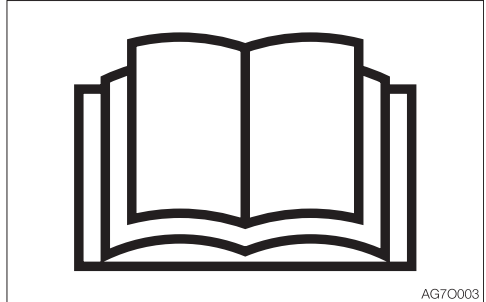
Read and understand the message to avoid personal injury or death.

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

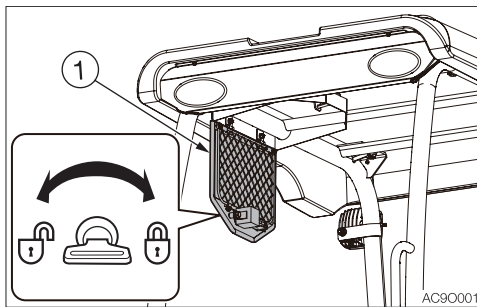
## FOREWORD

This manual describes the safety instructions to be followed when operating the machine. 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.

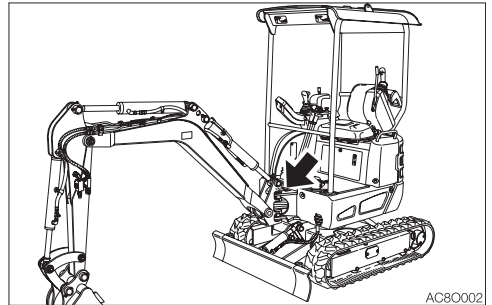


1. Insert the starter key and turn it counterclockwise to open the cover (1).
2. After using the manual, place it in the plastic pouch and store it back in the manual storage compartment.

## SERIAL NUMBERS

**IMPORTANT:** Do not remove the machine name plate with the serial number. Check the serial number of the machine and write it down in the space below.

Machine number: \_\_\_\_\_



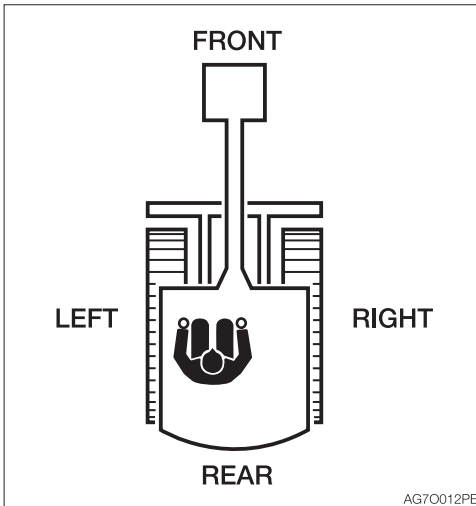
## FIRST-TIME CHARGING

When using the machine for the first time, be sure to fully charge it (until the white or green bar appears).



# 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

## 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 hydraulic oil.
- Avoid heavy loads and rapid operations. Operate with a load of about 80% of 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.

 ,  ..... Prohibited

 ..... Lock

 ..... Unlock

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# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

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## FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

The electric hydraulic excavator is driven by a motor that uses power stored in a lithium ion battery.

**IMPORTANT: Do not disassemble or remove high-voltage parts such as the lithium ion battery, charger or motor.**

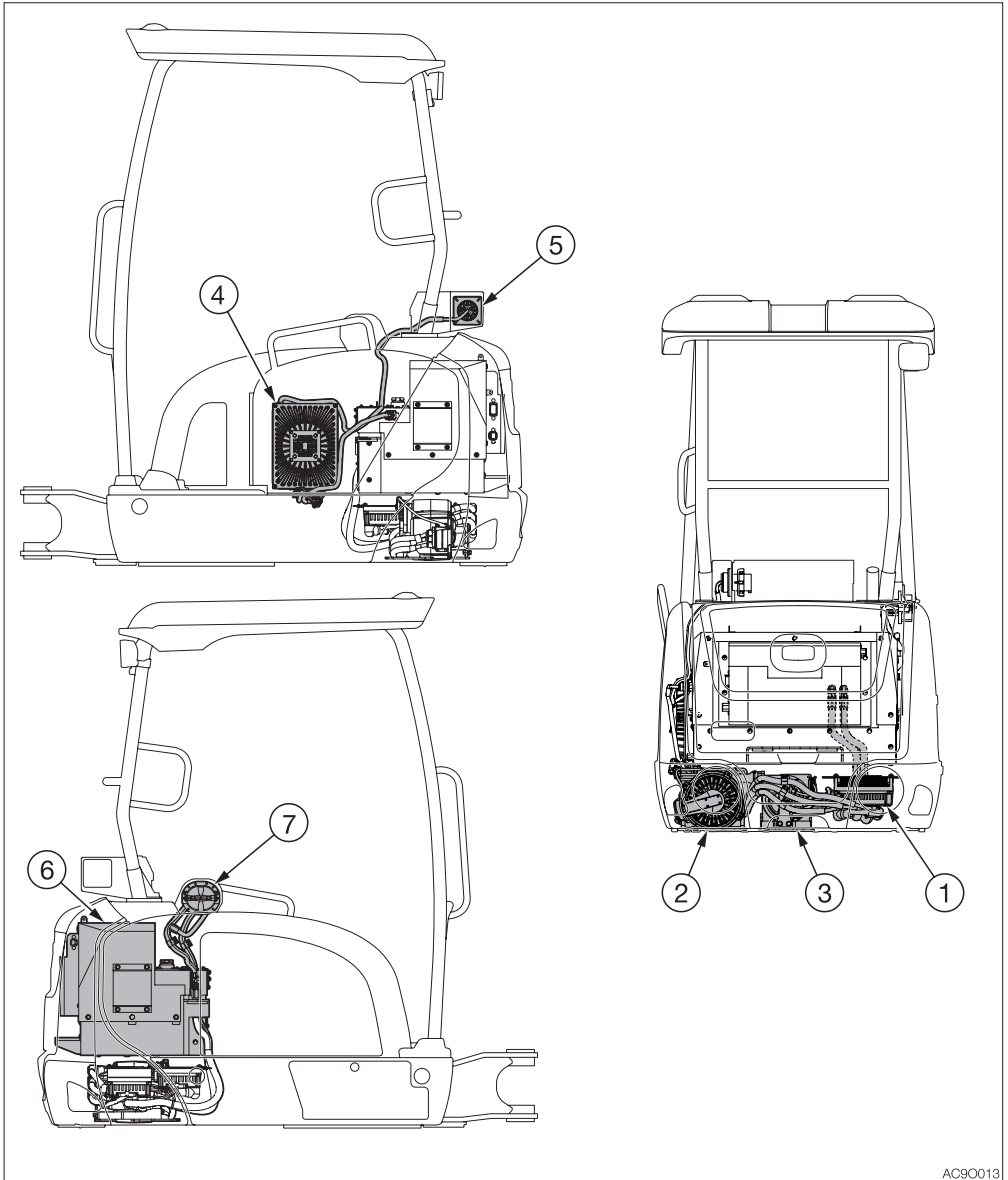
**IMPORTANT: Do not use the charger with the power supply or voltage not designated.**

**Doing so could cause fire or failure.**

**Note:** The capacity (power storage capability) of the lithium ion battery gradually reduces through repeated use. This is an inherent characteristic of the battery and is not a malfunction.

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

## HIGH-VOLTAGE COMPONENT NAMES



AC90013

- 1. Inverter
- 2. Motor (main)
- 3. Motor (sub)
- 4. On-board charger
- 5. On-board charging port
- 6. Lithium ion battery pack

- 7. Off-board charging port

**Note:** Never wash areas near the high-voltage parts with water.

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

## PRECAUTIONS FOR THE ELECTRIC HYDRAULIC EXCAVATOR

Handling precautions for the electric hydraulic excavator

### WARNING

- The machine uses high-voltage direct current (maximum 84 volts); Do not touch the high-voltage cable (orange color cable) or connector, charger, inverter or any other high-voltage parts such as the motor and lithium ion battery. If an electric shock occurs, serious injury could result.

**IMPORTANT:** To prevent damage to the lithium ion battery, observe the following precautions.

- When the machine is not going to be used for a long time, store the lithium ion battery at an ambient temperature of -10 to 30°C, with a state of charge (amount of remaining power) of around 10%.
- Inspect the state of charge of the lithium ion battery once a month. If it is 0%, recharge it to 10%.

**Note:** If the battery is stored at ambient temperature of 45°C (113°F) and over 30% state of charge, it will degrade by 2 to 5% per month.

The electric hydraulic excavator fails

### WARNING

- Never touch the high-voltage parts or cable if it is exposed.
- If there is a leak in the lithium ion battery, immediately contact a Takeuchi sales or service dealer for help. There is a risk of fire.
- Never touch any leaking liquid found inside or outside the operator's compartment. If liquid leaked from the lithium ion battery accidentally comes in contact with the skin or clothes, immediately wash it with clean water such as tap water, and then seek medical attention.
- If a strong impact is felt in the lithium ion battery area at the rear of the machine while operating, park the machine in a safe place and check for any damage. If there is damage in the lithium ion battery area at the rear of the machine, immediately contact a Takeuchi sales or service dealer for help without touching the damaged part.
- If a fire occurs in the lithium ion battery or a high-voltage part, exit the machine as quickly as possible. When extinguishing the fire, be sure to use a fire extinguisher for electrical fires.
- If you cannot ensure the safety of the machine due to the damage caused by an accident or other reasons, leave the machine and then contact a Takeuchi sales or service dealer for help. When contacting, be sure to inform them that the machine is an electric hydraulic excavator.



# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

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- If the repair requires sheet-metal working or coating, be sure to contact a Takeuchi sales or service dealer. In case of damage to the battery pack (lithium ion battery), serious injury could result if the repair is not done by a person qualified to repair the electric hydraulic excavator.
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## CAUTIONS IN USING THE LITHIUM ION BATTERY

Using the lithium ion battery incorrectly could cause electric shock, localized heat generation or heat runaway, resulting in smoke, ignition or explosion. Be sure to observe the following warnings.



### WARNING

- Use a charger supplied by Takeuchi, as well as the correct voltage and current when charging. Refer to “Basic Specifications” on page 7-2.
  - Do not place the machine in a hot place such as close to the fire.
  - Do not pour water or apply excessive force onto the lithium ion battery.
  - Do not disassemble the lithium ion battery.
  - If hot gas is ejected from the lithium ion battery, leave the area; the gas contains toxic component.
  - When extinguishing the fire, use a fire extinguisher for electrical fire.
-

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

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## CAUTIONS IN USING THE CHARGER/ CHARGING CABLE

Using the charger/charging cable incorrectly could damage the charger/charging cable itself and also the lithium ion battery connected, resulting in smoke, explosion or ignition. Be sure to observe the following warnings.



### WARNING

- Observe the specification for the input power supply.  
Refer to “Basic Specifications” on page 7-2.
- Do not use the charger or store it for a long period in a hot place, such as close to the fire.
- Do not pour water or apply excessive force onto the charger itself.
- Do not disassemble the charger.

**IMPORTANT:** The charger or charging cable purchased from Takeuchi or a Takeuchi sales or service dealer is exclusively for the machine. Do not use it for any other purpose than to charge the machine.

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

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## MAKING THE LITHIUM ION BATTERY LAST LONGER

The capacity (power storage capability) of the lithium ion battery gradually reduces as you use it. The life of the lithium ion battery can be prolonged by taking the following precautions.

### When charging

- The life of the lithium ion battery can be prolonged by avoiding unnecessary charging.

### When parking

- Do not store the machine in a place where the outside temperature is extremely high or low. The difference in temperature will accelerate depletion of the lithium ion battery capacity (power storage capability). In midsummer, the lithium ion battery will last longer if the machine is parked in the shade, not in direct sunlight.
- When the machine is not going to be used for a long time, store the lithium ion battery at an ambient temperature of  $-10$  to  $30^{\circ}\text{C}$ , with a state of charge (amount of remaining power) of around 10%.
- Inspect the state of charge of the lithium ion battery once a month. If it is 0%, recharge it to 10%.

**Note:** If the battery is stored at ambient temperature of  $45^{\circ}\text{C}$  ( $113^{\circ}\text{F}$ ) and over 30% state of charge, it will degrade by 2 to 5% per month.

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

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## CHARGING THE LITHIUM ION BATTERY

### Cautions on charging

When charging, be sure to observe the following precautions to prevent a fire or electric shock.



### WARNING

- Persons who use a medical electrical device, such as an implantable pacemaker or an implantable cardioverter defibrillator (ICD), are advised to consult the medical electric device manufacturer about the effect on the medical device before charging.
- Persons who use a medical electrical device, such as an implantable pacemaker or an implantable cardioverter defibrillator (ICD), are advised to keep the implanted portion of the body at least 15 cm away from the charging cable. The radio waves from the charging cable could affect the operation of such medical devices.
- Persons who use a medical electrical device, such as an implantable pacemaker or an implantable cardioverter defibrillator (ICD), must stay away from the off-board charger. Ask another person to do it if it is necessary to operate the charger. The electromagnetic waves from the off-board charger while in use could temporarily affect the device.
- Do not allow children to use the charging cable or the off-board charger by themselves. Doing so could cause a serious accident.
- When any abnormality such as an odd smell, smoke, unusual noise, or malfunction is detected during charging, stop charging. Failure to do so could result in fire, electric shock, injury or burns.
- If thunder is heard, do not touch the machine, charger, or charging cable. Doing so could result in electric shock due to a lightning strike.
- Do not touch the plug or insert or remove the plug with wet hands. Doing so could result in electric shock.
- Never use an extension cable or conversion adapter. Doing so could result in fire or burns. Charging can be performed in rain or snow, but the following precautions must be observed. Failure to do so could result in fire, electric shock, injury or burns.
- If there is a danger that the plug socket area could be submerged due to heavy rain, turn off the breaker.
- If the back side or inside of the charging port cap gets wet, wipe it before starting a charge operation.
- Charger and charging cable
  - Never disassemble, repair or modify the charger or charging cable. Failure to follow these instructions could result in serious damage or injury due to fire or electric shock.
  - Do not stretch, twist, bend, stand on or drag the cord or cable. Doing so could cause a break in the cord or cable, resulting in abnormal heating and fire.
  - Do not wind the cord or charging cable around the charging connector. Doing so could cause a break in the cord or cable, resulting in abnormal heating and fire.
  - Insert the plug straight and all the way to the end. Failure to do so could result in abnormal heating and fire.
  - Do not pull the cord to remove the plug. Doing so could cause a break in the cord or cable, resulting in abnormal heating and fire.

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

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## **WARNING**

- When the charger or charging cable fails
    - If there is a deep scratch, crack, breakage or rust on the plug, do not use the charger or charging cable. Failure to observe these instructions could result in fire or electric shock.
    - If the power is turned off when the plug or cord is moved, or if the charging is repeatedly interrupted, immediately stop using the charger or charging cable. Failure to do so could cause a break in the cord or cable, resulting in abnormal heating and fire.
    - When any abnormality such as an odd smell, smoke, unusual noise, or a malfunction is detected during charging, stop charging. Failure to do so could cause a break in the cord or cable, resulting in abnormal heating and fire.
  - Using the plug socket for charger
    - If the plug socket holes are too loose to securely hold the plug or if the plug socket has a break or discoloration, do not use it. As doing so could result in abnormal heating and fire, ask a licensed electrical expert to check the plug socket.
    - Do not open any cover during charging. The cooling fan inside could suddenly start running and your hands, legs, clothes or accessories could come into contact with it and become caught resulting in injury.
    - When charging, make sure that the connector is inserted all the way to the end. If the connector is not securely inserted to the end, the machine may not recognize it that could result in an unexpected accident or failure.
  - Handling the charging cable
    - Do not drop, hit hard or allow it to be submerged. Failure to follow these instructions could result in serious damage or injury due to fire or electric shock.
    - Do not insert any foreign body into the plug or charging connector or connect the plug into a plug socket that is not properly rated. Failure to follow these instructions could result in serious damage or injury due to fire or electric shock.
  - Observe the following precautions when storing the charging cable.
    - Store it in a place away from direct sunlight.
    - Store it in a place not exposed to rain or wind.
    - Cover the charging connector terminal with a protective cap to prevent dirt and dust from entering.
    - Do not store the cord or cable with twists in it.
-

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

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## IMPORTANT:

- Do not subject the charging port, charging cable or on-board charger to strong impact.
- Do not perform charging while the machine is covered with a sheet.
- Before charging, make sure that the charging port, charging connector or plug is free from any water, corrosion, foreign matter or damage. If there is any foreign matter or damage, contact a Takeuchi sales or service dealer for help without starting charging.
- Do not insert anything other than the charging connector into the charging port. Doing so could break the charging port.
- If the charging port is frozen, unfreeze it by using a dryer or the like before inserting the charging connector into it or removing the charging connector from it.
- After charging is complete, be sure to close the cap on the charging port. Failure to do so could result in failure if water or dirt enters.

## Notes:

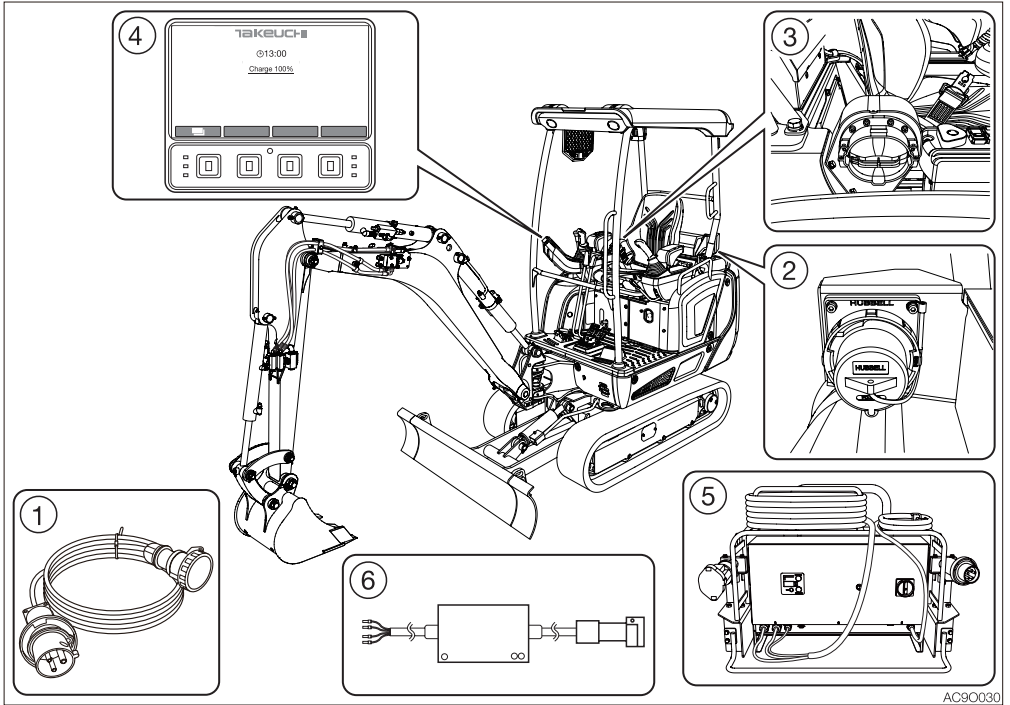
- Charging is not possible if the on-board charger and the off-board charger are connected to the machine at the same time.
- For the off-board charger, the machine cannot be started while the charging connector is connected.
- If the ambient temperature around the charger is high, a longer charging time may be required due to the action of the protective function.
- The time required for charging varies depending on the following conditions.
  - The lithium ion battery level when charging is started
  - The lithium ion battery temperature
  - The type of charger to be used or the power source to be connected
  - The age of the lithium ion battery

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

## EQUIPMENT FOR CHARGING

Instead of fuel, the machine is powered by using various types of chargers, charging cable and charging port. The charge level can be checked by viewing the multi-information display.

### Component names of charging equipment



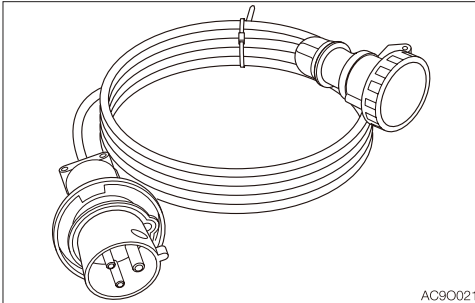
### IMPORTANT:

- When removing snow, mud or water from the charging port area, be sure to close the charging port cap beforehand.
- If the charging port area is frozen and the cap is hard to open/close, do not forcibly move it; be sure to thaw the area before opening/closing the port.
- If water is trapped inside the charging port, do not perform charging; instead, contact a Takeuchi sales or service dealer for help.
- Before operating, make sure that the charging port cap is completely closed.

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

## 1. Charging cable (for on-board charger) (option)

This cable is used for on-board charging.

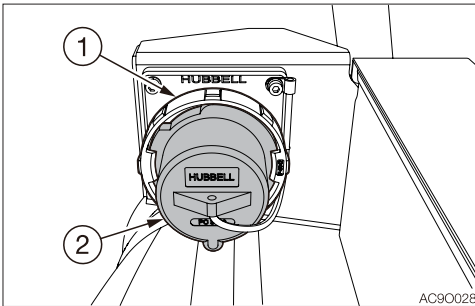


**IMPORTANT:** Select an appropriate connector for the charging cable by referring to “Charger (input specifications)” on page 0-25.

**IMPORTANT:** Be sure to select a charging cable that complies with the local laws and regulations.

## 2. On-board charging port

The charging cable for on-board charging is connected to this port.



### Opening

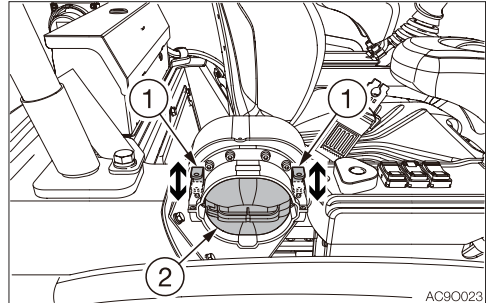
1. Turn the lock (1) clockwise to unlock the cap (2).
2. Pull out the cap (2).

### Closing

1. Insert the cap (2).
2. Turn the lock (1) counterclockwise to lock the cap (2).

## 3. Off-board charging port

The charging cable for off-board charging is connected to this port.



### Opening

1. Pull the lock (1) upward.
2. Pull the cap (2) to remove it.

### Closing

1. Insert the cap (2) and close it.
2. Push the lock (1) downward.

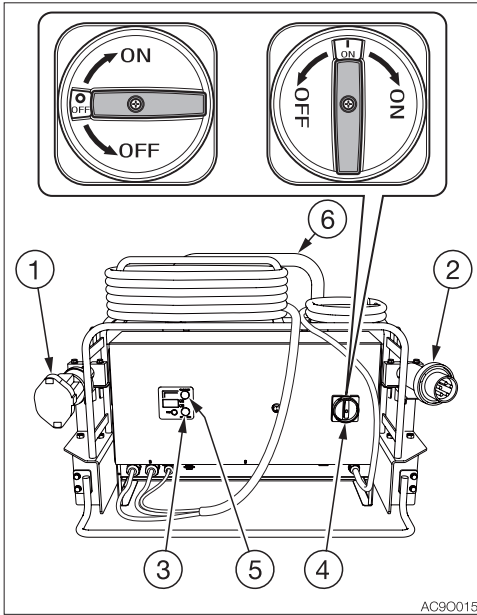
## 4. Multi-information display

The charge and machine conditions can be checked on this display. Refer to “Multi-information display” on page 2-8.



# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

## 5. Off-board charger (option)



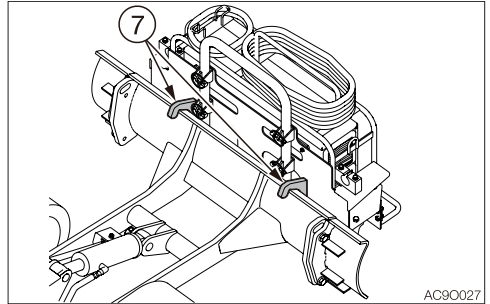
Connect the charging connector (1) to the off-board charging port.  
Connect the plug (2) for industrial purposes to the 400 V/480 V supply socket.

**IMPORTANT:** Select an appropriate connector of the charging cable to be connected to the plug for industrial purposes by referring to “Charger (input specifications)” on page 0-25.

**IMPORTANT:** Be sure to select a charging cable that complies with the local laws and regulations.

**IMPORTANT:** Do not allow the off-board charger to become wet. Doing so will result in a malfunction.

To start charging, turn the switch (4) to ON. The red indicator lamp (5) remains lit while charging.  
The green indicator lamp (3) turns on when the charging is complete.  
To stop in an emergency, turn the breaker to OFF.  
To move the off-board charger, push the handle (6).

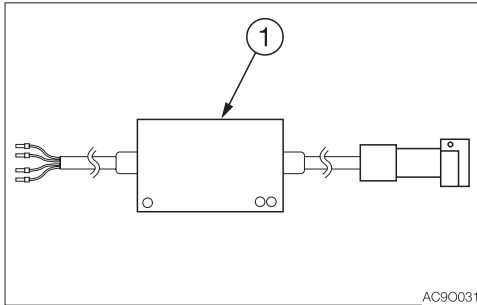


By engaging the hooks (7) of the off-board charger onto the blade, the machine can move the off-board charger.

**IMPORTANT:** Be sure to do this moving on flat, firm ground. If performed on rough terrain, the off-board charger could be disengaged from the blade, resulting in a failure.

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

## 6. Cable for off-board charger (option)



The cable for the off-board charger must be installed between the 400/480 V power supply and the industrial purposes plug on the off-board charger.

When the cable for the off-board charger is to be connected to a 400/480 V power supply, a qualified technician must perform the work. Contact a Takeuchi sales or service dealer for details.

## (1) Noise filter

A noise filter must be installed on the power line to comply with Electromagnetic Compatibility Regulation 2014/30/EU. Use a Takeuchi genuine cable that includes a noise filter. If such a cable is not to be used, install a noise filter on the power line.

Note that in regions outside Europe, a noise filter can also be installed to suppress noise and reduce the impact on nearby electronic devices.

When installing a noise filter on a 400/480 V power supply, ensure its performance is equivalent to the following.

Product name: Noise filter  
Manufacturer: TDK-Lambda  
Model No.: RTEN-5030

Contact a Takeuchi sales or service dealer for details.

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

## CHARGING

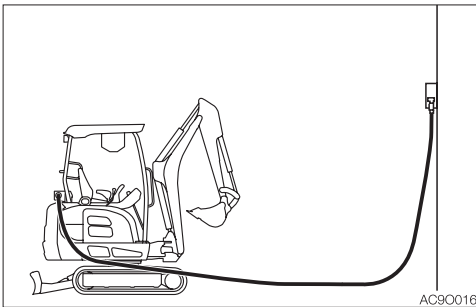
### Types of charging

There are two types of charging: 220V single phase charging which uses the charger built into the machine, and off-board charging which is 400-480V three phase charging using a mobile charger placed outside the machine. For the power supply to be used, refer to “Basic Specifications” on page 7-2.

### Using the on-board charger

#### **! WARNING**

When charging using the on-board charger, a voltage is generated at the off-board charger port, so put the cap on the port and securely lock it.



Directly connect the machine to the 220 V supply socket to charge. The machine can be operated while being charged.

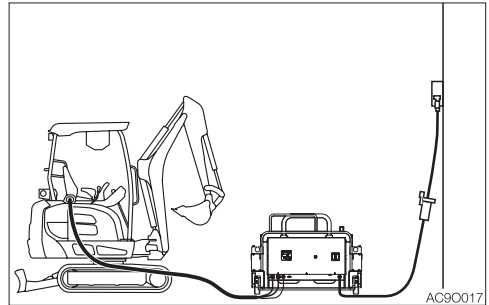
**IMPORTANT:** When a 220 V power supply socket is installed, a qualified technician must perform the work. Contact a Takeuchi sales or service dealer for details.

**Note:** The time required for on-board charging varies depending on the lithium ion battery temperature, ambient temperature around the charger, charge conditions, years of use, and condition of the connected power source.

### Using the off-board charger (400 V/480 V)

#### **! WARNING**

Be sure to use the off-board charger designated by Takeuchi. Using an inappropriate charger could result in fire or malfunction.



Connect the off-board charger to the 400 V /480 V supply socket to charge.

**IMPORTANT:** When performing off-board charging, be sure to follow the “Charging using the off-board charger”. If operated incorrectly, the machine or the off-board charger could be damaged.

**IMPORTANT:** When a 400 V/480 V power supply socket is installed, a qualified technician must perform the work.

Contact a Takeuchi sales or service dealer for details.

**IMPORTANT:** The off-board charger has an IP54 rating for dust and water resistance. Do not use the charger in places where it is exposed to intermittent water splashes from, for example, rain.

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

## Time required for charging

The time required for off-board charging largely varies depending on the temperature of the lithium ion battery.

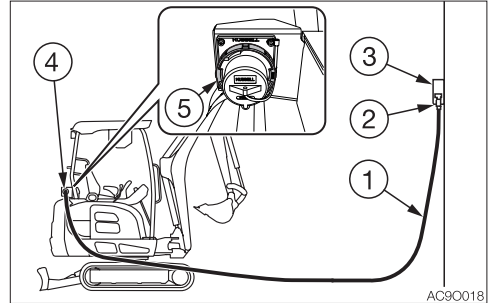
**Note:** In addition to the lithium ion battery temperature, the time required for off-board charging also depends on the ambient temperature around the charger, charge conditions and years of use.

## Charging using the on-board charger

Follow the steps below to perform on-board charging.

**Note:** Before charging, check that the key switch is turned to the OFF position.

1. Check that the key switch is OFF.



2. Take out the charging cable (1).
3. Open the charging port (4) cap.
4. Fully insert the connector of the charging cable (1) into the charging port (4), while turning the connector clockwise.
5. Secure the connector by turning the fixing part (5).
6. Connect the plug (2) of the charging cable (1) into the plug socket (3).
7. When the charging starts successfully, the multi-information display indicates the charge conditions and approximate charge level.
8. To end charging, remove the plug (2) from the plug socket (3).
9. Release the connector by turning the fixing part (5).
10. Pull out the connector of the charging cable (1) from the charging port (4).
11. Close the charging port (4) cap.
12. Store the charging cable (1).

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

## Charging using the off-board charger

Follow the steps below to perform off-board charging.

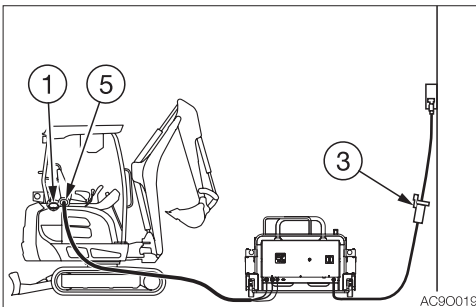
### CAUTION

When inserting the off-board charging connector, engage it with the charging port slot and securely insert it all the way to the end.

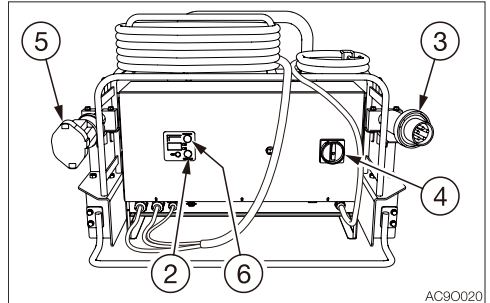
#### Notes:

- When charging, be sure to observe the instructions provided with the charger. If improperly operated the machine or charger could be damaged.
- Charging cannot be started if the key switch is not in the OFF position. Before charging, be sure to turn the key switch to OFF.

1. Check that the key switch is OFF.



2. Connect the plug for industrial purposes (3) to the 400 V/480 V supply socket.
3. Open the charging port (1) cap.
4. Connect the charging connector (5) of the off-board charger into the charging port (1).



5. Confirm that the green indicator lamp (2) is turned on, and then turn the switch (4) to ON.
6. The red indicator lamp (6) turns on when the charging starts successfully. The multi-information display indicates the charge conditions and charge level.
7. When the charging is stopped, turn the switch (4) to OFF.
8. Remove the off-board charging connector (5) from the charging port (1).
9. Close the charging port (1) cap.
10. Pull out the plug for industrial purposes (3) from the 400 V/480 V supply socket.

**Note:** The time required for charging varies depending on the lithium ion battery temperature, ambient temperature around the charger, charge conditions, years of use, and condition of the connected power source.

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

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## **About the use of 400 V/480 V power supply for the off-board charger**

A noise filter must be installed on the power line to comply with Electromagnetic Compatibility Regulation 2014/30/EU.

Use a Takeuchi genuine cable that includes a noise filter. If such a cable is not to be used, install a noise filter on the power line.

Note that in regions outside Europe, a noise filter can also be installed to suppress noise and reduce the impact on nearby electronic devices.

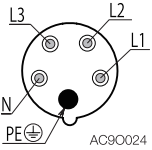
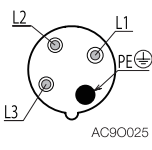
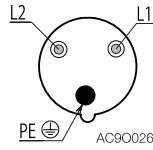
When installing a noise filter on a 400/480 V power supply, ensure its performance is equivalent to the following.

Product name: Noise filter  
Manufacturer: TDK-Lambda  
Model No.: RTEN-5030

Contact a Takeuchi sales or service dealer for details.

# FEATURES OF THE ELECTRIC HYDRAULIC EXCAVATOR

## CHARGER (INPUT SPECIFICATIONS)

Item	Off-board charger* (400 V)	Off-board charger* (480 V)	On-board charger
Number of phases	Three phases	Three phases	Single phase
Input line-to-line voltage	V 340 to 460	408 to 552	95 to 265
Maximum input line current	A 18.4	16	16
Frequency	Hz	50 or 60	
Connector (charger side)	 <p>AC90024 IEC60309 3P+N+E</p>	 <p>AC90025 IEC60309 3P+E</p>	 <p>AC90026 IEC60309 2P+E</p>

\*: This charger can be used in a Delta or Star connection. It can be operated without connecting the neutral line.

If you are not sure whether the charging equipment is compatible with the machine, please contact a Takeuchi sales or service dealer.









## GENERAL PRECAUTIONS

**It is your responsibility to observe all pertinent laws and regulations and to follow the manufacturer'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 or maintenance of this machine when under the influence of alcohol, drugs, medication, overwork or lack of sleep.

### When a problem is found on the machine

If any problem (noise, vibration, smell, malfunction of instrument(s), smoke, oil leak, wrong indication of alarm or warning indicator on the multi-information display, etc.) is detected during the operation or inspection and maintenance of the machine, immediately inform your sales or service dealer 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.

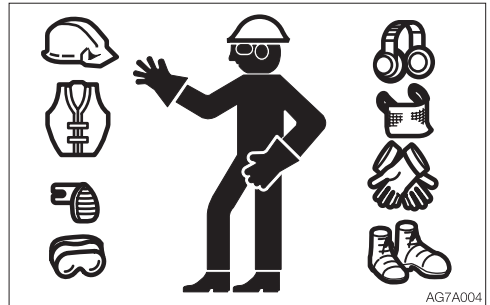
- Do not operate the machine if the ambient temperature is higher than +45°C (+113°F) or lower than -15°C (+5°F).
- Do not charge the machine if the ambient temperature is higher than +45°C (+113°F), or lower than 0°C (+32°F).
  - If operated at an ambient temperature of higher than +45°C (+113°F), the hydraulic oil may become very hot, causing damage to the hydraulic equipment. Also, the life of the electrical component such as the lithium ion battery and charger may be shortened, resulting in early failure.
  - If operated at an ambient temperature of lower than -15°C (+5°F), the parts made of rubber such as gaskets may get hardened and cause 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.



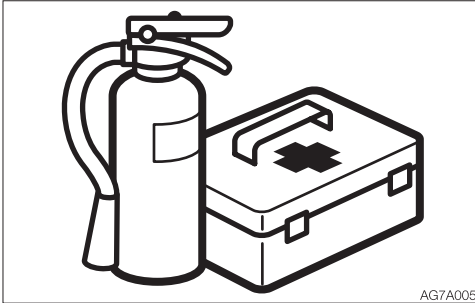
### Using the machine at an altitude higher than 2000 meters

- When selecting a work site at high altitude, special conditions may need to be considered due to the thin air.
- If the driving voltage (direct current input) is increased due to the low insulation resistance in air, arc discharge could occur, damaging the power conditioner.
- The failure rate of electronic parts due to cosmic radiation rapidly increases with higher altitude.
- If the machine is to be used at an altitude higher than 2000 meters, consult your sales or service dealer for help.

### Wear appropriate clothing and protective equipment

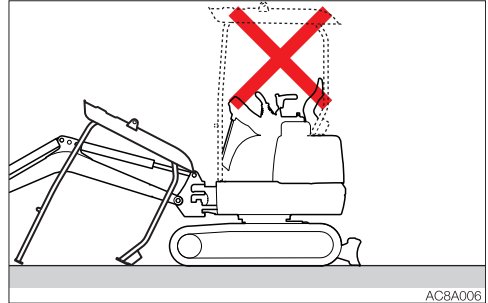


- Do not wear loose clothing or any accessory that can catch on controls or in moving parts.
- Do not wear oily or fuel stained clothing that can easily catch fire.
- Wear a hard hat, safety shoes, safety glasses, filter mask, heavy gloves, ear protection and other protective equipment as required by 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.

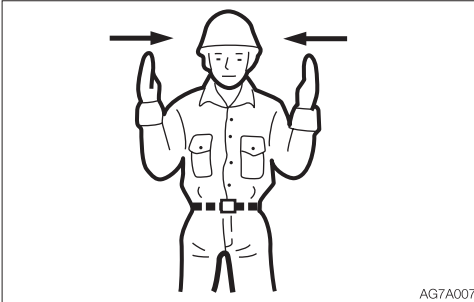
**Install a fire extinguisher and first aid kit**

Be prepared for fire and accidents

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

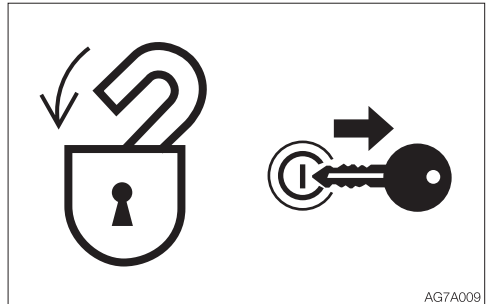
**Never remove safety equipment**

- 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 seat, lower the working equipment to the ground, raise the safety lock lever to the lock position and then stop the motor. 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.
- 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 the lock position and stop the motor. Also, be sure to remove the key, lock the door and covers, take the key with you and store it in a specified place.

**Avoid fire and explosion hazards**

Keep flames away from oil and grease.

- When handling these combustible materials, keep lit cigarettes, matches, lighters and other flames or sources of flames away.
  - Do not leave the location while refilling with oil.
  - Clean up spilled oil immediately.
  - Check for oil leak. Repair any leak and clean it before operating the machine.
  - When operating with grinder or welding, move flammables 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.
  - Always use a nonflammable cleaning material.
- When handling the cleaning solvents or paints, open the door and windows to ventilate thoroughly.
  - Store all flammable fluids and materials in a safe and well-ventilated place.
  - Short circuiting of the electrical system may cause a fire. Check for any loosened connections or damage to the wires every day. Retighten the loose connections or connector(s) and wire clamp. Repair or replace the damaged wire. Ask a Takeuchi sales or service dealer for repair or replace.
  - If the covers in the area near to the high-voltage parts are damaged, the high-voltage parts must be checked for damage. Ask a Takeuchi service or sales dealer for inspection.
  - 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 fire or injury.



### 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.



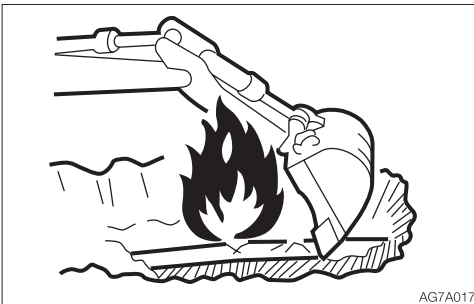


## **PRECAUTIONS WHEN PREPARING**

### **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.



- 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.

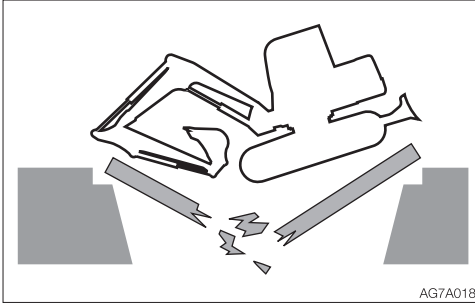


SAFETY

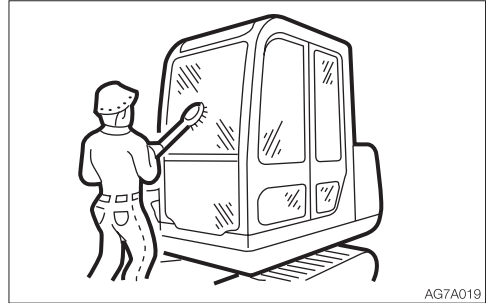
## PRECAUTIONS WHEN PREPARING

### Check the strength of the bridge

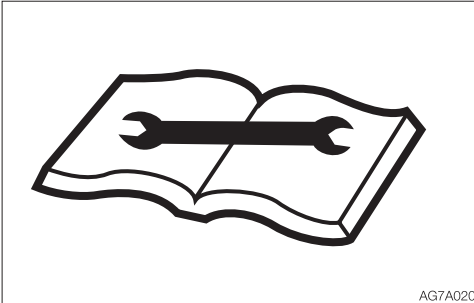
When traveling over a bridge or a structure, check the permissible load. If the strength is insufficient, reinforce the bridge or the structure.



### 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.
- 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 motor fails, immediately stop the machine by following the shutdown procedure, and keep the 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. Operating the travel pedals with mud or grease on shoes may 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. The plastic bottle could act as a lens and cause a 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 temperature rises, the lighter may explode.



## 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.



- 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 run the motor 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.

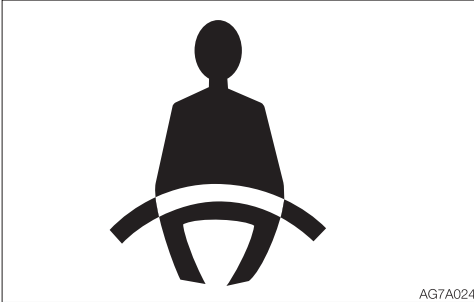


- Check if there is a “DO NOT OPERATE” alert sign or similar sign hung on the controls or key switch. If there is one, do not start the motor or touch any controls.
- Sound the horn to warn people around the machine.



### Sit in the operator's seat and start the motor

- Adjust the seat to securely latch it.



- 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.

### After starting the motor

After starting the motor, 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 hydraulic oil.
- Check if all gauges and warning devices are properly working.
- Check for any noises.
- Operate each control to ensure they are properly working.

### In cold climates

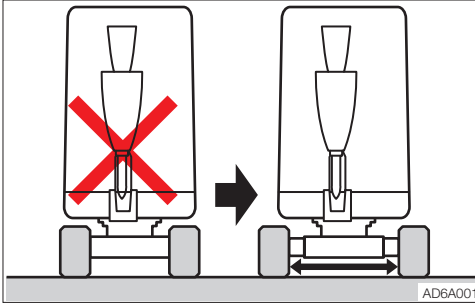


- Be careful of slippery conditions on freezing ground, steps and hand holds.
- In severe cold climates, do not touch any metal parts of the machine with bare hands. The skin will freeze to the metal, resulting in severe injury.
- Warm up the hydraulic oil before operating the machine. If the levers are operated without a proper warm-up, the machine will be less responsive or move unexpectedly, resulting in an 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.
- Wipe the lights clean to ensure good visibility.
- Unauthorized machine modifications or installation of unapproved attachments could impair the visibility. The operator's field of view must conform to ISO 5006.

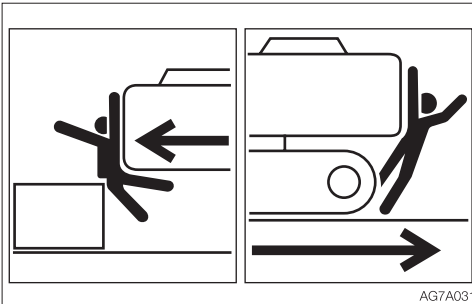
### Do not permit riders on the machine



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



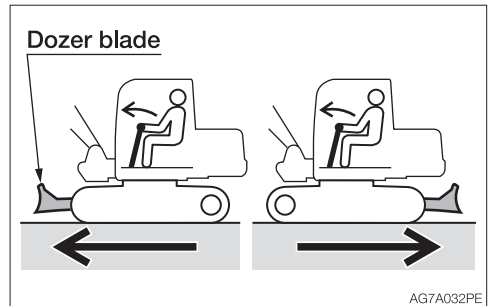
Check if the work area is safe and secure before operation



AG7A031

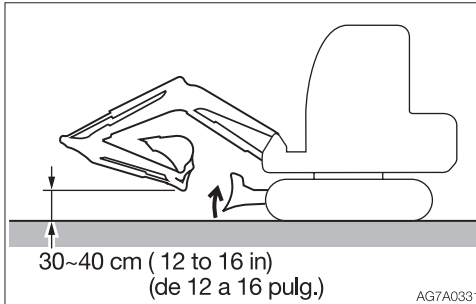
- Confirm the performance limits of the machine.
- Use a signal person at road shoulders, narrow places or where your vision is obstructed.
- Never allow anyone to enter the machine's slewing radius and path.
- Signal your intention to move by sounding the horn.
- There is a blind spot in the rear of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

Check the position of the undercarriage (tracks) before traveling

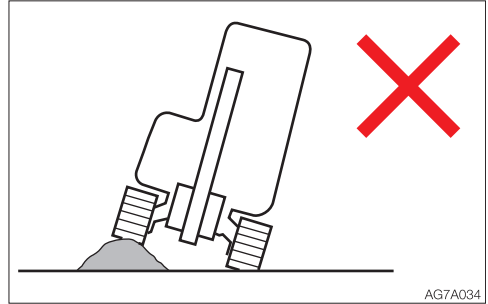


AG7A032PE

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.





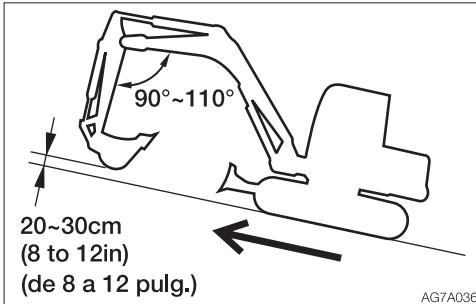
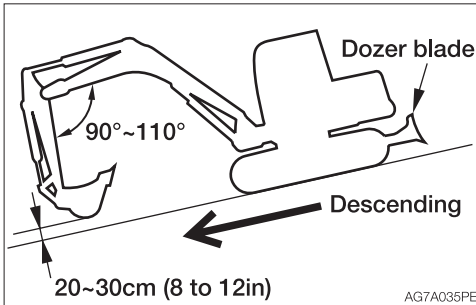
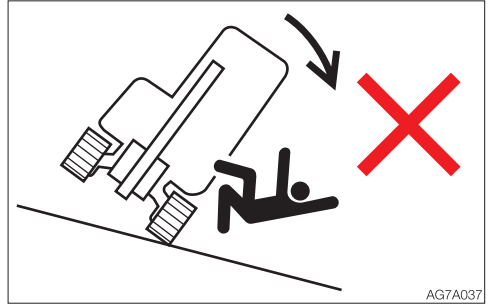
SAFETY

## PRECAUTIONS WHEN OPERATING

### 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 the 1st (low) speed. When descending a slope, slow down the motor speed.
- Do not descend slopes in reverse.

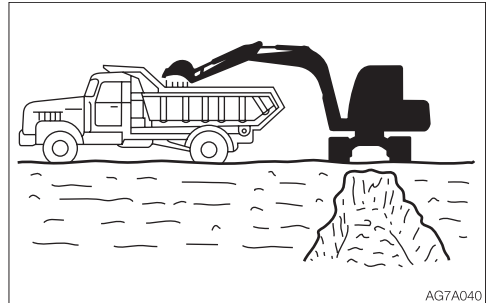
- Do not change directions on slopes or traverse slopes. First return to a flat surface, and then take an alternative path.
- The machine may slip sideways even on a slight slope if the ground is covered with grass or dead leaves, or when traveling on a wet metal plate or frozen surfaces. Make sure the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

**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 conditions, the road shoulder and objects placed beside the road can be buried in the snow and cannot be seen. There is a hazard of the machine tipping over or hitting covered objects, so always operate the machine 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 stuck 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 entrapment 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 is dangerous and risks the load spilling or sudden dropping of the attachment.

**Ensure driver's safety when loading**

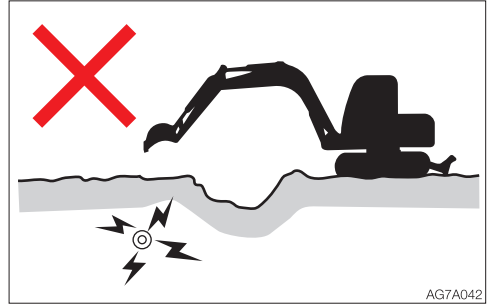
Do not load a truck unless the truck driver is in a safe place.

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

**Keep a safe distance from the high-voltage cable**

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

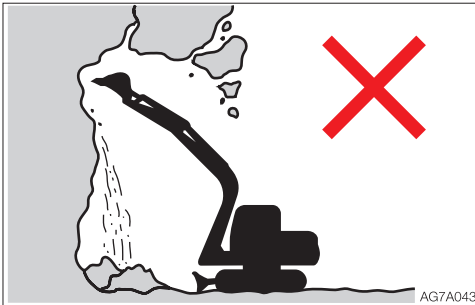
- Always maintain a safe distance between the machine and the high-voltage electric cable.
- Check with the local power company about safe operating procedure before starting operations.
- Consider all cables to be high-voltage cables and treat all cables as energized even though it is known or believed 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.



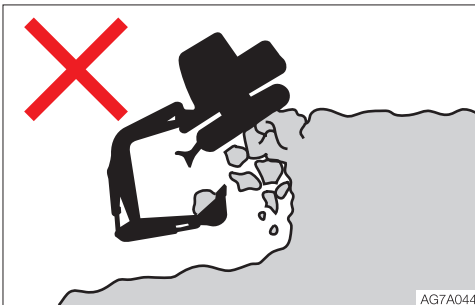
- Pay also careful attention to the high-voltage electric cables buried underground.



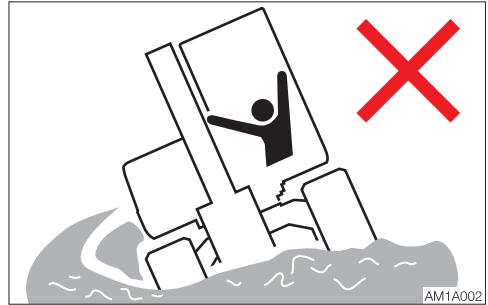
**Watch out for hazardous working conditions**



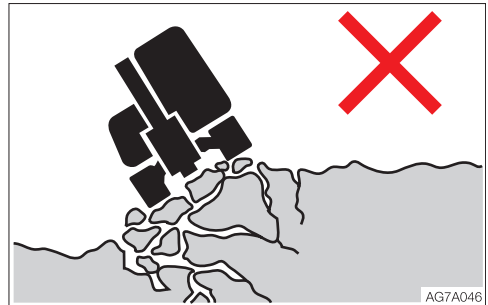
- Never undercut a high bank. Doing so is dangerous and may cause ground collapse.
- Do not operate in places where there is a danger of falling rocks.



- 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.

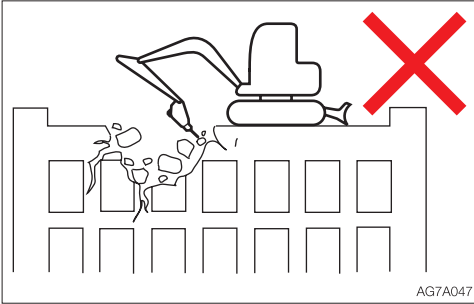


- Do not come close to unstable grounds (cliffs, road shoulders, deep ditches). If the ground should collapse under the weight or vibration of the machine, there is a risk that the machine may fall or tip over.
  - Remember that the soil after heavy rain or blasting is weak.
  - The ground at the top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

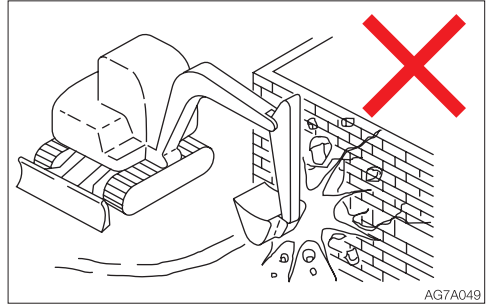


SAFETY

## PRECAUTIONS WHEN OPERATING



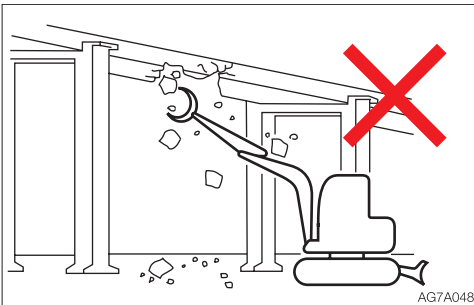
AG7A047



AG7A049

- Do not perform demolition work under the machine. There is a risk of the machine falling down due to ground instability.
- 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.

- Do not use the impact force of the hoe attachment for breaking work. There is a risk of serious injury due to flying debris, and it may also damage the hoe attachment.



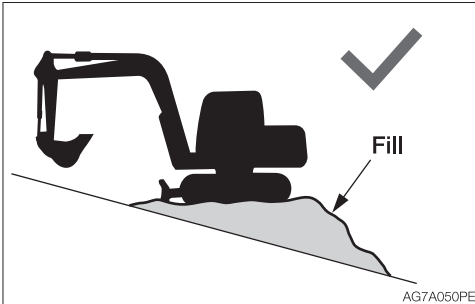
AG7A048

- 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.

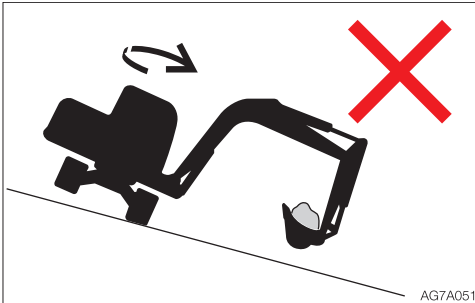


### Operating on slopes is dangerous

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.

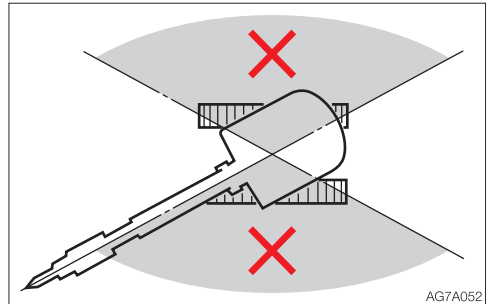


- Level off the work area.



- 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

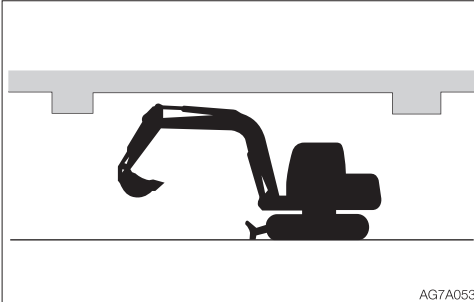


The machine can tip over more easily in the lateral direction than in the longitudinal direction.

- 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.

### Cautions when lifting loads



If the machine is used for lifting, it must be equipped with an emergency shut-off valve on the arm and the boom, respectively. 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.



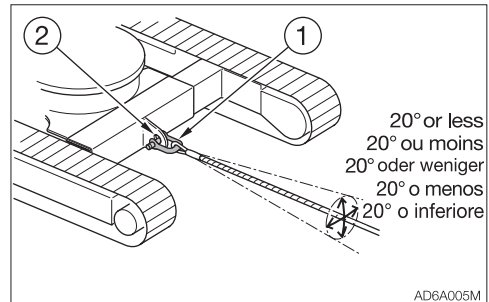
SAFETY

## PRECAUTIONS WHEN OPERATING

### 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.

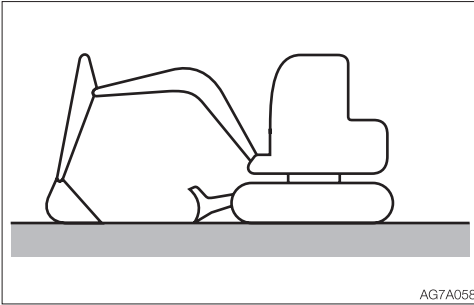
- It becomes dangerous if the wire rope breaks or becomes disengaged. Use a wire rope appropriate for the required tractive force.
- Do not use a wire rope that is kinked, twisted or otherwise damaged.
- Do not apply heavy loads abruptly to the wire rope.
- Wear safety gloves when handling the wire rope.
- 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.





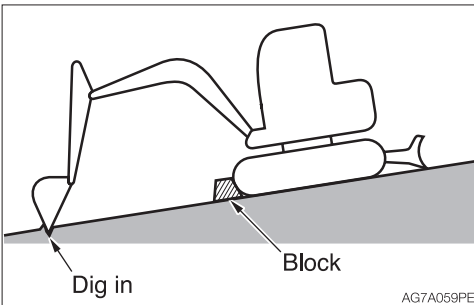
## PRECAUTIONS WHEN STOPPING

### Park safely



AG7A058

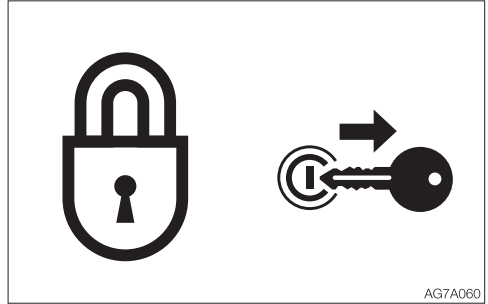
- Park the machine on a flat, rigid and safe ground. Set the parking brake.



AG7A059PE

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.



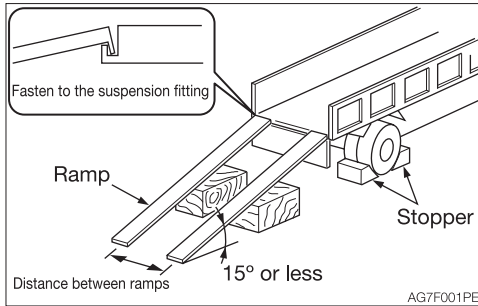
AG7A060

- 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 motor 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 ramps 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 the machine tipping over or falling.
- 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 course 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 may be unstable.
- Always lock the covers after the machine is loaded onto the vehicle. Otherwise, the covers may open during transport.
- 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.
- 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

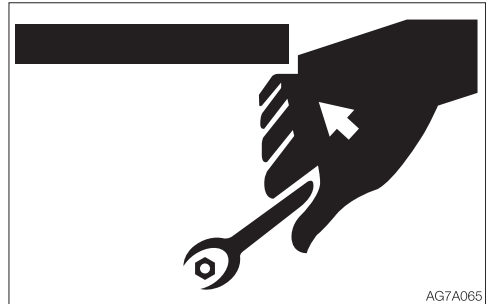
Severe injury could result if an unauthorized person runs the motor or touches the controls during inspection or maintenance.

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



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

### 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

- Regardless of the replacement schedule, replace immediately if a symptom of wear is found.

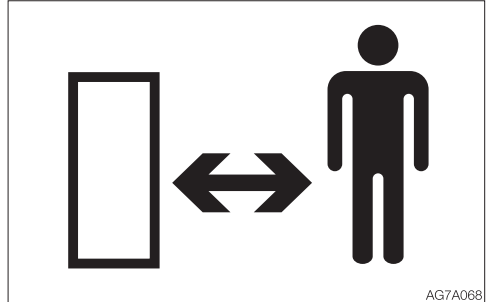


### Explosionproof lighting



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

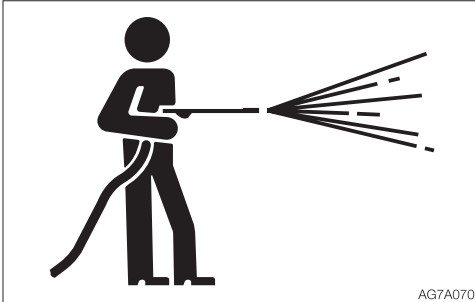
### Prohibit access by unauthorized persons



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 motor before washing the machine with water. Cover the electrical parts so that water cannot enter. Water on electrical parts could cause short-circuits or malfunctions.

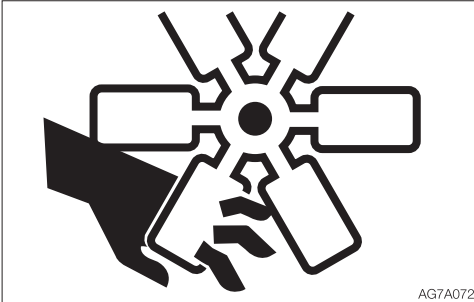
Do not use water or steam to wash the batteries, electronic control components, sensors, connectors or the operator's compartment.

**Stop the motor before performing maintenance**

- Avoid lubrication or mechanical adjustments while the machine is moving or while the motor is running when the machine is not moving.
- If maintenance must be performed with the motor 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 motor 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 object is dropped or inserted in the fan, it will be flown or cut in pieces. Do not drop or insert anything in the fan.

**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.



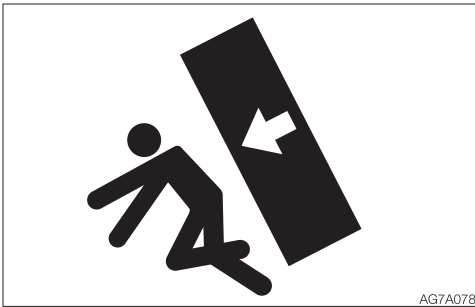
### Secure the working equipment

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

### Secure the cover when opened

Be sure to properly secure the cover if it is to be left open for some time. Do not leave the 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 temporarily 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.

### Handling of hoses

Oil leak or hydraulic oil 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 motor and allow each part of the machine to cool down before performing maintenance.

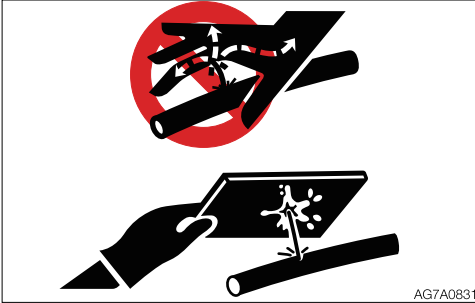
- The hydraulic lines, sliding parts and other parts of the machine are hot immediately after the motor is stopped. Touching these parts could cause burns.
- The hydraulic oil and other oils are also hot and under high pressure. Be careful when loosening the cap or plug. Working on the machine under these conditions could result in burns or injuries due to the hot oil spurting out.



**Be careful with oil internal pressure**

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

- Completely relieve the internal pressure before performing maintenance work.



- The high-pressure hydraulic oil can 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 goggles and thick gloves. Use cardboard instead of your hands to check for leaks. 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.

- Slowly loosen the air breather to release the internal pressure from the hydraulic oil tank.
- 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**

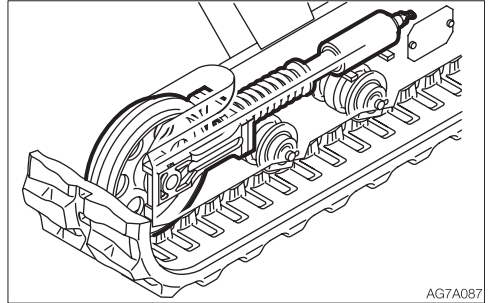
When using a hammer, pins may fly out or metal particles may be scattered. This may lead to serious injury.

- 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 turn.
- 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



AG7A089

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 lead-acid battery wiring



AG7A090

Disconnect the lead-acid 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 the lead-acid batteries**

- Lead-acid 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.
- Wear protective goggles and gloves when working with the lead-acid batteries.
- Lead-acid batteries generate flammable hydrogen gas which may explode. Keep away from lighted cigarettes or fire, and avoid creating arcs and sparks.
- When checking the level of the battery fluid, use a flashlight.
- Be sure to stop the motor by turning the key switch to OFF before inspecting or handling the lead-acid 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 the lead-acid battery or jump-start the motor if the lead-acid battery is frozen; otherwise it may explode. Warm the frozen lead-acid battery to 15°C (60°F) before use.
- Do not use or charge the lead-acid battery when the fluid level is below the lower level limit. Doing so will hasten the deterioration of the internal portions of the lead-acid battery and shorten the lead-acid 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 improve safety, replace the safety-critical parts like hoses and seat belts periodically.
- 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 characteristics of these parts could cause serious physical or personal damage, judging the remaining life of these parts is 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.

**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 lead-acid 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  $2.5 \text{ m/s}^2$  ( $8.2 \text{ ft/s}^2$ ) while the seated part of the body is subjected to vibrations lower than  $0.5 \text{ m/s}^2$  ( $1.64 \text{ ft/s}^2$ ).

### Checks after maintenance

- Gradually increase the motor speed from low to maximum 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.



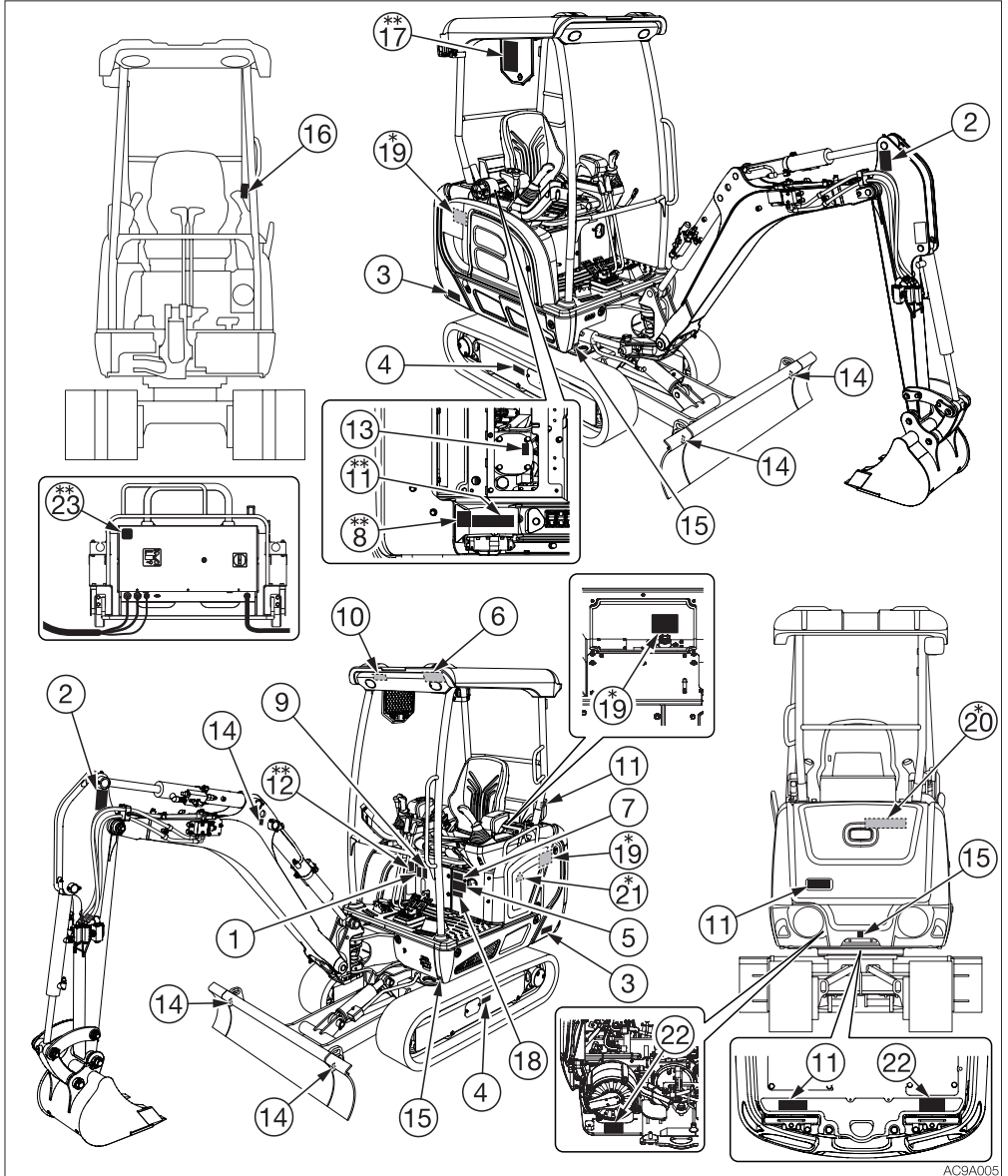
## **SAFETY SIGNS (DECALS)**

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.



**SAFETY**  
**SAFETY SIGNS (DECALS)**



\*: Decals for service technicians.

\*\* : If equipped.

AC9A005





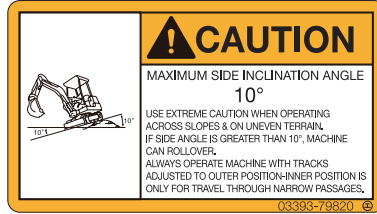
1. No.08810-31556



**Warning**

Read and understand this manual before performing any operation, inspection or maintenance on this machine.

5. No.03393-79820



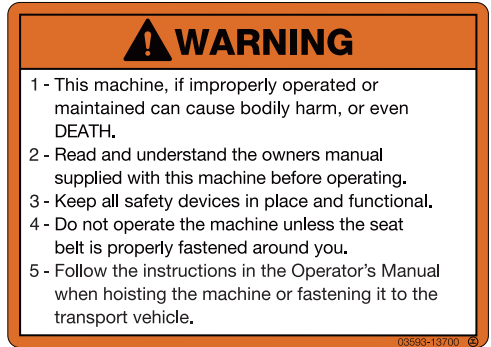
2. No.03293-64610



**Safety Distance**

Hazard of being hit by the working device of the machine.  
Keep away from machine during operation.

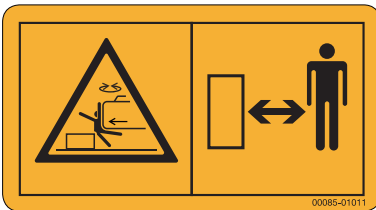
6. No.03593-13700



3. No.00085-01011

**Safety Distance**

Do not get near or stand within the machine working area.



7. No.03593-47020 (If equipped)



4. No.05793-00052

**Hazard of a flying plug from track adjuster**

Read manual before adjusting track for safe and proper handling.



7. No.03293-00066 (If equipped)

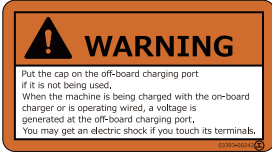
When a bucket wider than a standard one is installed, the cab (canopy) may be damaged if the bucket is fully offset to the left.





**SAFETY**  
**SAFETY SIGNS (DECALS)**

8. No.03393-00242



9. 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.



10. No.03593-32300



11. No.03393-00123

**ELECTRIC SHOCK HAZARD**  
Be sure to read the manual before performing maintenance, disassembling, assembling or transporting the machine.



12. No.03993-00023



Before starting lifting operation,  
be sure to turn on the lift  
overload warning switch.  
An alarm sounds  
if an excessive weight is lifted.

13. No.03593-06700  
Hydraulic oil



15. No.08810-31549  
Tie down point



14. No.03993-00500  
Position of hoisting



16. No.03993-00400  
For EU  
Position of Fire extinguisher



17. No.03393-00171  
For USA

**WARNING**

**EXCAVATOR MODEL TB20e**  
Long arm length: 1139mm(45in.)  
Machine with canopy and rubber greater, without bucket.

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, load to the machine sides, hazardous conditions, experience of personnel, etc.

The load safety device shall be equipped for lifting load.

The overload warning switch shall be turned on when the machine is used for lifting load.

The loads in the charts do not exceed 87% of hydraulic lift capacity or 75 % of tipping load.

The load point is the bucket hinge pin.

**UNITS: lbs.**

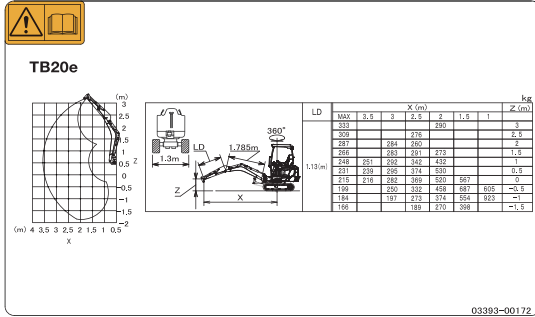
LIFT POINT HEIGHT	LIFTING CAPACITIES Over Front - Blade DOWN		LIFTING CAPACITIES Over Front - Blade UP		LIFTING CAPACITIES Over Side (Greater width 1300mm (51in.))		LIFTING CAPACITIES Over Side (Greater width 800mm (31in.))		LIFT POINT
	LIFT POINT RADIUS (in.)	(kg)	LIFT POINT RADIUS (ft.)	(kg)	LIFT POINT RADIUS (ft.)	(kg)	LIFT POINT RADIUS (ft.)	(kg)	
MAX 11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



SAFETY

# SAFETY SIGNS (DECALS)

17. No.03393-00172



18. No.03393-00236

**WARNING!**

No Children Allowed



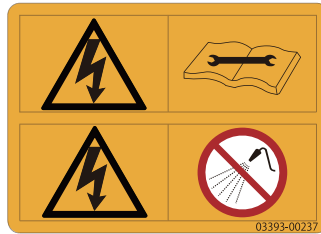
19. No.03393-00237

**ELECTRIC SHOCK HAZARD**

Be sure to read the service manual before performing maintenance, disassembling, assembling or transporting the machine.

**ELECTRIC SHOCK HAZARD**

Do not use a pressure washer.



20. No.03393-00238

**ELECTRIC SHOCK HAZARD**

Be sure to read the service manual before performing maintenance, disassembling, assembling or transporting the machine.

**ELECTRIC SHOCK HAZARD**

Do not use a pressure washer.



21. No.03393-00239

**ELECTRIC SHOCK HAZARD**



22. No.03393-00240



Touching the motor when it is running or immediately after it is stopped will cause a burn. Do not touch the motor.

23. No.03393-00250

**KEEP DRY**



AC9A008EN

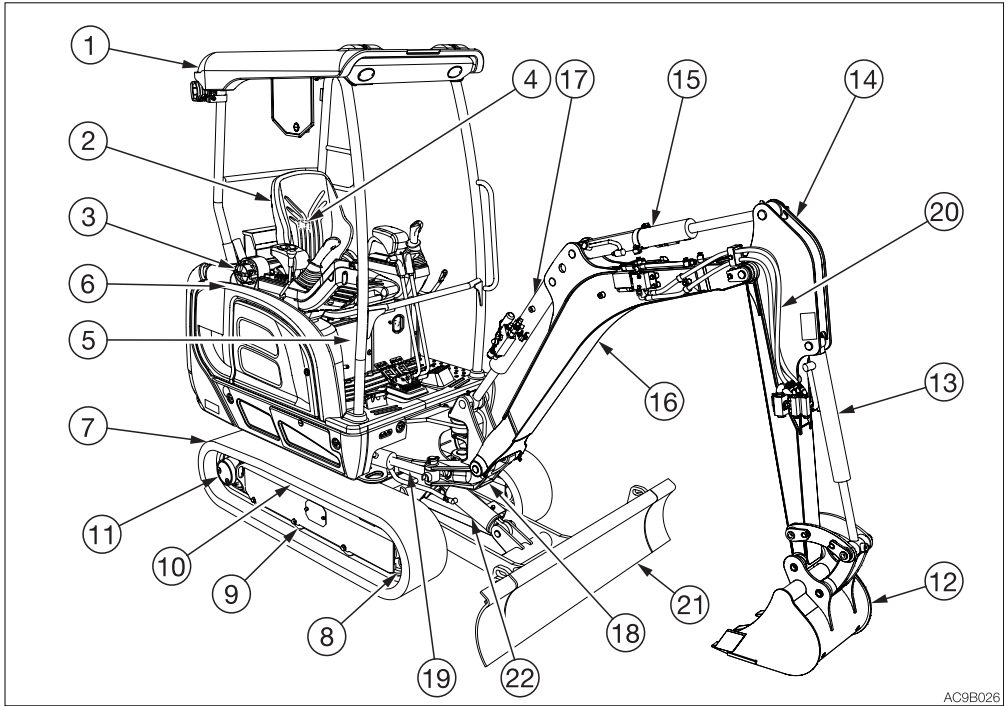


# CONTROLS





## COMPONENT NAMES



AC9B026

### Upperstructure

1. Canopy
2. Seat
3. Off-board charging port
4. On-board charging port
5. Hydraulic oil tank
6. Lithium ion battery

### Undercarriage

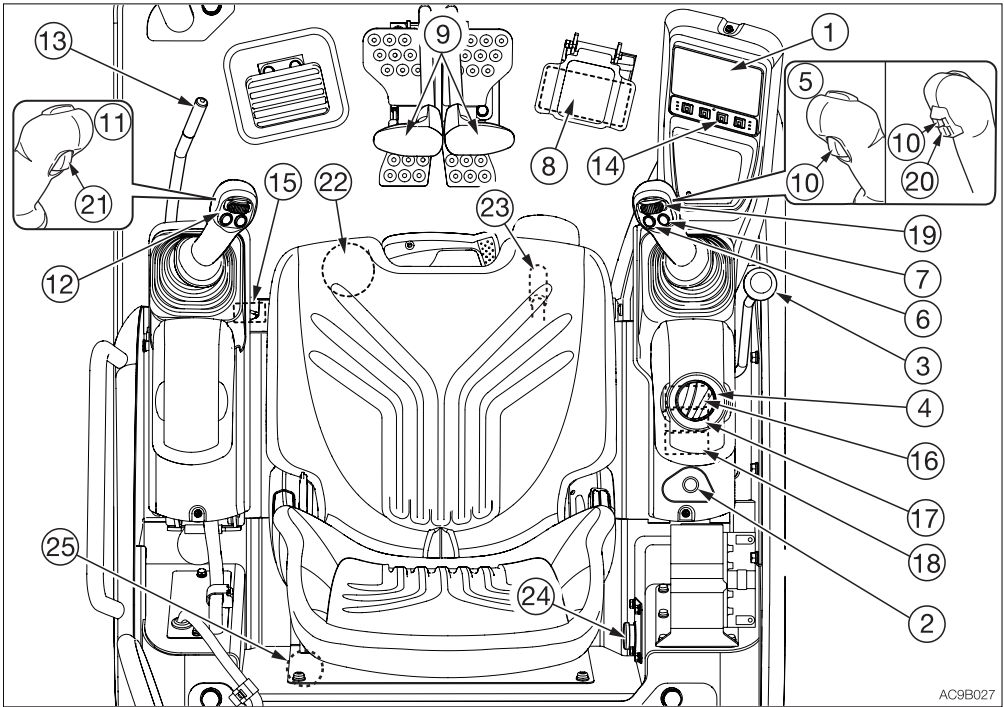
7. Crawler belt
8. Idler
9. Track roller
10. Shoe slide
11. Travel motor

### Working equipment

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



## CONTROLS COMPONENT NAMES



AC9B027

- |                              |                                       |
|------------------------------|---------------------------------------|
| 1. Multi-information display | 13. Safety lock lever                 |
| 2. Key switch                | 14. Light switch                      |
| 3. Blade lever               | 15. Emergency stop switch             |
| 4. Speed controller          | 16. Detent mode switch                |
| 5. Right operating lever     | 17. Auxiliary 1st auto tank switch    |
| 6. Horn button               | 18. Lift overload warning switch*     |
| 7. Deceleration button       | 19. Auxiliary 2nd/4th switch*         |
| 8. Boom swing pedal          | 20. Auxiliary 2/4 select button*      |
| 9. Travel levers/pedals      | 21. Third auxiliary hydraulic button* |
| 10. Travel speed button      | 22. Third auxiliary hydraulic switch* |
| 11. Left operating lever     | 23. Selector lever                    |
| 12. Auxiliary 1st switches   | 24. Power supply socket               |
|                              | 25. Service plug**                    |

\*: Subject to the specifications or optional products selected

\*\* : Remove it when repairing the machine due to failure. Otherwise, it must not be removed; doing so could cause the machine to fail.



## COVERS

### STARTER KEY

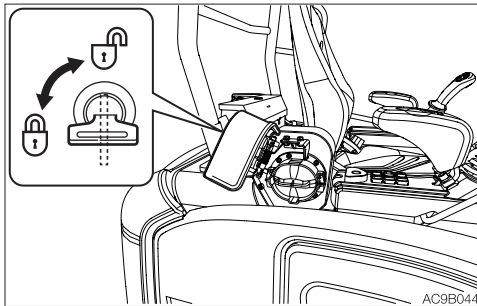


The starter key is used to start and stop the motor, as well as to lock and unlock the following components:

- Manual storage compartment
- Covers

### OFF-BOARD CHARGER PORT COVER (IF EQUIPPED)

#### Opening



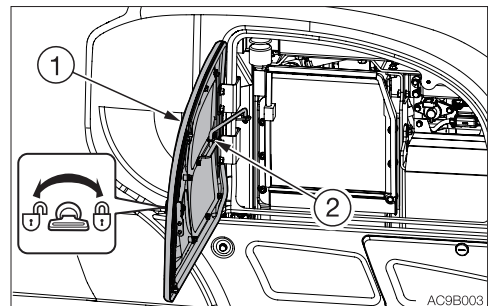
To unlock this holder, insert the starter key and turn it clockwise.

### SIDE COVER

#### CAUTION

- Before opening the side cover, be sure to set the safety lock lever to the lock position and stop the motor.
- When opening the side cover, open it all the way to the position where it is securely stopped.
- When opening and closing the side cover, be careful not to get your hands or other parts of your body caught by the cover.

For inspection and maintenance of the hydraulic oil system or electrical system, open this cover.



#### Opening

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

#### Closing

1. Support the side cover (1) by hand and release the stay (2).
2. Close the side cover (1).
3. Insert the starter key and turn it clockwise to lock the side cover (1).



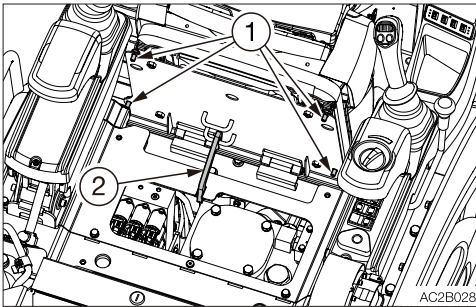


## MAINTENANCE COVER

### CAUTION

- Before opening the maintenance cover, set the safety lock lever to the locked position and stop the motor.
- When opening the maintenance cover, open it all the way to the position where it is securely stopped.
- When opening and closing the maintenance cover, be careful not to get your hands or other parts of your body caught by the cover.

For inspection and maintenance of the hydraulic oil system, open this cover.



### Opening

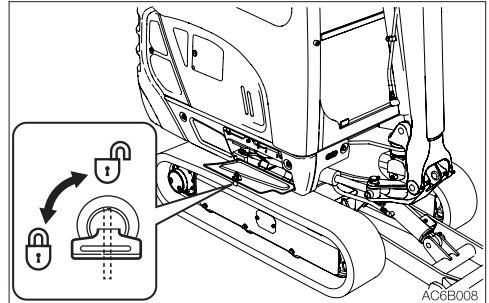
1. Remove the bolts (1).
2. Slide the seat backward.
3. Tilt the seat forward.
4. Secure the seat with the stopper (2).

### Closing

1. Hold the seat and lift the stopper (2) up to release it.
2. Return the seat to the original position.
3. Tighten the bolts (1).

## GREASE GUN HOLDER

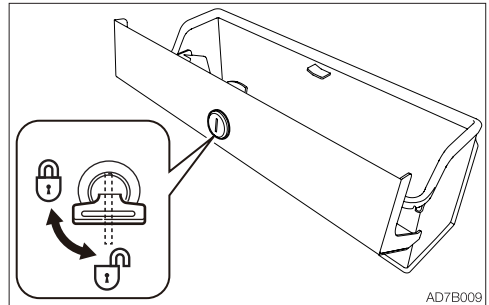
### Opening



To unlock this holder, insert the starter key and turn it clockwise.

## TOOL CASE

### Opening



To unlock this case, insert the starter key and turn it counterclockwise.

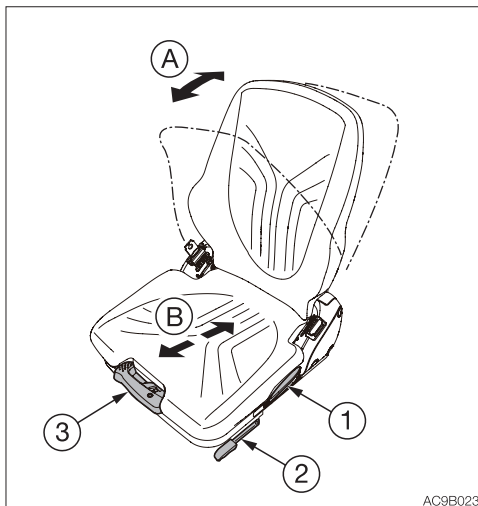


## SEAT AND SEAT BELT

### SEAT

#### **WARNING**

- Adjust and secure the seat.
- Do not make any adjustments while operating the machine.
- Remember that the backrest returns to the forward position abruptly due to the spring force.

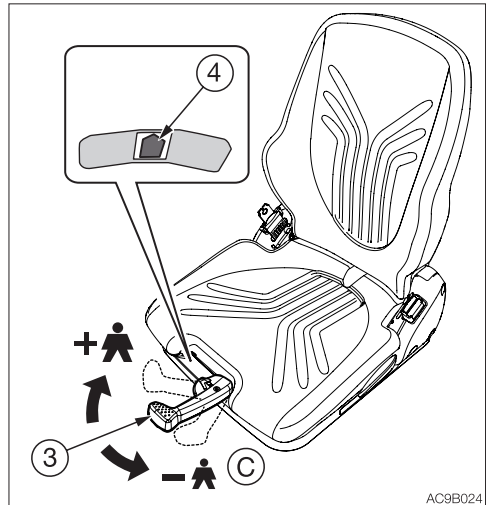


#### **(A) Adjusting the backrest**

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: 18 positions, in 170 mm (6.7 in.)



#### **(C) Adjusting according to operator's weight**

1. Sit back in the seat.
2. Open the lever (3).
3. Move the lever (3) up or down until the arrow (4) goes inside the transparent frame.  
Up: Increases the weight.  
Down: Decreases the weight.



## SEAT BELT

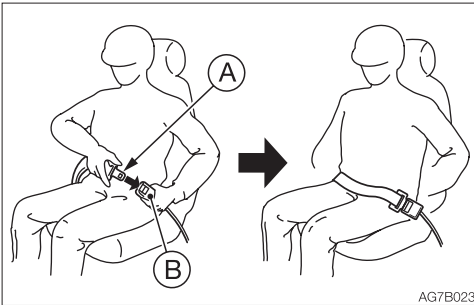
### **WARNING**

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

#### Fastening the seat belt

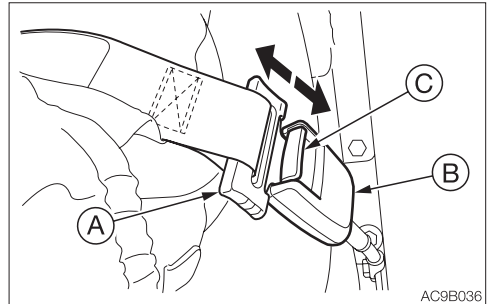
1. Adjust the seat to the desired position for operation, sit up and sit back in the seat.
2. Slowly pull out the seat belt to the desired length.

If pulled out too rapidly, the belt is automatically locked. If this occurs, release the belt and slowly pull the belt again.



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

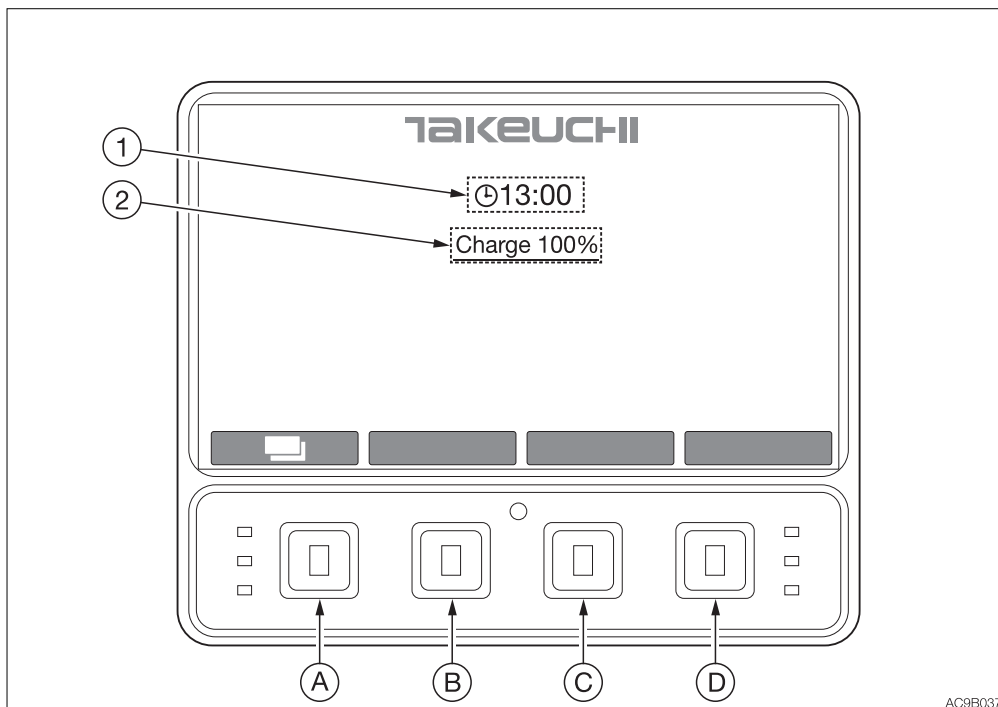


1. Grasp the tongue plate (A) and press the button (C) on the buckle (B). The seat belt retracts back into its original position.



# MULTI-INFORMATION DISPLAY

## CHARGE SCREEN



AC9B037

### 1. Clock

Displays the current time.

Refer to “Menu screen” on page 2-15.

Refer to “(5) Error code display” on page 2-19.

### 2. Charge

The orange bar is displayed during charging.

The green or white bar is displayed when the charging is complete.

The white bar indicates that the battery capacity is being improved (cell balancing control). The white bar may remain displayed for 9 hours or more; it is OK to stop charging before the bar turns off. The red bar appears if there is an error.

Press the button (A), go to the Error code display from the Menu screen, get the error code number, and then consult your sales or service dealer.

### Screen brightness

The screen remains bright for one minute after starting up.

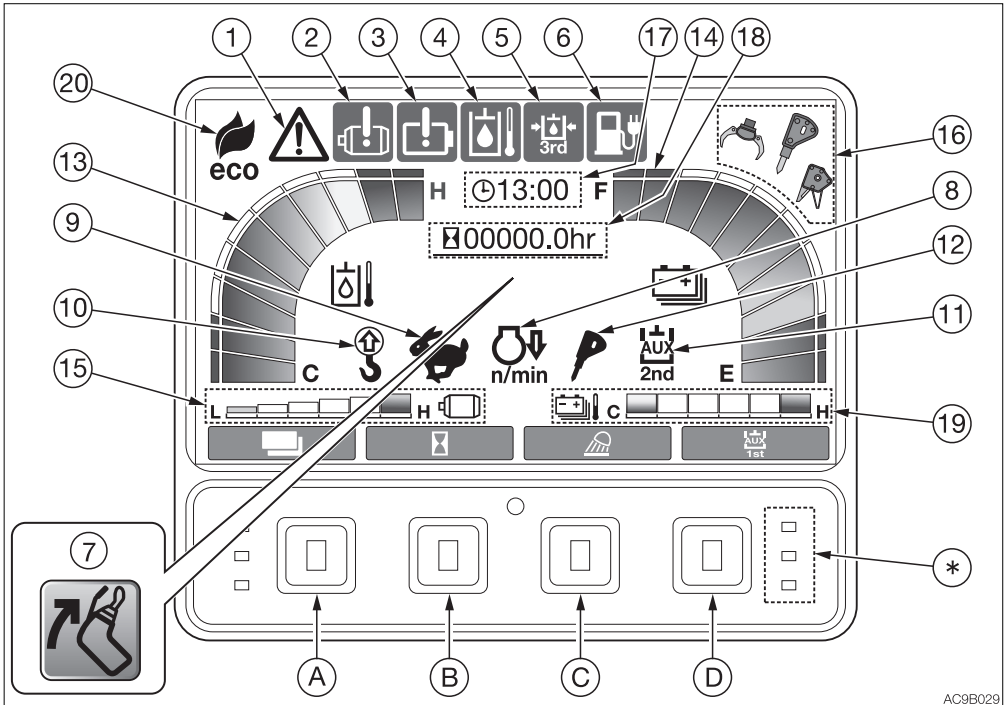
After one minute, the brightness is reduced by half.

Press the button (A to D) to return to the original brightness.

If no button is pressed for one minute, the brightness is reduced by half.



## MAIN MENU SCREEN



AC9B029

For explanation purposes, all lamps on this page are in the lit condition. This screen image is quite different from that of the real operation. In the actual operation, if a warning is given or any function is selected, the corresponding symbol appears enlarged at the center of the display for approx. one second.

\*: LED lamps  
Indicate the state of the machine.

- Red lamp (upper) flashes  
..... There is a problem in the machine.
- Yellow lamp (middle) lit  
..... Being charged or being operated wired.
- Green lamp (lower) lit  
..... Charging is complete.



## WARNING LAMPS

**IMPORTANT: If a warning lamp flashes and an alarm is sounded, immediately stop all operations and check the corresponding component.**

### 1. Vehicle emergency lamp

This lamp is displayed enlarged for one second, then flashes and an alarm sounds if there is a problem with the machine. Go to the Error code display from the Menu screen, get the vehicle error code number, and consult your sales or service dealer. Refer to “Menu screen” on page 2-15. Refer to “(5) Error code display” on page 2-19.

### 2. Drive system warning lamp

This lamp flashes and an alarm is sounded if a problem occurs in the drive system while the motor is running.

### 3. Lithium ion battery warning lamp

This lamp flashes and an alarm is sounded if a problem rises in the battery pack while the motor is running.

Refer to “Battery pack error code list” on pages 6-20 to 6-23.

### 4. Hydraulic oil temperature warning lamp

Red ... This lamp flashes if the hydraulic oil temperature becomes abnormally high while the motor is running.

Blue... This lamp flashes if the hydraulic oil temperature is low (under 6°C).  
The motor RPM is controlled.

### 5. Third auxiliary hydraulic warning lamp

This lamp starts flashing and an alarm sounds if the fixed side (left “e”) pressure of the third auxiliary drops abnormally while the motor is running, or while the quick-hitch is being used for changing the attachment.

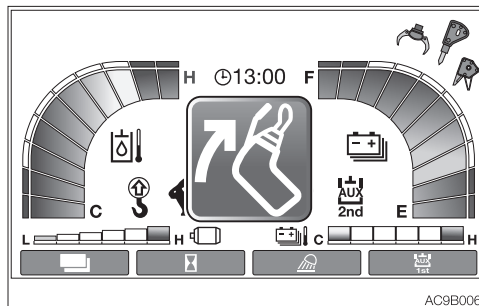
It also flashes and an alarm sounds if the lever lock is in the lock position.

### 6. Lithium ion battery level warning lamp

This lamp flashes when the lithium ion battery level becomes low while the key switch is in the ON position.

The lamp turns on when the machine is being operated wired.

### 7. Safety start warning lamp



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

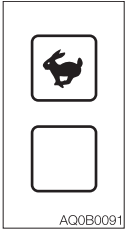


## INDICATORS

### 8. Deceleration indicator lamp

This lamp turns on when the deceleration button is pressed. The lamp lights up to indicate that the motor is in the deceleration mode at low speed.

### 9. Travel speed indicator lamp



..... High-speed travel

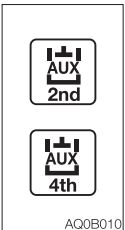
..... Low-speed travel

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

### 10. Lift overload warning indicator lamp

This lamp turns on when the lift overload warning switch is turned on.

### 11. Auxiliary 2nd/4th select indicator lamp



..... Auxiliary 2nd is selected.

..... Auxiliary 4th is selected.

### 12. Auxiliary 1st one-way (one-way circuit) indicator lamp



..... Auxiliary 1st auto tank is selected.

..... Auxiliary 1st one-way is selected.

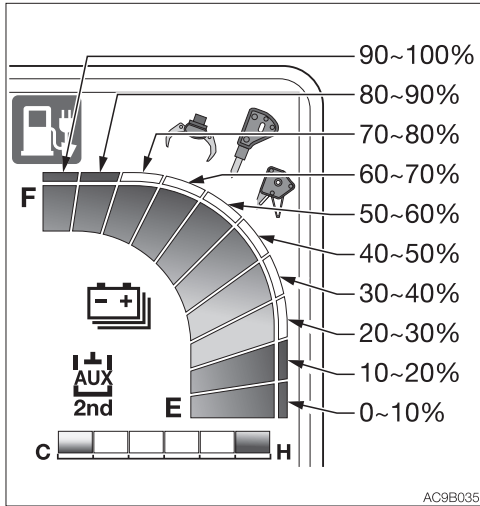
No display: .... Two-way (two-way circuit) is selected.

### 13. Hydraulic oil thermometer

This instrument indicates the temperature of the hydraulic oil. The level must be within the blue range during machine operation. The red range indicates overheat condition.



### 14. Lithium ion battery meter

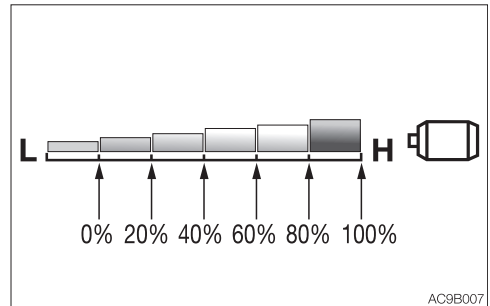


This meter indicates the amount of power left in the lithium ion battery. Be sure to charge the battery before it runs out of power.

**Note:** If the lithium ion battery level drops to 10%, the motor speed is controlled to 50%.

If the lithium ion battery level drops further, the lowest scale mark flashes.

### 15. Motor speed setting display



This gauge displays the motor speed settings set with the speed controller. When the gauge is in the blue or white range, the motor speed is low to medium. When the gauge is in the red range (80% or more), the motor speed is high.

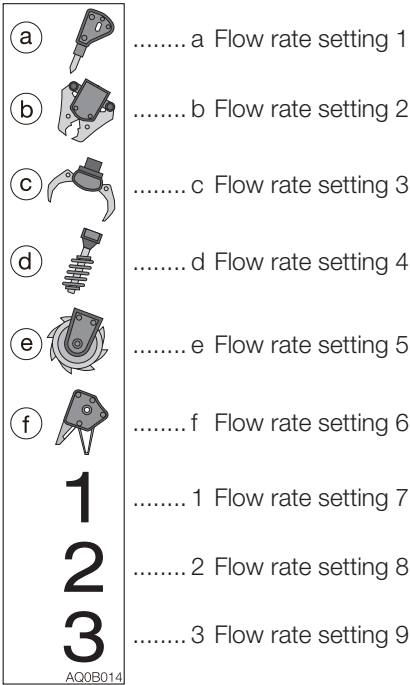
**Note:** The machine is not faulty if the gauge is in the red range. Operating the machine with the gauge in the blue or white range is energy-saving and will help conserve the global environment.





**16. Auxiliary 1st flow rate indicator lamp**

This lamp lights up to indicate which flow rate setting is selected in the auxiliary 1st.



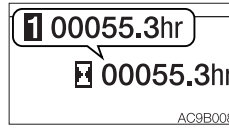
Refer to “Auxiliary 1st flow rate setting” on page 2-17.

**17. Time indicator**

Displays the time set.  
Refer to “Time setting” on page 2-21.

**18. Hour meter/Trip meter**

• **Hour meter**



Displays the total motor 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 “Trip meter setting” on page 2-16.

**19. Lithium ion battery thermometer**

This instrument indicates the temperature of the lithium ion battery.  
The level must be within the white range during machine operation.  
The red range indicates overheat condition

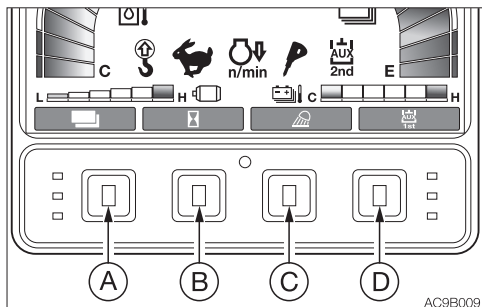
**20. ECO mode indicator lamp**

This lamp lights up when the ECO mode is selected by the ON/OFF setting. If the machine is not being operated, the motor stops.

Refer to “3. ON/OFF setting” on page 2-18.



## SCREEN CONTROL KEY



**Note:** Do not press the symbol keys on the display. The LCD could be damaged if the symbol keys are pressed hard. For actual operation, press the push button keys located at the bottom of the screen.

### A. Menu key

Use this key to switch between the Home screen and the Menu screen. This key is also used to cancel changes made in each setting. The screen returns to the Home screen if this key is pressed in the information screen.

### B. Hour meter key

This hour meter symbol is displayed in the initial screen. Pressing this key changes the meter display in the following order. Trip meter 1, Trip meter 2, Trip meter 3, Hour meter.

Down (↓) key

Use this key to move the cursor ► downward and to decrease the value in each setting. Press and hold this key for one second to rapidly decrease the value.

### C. Light key

Used to turn ON or OFF the lights.

Up (↑) key

Use this key to move the cursor ► upward and to increase the value in each setting. Press and hold this key for one second to rapidly increase the value.

### D. Auxiliary 1st key

The auxiliary 1st symbol is displayed in the initial screen. Pressing this key changes the symbol display in the following order. Auxiliary 1st setting 1, Auxiliary 1st setting 2, Auxiliary 1st setting 3.

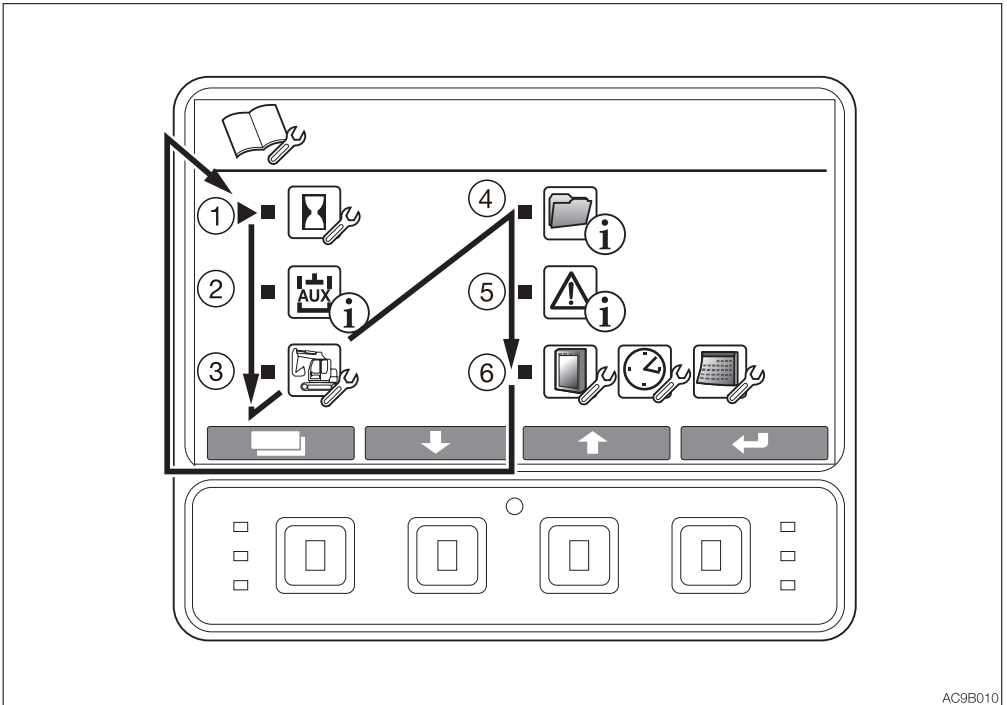
Enter key

Use this key to confirm or execute the setting made by each key. To clear the trip meter being displayed, press and hold this key for three seconds.



## SCREEN NAVIGATION

- Menu screen



AC9B010

Press the Menu key to go the Menu screen while in the Home screen.

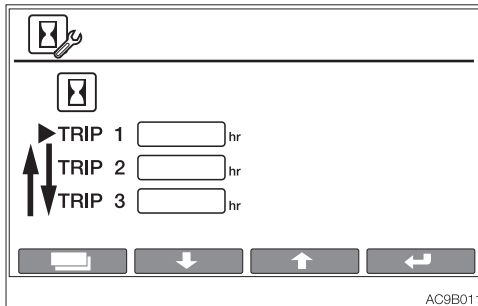
- (1) Trip meter setting
- (2) Auxiliary line flow rate display
- (3) Machine settings
- (4) Data display
- (5) Error code display
- (6) LCD setting/Date and time setting

Move the cursor ► with the Up (↑) or Down (↓) key to go to the desired item to be set, and then press the Enter key to confirm. The screen returns to the Home screen if the Menu key is pressed on the Menu screen.

The wrench symbol indicates the “setting is possible state” and the (i) mark indicates information only.



## (1) TRIP METER SETTING

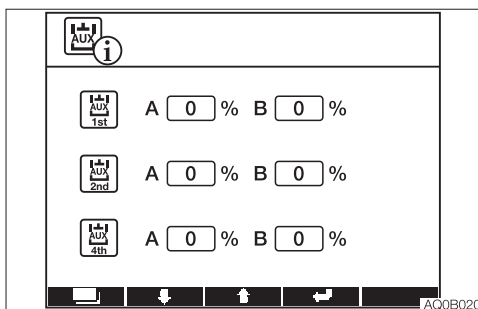


Three patterns of desired operating hours can be set.

Press the Menu key to return to the Menu screen.

Move the cursor ► with the Up (↑) or Down (↓) key, and press and hold the Enter key for three seconds to clear the flashing trip meter pointed by the cursor.

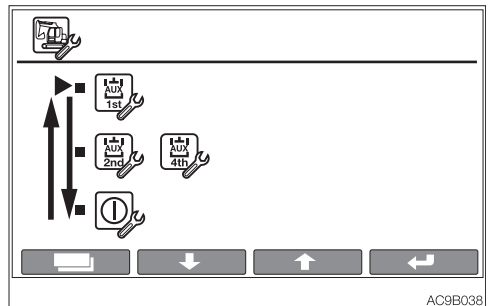
## (2) AUXILIARY LINE FLOW RATE DISPLAY



Displays the flow rate of the Auxiliary 1st, 2nd and 4th.

## (3) MACHINE SETTINGS

### • Machine setting screen

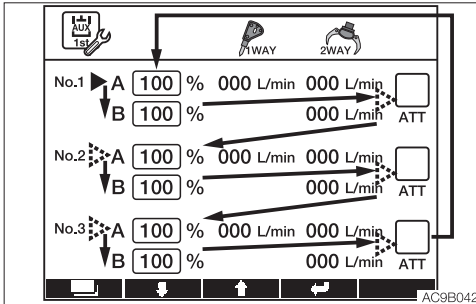


The settings made to the machine can be changed. Move the cursor ► with the Up (↑) or Down (↓) key to go to the desired item to be set, and then press the Enter key to confirm.

To return to the Menu screen, press the Menu key.



### 1. Auxiliary 1st flow rate setting

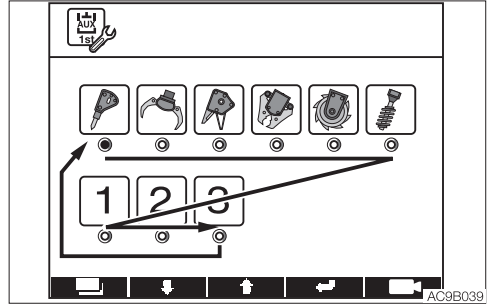


Three flow rate patterns can be set in the auxiliary 1st.  
Refer to the trip meter setting for the key operation. To move the cursor ► in the direction of the arrow, use the Down (↓) key. To move the cursor ► in the opposite direction of the arrow, use the Up (↑) key.

Initial condition	Standard flow	Variable range
Auxiliary 1st No.1	100%= 34 L/min (9 US gpm)	10 to 100%
Auxiliary 1st No.2	75%= 26 L/min (6.9 US gpm)	10 to 100%
Auxiliary 1st No.3	50%= 17 L/min (4.5 US gpm)	10 to 100%

The table shows the 1-way flow rate when there is no load.

**Note:** The 1-way flow can be performed only when the switch (A) is used.



Pressing the Enter key while the cursor ► is at “ATT” goes to the attachment select screen.

Pressing the Down (↓) key moves the cursor ● in the direction of the arrow.

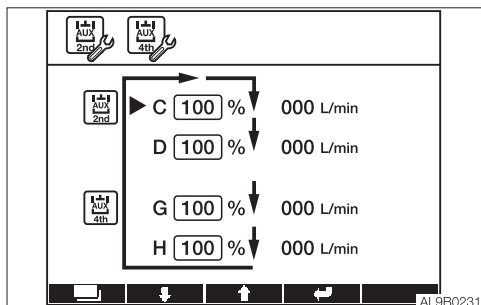
Use the Up (↑) key to move the cursor ● in the opposite direction of the arrow.

Move the cursor ● to the desired symbol or the number, and then press the Enter key to confirm.

The selected symbol will appear at the upper right of the Home screen.



## 2. Auxiliary 2nd/4th flow rate setting



One pattern of the auxiliary 2nd/4th flow rate can be set.

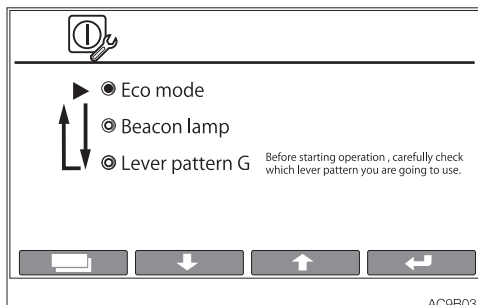
Initial condition	Standard flow	Variable range
Auxiliary 2nd	C/D 100%= 11 L/min 2.9 US gpm)	10 to 100%
Auxiliary 4th	G/H 100%= 11 L/min 2.9 US gpm)	10 to 100%

The table shows the 1-way flow rate when there is no load.

**Note:** The 1-way flow can be performed only when the switch (A) is used.

Refer to the trip meter setting for the key operation. To move the cursor ► in the direction of the arrow, use the Down (↓) key. To move the cursor ► in the opposite direction of the arrow, use the Up (↑) key.

## 3. ON/OFF setting



The ECO mode, beacon lamp and lever pattern G can be set to ON or OFF.

To return to the machine setting screen, press the Menu key.

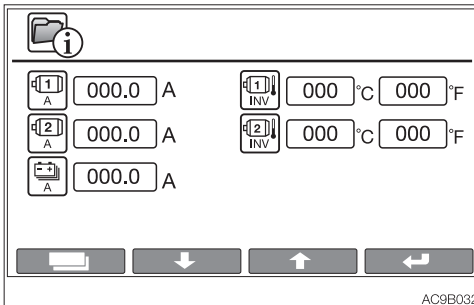
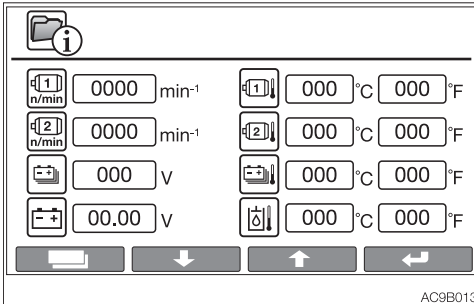
Use the Up (↑) or Down (↓) key to move the cursor (►), and then press the Enter key to turn on or off the blue circle.

Blue circle is lit: ON

Blue circle is off: OFF



#### (4) DATA DISPLAY

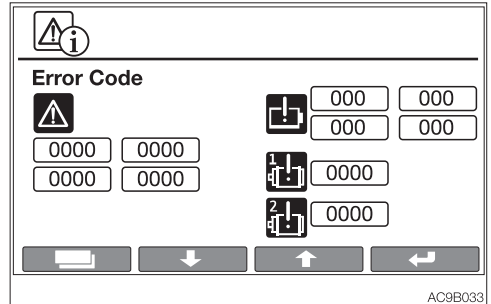


Displays various data. The setting cannot be changed.  
Use the Up (↑) or Down (↓) key to switch among the data items to be displayed.

Display items

- Motor RPM
- Battery voltage
- Motor temperature
- Lithium ion battery temperature
- Hydraulic oil temperature
- Motor current
- Lithium ion battery current
- INV temperature

#### (5) ERROR CODE DISPLAY



..... Vehicle error code

Displays four error codes, with the latest code in the upper left.

..... Battery Management Unit (BMU) error code

Displays four error codes, with the latest code in the upper left.

..... Motor 1 error code

Displays the latest error code.

..... Motor 2 error code

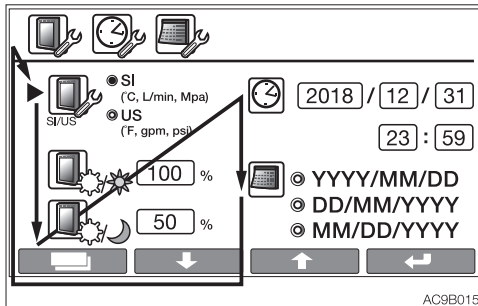
Displays the latest error code.

Refer to “Battery pack error code list” on pages 6-20 to 6-23.

**IMPORTANT: If an error code appears, immediately stop the operation and contact a Takeuchi sales or service outlet for help.**

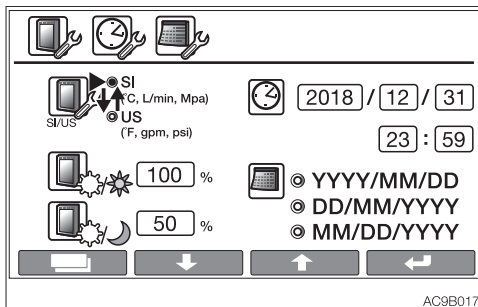


## (6) LCD SETTING/DATE AND TIME SETTING



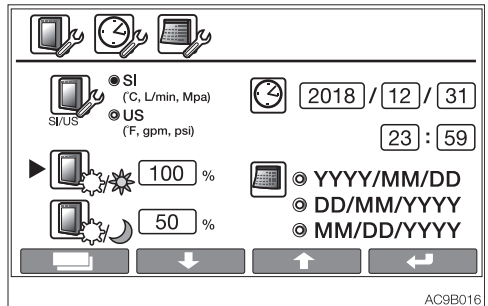
The display settings can be changed. Use the UP (↑) or Down (↓) key to move the cursor ▶. Press the Menu key to return to the Menu screen.

### • Unit setting



Switch between SI unit and US units. Move the blue flashing light to the desired unit position, and then press the Enter key to confirm.

### • Brightness setting



The brightness of the LCD is set to between 1 and 100%. The brightness changes each time the adjustment is made. Pressing the Enter key upon selecting the brightness setting symbol causes the value to flash for editing. To cancel editing, press the Menu key. Use the Up (↑) or Down (↓) key to change the value, and then press the Enter key to complete editing.

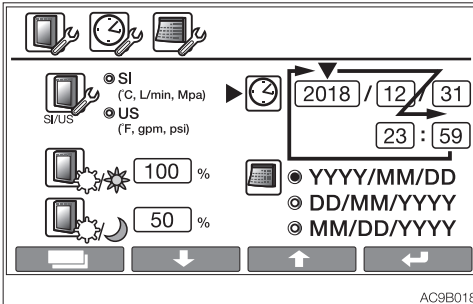
- (1) Day mode: initial setting value is 100%
- (2) Night mode: initial setting value is 50%

Adjustment to the night (day) mode while in the day (night) mode cannot be synchronized. For the key operations, refer to “Screen control key” on page 2-14.





• Time setting



The year, month, date, hour and minute can be set. (Effective year range: 2010 to 2099)

- Move the cursor ► to the clock symbol, and then press the Enter key. The cursor ▼ will be shifted to the place for setting the year.

Press the Enter key again, and then enter the year. (The year display keeps flashing during editing.)

Press the Enter key to confirm. The month, date, hour and minute can be set using the same procedure for the year.

- Move the cursor ► to the calendar symbol, and then press the Enter key to change the format of “Year-Month-Date” to “Date-Month-Year” or “Month-Date-Year”.  
For the key operations, refer to “Screen control key” on page 2-14.

**IMPORTANT:** If a past date is set, the battery pack error code 105 may appear.

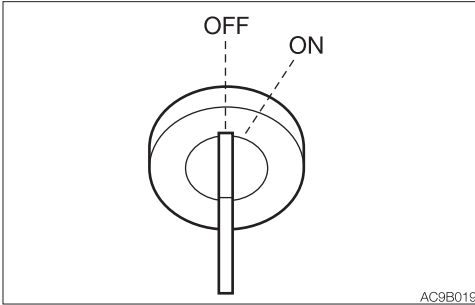
## SWITCHING IMAGES

Turn on the light switch on any screen to decrease the display brightness and to enter the “evening mode”.



## SWITCHES

### KEY SWITCH

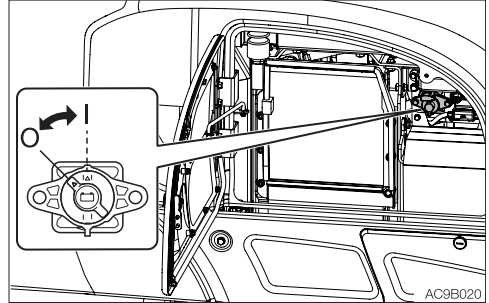


**IMPORTANT:** Do not repeatedly switch the key from OFF/ON to ON/OFF over a short period. Doing so will cause electrical breakdown.

- OFF ..... Position for stopping the motor and inserting or removing the key.
- ON ..... Position in which the motor is running. At this position, all the electrical equipment is functional.

### LEAD-ACID BATTERY SWITCH

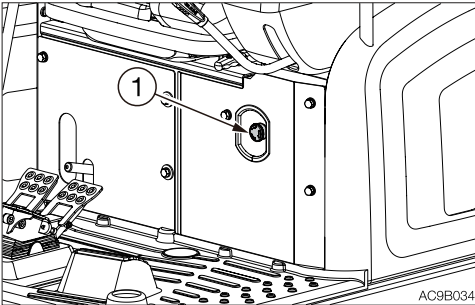
**IMPORTANT:** Never turn this switch to the OFF (O) position while the motor is running. Doing so will cause electrical breakdown.



- OFF (O).... Cut off the electrical circuit. Be sure to set this switch to the OFF (O) position when storing the machine for a long period, or when performing maintenance of the electrical system.
- ON (I).... Connects the electrical system. Check that this switch is in the ON (I) position before starting the motor.



## EMERGENCY STOP SWITCH



In an emergency, this switch is used to shut down the machine by stopping charging or the motor.

1. Press the switch (1).
2. To resume the operation, turn it counterclockwise.

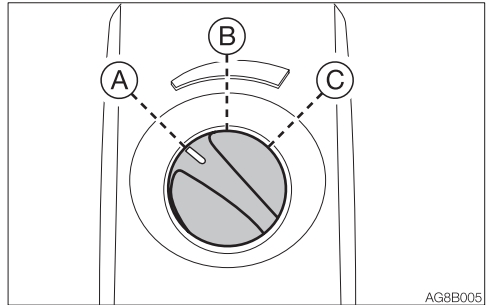
ON .....Machine is normal.

OFF .....Lead-acid battery is run down.

Electric wiring is disconnected. The key switch is in the OFF position. The emergency stop switch is activated.

**IMPORTANT:** Use the emergency stop switch to stop the machine only if the machine cannot be stopped when you stop the charger or the motor. Do not use the emergency stop switch if the normal stop procedure is available. Since the system is forcibly shut down, the normal shutdown procedure may not be done and the internal data may be left unsaved.

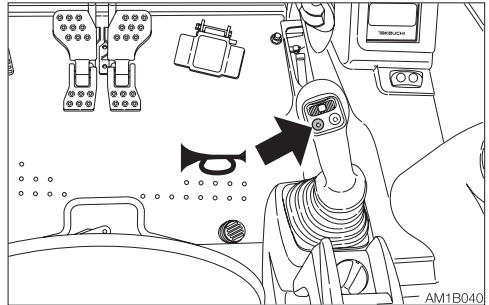
## SPEED CONTROLLER



This controller is used to control the maximum motor speed.

- (A).....Low speed
- (B) .....Medium speed
- (C) .....Maximum speed

## HORN BUTTON



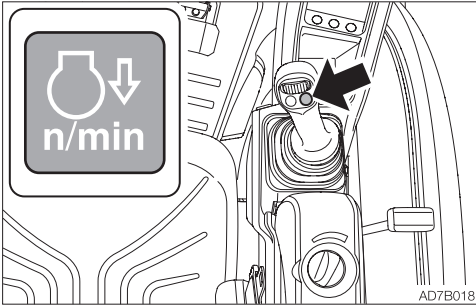
Press the button situated on the right operating lever to blow the horn.



## DECELERATION BUTTON

### WARNING

Before operating the deceleration button, set the operating lever to the neutral position and take your foot off the pedals. If the deceleration button is pressed while driving, the machine's operating speed will abruptly change resulting in a dangerous situation.

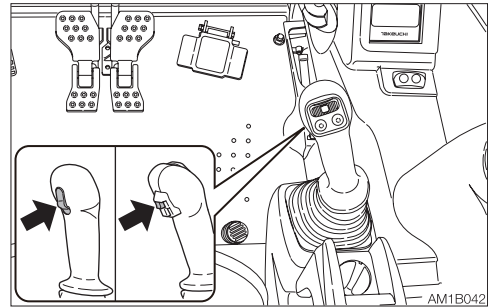


Press the button on the right operating lever to enter the deceleration mode. Press the button again to cancel the deceleration mode. For safety reasons, it is designed that the deceleration function is activated to enter the deceleration mode whenever the motor is started. Cancel the deceleration mode by pressing the deceleration button as necessary.

## TRAVEL SPEED BUTTON

### 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).

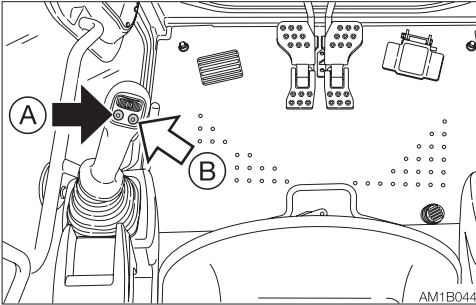


Press this switch to set the travel speed to 2nd (high) speed. Press it again to return to 1st (low) speed.



## AUXILIARY 1ST SWITCHES

### Auxiliary hydraulic buttons



Press these buttons to control the flow of the oil in the first auxiliary hydraulic lines.

- Proportional control of the auxiliary hydraulic circuit is not possible when using the A and B buttons.

(A).....Hydraulic oil flows to the left auxiliary line (a).

(B) .....Hydraulic oil flows to the right auxiliary line (b).

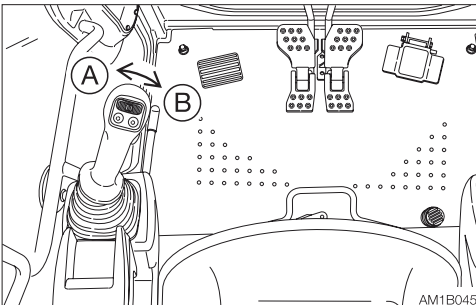
(B) .....Hydraulic oil flows to the right auxiliary line (b).

Refer to “Auxiliary hydraulic lines (If equipped)” on pages 2-33 to 2-37.

### Slider switch (Proportional control)

Proportional control allows the operator to meter the oil flow to the attachment. (Slow/ Fast and Fast/Slow)

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 first auxiliary hydraulic lines.

(A).....Hydraulic oil flows to the left auxiliary line (a).

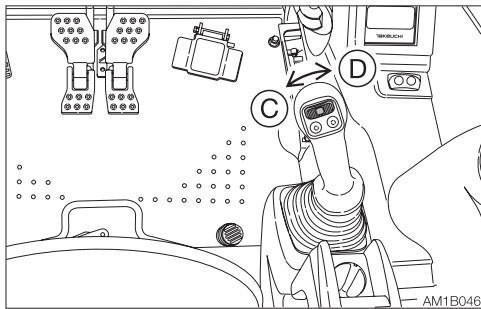


## AUXILIARY 2ND/4TH SWITCH (IF EQUIPPED)

### Slider switch (Proportional control)

Proportional control allows for slow-to-fast/  
fast-to-slow movement of attachment.

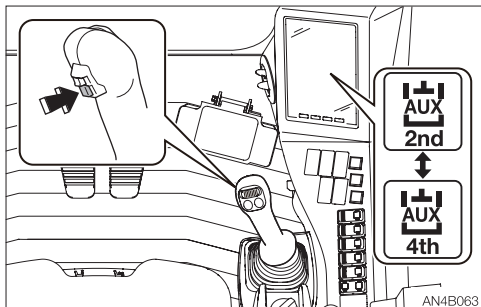
Example: If you move the slider switch half  
way, the attachment will move at  
approximately one-half the speed.



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).



To use the auxiliary 4th hydraulic line, press  
the auxiliary 2/4 select button to change to  
the operation of the auxiliary 4th.

Refer to “Auxiliary hydraulic lines (if  
equipped)” on pages 2-33 to 2-37.

## THIRD AUXILIARY HYDRAULIC SWITCH AND BUTTON (IF EQUIPPED)

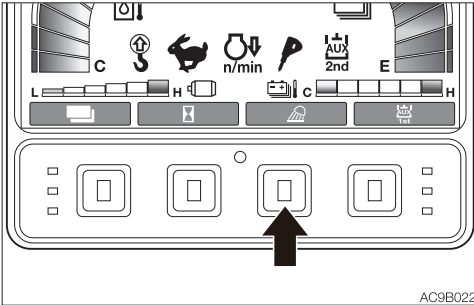
Refer to “Third auxiliary hydraulic switch and  
button (if equipped)” on page 2-36.

## AUXILIARY 2/4 SELECT BUTTON (IF EQUIPPED)

Refer to “Auxiliary 2/4 select button (if  
equipped)” on page 2-37.



## LIGHT SWITCH



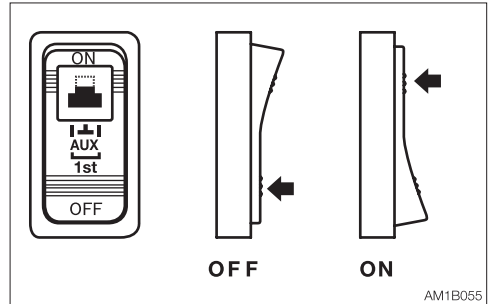
When this button is pressed with the key switch is ON, the lights turn on as follows:

ON .....Switch lamps, front light, boom light and tail lamps will be lit.

To turn off, press the switch again

## DETENT MODE SWITCH (AUXILIARY 1ST) (IF EQUIPPED)

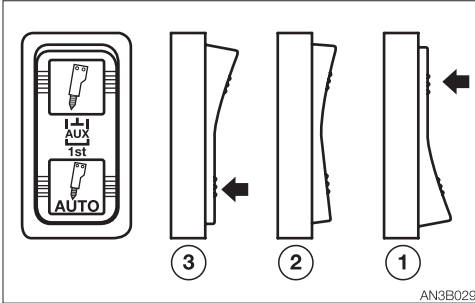
**IMPORTANT:** Do not operate the machine in the detent mode for a long time. Doing so will increase the hydraulic oil temperature and shorten the service life of the hydraulic components.



This switch is used to change the operation mode of the auxiliary 1st button (A). Pressing the ON side of the switch causes the auxiliary button (A) to enter the detent mode. Pressing the OFF side changes to the momentary mode.



### AUXILIARY 1ST AUTO TANK SWITCH



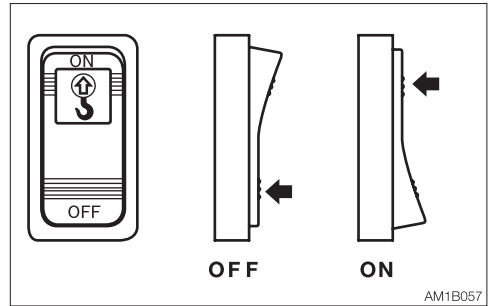
Use this switch to change the direction of hydraulic oil flow in the Aux. 1st line.

- (1) When using a hydraulic breaker (1-way flow)
- (2) When using a reversible attachment (2-way flow)
- (3) One-way flow can be set only when the button "A" of the Aux. 1 is pressed. (The tank circuit is automatically opened.)

### 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



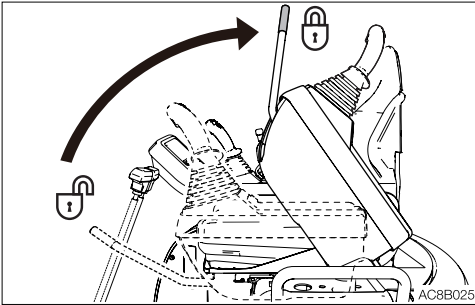


## LEVERS AND PEDALS

### 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 motor. 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.
- 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 the lock position and turn off the power. Also, be sure to lock the door and covers, take the key with you and store it in a specified place.



This device is for locking the hoe attachment, slew and travel functions.

When the lever is raised, the lever stand springs up and the controls are locked.

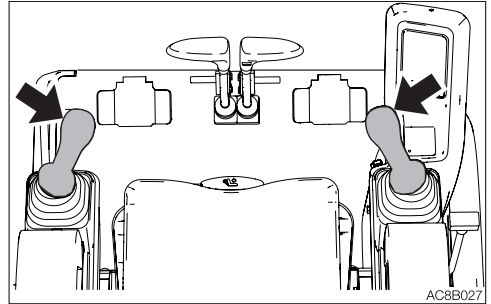
#### **Safety start function**

When the lever is in the unlock position, the motor cannot be started.

### 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.



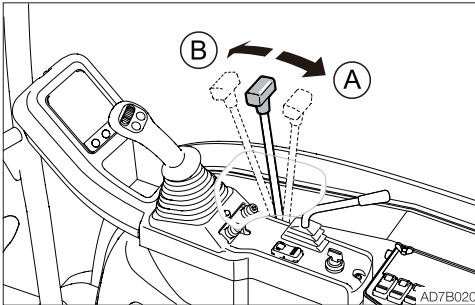
Use these levers to operate the boom, arm, bucket and upperstructure.

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

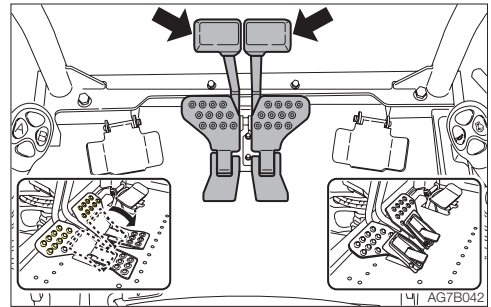
(B) .....Blade down

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 feet on the pedals unless operating it for traveling. If the pedal is accidentally depressed 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 lower portion of the pedals when not being used.

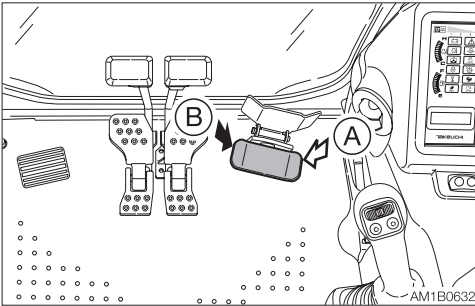
Refer to “Operating the travel levers/pedals” on page 3-12.



## BOOM SWING PEDAL

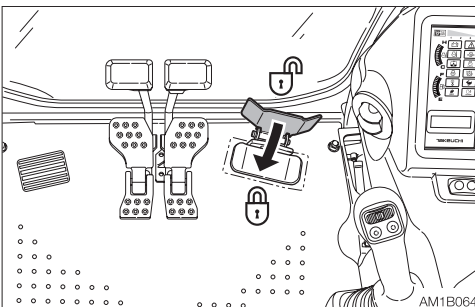
### **WARNING**

Keep the pedal cover lowered in the lock position when not using the boom swing function. Stepping on the pedal without the cover lowered may cause the machine to move suddenly and cause injury or death.



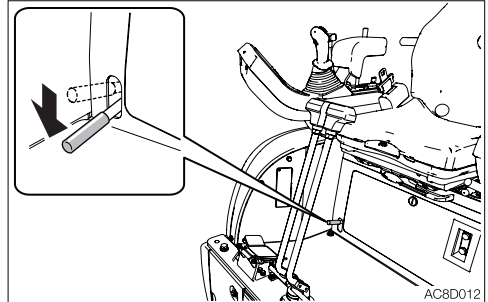
Use this pedal to operate the boom swing.  
(A).....Boom swing right  
(B) .....Boom swing left  
Refer to “Operating the boom swing” on page 3-17.

### Pedal lock



Set the pedal cover over the pedal to lock it.  
Raise 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.

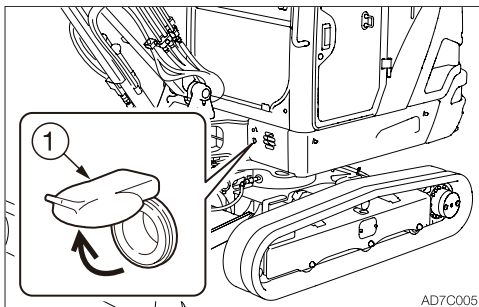
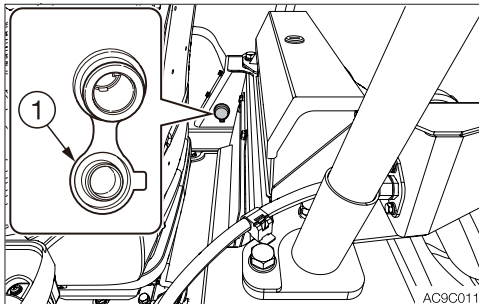


## ACCESSORIES

### POWER SOCKETS

#### WARNING

Use only those electric products which comply with the specifications of these sockets.



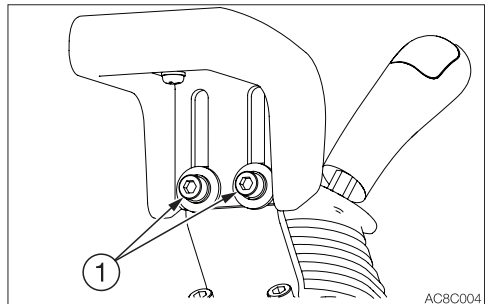
These sockets are electrical outlets. When using, be careful not to exceed the following ratings.

Front side of the machine: 24 V, 2 A

Rear side of the machine: 12 V, 1.5 A

To use, open the cap (1).

### ARMREST

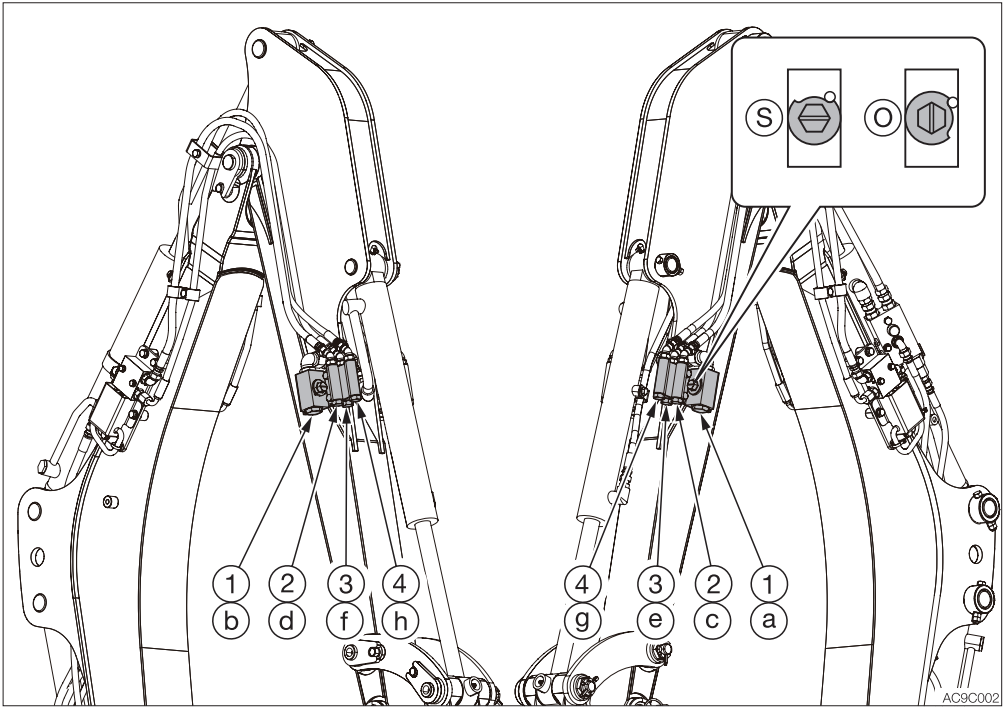


Adjusting the height

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)



### WARNING

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

- Immediately after the motor is stopped and while the safety lock lever is still in the unlock position, turn the key switch to ON and press each auxiliary hydraulic switch several times to release the pressure from the auxiliary hydraulic circuit.
- Press the air breather button to relieve the tank pressure.
- 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
- (4).....Fourth auxiliary hydraulic lines

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



### **Connecting the hydraulic circuits**

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

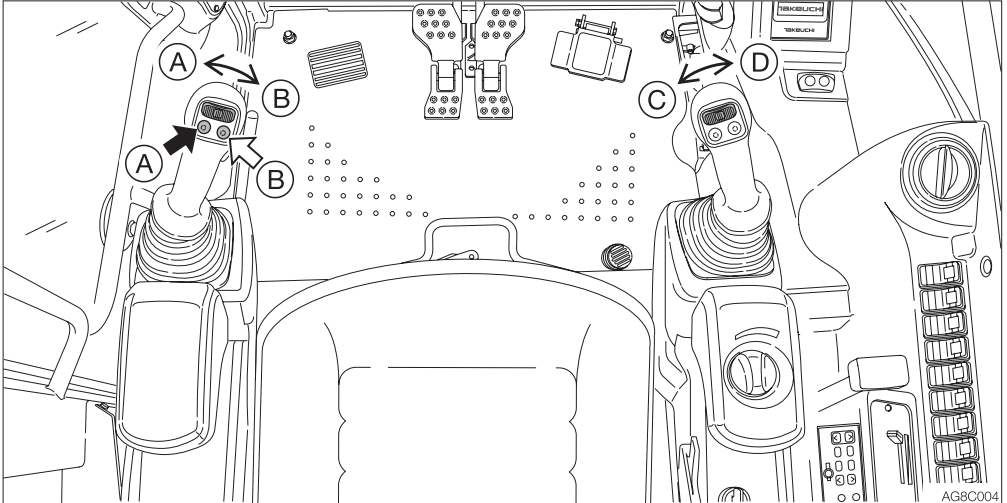
1. Release the pressure remaining in the lines, and then close the stop valve.  
Refer to “Releasing the residual pressure” on page 2-35.
2. Remove the plugs.
3. Connect the attachment hydraulic lines to ports (a/c) and (b/d). When installing a hydraulic breaker, connect the supply circuit to the port (a) and the return circuit to port (b).
4. Open the stop valves. When installing a hydraulic breaker, open the selector valve (1).
5. When connecting is complete, purge air from the hydraulic lines.
  - a. Start the motor and run it at low speed with no load for 10 minutes.
  - b. With the motor running at low speed, operate the auxiliary hydraulic switches repeatedly (approx. 10 times) to purge air from the hydraulic lines.
  - c. Stop the motor and wait for at least 5 minutes until all 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 2-35.
2. Disconnect the lines from the ports (a/c) and (b/d).
3. Install the plugs.



### Operating

Press the following buttons to control the flow of the oil in the first/second auxiliary hydraulic lines.

- (A).....Hydraulic oil flows to left auxiliary line (a).
- (B) .....Hydraulic oil flows to right auxiliary line (b).
- (C) .....Hydraulic oil flows to left auxiliary line (c).
- (D) .....Hydraulic oil flows to right auxiliary line (d).

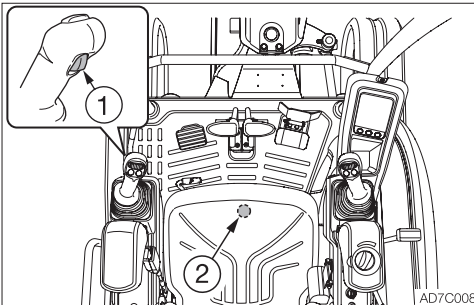
### Releasing the residual pressure

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.

Refer to “Operating the machine with an accumulator” on page 2-38.

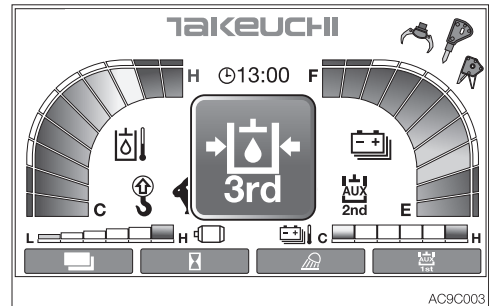


### Third auxiliary hydraulic switch and button (If equipped)



The 3rd auxiliary is primarily used for a hydraulic coupler, allowing a bucket to be quickly connected or disconnected. After the motor is started, hydraulic oil constantly flows into the pipe (e). This allows the pressure in the (e) side to increase, preventing the pin inserted on the bucket from coming out. If the pressure in the (e) side drops, a warning lamp starts flashing alerting the operator that the bucket may be disconnected. For a safety, 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 disconnected from the machine.

### Third auxiliary hydraulic warning lamp

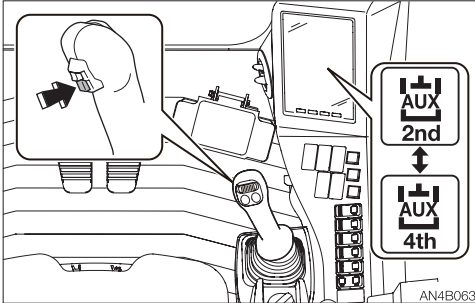


This lamp turns on and an alarm sounds if the auxiliary 3rd hydraulic pressure drops abnormally.





### Auxiliary 2/4 select button (If equipped)



This button is used to change from second auxiliary operation to fourth auxiliary operation.

Pressing this button displays the second auxiliary on the LCD to indicate that the second auxiliary operation is enabled.

Pressing this button again displays the auxiliary 4th on the LCD to indicate that the auxiliary 4th operation is enabled.

The actual operation is performed with the auxiliary 2nd/4th switch (slider switch).

Refer to “Auxiliary 2nd/4th switch (If equipped)” on page 2-26.

### Setting the flow rate

The flow rate in the auxiliary 1st, 2nd and 4th can be set to the desired values.

For details, refer to “Auxiliary 1st flow rate setting” on page 2-17 and “Auxiliary 2nd/4th flow rate setting” on page 2-18.

**IMPORTANT: The set values are not guaranteed values. They should be used as estimates.**



## 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:

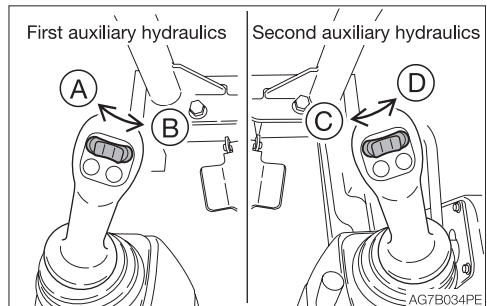
- Do not disassemble.
- Do not allow flame near or throw it into a fire.
- Do not drill, weld or fuse.
- Do not subject it to physical shock such as hitting, rolling or dropping.
- Before disposing of the unit, the sealed gas must be drained. Contact a Takeuchi service agent for help.

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 motor is stopped, provided that the pressure is done within 10 minutes after the motor stopping.

### 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. Release residual pressure within 10 min of stopping the motor.

1. Return the throttle control to the low speed position.
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 motor.
5. Turn the key switch to the ON position.



6. Move or press the auxiliary hydraulic switches several times to release the residual pressure in the circuitry.
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 motor is stopped

Perform this operation within 10 minutes after the motor is stopped.

1. Sit at the operator's seat.
2. Lower the safety lock lever to the unlock position.
3. Turn the key switch to the ON position.
4. Slowly push the operating lever forward to lower the boom.



## LIFTING SAFETY DEVICE (IF EQUIPPED)

The lifting safety devices include an emergency shut-off valve and an overload warning device.

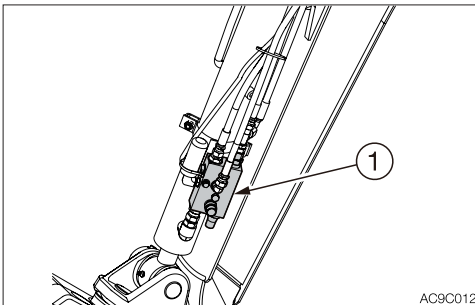
### Emergency shut-off valve

#### **WARNING**

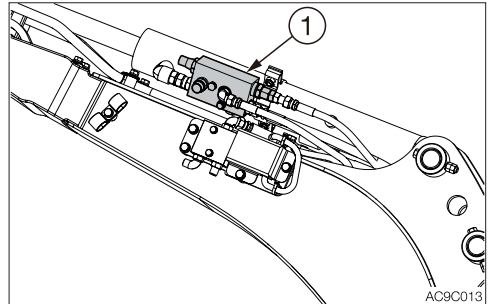
- If the boom or arm stops due to the breakage of hose, immediately move away from the load being lifted and go to a safe location.
- If the hose of the emergency shut-off valve gets broken, immediately stop the operation.
- Since the emergency shut-off valve (1) is a safety device, you must not disassemble 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.

The emergency shut-off valve (1) prevents the boom or arm from falling rapidly in case the hydraulic hose is broken and there is a sudden drop in pressure.

### Boom



### Arm (option)



If the hose breaks and the emergency shut-off valve (1) is activated to stop the operation of boom or arm, lower the boom or arm by slowly operating the lever while ensuring safety. Ask your sales or service dealer for repair.

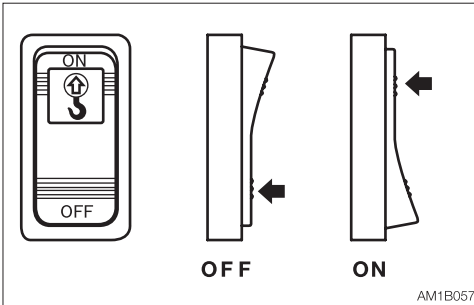


## Overload warning device

### **WARNING**

If the load is not reduced 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.)



## Lift overload warning switch

OFF ....Off

ON .....On

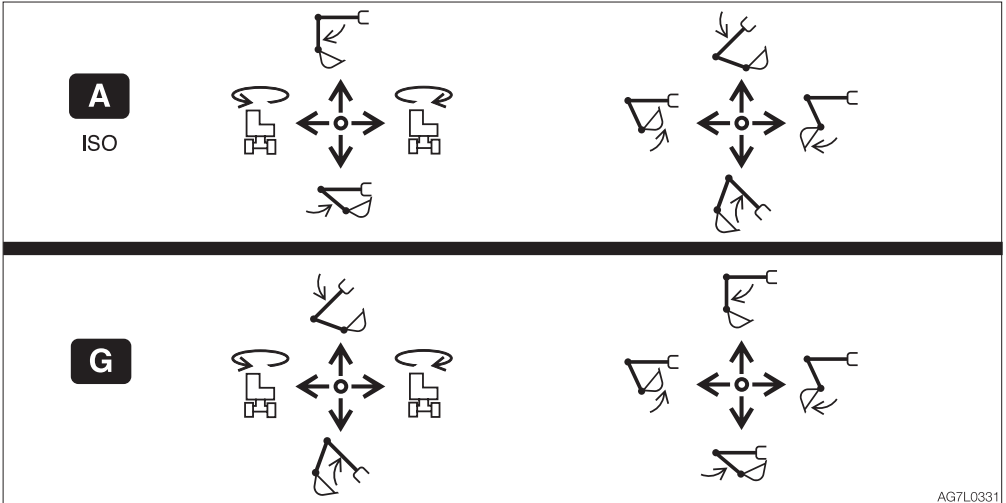


## SELECTING A LEVER PATTERN

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

**⚠ WARNING**

Before starting operation, carefully check which lever pattern you are going to use.



## SWITCHING THE LEVER PATTERN

Refer to “3. ON/OFF setting” on page 2-18.



# OPERATION



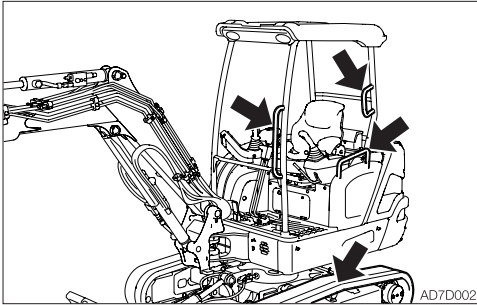


## **BEFORE STARTING OPERATION**

### **GETTING ON OR OFF THE MACHINE**

#### **WARNING**

- Do not jump on or down from the machine. Never attempt to get on or off a 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 walk-around inspections once a day before starting the motor for the first time that day.

### **DAILY INSPECTION**

Perform daily inspections once a day before starting the motor for the first time.

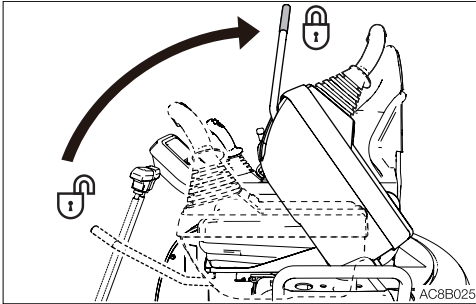




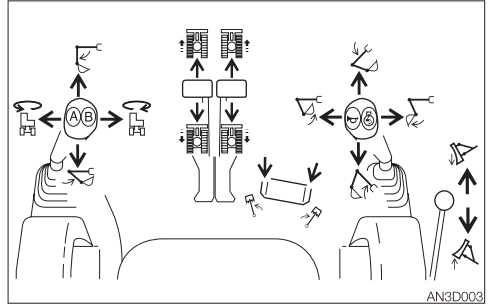
## **STARTING AND STOPPING THE MOTOR**

### **BEFORE RUNNING THE MOTOR**

1. Adjust the seat to 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.

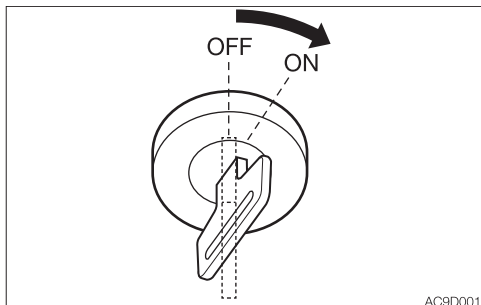


## STARTING THE MOTOR

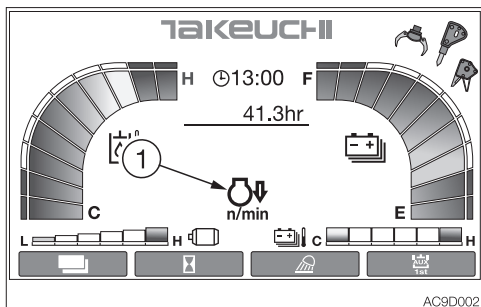
### **WARNING**

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

### Normal starting



1. Turn the key to the ON position and start the motor.  
The motor does not start unless the safety lock lever is in the lock position at this point.  
Refer to “Safety lock lever” on page 2-29.



2. Check that the warning lamps are off.

- Note that only the deceleration lamp (1) turns on.

For safety reasons, it is designed that the deceleration function is activated to set the motor revolutions to low speed whenever the motor is started.

Cancel the deceleration mode by pressing the deceleration button as necessary.

**Note:** Auxiliary 3rd hydraulic pressure warning lamp is displayed enlarged; this is not a malfunction.

- Turn on the light switch to check that the boom light, front light and tail lamps turn on.
- Check the battery level.

If a lamp does not light or the alarm is not sounded, there may be a failure in the machine. Ask a Takeuchi service agent for repair.

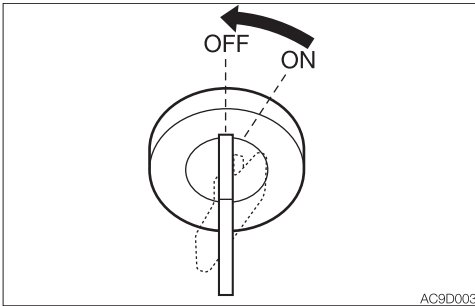
3. Press the deceleration button to cancel the deceleration mode.



## STOPPING THE MOTOR

**IMPORTANT:** Do not stop the motor suddenly when operating with heavy loads or at the maximum speed. Never stop running the motor suddenly except in emergency.

1. Move all levers to the neutral position.



2. Turn the starter key to the OFF position to stop the motor.

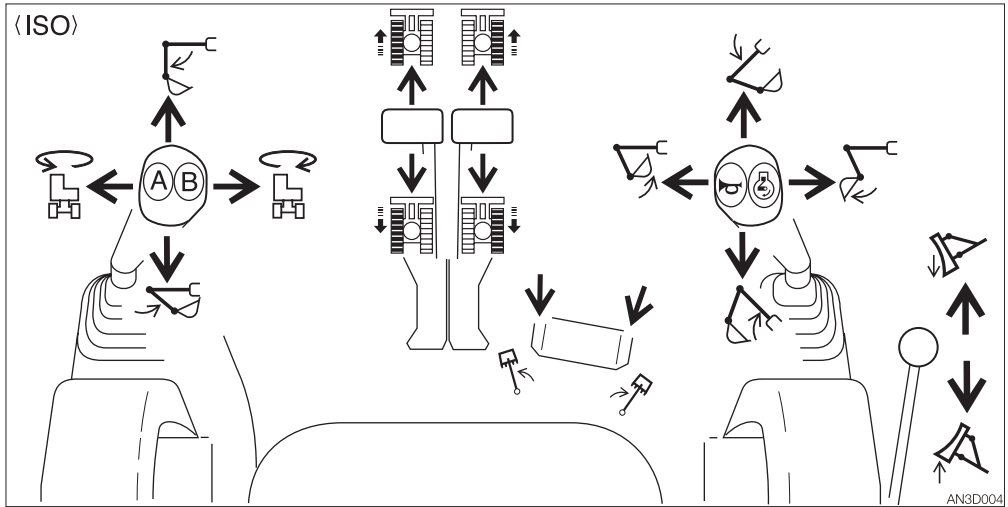


# OPERATING THE MACHINE

## 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.



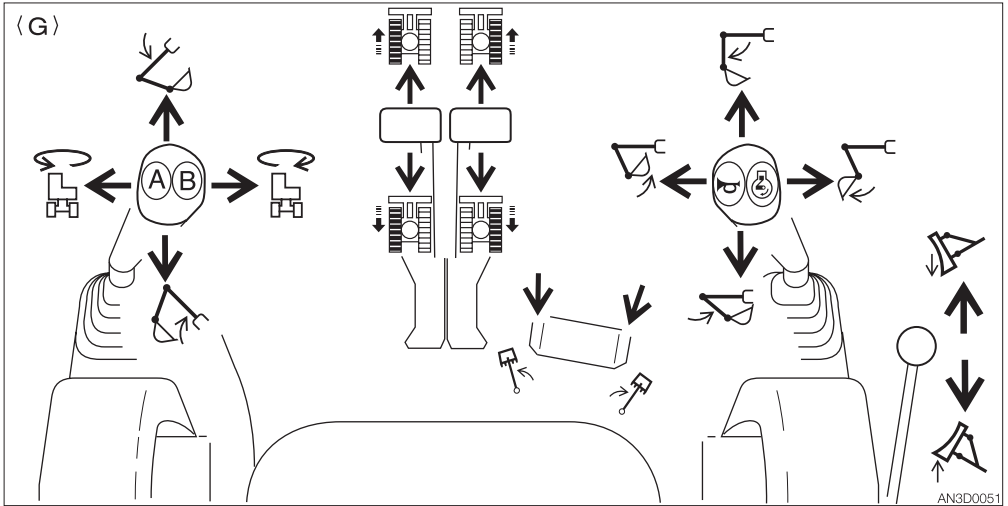
	Left crawler forward		Right crawler forward
	Left crawler reverse		Right crawler reverse
	Arm out		Boom lower
	Arm in		Boom raise
	Upperstructure slew left		Bucket load
	Upperstructure slew right		Bucket dump
	Boom swing left		Dozer blade lower
	Boom swing right		Dozer blade raise



## LEVER PATTERN (G PATTERN)

### 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 “3. ON/OFF setting” on page 2-18.



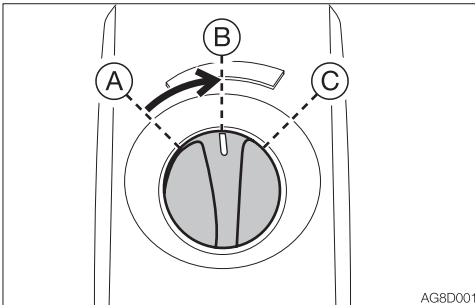
## WARMING UP THE MACHINE (HYDRAULIC OIL)

### **WARNING**

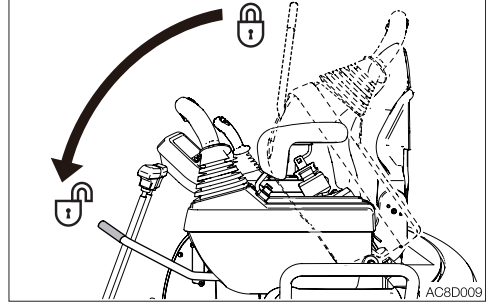
Operating the working equipment without warming up the machine (hydraulic oil) is dangerous, as the working equipment cannot respond to controls quickly or may move in unexpectedly, and the safety devices may not operate properly. Be sure to sufficiently warm up the machine.

**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).

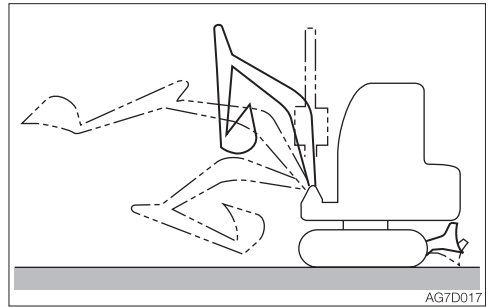
### Normal warm-up



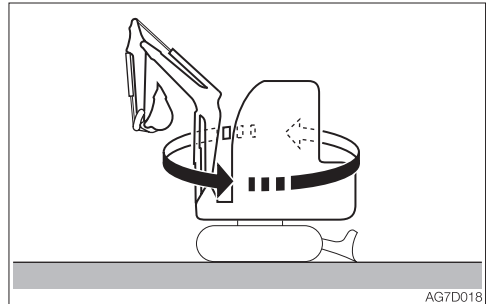
1. Turn the speed controller to the middle position.



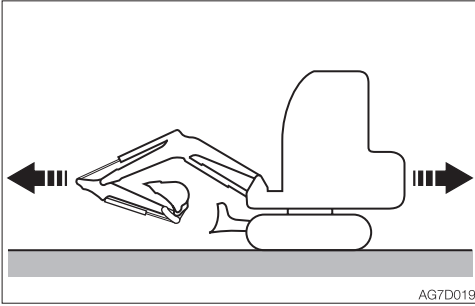
2. Fully lower the safety lock lever to disengage the lock and lift the bucket from the ground.



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.

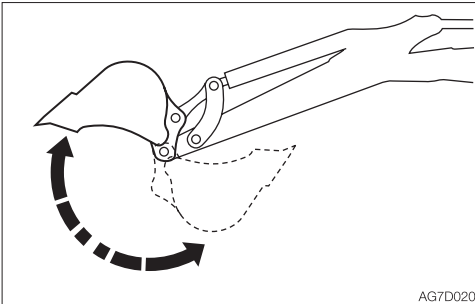


AG7D019

5. Travel slowly forward and in reverse several times.

### Warm-up in cold climates

1. Perform the normal warm-up procedure.



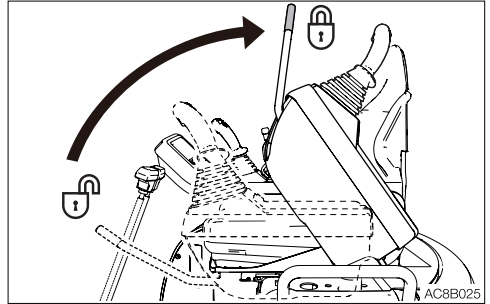
AG7D020

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

1. Check that all warning lamps are off and meters are functioning properly.
2. Check that there are no irregularities in the sound and vibrations.



AC8B025

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

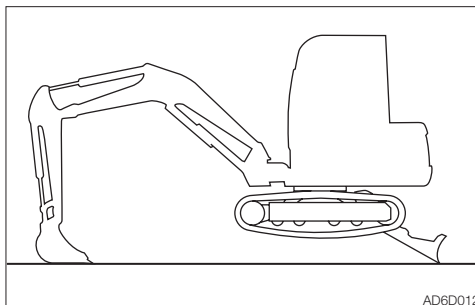
- Always operate the machine with the crawler width extended to 1300 mm (51.2 in.) to maximize the machine stability. If the machine is operated with the crawler width narrowed (980 mm, 38.6 in.), the machine may tip over due to its poor stability.
- If the machine must be operated with the narrowed 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 maximum machine stability.

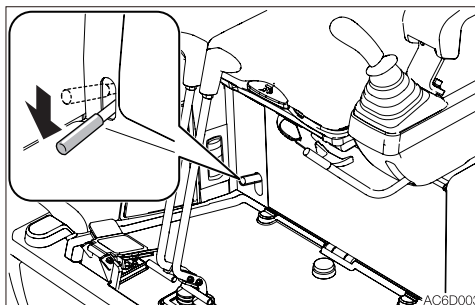
### Switching the crawler width

Perform the operation on flat rigid ground with no obstacles around.



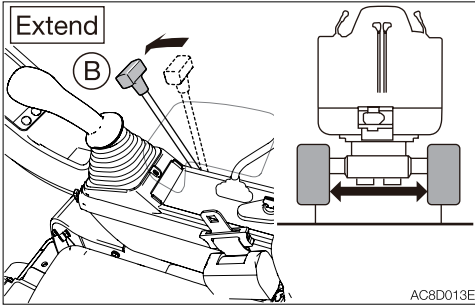
1. Raise the machine body by using the hoe attachment and the dozer blade.

**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.



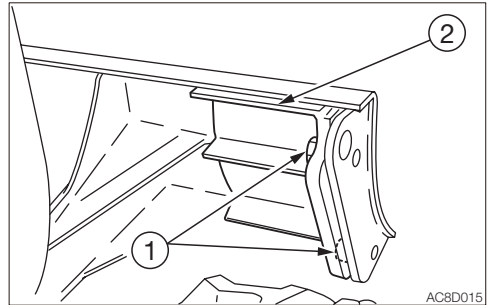


3. Push the blade lever forward (B) to increase the crawler width (1300 mm or 51.2 in.).

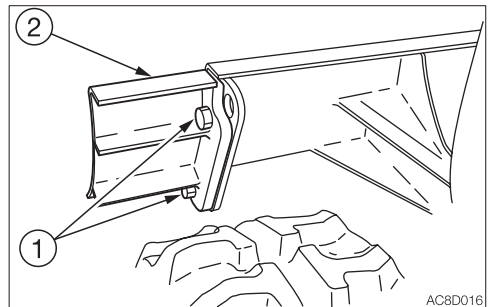
If necessary, extend the blade width by changing the plate (2).

Refer to "Switching the blade width" on page 3-11.

## SWITCHING THE BLADE WIDTH



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



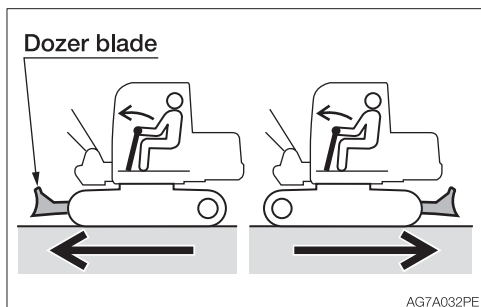
2. Attach the right the plate (2) to the left, the left plate (2) to the right.  
3. Tighten plate (2) with bolts (1).



## OPERATING THE TRAVEL LEVERS/ PEDALS

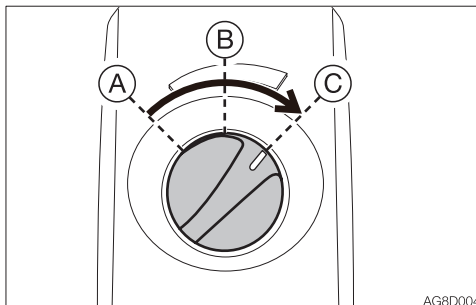
### **WARNING**

- 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.

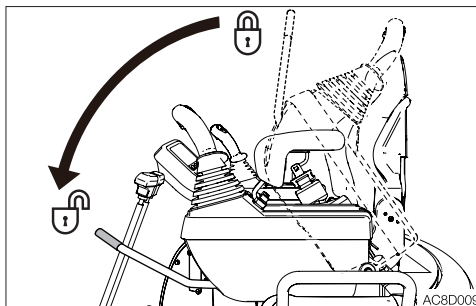


- Before operating the travel levers/pedals, make sure that the dozer blade is to the front of the operator's seat. Remember that when the dozer blade is to the rear of the operator's seat, the travel levers/pedals must be operated in the reverse direction from when it is to the front.
- Clear all obstacles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

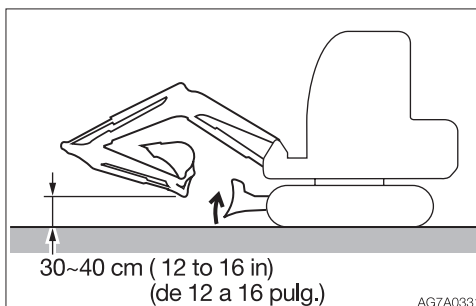
## Moving the machine forward and backward



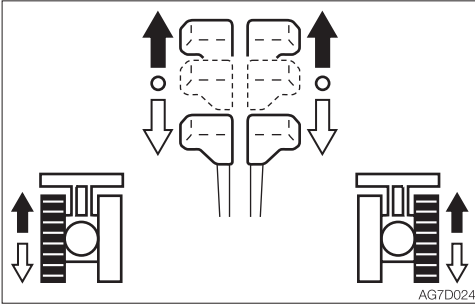
1. Turn the speed controller clockwise to increase the motor speed.



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

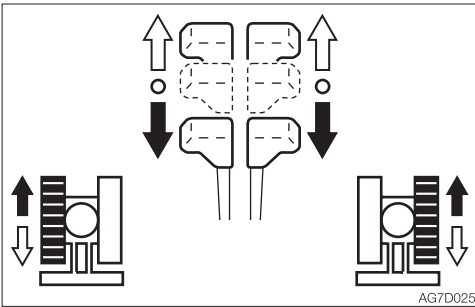


3. Fold the hoe attachment and lower it 30 to 40 cm (12 to 16 in.) above the ground.
4. Lift the dozer blade.
5. Operate the left and right travel levers as below.



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:

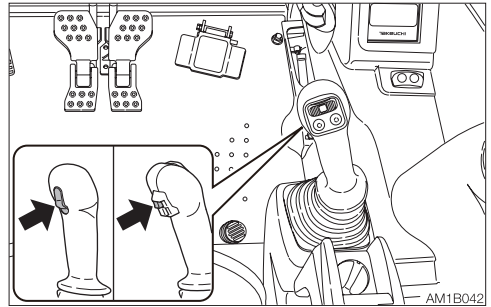
- ➔ To move forward:  
Tilt the levers backward.
- ⇨ To move backward:  
Tilt the levers forward.

### Traveling in 2nd (High) speed



### **WARNING**

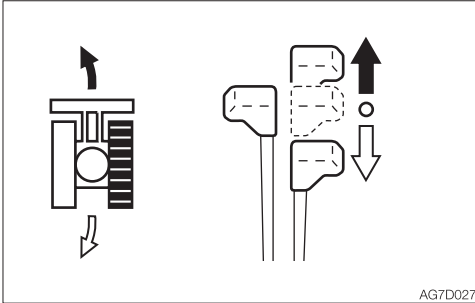
When a load greater than a set value is applied during traveling in 2nd (high) speed, the speed will automatically slow down to 1st (low) speed. When the load becomes lighter, the speed will increase and return to 2nd (high) speed. It should be noted that the travel speed changes depending on the load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



AG7D027

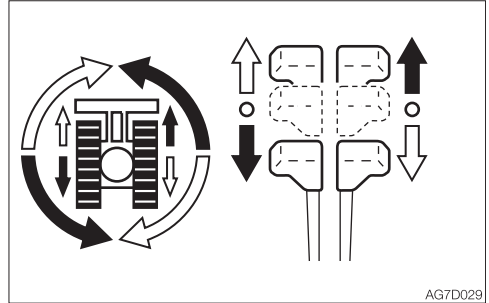
Turning to the left when stopped:

➔ 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 the right lever explained above.

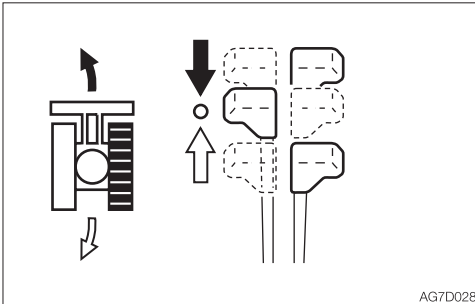
### Spin turn



AG7D029

➔ 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.



AG7D028

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 the left lever explained above.



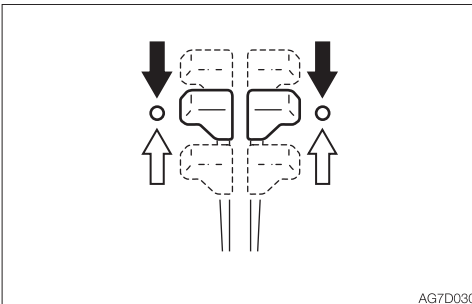
## STOPPING TRAVEL

### **WARNING**

- Park the machine on 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.

### **CAUTION**

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



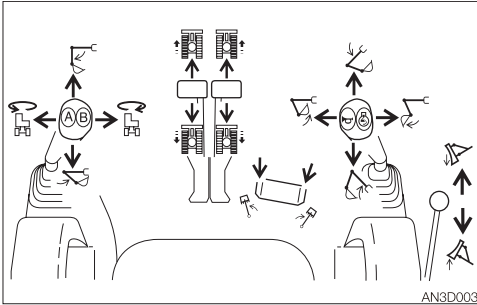
1. Set the left and right travel levers slowly to the neutral position. The machine stops.



## 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.

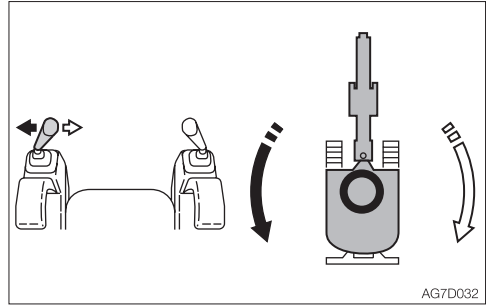
Return the operating levers to the neutral position to stop the hoe attachments.

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

## Slewing

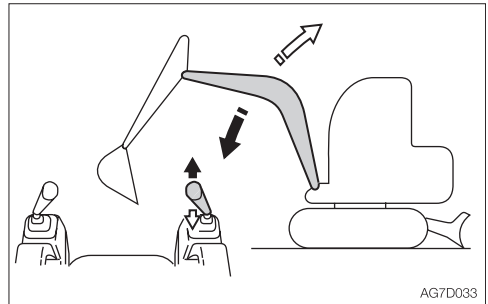
### **WARNING**

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.

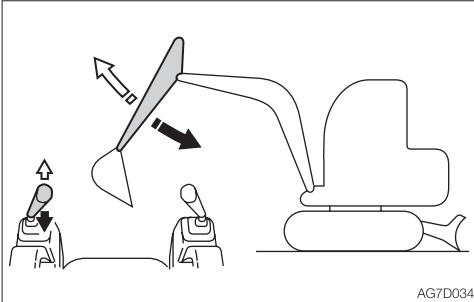
## Operating the boom



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

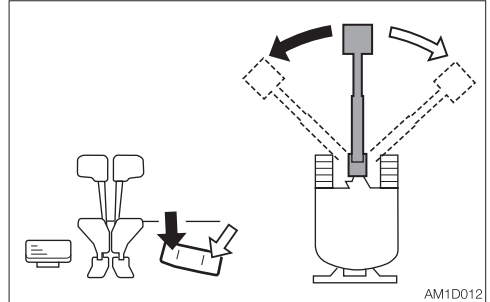


### Operating the arm



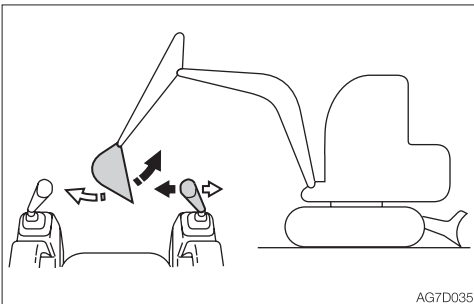
- ➔ Arm in:  
Tilt the left operating lever backward.
- ⇨ Arm out:  
Tilt the left operating lever forward.

### Operating the boom swing



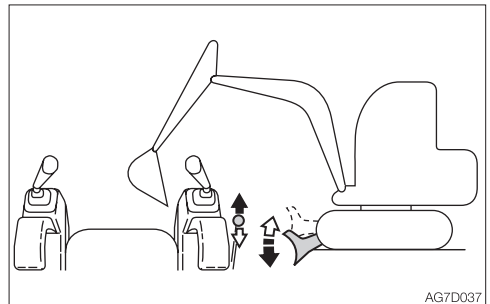
- ➔ Boom swing left:  
Step on the left side of the pedal.
- ⇨ Boom swing right:  
Step on the right side of the pedal.

### 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.



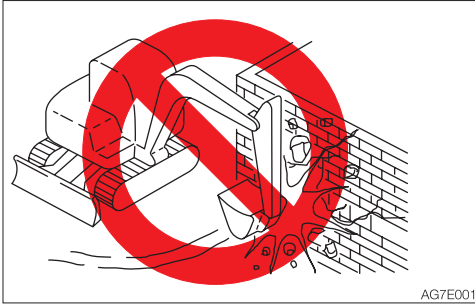
## OPERATING PROCEDURES

### PROHIBITED OPERATIONS

#### **WARNING**

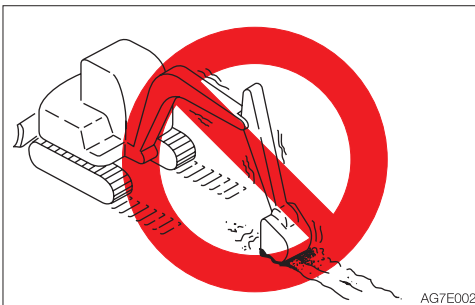
- Do not operate on bedrock (hard or soft).
- Do not slew while traveling. If you must operate the hoe attachment while traveling, operate at speeds slow enough so you have complete control at all times.

**Do not perform demolition or leveling using slew force**



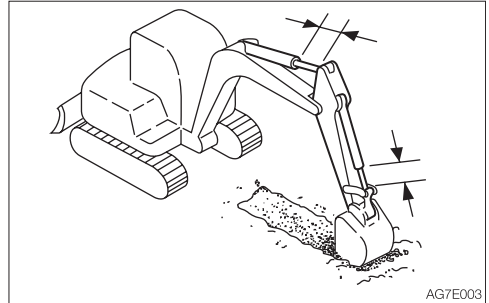
Do not demolish walls or level ground using slew force. Also, do not dig the bucket teeth into the ground during slewing. Doing so will damage the hoe attachment.

**Do not dig while traveling**

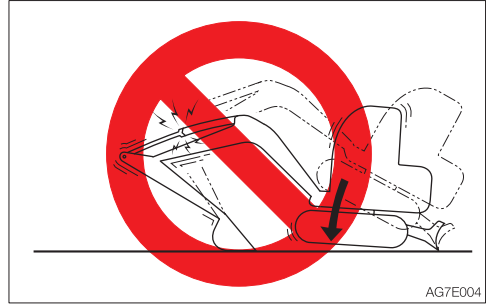


Do not dig the bucket into the ground and use the traveling force to dig.

**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.



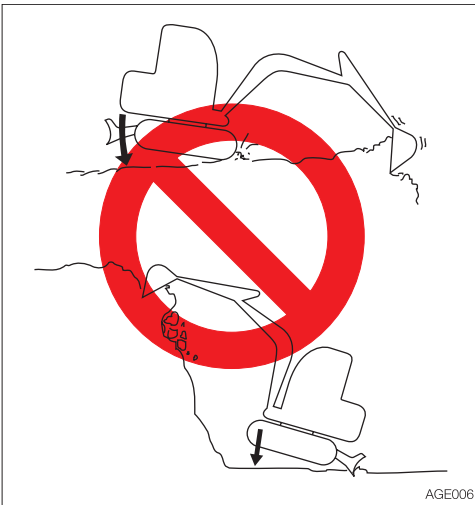


**Do not drive piles with the bucket or dig by banging the bucket**



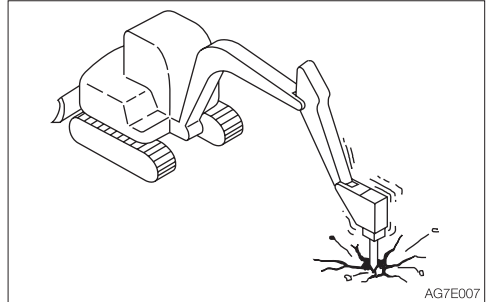
Doing so will shorten the service life of the hoe attachment. Use the hydraulic force to dig.

**Do not perform operations using the machine's dropping force**



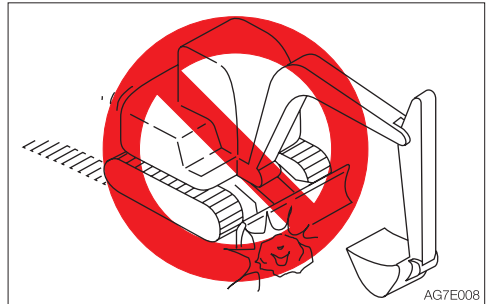
Putting excessive strain on the machine will shorten its service life. When digging, use the hydraulic force of the cylinders and use shallow and long strokes.

**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.

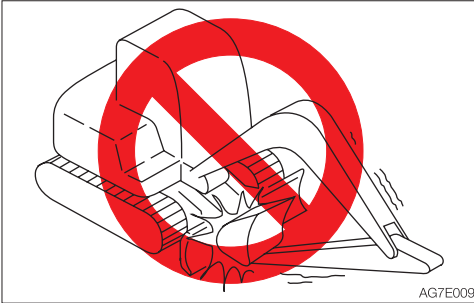
**Caution on exposing the dozer blade to shocks**



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

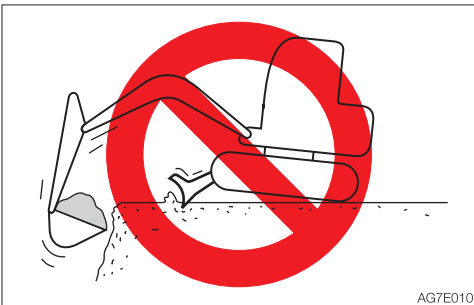


### Caution on folding the hoe attachment

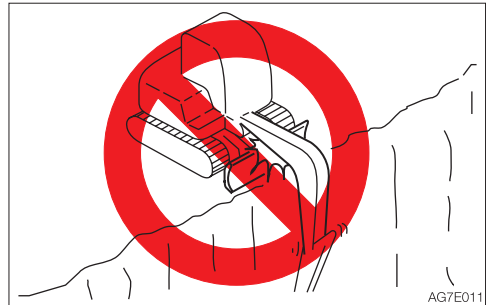


Be careful not to let the bucket hit the dozer blade when the hoe attachment is being folded.

### Do not use the dozer blade as an outrigger

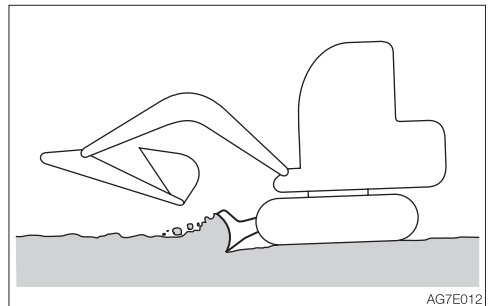


### Pay attention to the dozer blade when digging



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

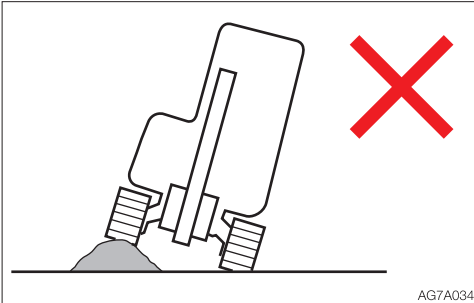


This dozer blade is designed for simple earth pushing. Do not dig down deeply with the dozer blade. Doing so could damage the dozer blade and undercarriage.



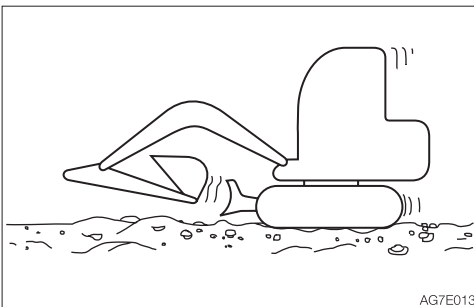
## CAUTIONS ON OPERATING

### Cautions on traveling



Traveling over obstacles (rocks, stumps, etc.) may put a heavy 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.

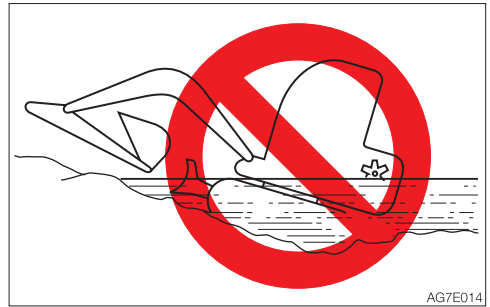
### Cautions on traveling in 2nd (High) speed



- On uneven ground, maintain 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.

### Prohibition of use in water and caution on use in rainy weather



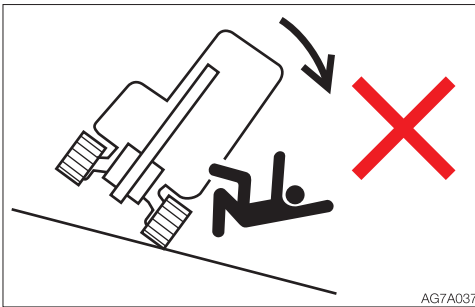
The machine uses many electric parts both inside and outside. Although they are waterproof, the machine could fail if water enters inside. Do not use the machine in water. Also, do not use it in rainy weather when the wind speed is over 10 m/s (22 mph).



## CAUTIONS ON TRAVELING ON SLOPES

### WARNING

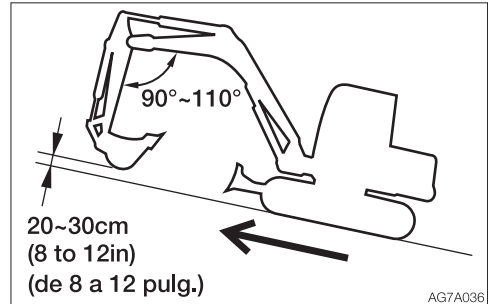
- Never travel on slopes that are too steep for the machine to maintain its stability. Note that in reality, the machine's performance decreases on slopes due to its poor working condition.
- When traveling on slopes, lower the bucket to a height of 20 to 30 cm (8 to 12 in.) above the ground. When climbing 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.

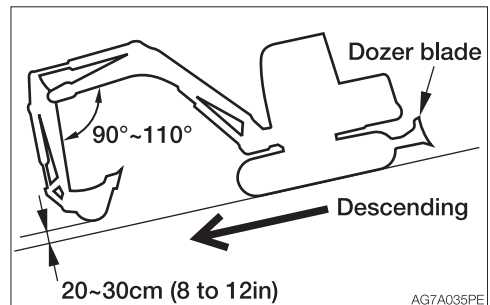
- The machine may slip sideways even on a slight slope if they are covered with grass, dead leaves, when traveling on a wet metal plate, or frozen surfaces. Do not allow the machine to position sideways to slopes.

### Traveling posture on slopes Climbing slopes



- When climbing slopes, maintain the machine posture as shown in the figure above.
- Pay attention to the attachment posture to prevent the machine from falling backwards. The center of gravity of this machine is farther toward the rear, compared to the machine with an engine.

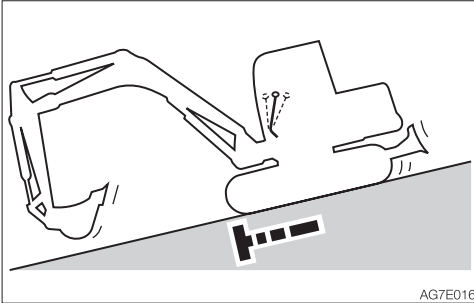
### Descending slopes



When descending slopes, slow down the motor speed and maintain the machine posture as shown in the figure above.

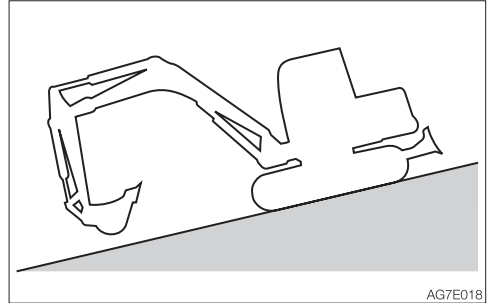


### Braking when descending slopes



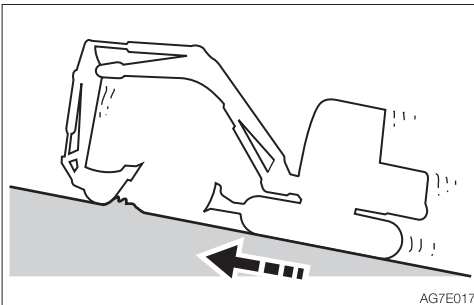
When descending slopes, the brakes are applied automatically once the travel levers are returned to the neutral position.

### If the motor stops



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

### If the crawler slips



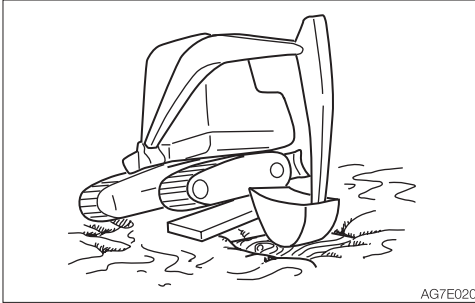
If the crawler slips while climbing a slope and travel becomes difficult, use the pulling force of the arm to climb the slope.



## GETTING OUT OF MUD

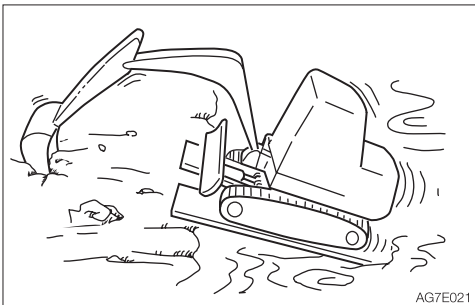
If the machine gets stuck in mud, use the procedure below to get it out.

### 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.

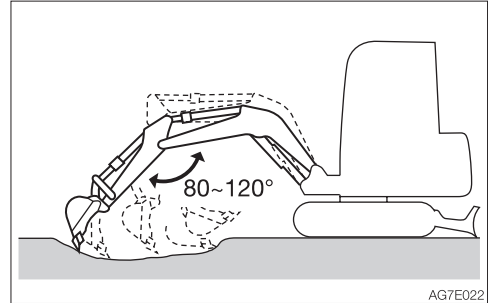
### If both crawlers are stuck



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.

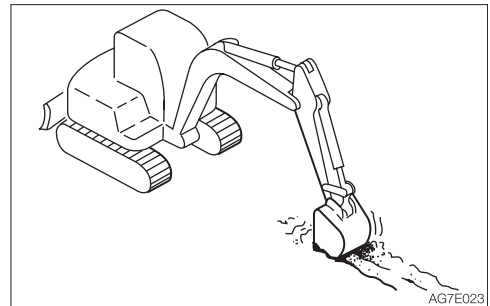
## OPERATIONS POSSIBLE WITH THIS MACHINE

### 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.

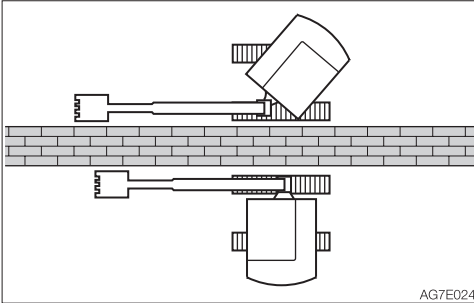
### Digging ditches



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.

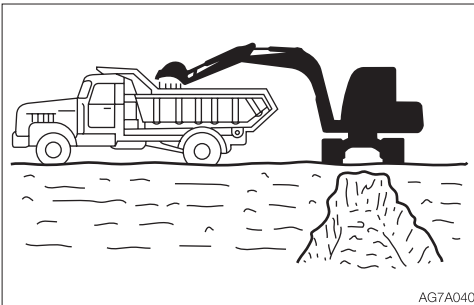


### Digging side drains



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

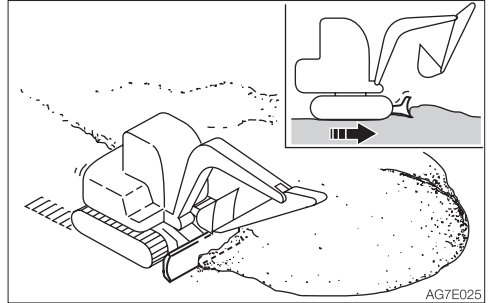
### Loading



When loading dirt onto a truck bed, load from the back of the truck, as it is easier and makes it possible to load more than loading it from the front.

Also, use a small slewing angle for greater efficiency.

### Leveling



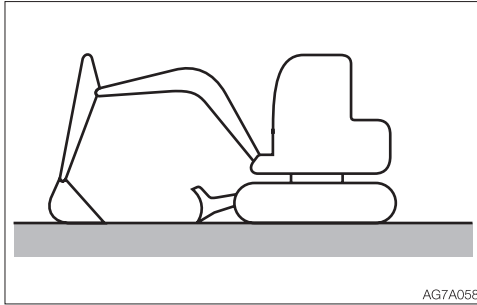
1. Bring the hoe attachment close to the body.
2. Gradually remove the dirt from the side of the mound.
3. Once the mound is low, remove the dirt from the top. If the load becomes too heavy body, adjust by raising or lowering the dozer blade.



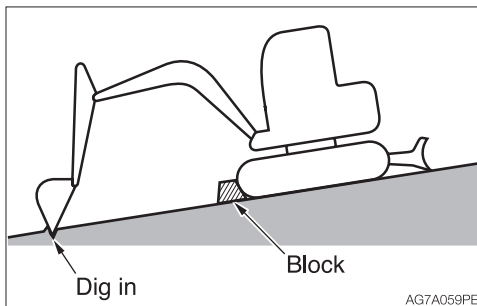
## **PARKING THE MACHINE**

### **PARKING**

 **WARNING**



- Park the machine on 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, lower the working equipment to the ground, raise the safety lock lever to the lock position and then stop the motor. Also, be sure to lock the door and covers, take the key with you and store it in a specified place.

1. Set the left and right travel levers to the neutral position.
2. Turn the throttle lever and set the motor speed to low.
3. Lower the bucket and the dozer blade to the ground.
4. Raise the safety lock lever to the locked position.
5. Stop the motor and remove the starter key. Refer to "Stopping the motor" on page 3-5. Refer to "Operating the machine with an accumulator" on page 2-38.



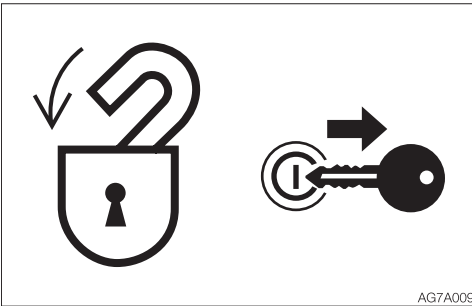


## **INSPECTION AND CHECKS AFTER STOPPING THE MOTOR**

1. Inspect for oil leak. Inspect the work equipment, covers and undercarriage. If any irregularities are found, repair.
2. Charge the lithium ion battery as necessary.
3. Remove any mud from the undercarriage.

### **Locking**

Be sure to lock the following places:



- Manual storage compartment
- Covers

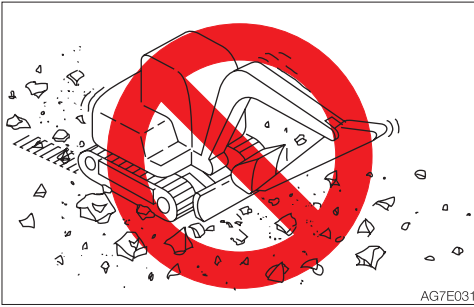


## **HANDLING RUBBER CRAWLERS**

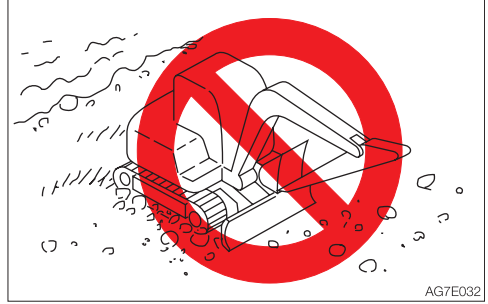
Rubber crawlers have an inherent weakness, lack of strength, due to their use of rubber. Be sure to observe the prohibitions and cautions below to prevent the crawlers from being damaged or coming off.

### **PROHIBITIONS**

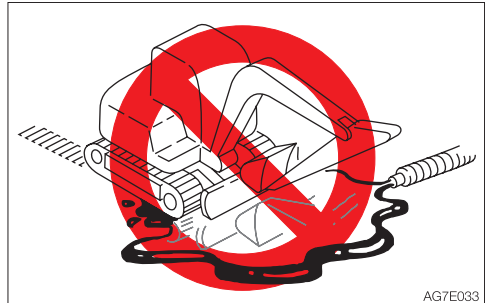
Do not travel or operate the machine in the following places:



- 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.

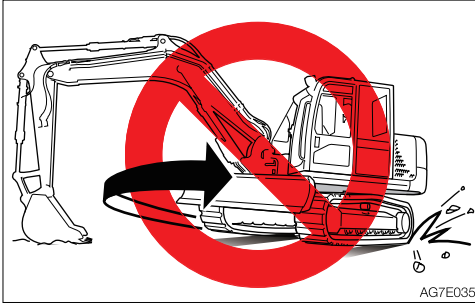


- It will cause irregular wear or damage to the lugs, if the machine travels on irregular surfaces such as recently paved surfaces with asphalt, exposed to fire or of hot iron sheets that have been in direct sunlight.
- Do not move earth in places where the rubber crawlers may slip. Doing so may speed up lug wear.

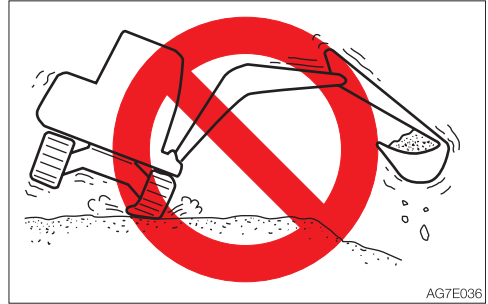


## CAUTIONS

Observe the following cautions when operating the machine:



- 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 spinning 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 it 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  $-25^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$  ( $-14^{\circ}\text{F}$  to  $131^{\circ}\text{F}$ ).
- 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.



- 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.



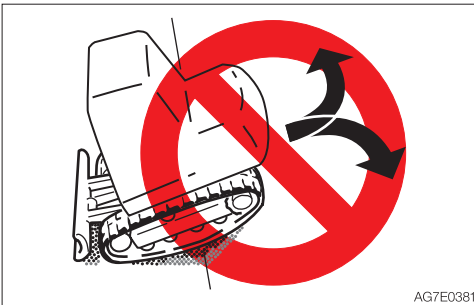
## PREVENTING THE RUBBER CRAWLERS FROM COMING OFF

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

- Always keep the crawlers at the proper tension.



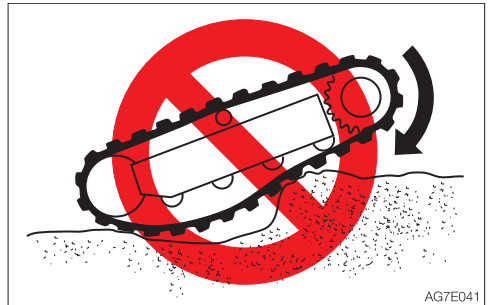
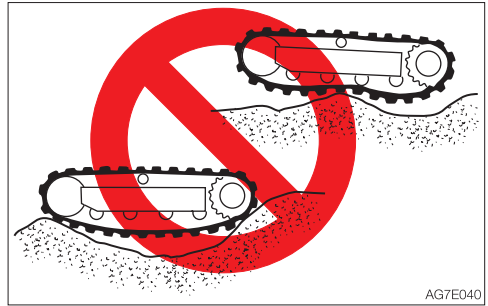
- When traveling over a large step such as a cobblestone or rock (20 cm (8 in.) or deeper), climb up the step at a right angle and do not change courses on top of the step.



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



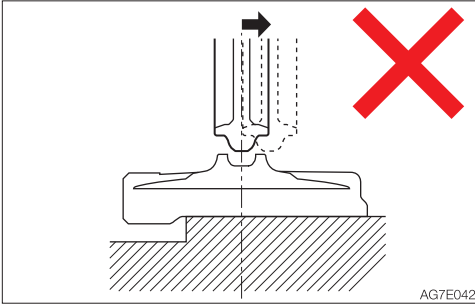
- Avoid traveling by setting one crawler on a slope and the other crawler on a flat surface (with the machine at an angle of 10° or more). Travel with both crawlers set on flat surfaces.



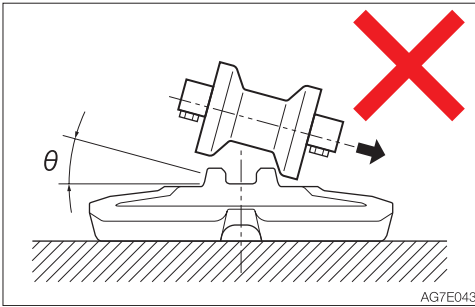
- Do not change directions when the crawler belts are slack as shown in the figure.



## OPERATION HANDLING RUBBER CRAWLERS



- 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



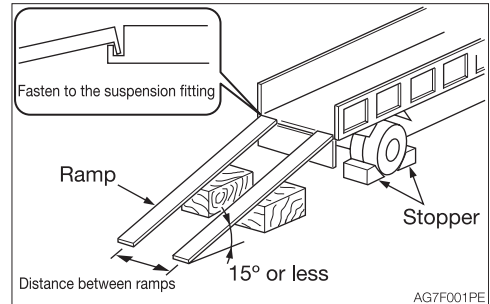
## LOADING AND UNLOADING

### WARNING

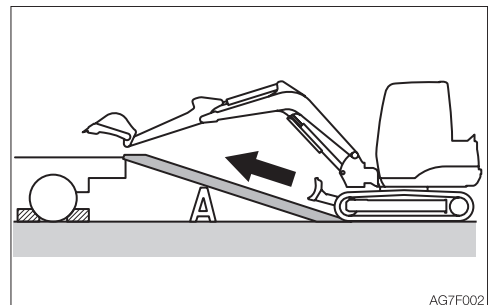
The machine may roll or tip over or fall while being loaded or unloaded. Take the following precautions:

- 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 ramps 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.
- Lock the cab door after being loaded, if applicable. Otherwise, the door may open during transport.
- 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 speed of the motor.

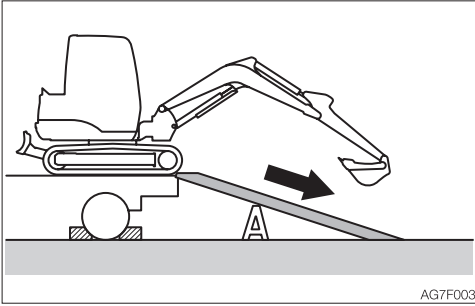






## TRANSPORT LOADING AND UNLOADING

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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 4-6.



## 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.
- 

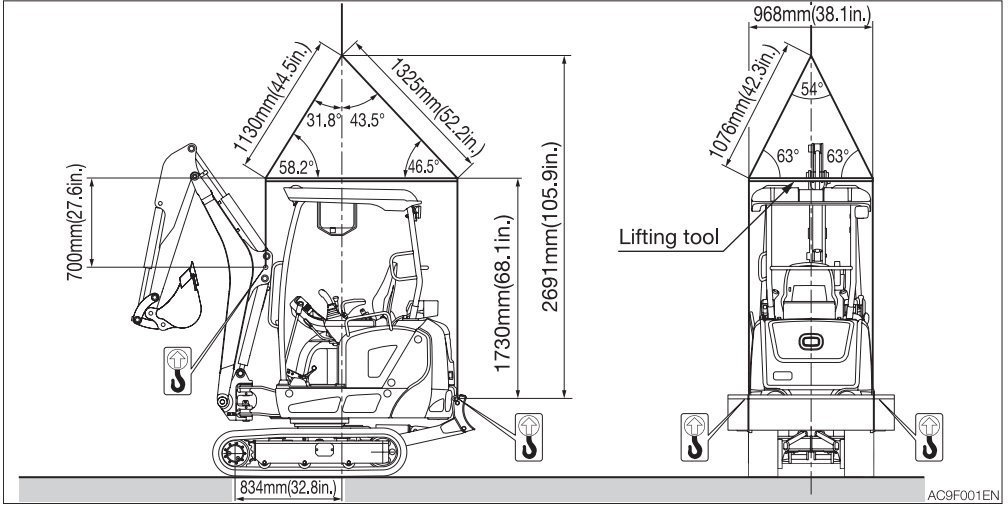
**IMPORTANT:** This hoisting method applies to machines with standard specifications. The center of gravity differs according to the attachments and optional equipment installed. Contact your Takeuchi service agent for details.

### 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 motor, remove the starter key and get off the machine.
7. Install the wire ropes as shown on the figure below. Install the wire ropes and hoisting attachment without letting them touch the machine body.
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.



TRANSPORT  
**HOISTING THE MACHINE**

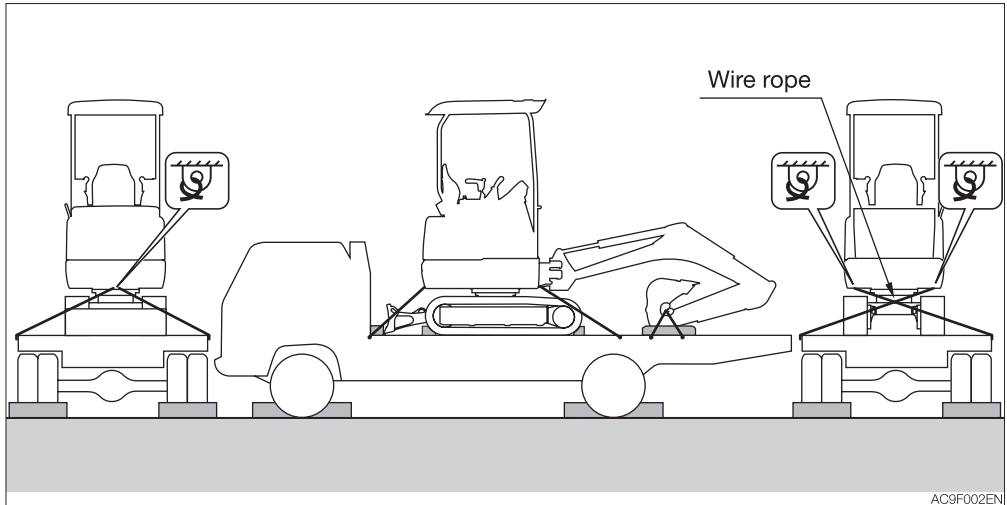




## SECURING THE MACHINE

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 motor, 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 it 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.

#### **Never wash the high-voltage parts with water.**

Never wash areas near the high-voltage parts with water. For the locations of high-voltage parts, refer to "High-voltage component names" on page 0-9.

#### **Keep the machine clean**

- Clean the machine before performing inspection and maintenance and try to keep it clean.
- Stop the motor before washing the machine. Cover the electrical parts with vinyl to prevent water from entering, as this could cause a short-circuit or malfunction. Do not use water or steam to wash the lead-acid battery, electronic control components, sensors, connectors, inside the operator's compartment or the covers located near the lithium ion battery pack.

#### **Lubricant and grease**

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



### 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.

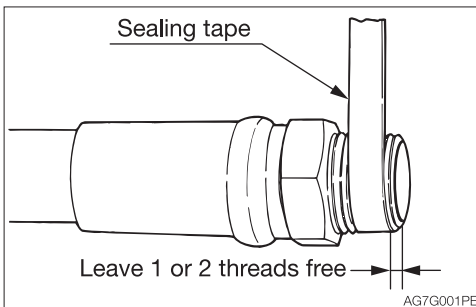
### Clean the installation surfaces

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, filters and batteries.

### Check after maintenance

- Gradually increase the motor 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.

### Cautions on handling of battery wiring (excluding the high-voltage parts)

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

### Cautions on using high-voltage parts

- Ask a Takeuchi sales or service dealer for repair of the high-voltage parts.
  - Never disassemble or modify the high-voltage parts.
- For details of the high-voltage parts, refer to "High-voltage component names" on page 0-9.



## SERVICE DATA

### LUBRICANT TABLE

Select the appropriate 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 replenishing, never mix oils of different brands. If a brand is to be changed, replace the whole oil.

#### Lubricant

Location	Type	Type by air temperature							When to replace
		-4 -20	14 -10	32 0	50 10	68 20	86 30	104°F 40°C	
Hydraulic oil tank	Takeuchi genuine hydraulic oil 46								Every 4000 hrs.**
	Biodegradable oil recommended by Takeuchi*** Mobil EAL EnviroSyn 46H Panolin HLP Synth 46								Every 4000 hrs.
	Anti-wear hydraulic oil								Every 2000 hrs.**
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.
- \*\* : 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.
- \*\*\*: When replacing a mineral oil with a biodegradable oil, the residual mineral oil in the machine should be about 2% or less, as complying with the ISO 15380. For details, refer to “Biodegradable oil” on page 8-10.

API standard: American Petroleum Institute  
SAE standard: Society of Automotive Engineers

**Volume**

Hydraulic oil tank	Travel reduction gear
System 24 L (6.3 US gal.)	0.3 L X 2 (0.3 US qt.) X 2
Tank 14.1 L (3.7 US gal.)	



## REGULARLY REPLACE THE HYDRAULIC OIL

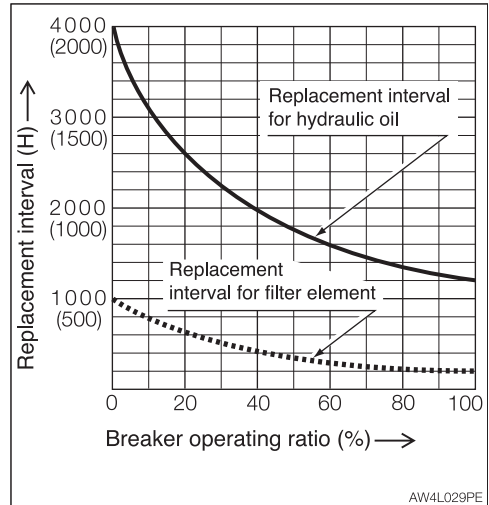
When a hydraulic breaker is used, the oil deteriorates more quickly than that used for a usual excavation operation. Be sure to replace the hydraulic oil and the return filter elements.

- 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 8-6.



( ): 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	15511-04300	Every 1000 hrs after the initial 250 hrs.
	Pilot line filter		15512-00703	
	Air breather		15520-03000	Every 1000 hrs.



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### **LIST OF TOOLS (IF EQUIPPED)**

<b>Code</b>	<b>Part name</b>	<b>Part No.</b>	<b>Remarks</b>
1	Spanner	16900-01012	10 - 12
2	Spanner	16900-01417	14 - 17
3	Screwdriver	16902-20205	(+) (-) replaceable shank
4	Monkey wrench	16904-00250	250 mm
5	Pliers	16905-00200	200 mm
6	Spanner	16901-00013	13
7	Spanner	16909-00019	19
8	Spanner	16900-01922	19 - 22
9	Tool case	16914-00005	
10	Grease gun	16910-60600	500 cc

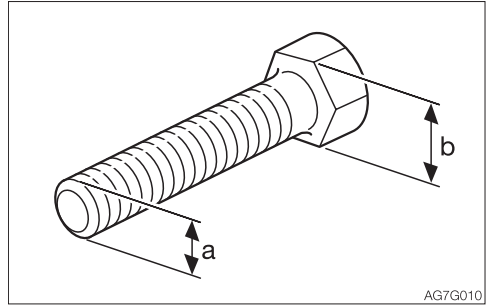
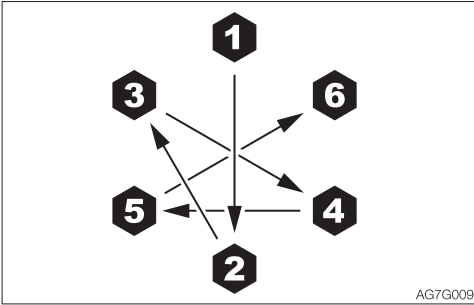


## LIST OF TIGHTENING TORQUES

### 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±0.8	7.2±0.6
	12, 13	M8 x 1.25	23±1.8	17±1.4
	14, 17	M10 x 1.5	47±3.8	35±2.8
	17, 19	M12 x 1.75	83±6.6	62±5
	19, 22	M14 x 2.0	134±10.7	99±7.9
	22, 24	M16 x 2.0	208±16.6	153±12.2
	27, 30	M20 x 2.5	411±32.9	303±24.2
Fine	12, 13	M8 x 1.0	25±2	18±1.4
	14, 17	M10 x 1.25	50±4	37±3
	17, 19	M12 x 1.5	87±7	64±5.1
	19, 22	M14 x 1.5	135±10.8	100±8
	22, 24	M16 x 1.5	221±17.7	163±13
	27, 30	M20 x 1.5	452±36.2	333±26.6



## 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
Hydraulic system	Main body	Hydraulic hoses (pump - delivery)	Every 2 years
		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)	
	Non-slip sheet		



## MAINTENANCE SAFETY-CRITICAL PARTS

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.

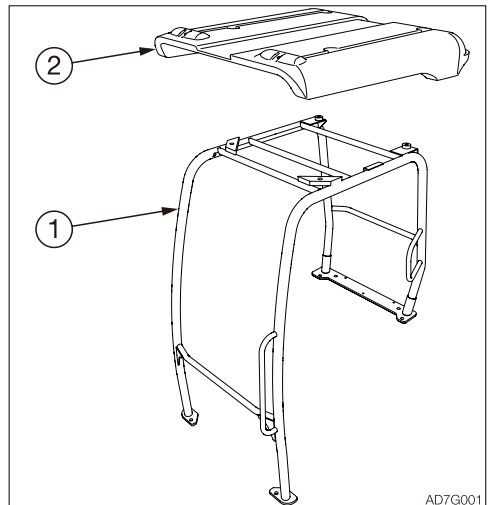
Check the hydraulic hoses according to the periodic schedule described below.

Refer to "Maintenance".

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

\*: Canopy parts No.(1) 03384-00188

\*: Canopy parts No.(2) 03484-00027



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## MAINTENANCE LIST

Inspection and maintenance item	Page
<b>Walk-around inspection</b>	
Inspecting by opening the covers	5-14
Inspecting by walking around the machine	5-15
Inspecting while sitting in the operator's seat	5-15
<b>Daily inspection (every 10 hours)</b>	
Inspecting the lithium ion battery level	5-16
Inspecting the hydraulic oil tank level and replenishing	5-17
Lubricating the working equipment	5-19
<b>Every 50 hours</b>	
Inspecting and adjusting the crawler tension	5-20
Lubricating the slew bearing	5-22
Lubricating the slew motor pinion	5-22
Inspecting the lead-acid battery level and replenishing	5-23
<b>After the initial 250 hours (only for new machines)</b>	
Replacing the hydraulic oil return filter	5-25
Replacing the pilot line filter	5-26
Replacing the travel motor gear oil*	5-28
<b>Every 250 hours</b>	
Cleaning the dust-free filters for the motors	5-29
Cleaning the oil cooler fins	5-30

\*: 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
<b>Every 1000 hours</b>	
Replacing the hydraulic oil return filter	5-31
Replacing the travel motor gear oil*	5-31
Replacing the air breather	5-31
Replacing the pilot line filter	5-31
<b>Every 2000 hours</b>	
Inspecting the accumulator	5-32
<b>Every 4000 hours</b>	
Replacing the hydraulic oil and cleaning the suction strainer	5-34
<b>When required</b>	
Replacing the bucket teeth and the side cutters	5-38
Replacing the bucket	5-41
Adjusting the gap between the bucket and arm (If equipped)	5-44
Lubricating the levers and pedals	5-46
Inspecting the rubber crawlers	5-47
Replacing the rubber crawlers	5-48

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



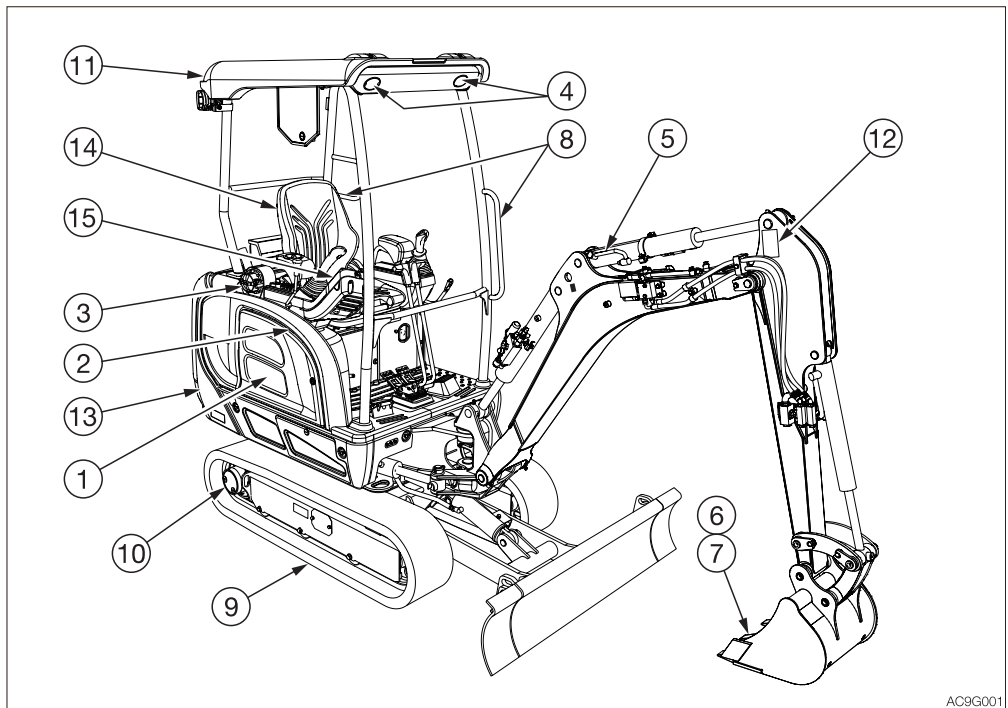
## WALK-AROUND INSPECTION

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

### **WARNING**

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

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



### INSPECTING BY OPENING THE COVERS

1. Check for any twigs, leaves, oil/fat or other combustible materials around the oil cooler and lead-acid battery.
2. Check for oil leakage from the hydraulic oil tank, hydraulic devices, hoses or connections.

**INSPECTING BY WALKING AROUND THE MACHINE**

3. Check the covers in the area near to the high-voltage parts for damage.
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/cab and guard for damage and the nuts and bolts for looseness.
12. Check the labels for dirt and damage.
13. Check the air inlet of the cooling fan for dirt buildup.

**INSPECTING WHILE SITTING IN THE OPERATOR'S SEAT**

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



## DAILY INSPECTION (EVERY 10 HOURS)

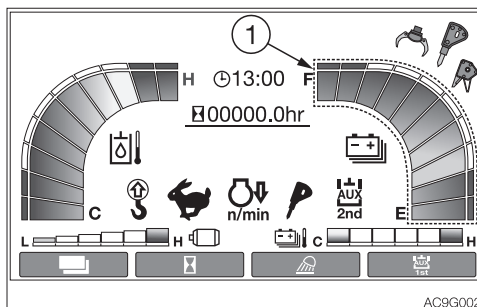
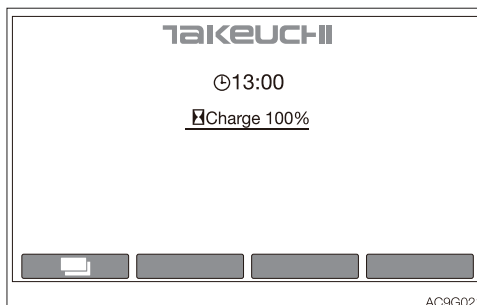
Perform the following inspections every day before starting the motor for the first time.



### WARNING

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

## INSPECTING THE LITHIUM ION BATTERY LEVEL



1. Turn the key switch to the ON position.
2. Check the lithium ion battery level using the charge screen or lithium ion battery meter (1).
3. Charge the lithium ion battery if its level is low.  
Refer to "Charging the lithium ion battery" on page 0-14.



## INSPECTING THE HYDRAULIC OIL TANK LEVEL AND REPLENISHING

### **WARNING**

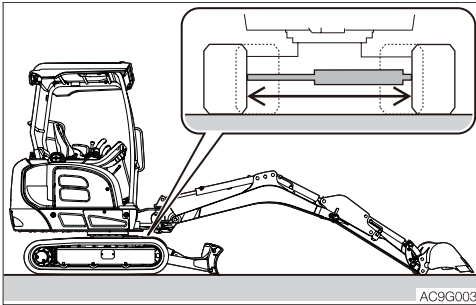
Oil may spurt out if caps or filters are removed or pipes are disconnected before releasing the pressure in the hydraulic system.

- Gradually loosen the vent plug to relieve tank pressure.

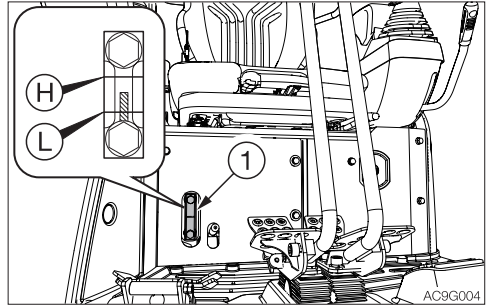
### Inspection

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



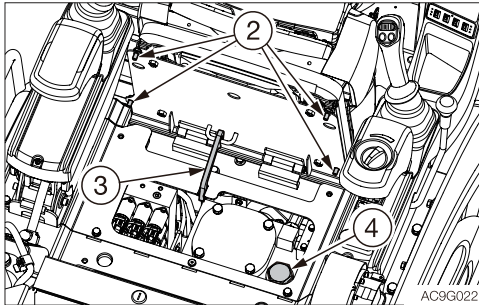
1. Start the motor and run it at low speed.
2. Fully extend the crawler width.
3. Fully retract the cylinders (arm and bucket), and lower the bucket to the ground.
4. Lower the dozer blade and stop the motor.



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

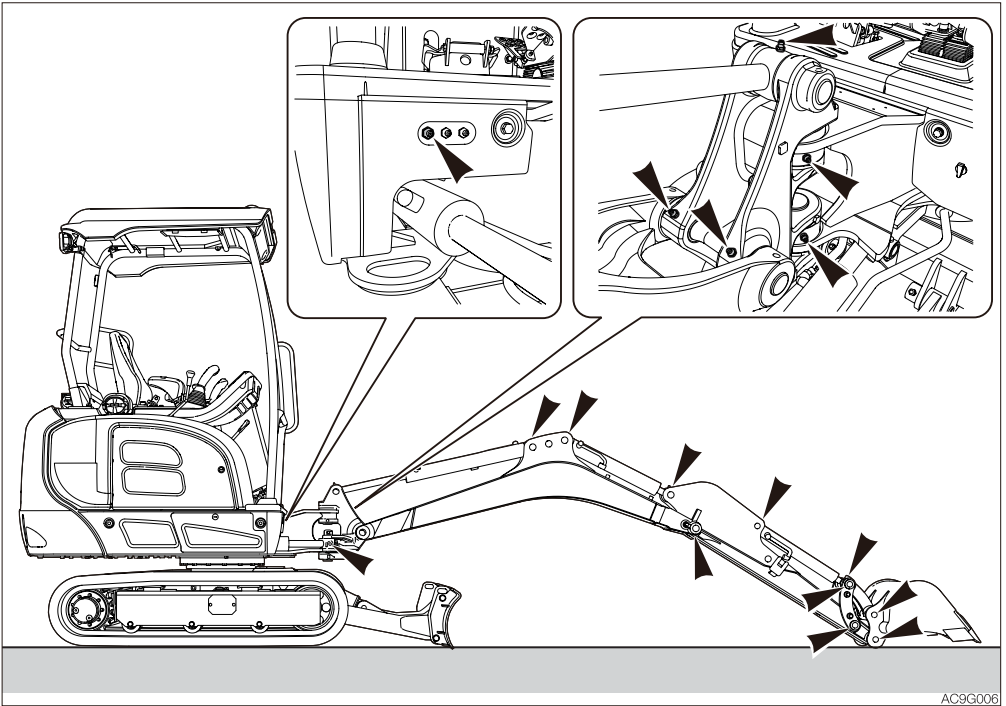


**IMPORTANT:** Do not fill up to the level higher than the upper limit (H). Doing so will damage the hydraulic circuits or result in oil spurting. If accidentally done, stop the motor and wait the hydraulic oil to cool, and then let the excessive oil drain from the drain plug.

1. Raise the safety lock lever to the locked position.
2. Remove the bolts (2).
3. Slide the seat backward.
4. Tilt the seat forward.
5. Secure the maintenance cover with the stopper (3).
6. Slowly loosen the plug (4) to relieve the internal pressure, and then remove the plug.
7. Add the hydraulic oil up to the middle of the sight gauge (1).
8. Tighten the plug (4).



## LUBRICATING THE WORKING EQUIPMENT



1. Set the machine to the greasing posture as shown in the figure above, lower the working equipment to the ground, and then stop the motor.
2. Use the grease gun to lubricate the grease fittings.
3. Wipe off the excess grease.



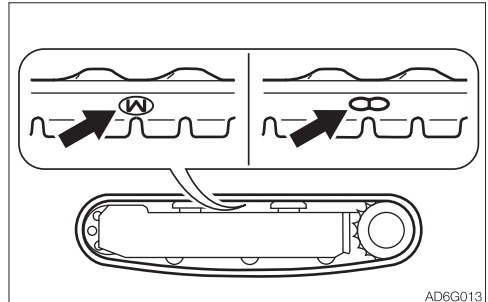
## EVERY 50 HOURS

### INSPECTING AND ADJUSTING THE CRAWLER TENSION

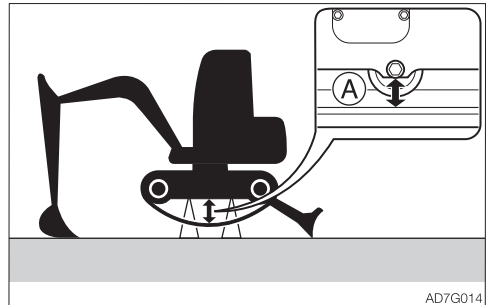
#### WARNING

- 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 turn.
  - 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

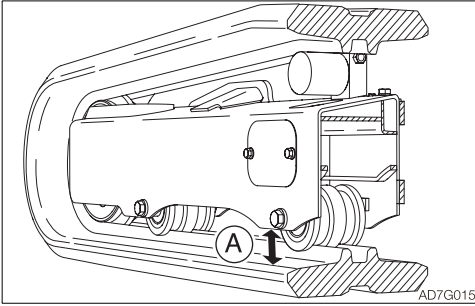


1. For rubber crawlers, move the machine so that the “M” or “∞” mark at the joint is at the top center of the crawler frame.



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





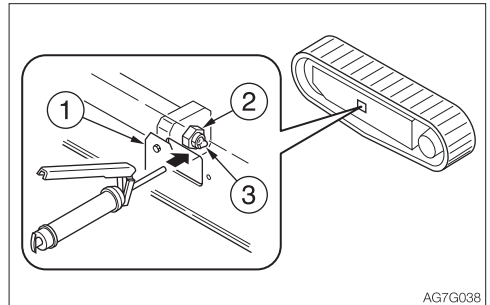
3. Inspect the gap (A) between the bottom surface of the frame at the center of the crawler frame and the top surface of the crawler.

The gap (A) must be within the following range:

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

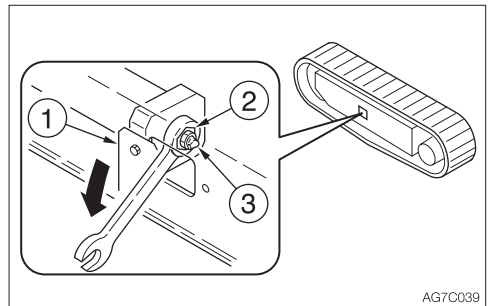
## Adjustment

### 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



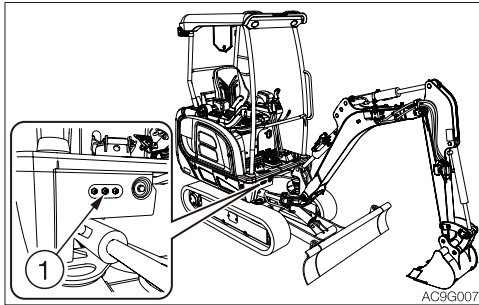
1. Remove the cover (1).
2. Slowly loosen (one turn) the grease discharge valve (2) with a spanner to discharge grease. If grease does not come out well, move the machine back-and-forth.
3. Tighten the grease discharge valve (2).
  - Tightening torque:  
59 to 88 N·m (43.5 to 64.9 ft·lb.)



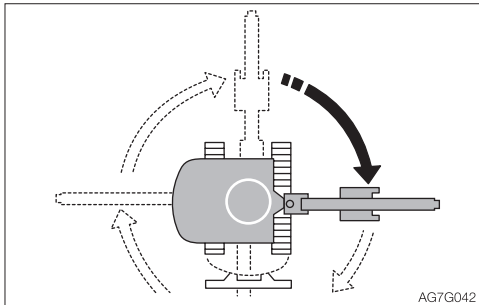
## LUBRICATING THE SLEW BEARING

### WARNING

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

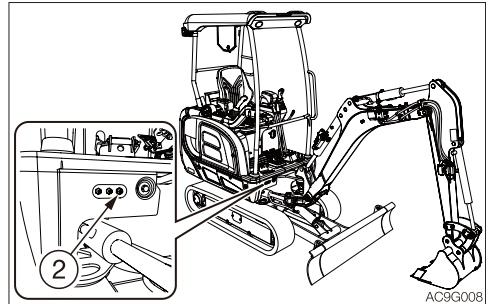


1. Stop the motor with the machine in the posture shown in the figure above.
2. Use the grease gun to grease the grease fitting (1).



3. Start the motor, raise the bucket and slew 90 degrees.
4. Lower the bucket to the ground, and then stop the motor.
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.



## INSPECTING THE LEAD-ACID BATTERY LEVEL AND REPLENISHING



### DANGER

- Do not use or charge the lead-acid battery when the fluid level is below the lower level limit. Doing so will hasten the deterioration of the internal portions of the lead-acid battery and shorten its life. It could also cause it to rupture (explode).
- Lead-acid batteries generate flammable hydrogen gas which may explode. Keep away from lighted cigarettes or fire, and avoid creating arcs and sparks.
- 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.
- Do not use the cable if it's connecting terminal is loose or corroded. If used, ignition or explosion may occur.
- Do not block the exhaust hole of the lead-acid battery. An explosion could result, if blocked.



### WARNING

- Wear protective goggles and clothing when working with the lead-acid 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.
- Lead-acid 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

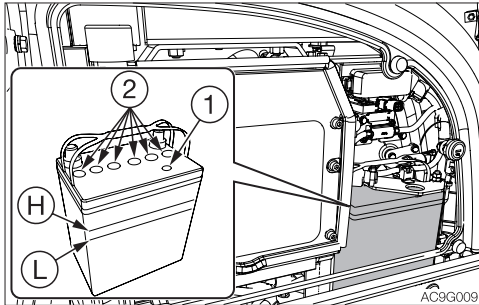
**IMPORTANT:** Check the fluid level of all cells following the steps below, even when the fluid level can be checked using the indicator.

**Note:** Under normal operating conditions, the maintenance-free battery does not require addition of water because of the special plate designed to minimize fluid loss. However, for machines that are heavily used or operated under severe conditions (for example, in high ambient temperature), the fluid level often becomes low. In this case, check the fluid level of the maintenance-free battery and add water as needed. For any abnormal conditions such as the battery fluid level goes down fast, contact a Takeuchi sales or service dealer for advice.

**Note:** The warranty will be void if the label on the lead-acid battery is removed during the warranty period. If the indicator displays "Insufficient battery fluid" during the warranty period, contact your sales or service dealer without doing anything to the lead-acid battery.

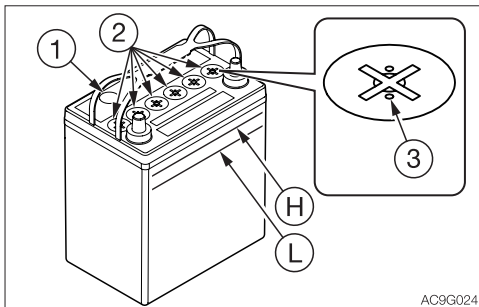


1. Open the side cover.



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).
4. Check the battery terminal for looseness, dirt and corrosion.



5. Check the exhaust holes (3) on the sealing plugs (2) for dirt.
6. Turn the key switch to ON and check the battery voltage on the display. The lead-acid battery is normal if the voltage is 12 V or more.

Refer to “(4) Data display” on page 2-19.

## Replenishing

When adding distilled water, do so before starting operations in order to prevent freezing.

1. Loosen the sealing plugs (2) and add distilled water up to the upper level line (H).
2. Check that the indicator (1) turns blue.
3. Securely tighten the sealing plugs (2).

## Recharging

Ask your sales or service dealer to recharge the dead lead-acid battery. Be sure to remove the dead battery from the machine before recharging; failure to do so could result in machine failure.

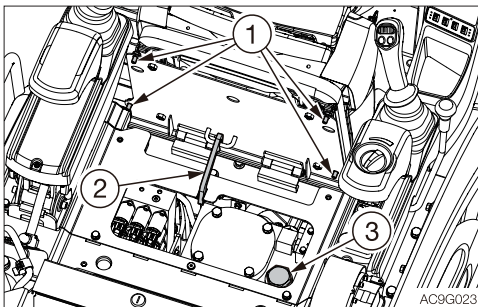


## **AFTER THE INITIAL 250 HOURS (ONLY FOR NEW MACHINES)**

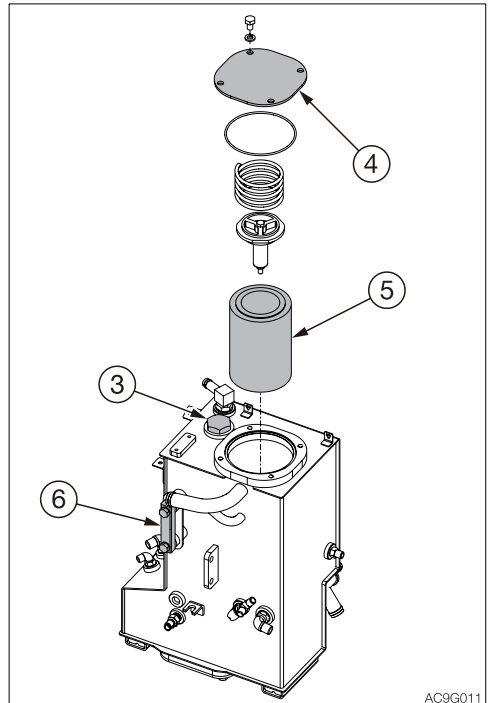
### **REPLACING THE HYDRAULIC OIL RETURN FILTER**

#### **⚠ WARNING**

- Stop the motor and allow each part of the machine to cool down before performing inspection and maintenance.
  - The motor, the hydraulic system and other parts of the machine are hot immediately after the motor 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. Raise the safety lock lever to the locked position.
2. Remove the bolts (1).
3. Slide the seat backward.
4. Tilt the seat forward.
5. Secure the maintenance cover with the stopper (2).
6. Slowly loosen the vent plug (3) to relieve the internal pressure, and then remove the plug.



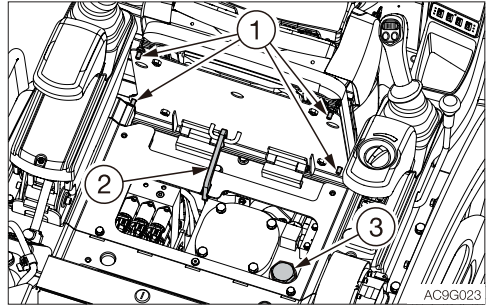
7. Loosen the bolts to take out the flange (4).
8. Remove the return filter (5).
9. Install a new return filter.
10. Reinstall the flange (4) on its original position.
11. Inspect the level with the sight gauge (6), and replenish if the level is too low. Refer to "Inspecting the hydraulic oil tank level and replenishing" on page 5-17.



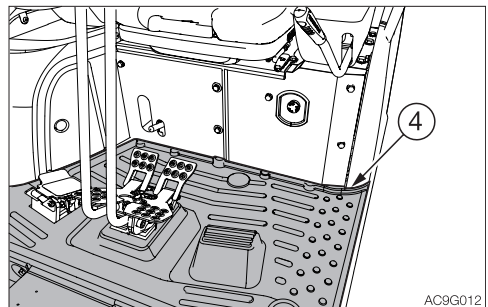
## REPLACING THE PILOT LINE FILTER

### WARNING

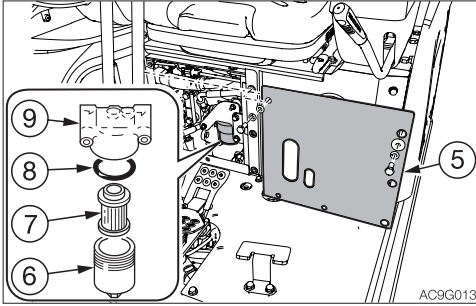
- Stop the motor and allow each part of the machine to cool down before performing inspection and maintenance.
  - The motor, the hydraulic system and other parts of the machine are hot immediately after the motor is stopped. Touching these parts will cause burns.
  - The hydraulic oil is also hot and under high pressure immediately after the motor 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. Raise the safety lock lever to the locked position.
2. Remove the bolts (1).
3. Slide the seat backward.
4. Tilt the seat forward.
5. Secure the maintenance cover with the stopper (2).
6. Slowly turn the vent plug (3) to relieve tank pressure, then remove.
7. Release the stopper (2) to return the seat to the original position.



8. Remove the floor mat (4).



9. Remove the bolts to remove the cover (5).
10. Turn the case (6) counterclockwise and remove it.
11. Remove the element (7) and O-ring (8).
12. Clean the inside of the case (6).
13. Apply a thin layer of oil on the O-ring of the new filter.
14. Install the new element on the filter stand (9).
15. Apply a thin layer of oil on the new O-ring (8).
16. Install the new O-ring (8) and the case (6) on the filter stand (9).
  - Case (6) tightening torque: 25 to 35 N·m (18.4 to 25.8 ft-lb)
17. Inspect the level with the sight gauge (1) and replenish if the level is too low. Refer to “Inspecting the hydraulic oil tank level and replenishing” on page 5-17.

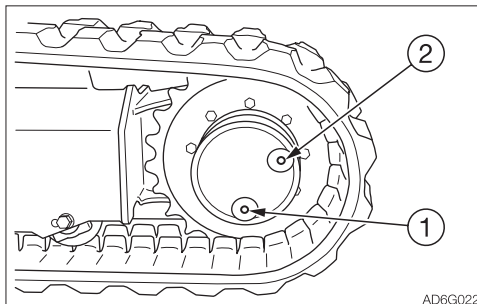


## REPLACING THE TRAVEL MOTOR GEAR OIL

### WARNING

- Stop the motor and allow each part of the machine to cool down before performing inspection and maintenance.
  - The travel motor is hot immediately after the motor is stopped. Touching it will cause burns.
  - The gear oil is also hot and under high pressure immediately after the motor 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 plugs (1) and (2) and drain the oil.
4. Rewrap the plugs with new sealing tape.
5. Tighten the plug (1).
  - Plug (1) tightening torque: 46 to 51 N·m (34 to 37.6 ft·lb)
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).
  - Plug (2) tightening torque: 46 to 51 N·m (34 to 37.6 ft·lb)





## EVERY 250 HOURS

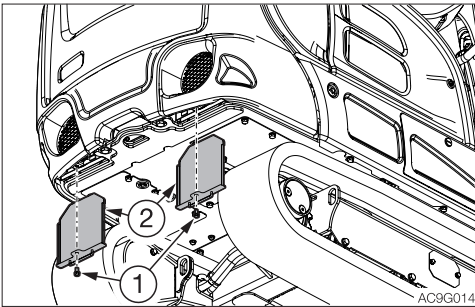
### CLEANING THE DUST-FREE FILTERS FOR THE MOTORS

#### **WARNING**

Always wear appropriate equipment such as protective goggles and dust mask when working with compressed air, as metal fragments or other objects can fly and cause serious injury.

Clean the filters immediately after operating in dusty places.

If they are clogged, the motor could overheat.



1. Remove the bolts (1).
2. Remove the dust-free filters (2).
3. Clean the dust-free filters (2).



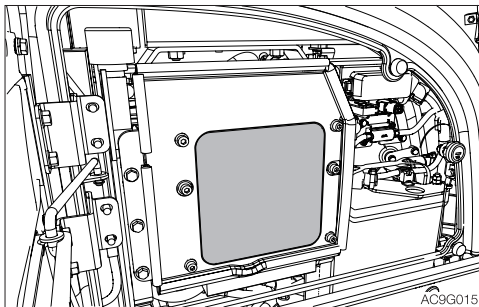
## CLEANING THE OIL COOLER FINS

### **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, make sure the pressure is no higher than 200 kPa (28 psi/2.0 kgf-m) and hold the nozzle sufficiently away from the fins.
- Never use water when cleaning.
- When operating the machine in very dusty places, perform inspection and maintenance operations every day.



Blow compressed air on the fins to remove mud and dirt stuck on them.



## EVERY 1000 HOURS

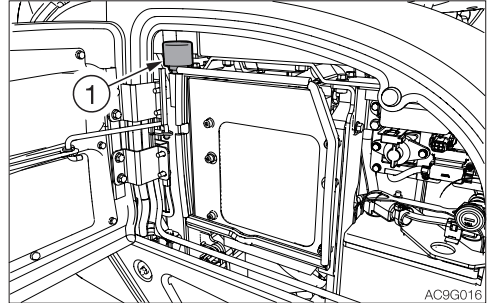
### REPLACING THE HYDRAULIC OIL RETURN FILTER

Refer to “Replacing the hydraulic oil return filter” on page 5-25.

### REPLACING THE TRAVEL MOTOR GEAR OIL

Refer to “Replacing the travel motor gear oil” on page 5-28.

## REPLACING THE AIR BREATHER



1. Open the side cover.
2. Slowly turn the air breather (1) counterclockwise by hand or with the wrench to release the internal pressure from the hydraulic oil tank. When the hissing sound stops, remove the air breather (1).
3. Apply a thin layer of oil on the packing of the new air breather.
4. Install the new air breather by hand.
  - Tightening torque: Max. 5 N·m (3.7 ft-lb)

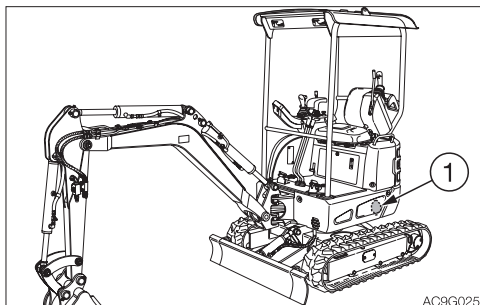
## REPLACING THE PILOT LINE FILTER

Refer to “Replacing the pilot line filter” on page 5-26.



## EVERY 2000 HOURS

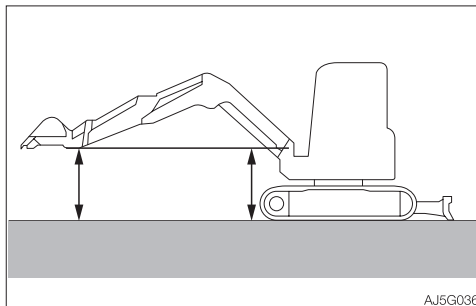
### INSPECTING THE ACCUMULATOR



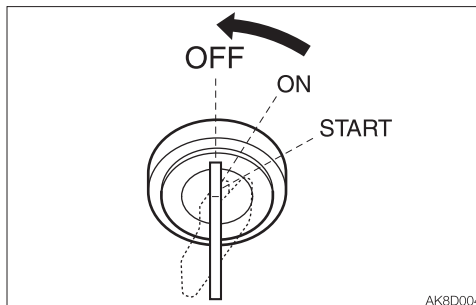
#### WARNING

- High-pressure nitrogen gas is enclosed in the accumulator (1). If handled incorrectly, it could explode and cause serious injury. Strictly observe the following precautions:
  - Do not disassemble.
  - Do not allow flame nearby 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 sales or service dealer for help.
- Clear all personnel from the work area.
- Sound the horn to warn people around the machine.

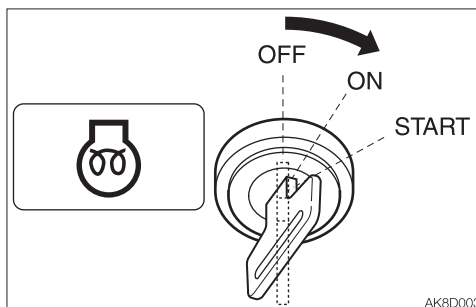
**IMPORTANT:** If the accumulator (1) fails, the boom cannot be lowered or the residual pressure in the hydraulic circuit cannot be released while the motor is stopped.



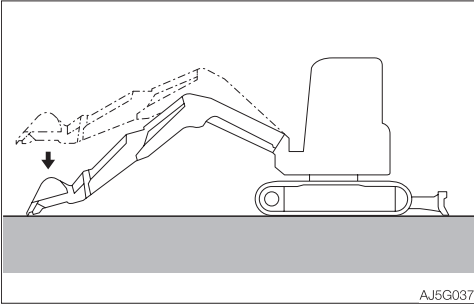
1. Start the motor, then fully retract the arm and bucket cylinders.
2. Operate the boom so that the tip of the arm is positioned at the bottom of the boom.



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



4. Lower the safety lock lever to the unlock position, and then turn the key to the ON position. (Do not start the motor.)



5. Lower the boom until the bucket contacts the ground.

The machine is normal if the bucket is lowered to the ground. The accumulator (1) is probably faulty if the boom cannot be lowered or stops halfway. Consult a Takeuchi sales or service dealer for help.

**Note:** When the boom is lowered to lower the bucket to the ground, do it within 10 minutes of stopping the motor.



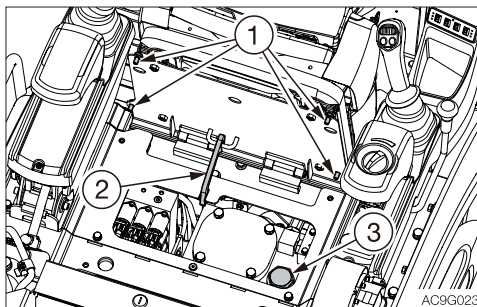
## EVERY 4000 HOURS

### REPLACING THE HYDRAULIC OIL AND CLEANING THE SUCTION STRAINER

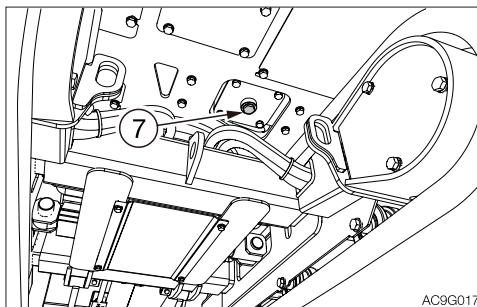
#### WARNING

- Stop the motor and allow each part of the machine to cool down before performing inspection and maintenance.
  - The motor, the hydraulic system and other parts of the machine are hot immediately after the motor is stopped. Touching these parts will cause burns.
  - The hydraulic oil is also hot and under high pressure immediately after the motor 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.

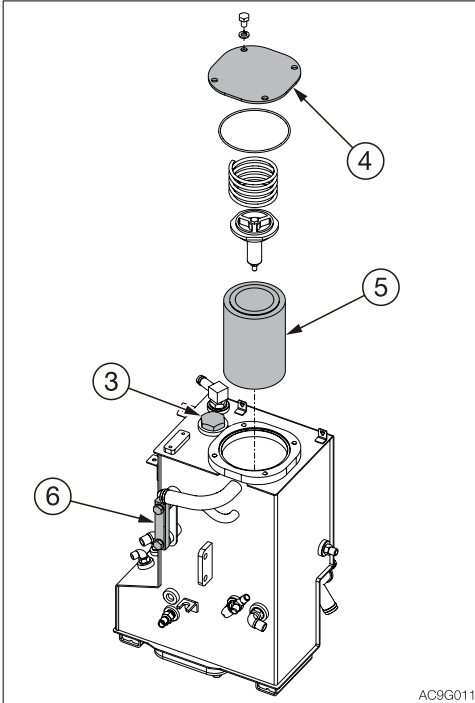
1. Set the machine to the hydraulic oil level inspection posture.  
Refer to “Inspecting the hydraulic oil tank level and replenishing” on page 5-17.
2. Raise the safety lock lever to the locked position.



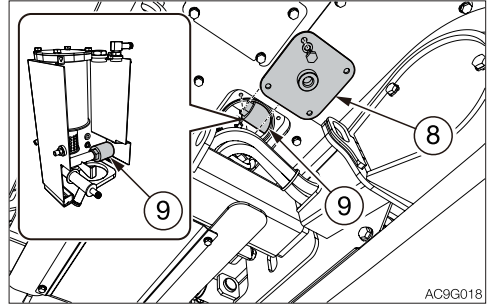
3. Remove the bolts (1).
4. Slide the seat backward.
5. Tilt the seat forward.
6. Secure the maintenance cover with the stopper (2).
7. Slowly loosen the vent plug (3) to relieve the internal pressure, and then remove the plug.



8. Place a pan for catching the waste oil under the drain plug (7).
9. Loosen the drain plug (7) and drain the hydraulic oil.



10. Loosen the bolts to take out the flange (4).
11. Remove the return filter (5).



12. Loosen the bolts and remove the flange (8).
13. Remove the suction strainer (9) and clean it.
14. Clean the inside of the hydraulic oil tank.
15. Replace the air breather.  
Refer to "Replacing the air breather" on page 5-31.
16. Install the suction strainer (9).
17. Install a new return filter to the flange (4).
18. Reinstall the flange (4) to their original positions.
19. Tighten the drain plug (7).
20. Add hydraulic oil from the hole of plug (3) up to the level between the upper limit (H) and the lower limit (L) in the sight gauge (6).
21. Tighten the plug (3).
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 5-17.



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

### • Emergency shut-off valve (If equipped)

This operation is dangerous and requires experience. Ask your sales or service dealer for help.

If air is not released, the working equipment could become slow in reacting to the operation of the operator and show unexpected behavior.



## **WARNING**

**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.**

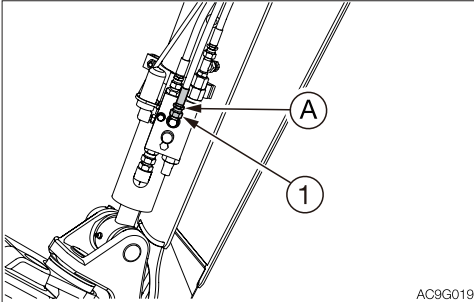
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1. Place a pan under the hose (A) or (B) to catch the waste oil.
2. Start the motor and let it run at low-idle
3. Fully lower the safety lock lever to the unlock position.



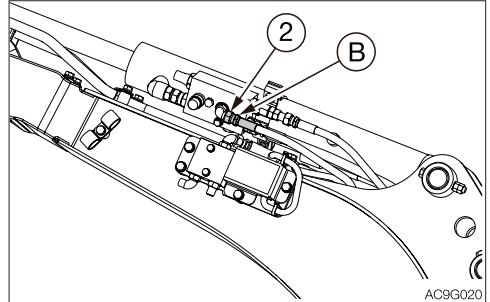


## Boom



4. Hold the hose fitting (A) in place with a wrench and slowly loosen the hose nut (1).
5. Slowly move the boom in the “Boom lower” direction a little until there are no more air bubbles coming from the hose nut (1) joint.
6. Hold the hose fitting (A) in place with a wrench and tighten the hose nut (1).

## Arm



4. Hold the hose fitting (B) in place with a wrench and slowly loosen the hose nut (2).
5. Slowly move the arm in the “Arm lower” direction a little until there are no more air bubbles coming from the hose nut (2) joint.
6. Hold the hose fitting (B) in place with a wrench and tighten the hose nut (2).



## WHEN REQUIRED

### REPLACING THE BUCKET TEETH AND THE SIDE CUTTERS

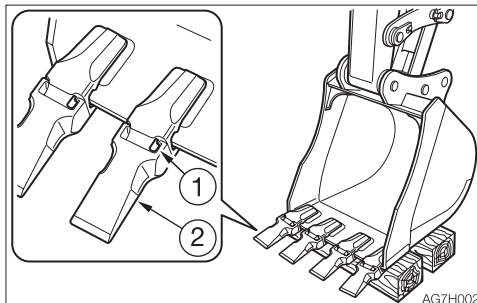
Replace the bucket teeth and the side cutters when the tooth points or the side cutters are worn. Do not wait until the adapter or bucket is damaged.

#### **WARNING**

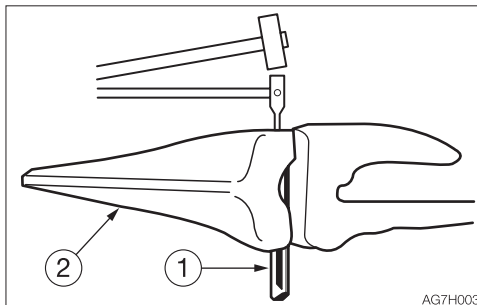
- Before performing maintenance or repairs under the machine, lower all moveable working equipment to the ground or in the lowermost position.
- To prevent unexpected movement, firmly secure the working equipment when repairing or replacing the bucket teeth or side cutter.
- When using a hammer, pins 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.

#### • Bucket tooth <V13SY or V17S> Removal

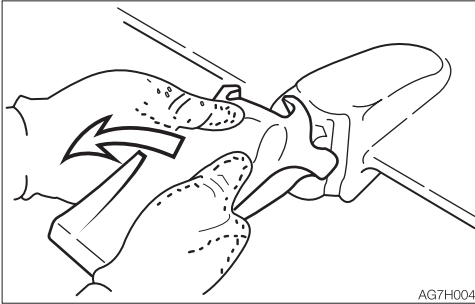
1. Clean the bucket and park the machine in a flat, safe place where the ground is hard.



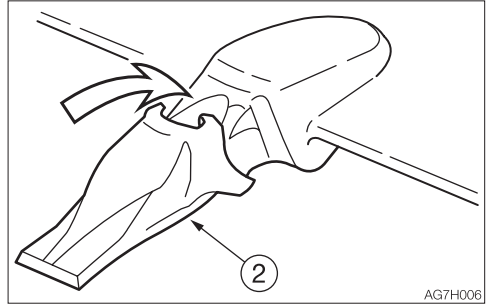
2. Set the bottom surface of the bucket flat and lower it on a block so that the locking pin (1) can be knocked out.
3. Remove the key, then check that the bucket is stable.



4. Place a rod against the locking pin (1) and knock the locking pin out by hammering against the rod. The rod should be round and thinner than the locking pin.

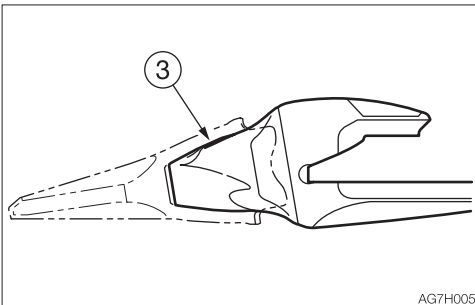


5. Remove the tooth point (2). Some tooth points (2) are of the type that are removed by turning (twisting) them counterclockwise. The same procedure can be used to remove the other tooth points.

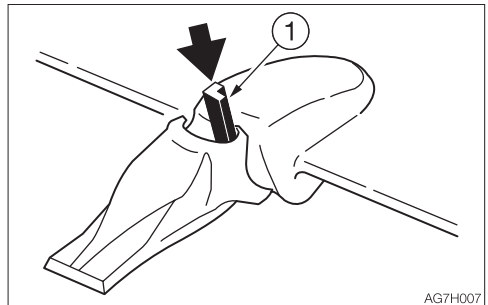


2. Put the tooth point (2) in the adapter nose (3). Push in firmly until the tooth point (2) touches the tip of the adapter nose (3). Some tooth points (2) are installed by turning (twisting) them clockwise.

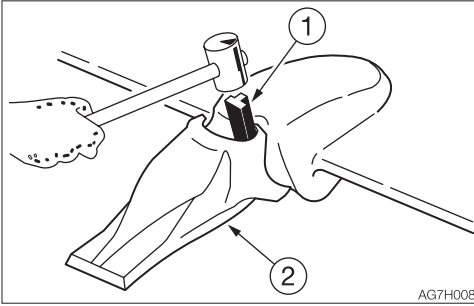
### Installation



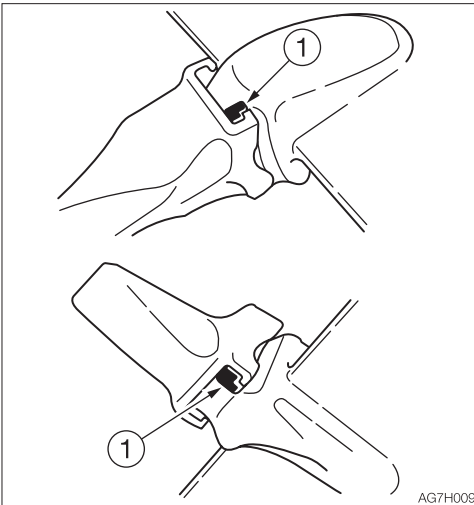
1. Clean the adapter nose (3). If there is gravel or mud on the adapter nose, the tooth point will not go in all the way and the pin cannot be driven in.



3. Insert the locking pin (1), making sure it is in the right direction.

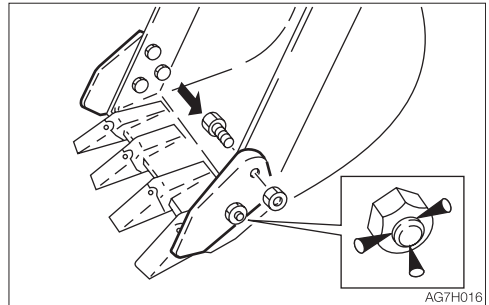


4. Drive in the locking pin (1) with a hammer until it is flush with the tip of the tooth point (2) ear.



5. The locking pin (1) is now driven in. The same procedure can be used to install the other tooth points.

• Side cutter  
Installation



1. Insert the bolts from the inner of the bucket and tighten the side cutter with nuts.  
Tightening torque: 241 N·m (178 ft·lb)
2. Caulk the bolts with a punch at three spots along the periphery of the screw to prevent the nuts from coming loose.

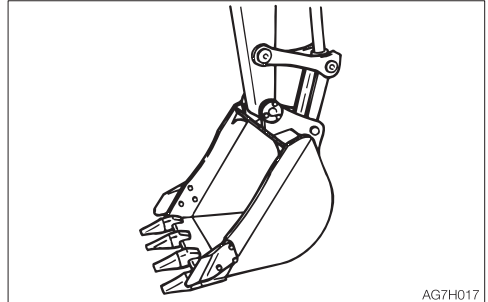


## REPLACING THE BUCKET

### **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 motor 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 motor 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.

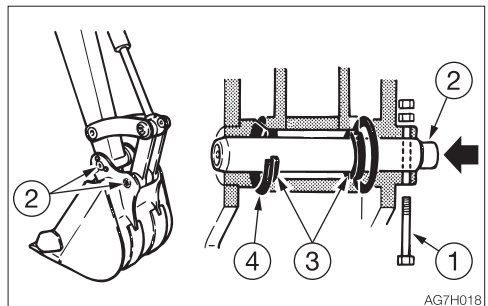
### Removing



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.

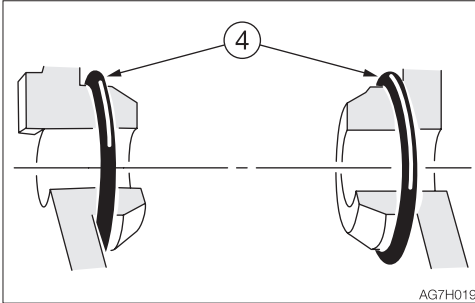
2. Set the safety lock lever to the locked position and stop the motor.



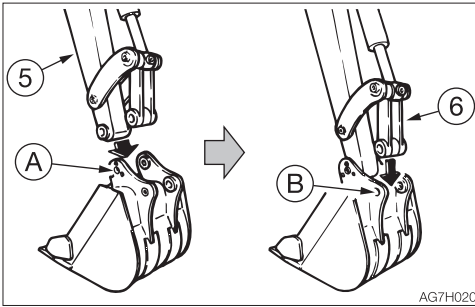
3. Remove the bolt (1).
4. Hammer the pin (2) out of the bucket.
5. Remove the bucket.  
Inspect the pin seal (3) and replace it if it is deformed or damaged. (See next page.)



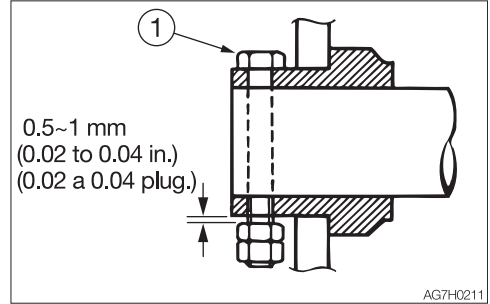
## Installation



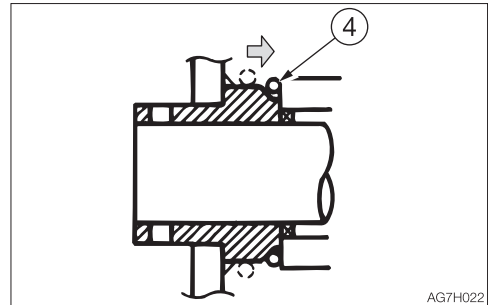
1. Set the O-ring (4) on the bucket as shown on the figure above.



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).



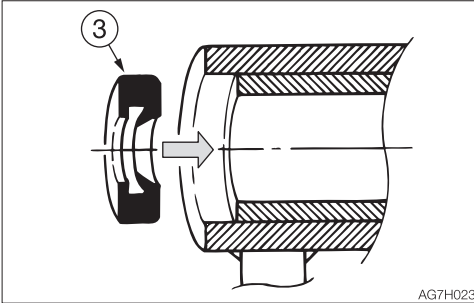
4. Align the turn prevention holes, and then install the bolt (1) and the nut. Be sure to leave a gap of about 0.5 to 1 mm (0.02 to 0.04 in.) between the nut and bucket bush, or the nut will come loose.



5. Adjust the gap between the bucket and the arm.  
Refer to "Adjusting the gap between the bucket and arm (if equipped)" on page 5-44.
6. Slide the O-ring (4).



### Replacing the pin seal



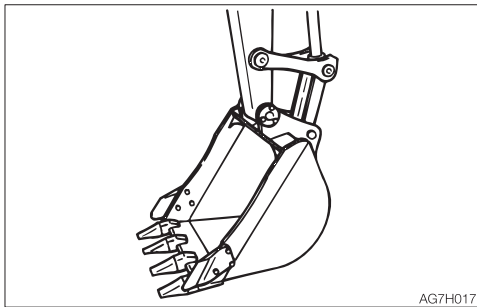
1. Set the pin seal (3) in the direction shown on the figure above.
2. Use a mallet to slowly press the pin seal in. Be careful not to damage the seal.



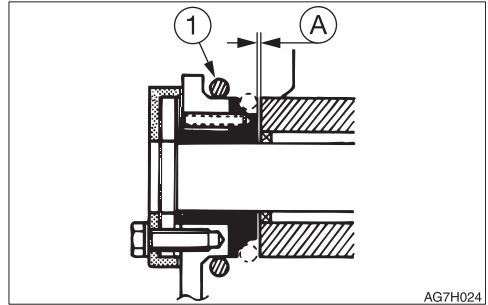
## ADJUSTING THE GAP BETWEEN THE BUCKET AND ARM (IF EQUIPPED)

### WARNING

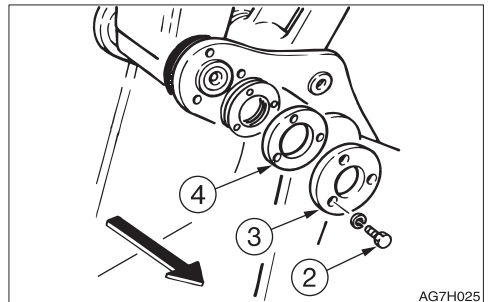
- Before performing maintenance or repairs under the machine, lower all working equipment to the ground or in the lowermost position.
- To prevent unexpected movement, securely block the working equipment when adjusting the gap.



1. Lower the bucket to the ground as shown on the figure above in a stable position.
2. Check that the bucket does not move, and then set the safety lock lever to the locked position and stop the motor.

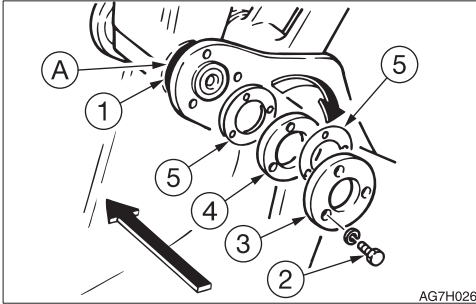


3. Move the O-ring (1) to bring the gap (A) into view and measure the width of the gap (A).  
The gap (A) should be 0.5 mm (0.02 in.). Swing the upperstructure slightly to the left and lightly press the arm point to the left side of the bucket (the side without an adjuster).



4. Remove the three bolts (2), the end plate (3) and flange (4).





AG7H026

5. Pull out the adjustment shim(s) (5) corresponding to the gap (A) from between the flange (4) and the bucket body.  
Adjustment shim thickness : 0.5 mm (0.02 in.)  
Be careful that the gap is no less than 0.5 mm (0.02 in.) after adjustment.

**Note:**

Example (for a gap of 2 mm or 0.08 in.):  
2 mm - 0.5 mm (standard value) = 1.5 mm (0.06 in.)  
In the above example, three shims (5) should be removed.

6. Insert the adjustment shim(s) (5) removed in step 5 above between the end plate (3) and the flange (4), and then fasten it in place with the three bolts (2).
  - Tightening torque for bolts (2): 83 N·m (61.5 ft-lb.)
7. Return the O-ring (1) to the original position.



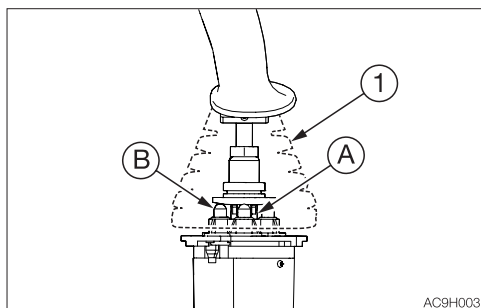
## LUBRICATING THE LEVERS AND PEDALS

### WARNING

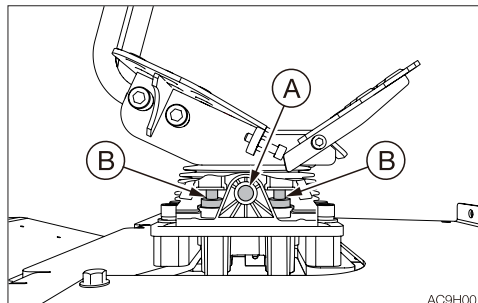
Set the machine to the parking posture, stop the motor, remove the starter key and store it. Failure to do so may result in the machine moving abruptly, leading to serious injury or death.

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

### Operating levers

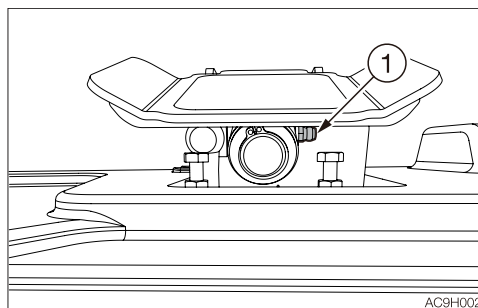


### Travel levers/pedals



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.

### Boom swing pedal



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



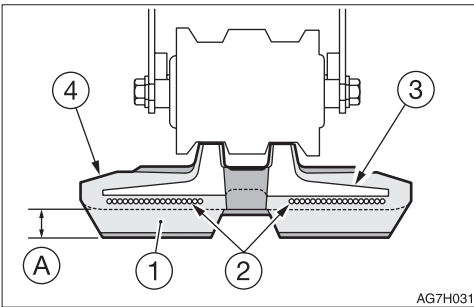
## INSPECTING THE RUBBER CRAWLERS

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.

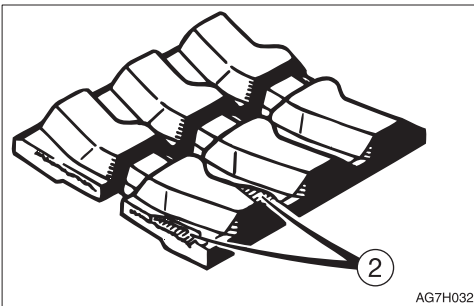
#### (1) Lug



AG7H031

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

#### (2) Steel cord

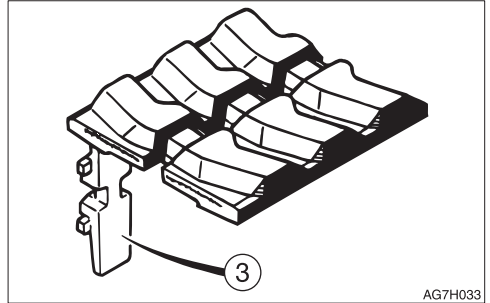


AG7H032

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.

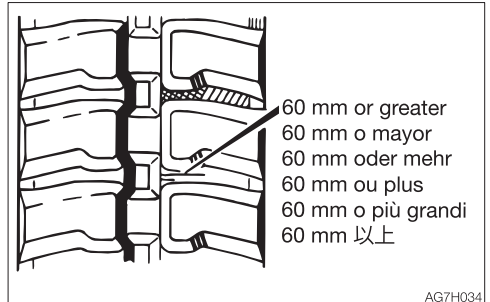
#### (3) Metal core



AG7H033

Replace if even one metal core is off.

#### (4) Rubber



AG7H034

60 mm or greater  
60 mm o mayor  
60 mm oder mehr  
60 mm ou plus  
60 mm o più grandi  
60 mm 以上

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.



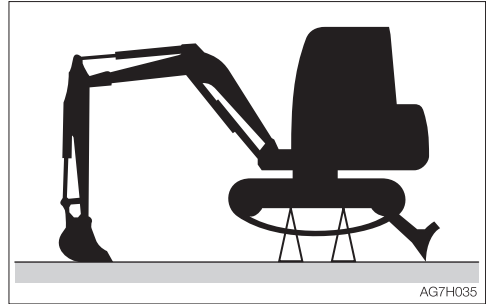
## REPLACING THE RUBBER CRAWLERS

### **WARNING**

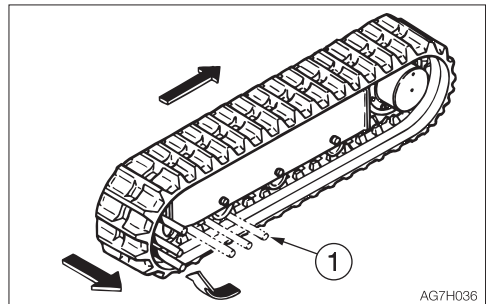
- If you must work beneath the raised machine or working equipment, always use wood blocks, jack-stands or other rigid and stable supports. Never get under the machine or working equipment if they are not sufficiently supported.
- If maintenance must be performed with the motor running, always work as a two person team communicating each other.
  - One person must sit in the operator's seat so that he/she can immediately stop the motor 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 5-20.



2. Use the working equipment to lift the body.

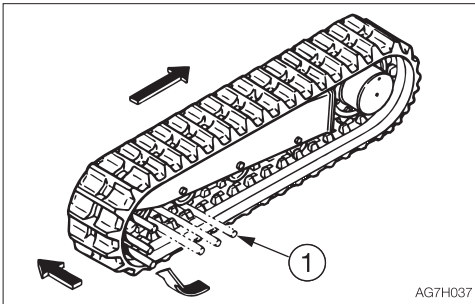


3. Set an iron pipe (1) in the rubber crawler and turn the sprocket slowly in the reverse direction.
4. Turn until the iron pipe (1) is directly next to the idler and the rubber crawler lifts away from the idler, then stop turning the sprocket.
5. Slide the rubber crawler sideways and remove it from 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 5-20.
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. When the machine is not going to be used for a long time, store the lithium ion battery at an ambient temperature of  $-10$  to  $30^{\circ}\text{C}$ , with a state of charge (amount of remaining power) of around 10%.  
Inspect the state of charge of the lithium ion battery once a month. If it is 0%, recharge it to 10%.

**Note:** If the battery is stored at ambient temperature of  $45^{\circ}\text{C}$  ( $113^{\circ}\text{F}$ ) and over 30% state of charge, it will degrade by 2 to 5% per month.

1. Clean the machine.
2. Inspect for oil leakage, cracks and loose nuts and bolts.
3. Confirm that the lithium ion battery level is around 10%.
4. Use the grease gun to lubricate the grease fittings.
5. Fully retract the bucket and arm cylinders and lower the bucket and dozer blade to the ground.
6. Apply rust-inhibiting oil to the hydraulic cylinder rods.
7. Disconnect the negative cable from the lead-acid battery and cover the battery to prevent freezing.

**Note:** When a machine is stored for a long time, the settings of the multi-information display may be reset. In this case, set the multi-information display again.

### 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 lead-acid battery and recharge it if necessary.  
Ask a Takeuchi 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.

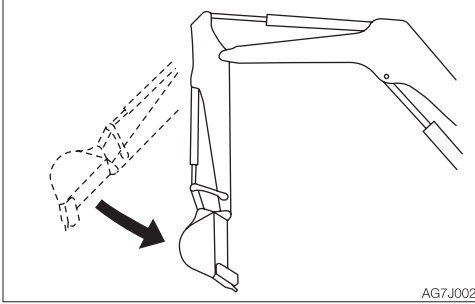
1. Wipe off the rust-inhibiting oil that was applied on the piston rods of the hydraulic oil cylinders.
2. Add oil or grease as necessary.

# TROUBLESHOOTING

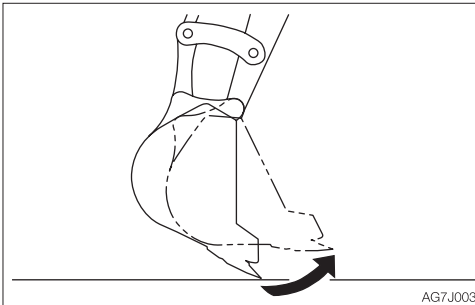


## SYMPTOMS THAT ARE NOT MALFUNCTIONS

The symptoms listed below are not malfunctions.



- The arm retracting speed momentarily decreases when the arm reaches an almost vertical position while the motor is running at low speed.



- The bucket moving speed momentarily decreases when the bucket teeth reach an almost horizontal position while the motor 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.

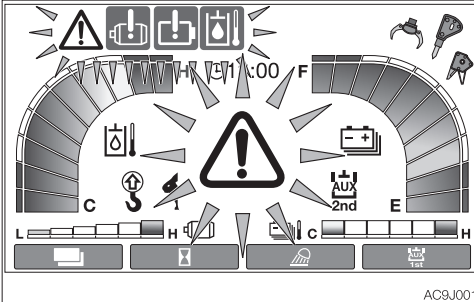
- It becomes less easy to operate the machine when an attachment weighing more than a standard arm or bucket is installed.
- The motor keeps running for several seconds after the key is turned to the OFF position.





## IF THE MACHINE OVERHEATS

The symptoms listed below indicate overheating.



- An alarm is sounded and the lithium ion battery warning lamp and the vehicle emergency lamp start flashing.
- An alarm is sounded and one or more lamps, such as the lithium ion battery warning lamp, hydraulic oil temperature warning lamp and drive system warning lamp, as well as the vehicle emergency lamp, start flashing.

### Remedy procedure

1. Park the machine in a safe place.
2. Turn the key to the OFF position.
3. Check the display at every 10 minutes until there is no warning.
4. If no warning is displayed, perform the inspections and countermeasures listed below.
  - Dust-free filters for the motors  
..... Clean  
Refer to page 5-29.

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



## IF THE LEAD-ACID BATTERY GOES DEAD

The symptom below indicates that the lead-acid battery is dead.

- The machine does not respond when the key is turned ON.

### Remedy procedure

Start the machine using the battery on the booster vehicle via the booster cables.

### WARNING

- When starting the motor using booster cables, be sure to connect the cables according to the proper procedure. Improper use of booster cables could cause the lead-acid battery to explode or the machine to move unexpectedly.
  - 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 goggles when starting the motor with the booster cables.

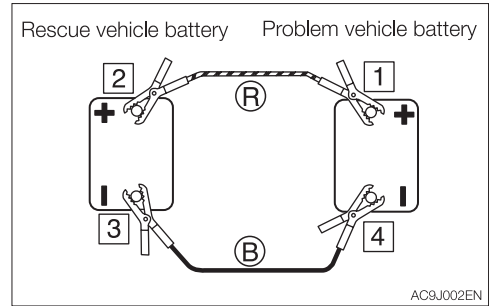
**IMPORTANT:** Use the booster cables and clips of a size suited to the capacity of the lead-acid battery. Do not use damaged or corroded booster cables and clips.

**IMPORTANT:** Be sure that the lead-acid battery of the booster vehicle has the same capacity as the dead lead-acid battery.

**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.



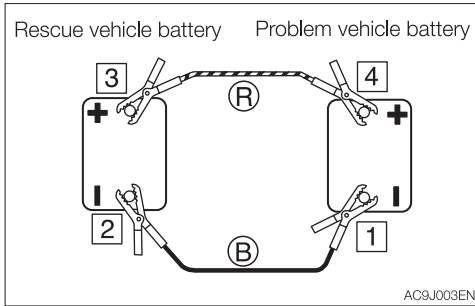
1. Connect the clip of booster cable (R) to the positive (+) battery terminal of the dead machine.
2. Connect the other clip of booster cable (R) to the positive (+) battery terminal of the booster vehicle.
3. Connect the clip of booster cable (B) to the negative (-) battery terminal of the booster vehicle.
4. Connect the other clip of booster cable (B) to the negative (-) battery terminal of the dead machine.

### Starting the machine

1. Check that the clips are securely connected to the terminals.
2. Turn the key switch to ON to start the 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 booster cable (B) from the negative (-) battery terminal of the dead machine.
2. Disconnect the other clip of booster cable (B) from the negative (-) battery terminal of the booster vehicle.
3. Disconnect the clip of booster cable (R) from the positive (+) battery terminal of the booster vehicle.
4. Disconnect the clip of booster cable (R) from the positive (+) battery terminal of the dead machine.

**Recharging**

Ask your sales or service dealer to recharge the dead lead-acid battery. Be sure to remove the dead battery from the machine before recharging; failure to do so could result in machine failure.

# MEMO

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## 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.

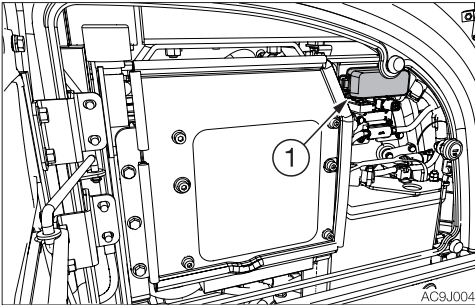
### INSPECTING AND REPLACING THE FUSE



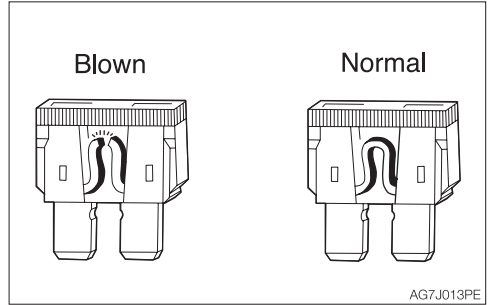
#### WARNING

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 motor.



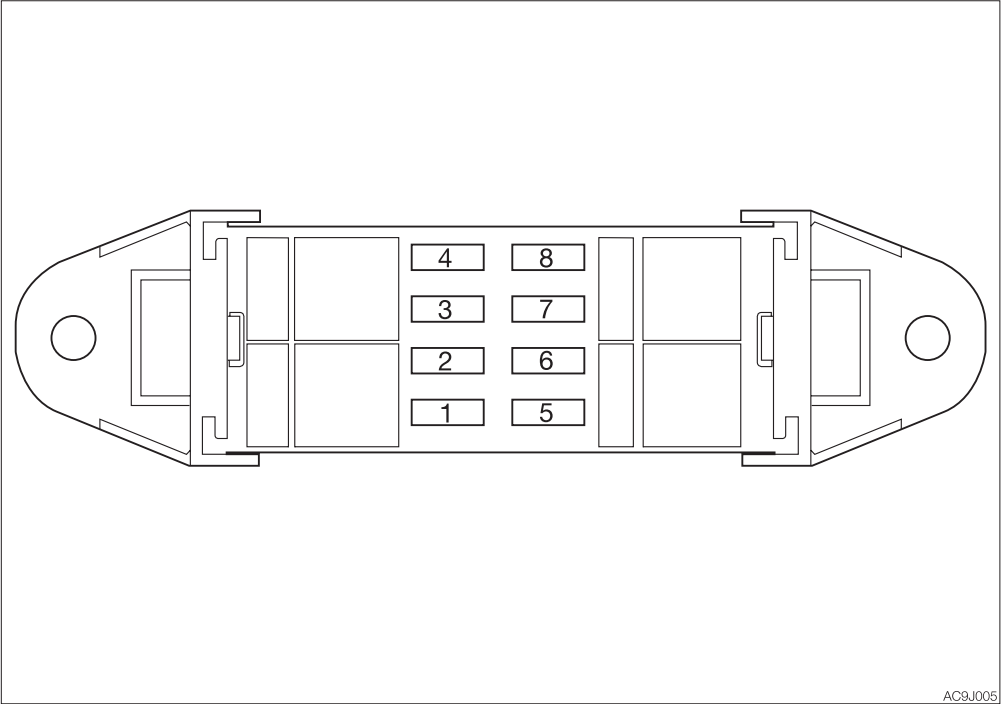
2. Open the fuse box cover (1).
3. Check for any blown fuses.



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



Fuse layout and circuits protected (1)










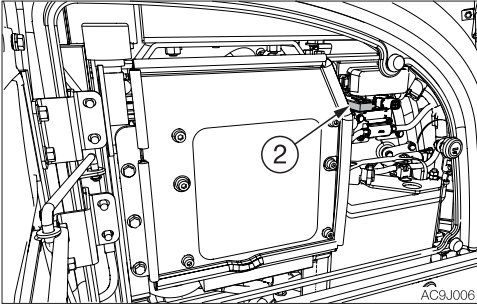
AC9J005



## TROUBLESHOOTING IF A FUSE BLOWS

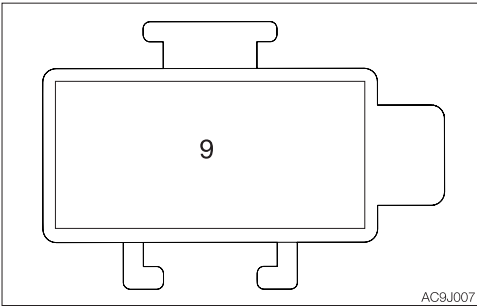
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No.	Capacity	Symbol	Protected circuit	Fuse No.
1	10A	MAIN CTL 	Main controller power supply	F1
2	5A		Power sockets (24V)	F2
3	15A		Lights	F3
4	25A	SUB CTL 	Sub-controller power supply	F4
5	5A	OPT	Option	F5
6	5A		Key switch (24V)	F6
7	10A		Horn	F7
8	3A		GPS	F8



5. Open the fuse box cover (2).
6. Check for any blown fuses.

**Fuse layout and circuits protected (2)**

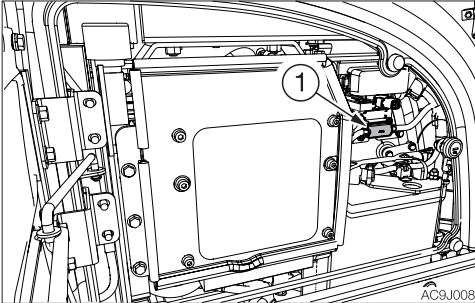


No.	Capacity	Symbol	Protected circuit	Fuse No.
9	3A		GPS	F9





## INSPECTING THE FUSIBLE LINK






If the machine is not turned on after turning the key switch to the ON position when the lead-acid battery switch is ON, the cartridge type fusible link (1) is likely blown. Open the maintenance cover 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.






## 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	<b>Vehicle emergency lamp</b>	<p>There is a problem in the machine. Refer to the respective warning lamp below. Get the error code number from the multi-information display, and then consult your sales or service dealer referring to the "Vehicle error code list", "Battery pack error code list" or "Motor error code list". Refer to "Multi-information display" on page 2-8. Refer to "Vehicle error code list" on pages 6-14 to 6-18. Refer to "Battery pack error code list" on pages 6-20 to 6-23. Refer to "Motor error code list" on pages 6-24 to 6-29.</p>
 AC9J009	<b>Drive system warning lamp</b>	<p>There is a problem with the motor for gear pump, motor for piston pump or the related equipment. Consult a Takeuchi sales or service dealer for help.</p>
 AC9J010	<b>Lithium ion battery warning lamp</b>	<p>There is a problem with the battery pack or its related equipment. Consult a Takeuchi sales or service dealer for help.</p>



Warning lamp	Lamp name	Causes and remedies
 AU7J002	<b>Hydraulic oil temperature warning lamp (red)</b>	The hydraulic oil temperature became too high due to machine overworking. Stop operation and let the hydraulic oil cool down.
	<b>Hydraulic oil temperature warning lamp (blue)</b>	The hydraulic oil temperature became too low due to ambient temperature conditions. Perform a warm-up operation. Refer to “Warm-up in cold climates” on page 3-9.
 AQQJ004	<b>Third auxiliary hydraulic warning lamp</b>	Pressure in the third auxiliary hydraulic line is too low  Consult a Takeuchi sales or service dealer for help.
 ACSJ011	<b>Lithium ion battery level warning lamp</b>	The lithium ion battery level is low. Charge the battery. Refer to “Inspecting the lithium ion battery level” on page 5-16.



## VEHICLE ERROR CODE LIST

If an error code appears on the display, consult your sales or service dealer.

<b>Error code</b>	<b>Error details</b>
9	Impossible to sense ACC key
402	CAN 0 communication error
412	CAN 1 communication error
422	CAN 2 communication error
512	CAN communication error (INV1)
522	CAN communication error (INV2)
532	CAN communication error (BMU)
602	CAN communication error (cluster gauge)
612	CAN communication error (IOX)
852	CAN communication error (lever L)
862	CAN communication error (lever R)
872	CAN communication error (travel pedal)
1703	Main power supply voltage error (too high)
1704	Main power supply voltage error (too low)
1713	IOX power supply voltage error (too high)
1714	IOX power supply voltage error (too low)
2503	Sensor voltage 1 error (too high) MMC
2504	Sensor voltage 1 error (too low) MMC
2553	Sensor voltage 2 error (too high) MMC
2554	Sensor voltage 2 error (too low) MMC
3401	Inverter precharge error



TROUBLESHOOTING  
**VEHICLE ERROR CODE LIST**

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<b>Error code</b>	<b>Error details</b>
3820	Hydraulic oil temperature too hot
3823	Hydraulic oil temperature sensor error (too high)
3824	Hydraulic oil temperature sensor error (too low)
3833	Ambient temperature sensor error (too high)
3834	Ambient temperature sensor error (too low)
3843	Motor ambient temperature sensor error (too high)
3844	Motor ambient temperature sensor error (too low)
3853	LiB ambient temperature sensor error (too high)
3854	LiB ambient temperature sensor error (too low)
4407	Contactator fused
5303	Accelerator sensor error (too high)
5304	Accelerator sensor error (too low)
5603	Lift alarm sensor error (too high)
5604	Lift alarm sensor error (too low)
5667	Travel pedal system error
5669	Travel pedal L neutral error
5679	Travel pedal R neutral error
5683	Swing pedal voltage value error (too high)
5684	Swing pedal voltage value error (too low)
5689	Swing pedal neutral error
5693	Blade voltage value error (too high)
5694	Blade voltage value error (too low)
5699	Blade neutral error



TROUBLESHOOTING  
**VEHICLE ERROR CODE LIST**

<b>Error code</b>	<b>Error details</b>
5707	Joy stick L system error
5709	Joy stick L neutral error
5717	Joy stick R system error
5719	Joy stick R neutral error
6503	AUX1 slide switch voltage value error (too high)
6504	AUX1 slide switch voltage value error (too low)
6509	AUX1 slide switch neutral error
6519	AUX1 (L) switch error
6529	AUX1 (R) switch error
6603	AUX2 slide switch voltage value error (too high)
6604	AUX2 slide switch voltage value error (too low)
6609	AUX2 slide switch neutral error
6709	AUX3 switch error (Grip)
6719	AUX3 switch error (Grip) (Foot)
8015	AUX1 (L) PWM output current error (too low)
8016	AUX1 (L) PWM output current error (too high)
8025	AUX1 (R) PWM output current error (too low)
8026	AUX1 (R) PWM output current error (too high)
8035	AUX2 (L) PWM output current error (too low)
8036	AUX2 (L) PWM output current error (too high)
8045	AUX2 (R) PWM output current error (too low)
8046	AUX2 (R) PWM output current error (too high)



<b>Error code</b>	<b>Error details</b>
9005	Boom raise PWM output current error (too low)
9006	Boom raise PWM output current error (too high)
9015	Boom lower PWM output current error (too low)
9016	Boom lower PWM output current error (too high)
9025	Arm dump PWM output current error (too low)
9026	Arm dump PWM output current error (too high)
9035	Arm digging PWM output current error (too low)
9036	Arm digging PWM output current error (too high)
9045	Bucket dump PWM output current error (too low)
9046	Bucket dump PWM output current error (too high)
9055	Bucket digging PWM output current error (too low)
9056	Bucket digging PWM output current error (too high)
9065	Slew left PWM output current error (too low)
9066	Slew left PWM output current error (too high)
9075	Slew right PWM output current error (too low)
9076	Slew right PWM output current error (too high)
9085	Travel LF PWM output current error (too low)
9086	Travel LF PWM output current error (too high)
9095	Travel RF PWM output current error (too low)
9096	Travel RF PWM output current error (too high)



TROUBLESHOOTING  
**VEHICLE ERROR CODE LIST**

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<b>Error code</b>	<b>Error details</b>
9105	Travel LB PWM output current error (too low)
9106	Travel LB PWM output current error (too high)
9115	Travel RB PWM output current error (too low)
9116	Travel RB PWM output current error (too high)
9125	Swing left PWM output current error (too low)
9126	Swing left PWM output current error (too high)
9135	Swing right PWM output current error (too low)
9136	Swing right PWM output current error (too high)
9145	Blade raise PWM output current error (too low)
9146	Blade raise PWM output current error (too high)
9155	Blade lower PWM output current error (too low)
9156	Blade lower PWM output current error (too high)
9900	Options settings change (TFM)

PWM = Pulse width modulation



# MEMO

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## BATTERY PACK ERROR CODE LIST

If an error code appears on the display, consult your sales or service dealer.

<b>Error code</b>	<b>Error details</b>
18	Vehicle communication error
19	Error of vehicle drive preparation complete signal
20	Mode error 1
21	Mode error 2
22	Inverter stopping error
23	Clock synchronization timeout
33	Gross voltage overcharge
34	Gross voltage overcharge caution
35	Gross voltage too low
36	Caution on gross voltage too low
37	Module overcharge
38	Module overcharge caution
39	Module voltage too low
40	Caution on module voltage too low
41	Cell overcharge
42	Caution on cell overcharge
43	Cell voltage too low
44	Caution on cell voltage too low
45	Voltage difference in modules too large
46	Voltage difference in cells too large
49	Module temperature too high



<b>Error code</b>	<b>Error details</b>
50	Caution on module temperature too high
51	Module temperature too low
52	Caution on module temperature too low
53	Temperature sensor error
54	DC/DC converter Heatsink primary temperature error
55	DC/DC converter Caution on heatsink primary temperature
56	DC/DC converter Heatsink secondary temperature error
57	DC/DC converter Caution on heatsink secondary temperature
58	CMU printed circuit board temperature error
59	DC/DC converter 24 VDC voltage error
60	DC/DC converter 14.5 VDC voltage error
65	Parameter error (off-board charger)
66	Timeout in response to precharge command (off-board charger)
67	Precharge timeout (off-board charger)
68	Timeout in response to charge command (off-board charger)
69	Charger error (off-board charger)
70	Output current error (off-board charger)
71	Receive error (off-board charger)



<b>Error code</b>	<b>Error details</b>
73	Timeout in response to recharge command (off-board charger)
74	Timeout in response to stop charge command (off-board charger)
76	Error response to precharge command (off-board charger)
77	Error response to charge command (off-board charger)
78	Error response to stop charge command (off-board charger)
79	Error response to recharge command (off-board charger)
81	Parameter error (on-board charger)
82	Timeout in response to precharge command (on-board charger)
83	Precharge timeout (on-board charger)
84	Timeout in response to charge command (on-board charger)
85	Charger error (on-board charger)
86	Output current error (on-board charger)
87	Receive error (on-board charger)
89	Timeout in response to recharge command (on-board charger)
90	Timeout in response to stop charge command (on-board charger)
92	Error response to precharge command (on-board charger)
93	Error response to charge command (on-board charger)
94	Error response to stop charge command (on-board charger)
95	Error response to recharge command (on-board charger)



<b>Error code</b>	<b>Error details</b>
97	Caution on reduced battery capacity
98	Battery capacity reduced
99	Contactactor for charging error
100	Contactactor for discharging error
101	Discharging overcurrent protection
102	Output overcurrent protection for off-board charger
103	Output overcurrent protection for on-board charger
104	Watchdog error
105	SOH not updated error
113	CMU circuit board communication error (CMU1 error)
114	CMU circuit board communication error (CMU2 error)
115	CMU circuit board communication error (CMU3 error)
116	CMU circuit board communication error (CMU4 error)
117	CMU circuit board communication error (CMU5 error)
118	CMU circuit board error (CMU1 error)
119	CMU circuit board error (CMU2 error)
120	CMU circuit board error (CMU3 error)
121	CMU circuit board error (CMU4 error)
122	CMU circuit board error (CMU5 error)
123	CMU circuit board MD error
130	Off-board charger stopped



## **MOTOR ERROR CODE LIST**

If an error code appears on the display, consult your sales or service dealer.

<b>Error code</b>	<b>Error details</b>
0*	WAITING FOR NODE
0*	DATA ACQUISITION
0*	CHECK UP NEEDED
0*	PARAM RESTORE
0*	TILLER OPEN
2250	COIL SHOR. MC
2311	STBY I HIGH
2312	PUMP I=0 EVER
3100	WRONG SET BAT.
3101	WRONG KEY VOLT.
3110	VMN HIGH
3111	INIT VMN HIGH
3120	VMN LOW
3121	INIT VMN LOW
3130	CAPACITOR CHARGE
3211	DRIVER SHORTED
3221	CONTACTOR DRIVER
3222	EB. DRIV.SHRT.

\*: The motor error code "0" may appear when the machine is started. This is not a problem because "0" will automatically disappear.



TROUBLESHOOTING  
**MOTOR ERROR CODE LIST**

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<b>Error code</b>	<b>Error details</b>
3223	POS. EB. SHORTED
3224	EB. DRIV.OPEN
3302	SMARTDRIVER KO
3610	EEPROM KO
3611	PARAM RESTORE
4110	MOTOR TEMPERAT.
4210	TH. PROTECTION
4211	THERMIC SENS. KO
4311	SENS MOT TEMP KO
5001	AUX BATT. SHORT.
5002	EVP COIL OPEN
5003	EVP DRIV. SHORT.
5101	VKEY OFF SHORTED
5114	LOGIC FAILURE #1
5441	CONTACTOR OPEN
5442	CONTACTOR CLOSED
6010	WATCHDOG
6302	CURRENT GAIN
8130	NO CAN MSG.
8131	NO CAN WR MSG.XX



TROUBLESHOOTING  
**MOTOR ERROR CODE LIST**

Error code	Error details
FF01	WARNING SLAVE
FF11	LOGIC FAILURE #3
FF12	LOGIC FAILURE #2
FF1C	PUMP VMN LOW
FF1D	PUMP VMN HIGH
FF42	BATTERY LOW
FF4E	VACC NOT OK
FF4F	INCORRECT START
FF50	FORW + BACK
FF51	WRONG FBSENS.SET
FF56	PEDAL WIRE KO
FF8C	STO-SS1 ACTIVEXX
FF8D	STO-SS1 ALARM XX
FF8E	SAFETY INIT. XX
FF90	SAFETY SW. XX
FF91	SAFETY DIAG. XX
FF92	BMS FAULT
FF93	BMS NOT READY
FF94	WRONG PERFORM.
FF95	NO CAN MSG DISP





TROUBLESHOOTING  
**MOTOR ERROR CODE LIST**

Error code	Error details
FF97	POT MISMATCH
FF98	SENSOR SUPPLY XX
FF99	OFFSET SPD.SENS.
FF9A	AGV
FF9B	WAIT MOTOR STILL
FFA1	RPM HIGH
FFA2	POS.EB.SHORT PIN
FFA3	ED SLIP MISMATCH
FFA4	POS.EB.SHORT GND
FFA8	SPEED FB.ERR. XX
FFA9	EMERGENCY
FFAB	ACQUIRING A.S.
FFAC	ACQUIRE ABORT
FFAD	ACQUIRE END
FFAF	SPEED OVERHEAD
FFB1	COIL SHOR. EB.
FFB2	MOTOR TEMP. STOP
FFB3	STEER SENSOR KO
FFB4	OVERLOAD



TROUBLESHOOTING  
**MOTOR ERROR CODE LIST**

<b>Error code</b>	<b>Error details</b>
FFBB	LIFT+LOWER
FFBC	PUMP VACC NOT OK
FFBD	PUMP INC START
FFBE	PUMP VMN NOT OK
FFBF	PUMP I NO ZERO
FFC0	PUMP VACC RANGE
FFC3	STEER SENSOR KO
FFC4	MOT.PHASE SH.
FFC5	WRONG SLAVE VER.
	NO CAN MSG DISP
FFC6	M/S PAR CHK MISM
FFC7	PARAM TRANSFER
FFC8	VDC OFF SHORTED
FFC9	CURRENT PROFILE
FFCA	VDC LINK OVERV.
FFCB	HW FAULT MC
FFCC	BRAKE RUN OUT
FFCD	EPS RELAY OPEN
FFD2	WRONG RAM MEM.
FFD3	STALL ROTOR
FFD4	POWER MISMATCH
	W.SET. TG-EB XX
FFD5	POSITIVE LC OPEN
	INPUT MISMATCH
FFD8	EB. COIL OPEN



TROUBLESHOOTING  
**MOTOR ERROR CODE LIST**

Error code	Error details
FFDB	PEV NOT OK
FFDD	HANDBRAKE
FFDE	SEAT MISMATCH
FFE2	VACC OUT RANGE
FFE3	HW FAULT
	OUT MISMATCH XX
FFE5	HW FAULT EB.
FFE6	LC COIL OPEN
	SOFTWARE ERROR
FFE8	CONT. DRV. EV
FFE9	POWERMOS SHORTED
FFEB	CTRAP THRESHOLD
FFEE	HW FAULT EV.
FFEF	CONTROLLER MISM.
FFF0	OUT MISMATCH PU
FFF1	COIL SHOR. EVAUX
FFF2	OPEN COIL EV.
	SP MISMATCH XX
FFF3	THROTTLE PROG.
	STO-SS1 ALARM XX
FFF4	SAFETY DIAG. XX
FFF5	IQ MISMATCHED
	SAFETY SW. XX
FFF7	SAFETY INIT. XX
FFF8	EVP DRIVER OPEN
FFF9	DRV. SHOR. EV
FFFA	ANALOG INPUT
FFFD	FIELD ORIENT. KO



## 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	<ul style="list-style-type: none"><li>• Insufficient grease on the left and right operating levers</li><li>• Boot is taken off error</li></ul>	<ul style="list-style-type: none"><li>• Grease the levers. Refer to page 5-46.</li><li>• Replace the boot.</li></ul>
Travel levers, blade lever and pedals do not move smoothly	<ul style="list-style-type: none"><li>• Insufficient grease on travel levers, blade lever and pedals</li></ul>	<ul style="list-style-type: none"><li>• Grease the levers and pedals. Refer to page 5-46.</li></ul>
Hoe attachment, slewing or traveling operation not possible	<ul style="list-style-type: none"><li>• Safety lock lever is raised (locked)</li></ul>	<ul style="list-style-type: none"><li>• Lower (release) the safety lock lever. Refer to page 2-29.</li></ul>
Digging force is insufficient	<ul style="list-style-type: none"><li>• Hydraulic oil level too low</li><li>• Hydraulic oil is not warm enough</li><li>• Hydraulic oil is not of suitable type</li></ul>	<ul style="list-style-type: none"><li>• Add to the specified level. Refer to page 5-17.</li><li>• Perform the warm-up. Refer to page 3-8.</li><li>• Replace the hydraulic oil. Refer to page 5-34.</li></ul>
Traveling is not possible or not smooth	<ul style="list-style-type: none"><li>• Stones or foreign objects are stuck</li></ul>	<ul style="list-style-type: none"><li>• Remove the foreign object.</li></ul>
Machine veers to the right/left	<ul style="list-style-type: none"><li>• Stones or foreign objects are stuck</li><li>• Faulty crawler tension adjustment</li></ul>	<ul style="list-style-type: none"><li>• Remove the foreign object.</li><li>• Adjust the crawler to the prescribed tension. Refer to page 5-20.</li></ul>



<b>Symptoms</b>	<b>Major causes</b>	<b>Remedies</b>
Travel speed cannot be changed	<ul style="list-style-type: none"><li>• Error in the electrical system</li></ul>	<ul style="list-style-type: none"><li>• Adjust or replace (ask your sales or service dealer).</li></ul>
Slewing is not possible or not smooth	<ul style="list-style-type: none"><li>• Insufficient grease on slew bearing</li></ul>	<ul style="list-style-type: none"><li>• Grease the bearing. Refer to page 5-22.</li></ul>
Hydraulic oil temperature is too high	<ul style="list-style-type: none"><li>• Hydraulic oil level too low</li><li>• Oil cooler fins are clogged.</li></ul>	<ul style="list-style-type: none"><li>• Add up to the specified level. Refer to page 5-17.</li><li>• Clean the oil cooler fins. Refer to page 5-30.</li></ul>
Cluster is not displayed or machine is not started	<ul style="list-style-type: none"><li>• Key switch contact is faulty</li><li>• 12 V battery is dead</li><li>• Electrical system contact is faulty</li><li>• Lead-acid battery switch is in the OFF position.</li><li>• Emergency stop switch is activated.</li></ul>	<ul style="list-style-type: none"><li>• Repeat ON/OFF key switch operation two or three times</li><li>• Recharge the 12 V battery</li><li>• Adjust or replace (ask your sales or service dealer).</li><li>• Turn the lead-acid battery switch to the ON position. Refer to page 2-22.</li><li>• Recover from the emergency stop state. Refer to page 2-23.</li></ul>



<b>Symptoms</b>	<b>Major causes</b>	<b>Remedies</b>
Crawlers come off	<ul style="list-style-type: none"><li>• Crawlers too loose</li></ul>	<ul style="list-style-type: none"><li>• Increase the tension. Refer to page 5-20.</li></ul>
Charging is disabled (no charge screen is displayed)	<ul style="list-style-type: none"><li>• Connection is faulty in the charging cable or the off-board charger</li><li>• The charging cable or the off-board charger is faulty</li><li>• Power is off at the main power supply socket.</li><li>• Both the Off-board charger and the charging cable are connected.</li><li>• The emergency stop switch is activated.</li></ul>	<ul style="list-style-type: none"><li>• Properly connect the off-board charger or the charging cable to the machine and the power source.</li><li>• Adjust or replace (ask your sales or service dealer).</li><li>• Turn on the power at the main power supply socket.</li><li>• Connect only either the off-board charger or the charging cable.</li><li>• Recover from the emergency stop state. Refer to page 2-23.</li></ul>
The state of charge is not displayed correctly (error code 105 is displayed).	<ul style="list-style-type: none"><li>• There is a difference between the battery capacity and the controller's calculation.</li></ul>	<ul style="list-style-type: none"><li>• Use the battery until the state of charge falls below 20%, and then start charging and finish it when the green or white bar appears.</li></ul>

# MEMO

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## **LOWERING THE BOOM TO THE GROUND**

If the hoe attachment must be lowered to the ground while the motor is stopped, use the following procedure.

### **PROCEDURE 1**

Perform this operation within 10 minutes after the motor is stopped.

1. Sit at the operator's seat.
2. Lower the safety lock lever to the unlock position
3. Turn the key switch to the ON position.
4. Slowly push the operating lever forward to lower the boom.

### **PROCEDURE 2**

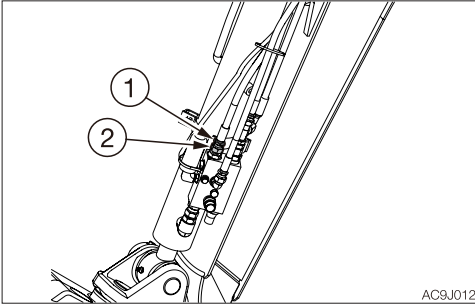
This operation is dangerous and requires experience. Ask your sales or service dealer for it.



### **WARNING**

- **Stop the motor and allow each part of the machine to cool down before performing inspection and maintenance.**
    - The motor, the hydraulic system and other parts of the machine are hot immediately after the motor 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.
  - 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.
  - Slowly turn the hose nut and lower the boom at a slow pace.
  - Do not loosen or remove the hoses not located in the specified places. Oil may spurt out if wrongly handled.
-





1. Place a pan under the hose to catch the waste oil.
2. Hold the hose fitting (1) with a wrench and slowly loosen the hose nut (2) with another wrench.
3. The oil in the boom cylinder is drained and the hoe attachment is lowered.
4. After the hoe attachment is lowered to the ground, check the safety and stability of the machine.
5. Hold the hose fitting (1) with a wrench and tighten the hose nut (2) with another wrench.
  - Tightening torque: 31.4 N·m (23.1 ft-lb.)



## 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.

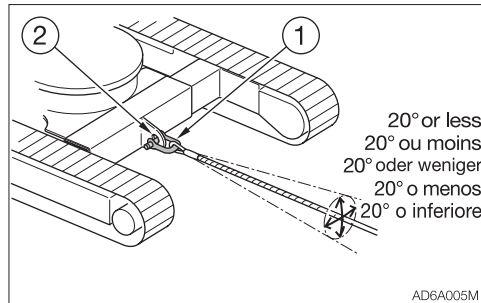
- It becomes dangerous if the wire rope breaks or becomes disengaged. Use a wire rope appropriate for the required tractive force.
- Do not use a wire rope that is kinked, twisted or otherwise damaged.
- Do not apply heavy loads abruptly to the wire rope.
- Wear safety gloves when handling the wire rope.
- 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 motor does not start. Doing so could damage the hydraulic equipment of the machine.

**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 force: 28.2 KN (6339 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 CANOPY IS DAMAGED

 **WARNING**

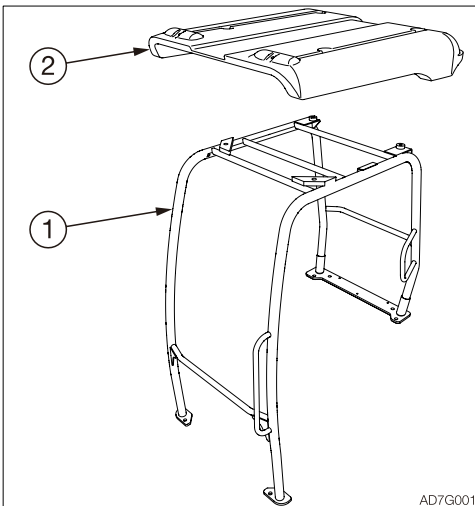
Immediately replace the damaged canopy.

Serious injury or death may occur if the machine is operated with damaged canopy.

Do not operate the machine until the replacement is complete. Do not try to repair the damaged canopy by welding. Doing so could endanger the safety of the canopy.

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- Canopy parts No.(1) 03384-00188
- Canopy parts No.(2) 03484-00027





# SPECIFICATIONS





## BASIC SPECIFICATIONS

Type			Canopy	
<b>MASS</b>				
Operating mass	kg (lb)	Rubber crawlers	1930 (4255)	
<b>PERFORMANCE</b>				
Bucket capacity (Standard bucket)	m <sup>3</sup> (cu. ft.)	Heaped	0.038 (1.34)	
		Struck	0.028 (0.99)	
Slew speed	min <sup>-1</sup> (rpm)		7.6 (7.6)	
Travel speed	km/h (mph)	Rubber crawlers	1st	2.1 (1.3)
			2nd	4.0 (2.5)
Gradeability	(degrees)		15	
Ground pressure	kPa (psi)	Rubber crawlers	32.1 (4.66)	
Noise level	dB (A)	Sound power level		L <sub>WA</sub> 80
		Emission sound pressure level at the operator's position (ISO 6396,2008:)		L <sub>pA</sub> 62
<b>LEAD-ACID BATTERY</b>				
Battery capacity (IEC 60095-1)		V·A·h	12-45	
CCA		A	380	
<b>LITHIUM ION BATTERY</b>				
Battery capacity	kWh		24.7	
Battery charge hours*	Off-board charger	0 to 100%	Approx. 4 hours**	
		20 to 80%	Approx. 2 hours**	
	On-board charger	0 to 100%	Approx. 10 hours***	
		20 to 80%	Approx. 6 hours***	
Battery voltage	V		73	

\*: The charging time depends on the voltage input to the charger.

\*\* : Estimated time required at 400 V input voltage and 16 A input current.

\*\*\*: Estimated time required at 200 V input voltage and 16 A input current.

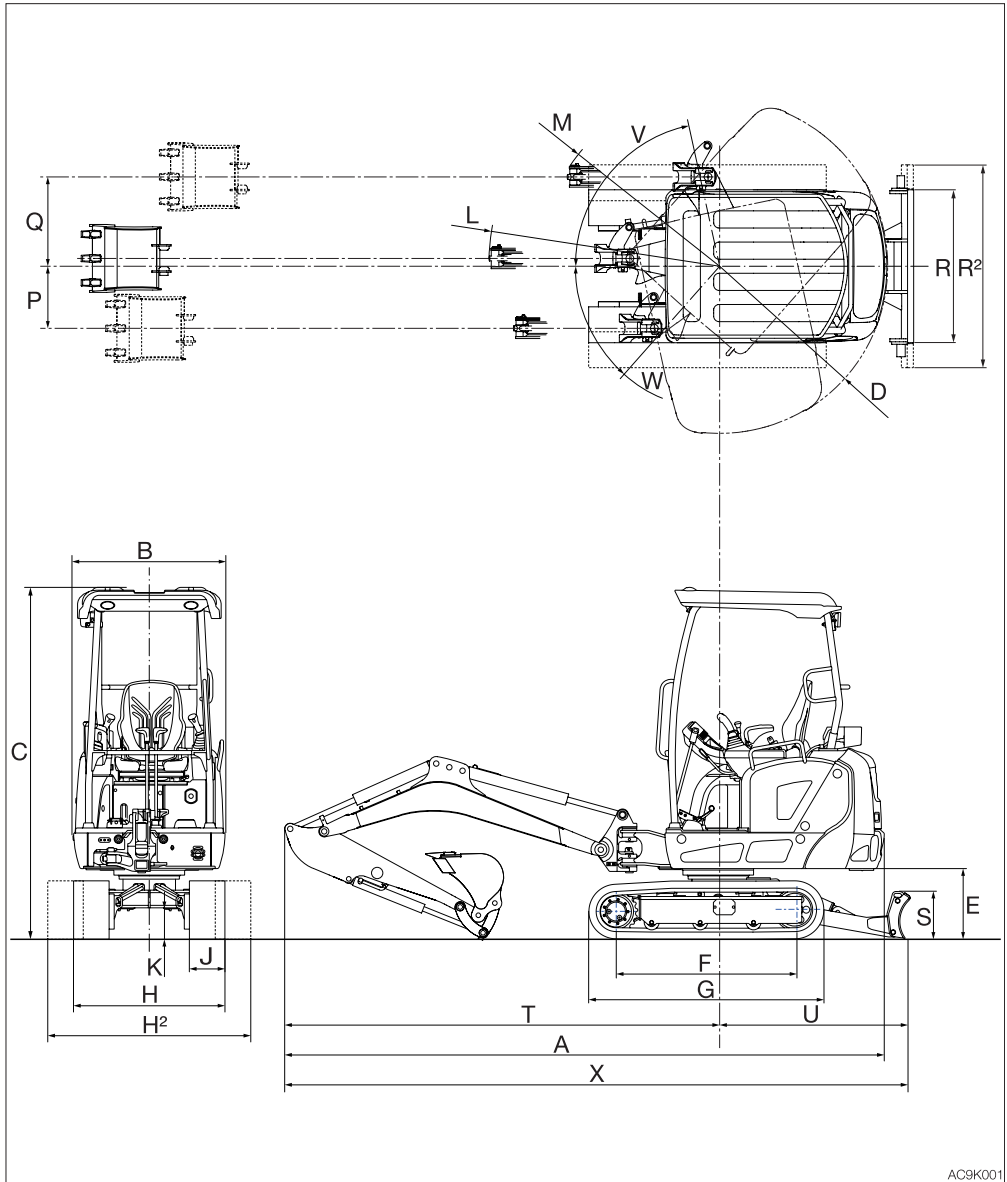


Type	Canopy		
<b>CHARGER (INPUT SPECIFICATIONS)</b>			
Item	Off-board charger (400 V)	Off-board charger (480 V)	On-board charger
Number of phases	Three phases		Single phase
Input line-to-line voltage	V 340 to 460	408 to 552	95 to 265
Maximum input line current	A 18.4	16	16
Frequency	Hz	50 or 60	



# MACHINE DIMENSIONS

## Canopy



AC9K001





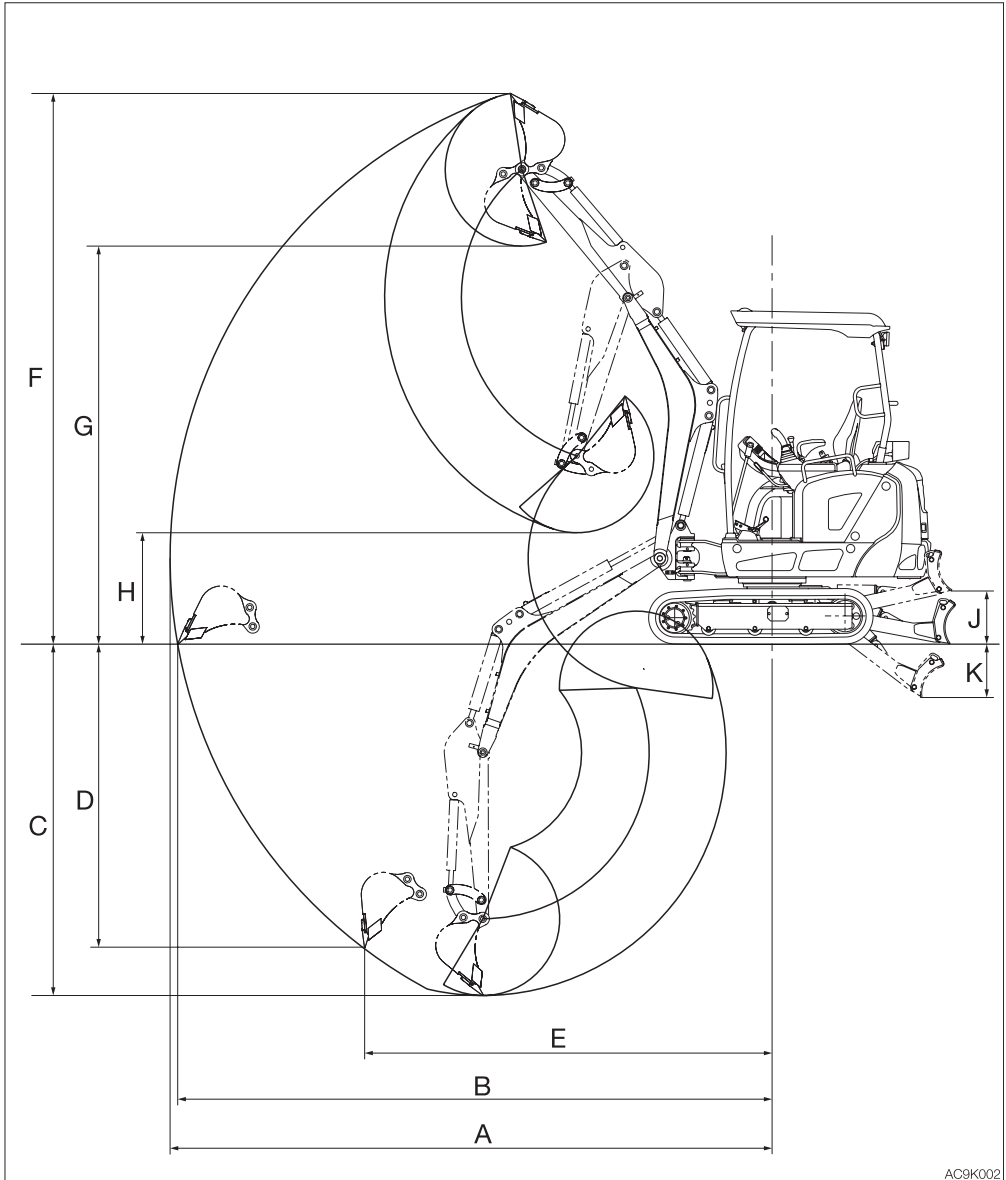
## Canopy

Unit: mm (inch)

	Item	Long arm
		Rubber crawlers
A	Overall length	3880 (152.8)
B	Upperstructure overall width	985 (38.8)
C	Overall height	2280 (89.8)
D	Slew radius	1075 (42.3)
E	Clearance height under upperstructure	450 (17.8)
F	Crawler base	1155 (45.6)
G	Crawler overall length	1520 (59.9)
H	Crawler overall width (narrow)	980 (38.6)
H <sup>2</sup>	Crawler overall width (wide)	1300 (51.2)
J	Crawler shoe width	230 (9.1)
K	Ground clearance of undercarriage	205 (8)
L	Minimum radius of equipment and attachment	1480 (58.2)
M	Minimum radius of equipment at maximum front offset	1155 (45.4)
P	Offset distance of bucket (right swing)	400 (15.7)
Q	Offset distance of bucket (left swing)	570 (22.5)
R	Dozer blade width (narrow)	980 (38.6)
R <sup>2</sup>	Dozer blade width (wide)	1300 (51.2)
S	Dozer blade height	300 (11.8)
T	Front distance to axis of rotation	2805 (110.4)
U	Dozer blade distance to axis of rotation	1200 (47.2)
V	Boom swing angle (Left)	78°
W	Boom swing angle (Right)	49°
X	Overall length (dozer blade at rear)	4050 (159.4)



# OPERATING RANGES



AC9K002

**Long arm**

Unit: mm (inch)

	<b>Item</b>	<b>Rubber crawlers</b>
<b>A</b>	Maximum reach	4090 (160.9)
<b>B</b>	Maximum reach at ground reference plane	4035 (158.9)
<b>C</b>	Maximum digging depth	2390 (94)
<b>D</b>	Maximum vertical digging depth	2060 (81)
<b>E</b>	Reach at maximum vertical digging depth	2790 (109.9)
<b>F</b>	Maximum height of cutting edge	3740 (147.3)
<b>G</b>	Maximum dumping height	2705 (106.5)
<b>H</b>	Minimum dumping height	755 (29.8)
<b>J</b>	Dozer blade maximum lifting	360 (14.2)
<b>K</b>	Dozer blade maximum lowering	365 (14.3)



## LIFTING CAPACITIES

When an excavator is used to lift loads in Europe, it must comply with EN 474-1. Install the following devices, and then turn on the overload warning switch before starting the lifting operation:

- Lifting device
- Lifting safety device

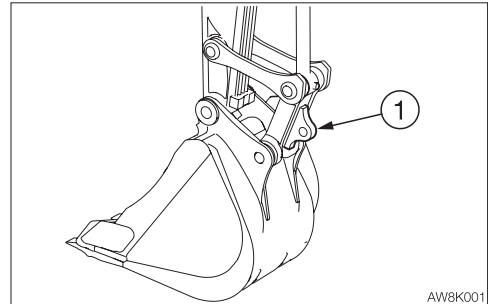
The lifting safety device must include two emergency shut-off valves, one for the boom and the other for the arm.

If the blade is used as an outrigger when lifting loads, the blade cylinder must be equipped with an emergency shut-off valve. Refer to “Lifting safety device (If equipped)” on page 2-39.

### 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 bucket mass is excluded.
- 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.
- The bucket cylinder is fully extended.
- Unit: kg (lbs)

### Lifting device (If equipped)



When lifting loads, install the sling on the lifting device (1).

### 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.

**Inspection before lifting loads**

Before lifting loads, inspect the following items to ensure there is no abnormality:

- Inspect for any damage to the attachment, hose or lifting device.
- Confirm that the overload warning device operates.

Turn on the overload warning switch, and then fully raise the boom. If the horn is sounded, the overload warning device is normal.

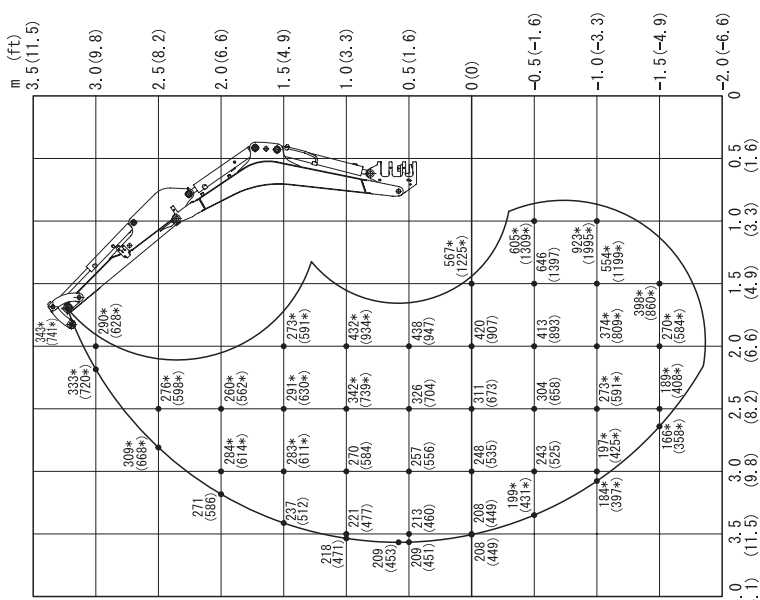
 **WARNING**

- **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, load to the machine sides, 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.**
  - **Do not lift loads when the boom is being swung to the right or left. Doing so could cause the machine to tip over.**
-

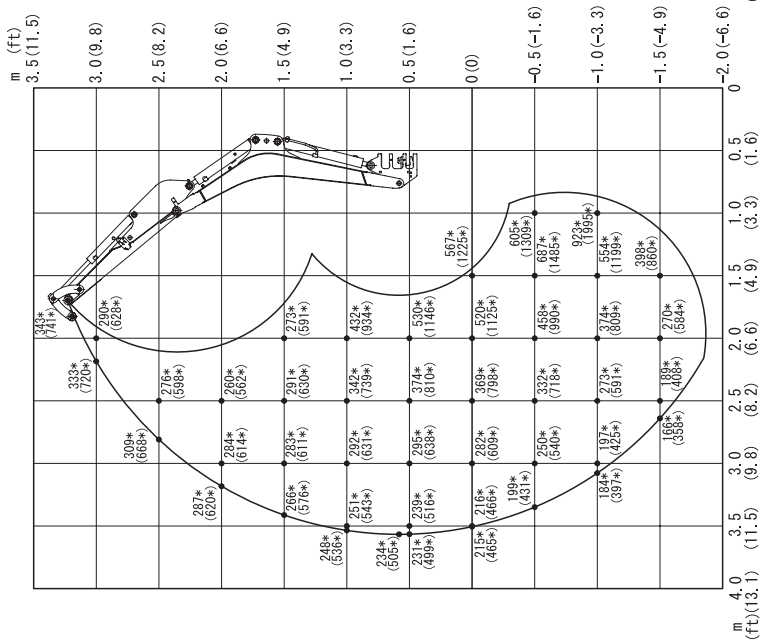


Long arm <Canopy>

Over Front ; Dozer Blade Up



Over Front ; Dozer Blade Down  
(if equipped with an emergency shut-off valve)



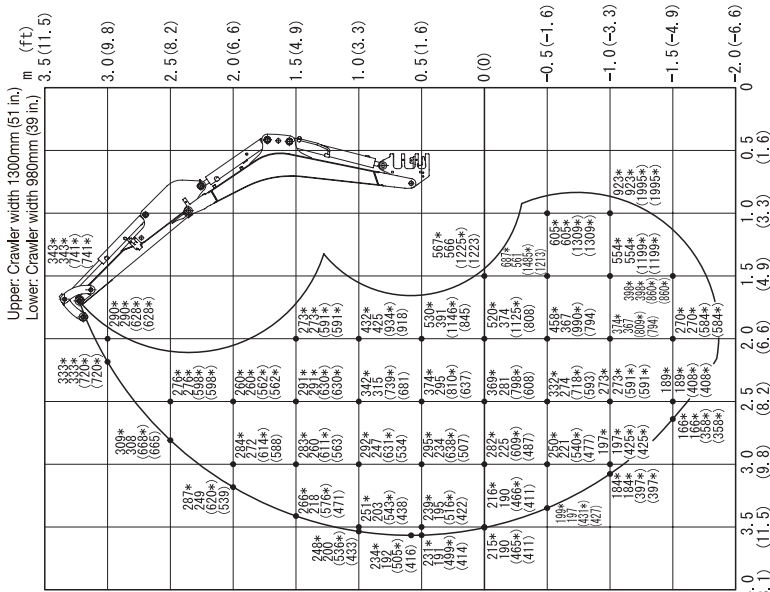
Units: kg(lbs.)



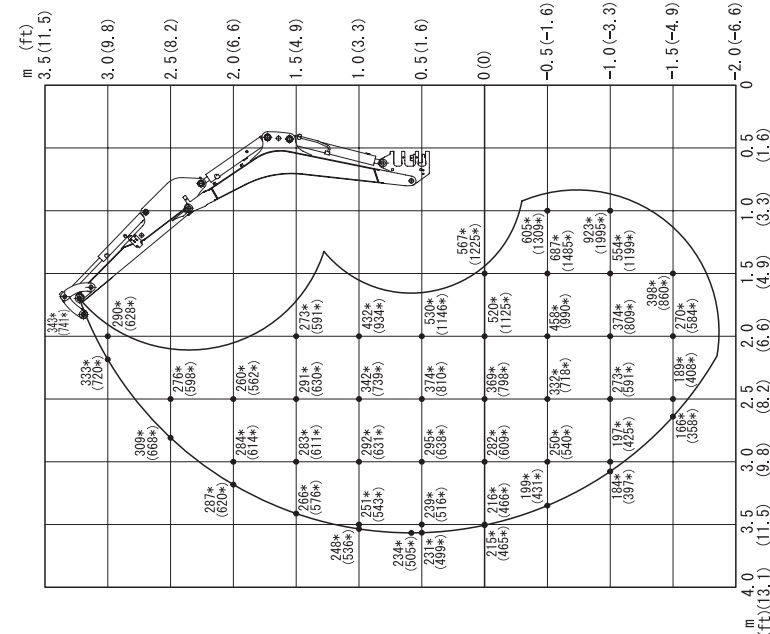
SPECIFICATIONS  
LIFTING CAPACITIES

Long arm < Canopy>

Over Side



Over Rear



Units: kg(lbs.)





# 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.
- Clean the site, clear obstacles and dangerous objects, and clean up spilled oil or grease.
- When lifting, 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 temporarily 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 lifting. 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

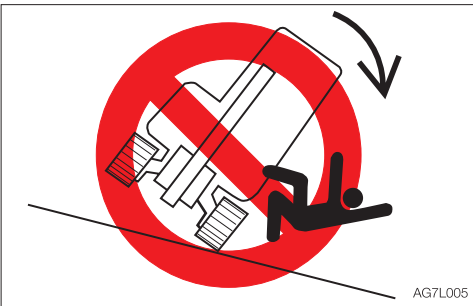
### **WARNING**

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 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.
- We will not be held responsible for any injuries, accidents or damage to its products caused by the use by a non-approved attachment.
- The swing stopper must be mounted when a bucket wider than a 450W bucket is mounted. Failure to mount the swing stopper may result in the bucket hitting the machine body.

√: 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 <sup>3</sup> (cu. yd.)	Bucket cutting width mm (inch)	Long arm 1130 mm (44.5 in.)
260W	0.020 (0.026)	265 (10.4)	√
350W	0.027 (0.035)	335 (13.2)	√
450W (Standard)	0.046 (0.060)	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 127 kg (280 lb.)		Within 485 (19.1)	√
Hydraulic Breaker (TKB-72)			√

# MEMO

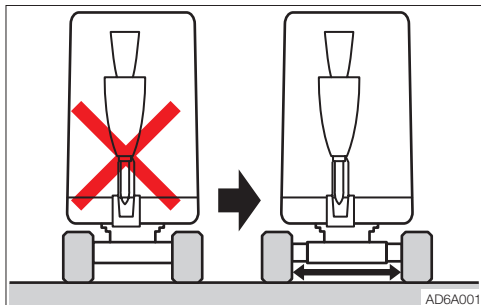
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## HYDRAULIC BREAKER

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

### **WARNING**



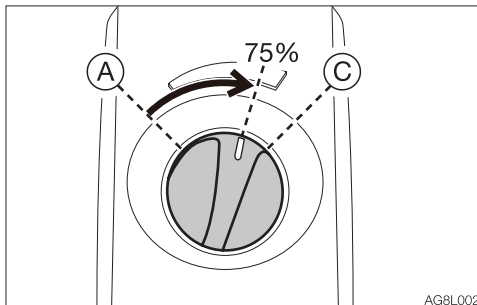
Do not use the breaker when the crawler width is narrowed!

- 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.

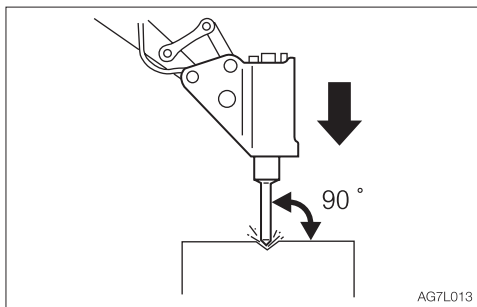
When an optional attachment, such as a breaker, tilted bucket or clamshell, is operated, be sure that the crawler width is extended to 1300 mm (51.2 in.).

**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



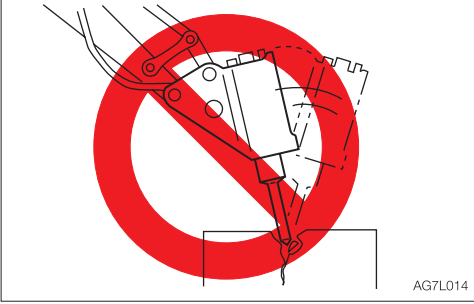
- Start the motor and run it at 75% of the maximum speed.



- 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.

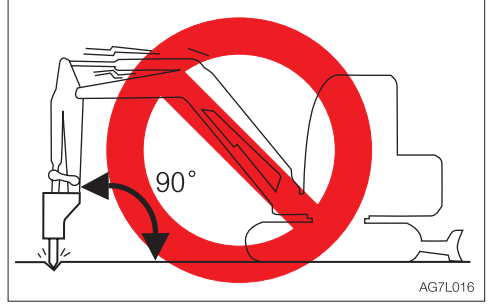


## OPTIONS HYDRAULIC BREAKER



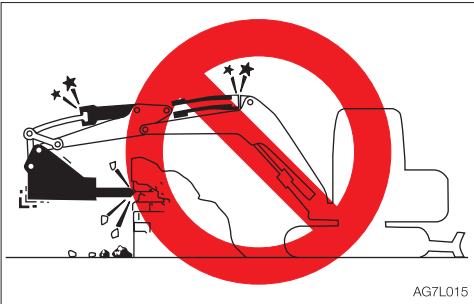
AG7L014

- 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.



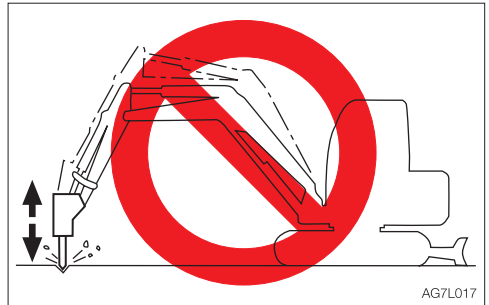
AG7L016

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



AG7L015

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



AG7L017

- 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 motor.
- 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

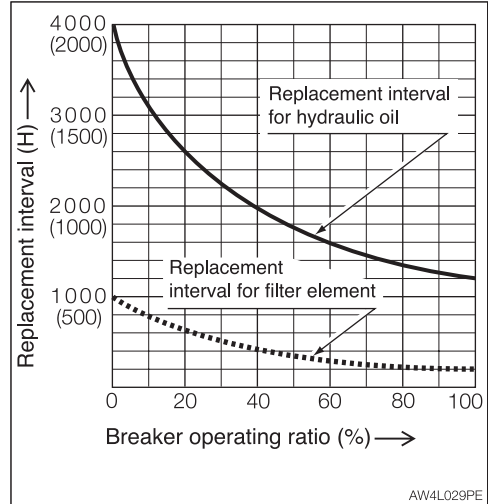
When a hydraulic breaker is used, the oil deteriorates more quickly than that used for a usual operation. Be sure to replace the hydraulic oil and the return filter elements.

- 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.





## **TRAVEL ALARM**

The alarm sounds while the machine is traveling and stops when the machine stops traveling.

If the alarm does not sound when traveling, the electrical system may be faulty. Consult a Takeuchi sales or service dealer for help.



## **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) and Panolin HLP Synth 46 (an ester synthetic oil).

When replacing the mineral oil with biodegradable oil, use either of the above brand oil.

Note that there are oils of other brands, even among ester synthetic oils, which may damage O-rings, packings and seals.

- When switching from a mineral oil to a biodegradable oil, the parking brake torque decreases by about 30%.

## **REPLACING THE MINERAL OIL WITH BIODEGRADABLE OIL**

- A mixture of mineral oil and biodegradable oil or a mixture of different brands of biodegradable oils will result in a decrease in performance of the hydraulic oil, biodegradability and safety. The inside of the hydraulic oil system must be flushed (cleaned) before replacing. The residual mineral oil in the machine should be about 2% or less, as complying with the ISO 15380.
- This operation is dangerous and requires experience. Ask a Takeuchi sales or service dealer for help.



### 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 5-34.
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 pump and cylinders and pressurize the hydraulic tank.
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.



## TAKEUCHI FLEET MANAGEMENT (TFM)

### CAUTION

- Never disassemble the TFM. It may cause injury or failure.
- Any damage to the TFM device or wire harness may cause damage to the device and surrounding equipment.



- Takeuchi Fleet Management (TFM) is a system that manages machine position information, operation information, and machine status using a communication device installed in the machine.
- Machines that support TFM are equipped with communication devices and are labeled as above.
- A communication contract is required to use TFM. Please contact our sales service for information regarding the contract.

### IMPORTANT:

- The TFM equipment has been tested and found to comply with the limits for a Class A and Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against signal interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can emit radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause signal interference to radio communications.
- Operation of this equipment in a residential area may cause signal interference in which the user may be required to take additional steps to correct the interference. To correct any interference issue, move the TFM equipped machine away from the affected device, or, if possible; relocate the affected device away from the TFM equipped machine.
- The TFM device uses mobile communication. Therefore, it may not function properly in places where the signal is weak (buildings, tunnels, underground, etc.).
- The TFM device complies with the RF radiation exposure limits of the FCC Rules. The product is tested for a separation distance of 0 mm from human bodies. It is advised for those with specific sensitive conditions to avoid close device-body exposure.
- Please be aware that storing a machine long-term may result in the loss of communication from the TFM device if its internal battery is drained.
- The TFM device consumes a small amount of machine battery power even when the key is in the OFF position. For extended storage, see “Maintenance during extended storage period” on page 5-50.

**Specification  
M7H (For Europe)**

Frequency	Power
<b>UMTS/HSPA:</b>	
900 MHz	0.25 W
2100 MHz	0.25 W
<b>GSM/GPRS:</b>	
900 MHz	2 W
1800 MHz	1 W
<b>GSM/EDGE:</b>	
900 MHz	0.5 W
1800 MHz	0.4 W

**M7L (For North America)**

Frequency	Power
<b>LTE Band:</b>	
700 MHz	0.2 W
850 MHz	0.2 W
1700 MHz (AWS)	0.2 W
1900 MHz	0.2 W
<b>UMTS Band:</b>	
850 MHz	0.25 W
1900 MHz	0.25 W

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First Published February 2019  
Seventh Published March 2022

AC9EN006

## **OPERATOR'S MANUAL**

TB20e Mini excavator

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

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Printed in Japan by STATION M Co., Ltd.



ZTR Control Systems, LLC

955 Green Valley Road  
London, Ontario, N6N 1E4  
Tel: 1-519-452-1233  
FAX: 1-519-452-7764

April 5, 2019

www.ztr.com  
info@ztr.com

**RE: M7H**

To whom it may concern,

This letter is to confirm that ZTR product **M7H** sufficiently demonstrate compliance to CE and the Radio Equipment Directives (RED). The M7H satisfies all the technical regulations applicable to the product within the scope of Council Directives 2014/53/EU, 2015/35/EU and 2014/30/EU. The following tests were completed successfully.

EN 60950-1: 2006+A11: 2009+A1: 2010+A12: 2011+A2: 2013

EN62311:2008

ETSI EN 300 328 V2.1.1 (2016-05)

ETSI EN 303 413 V1.1.1 (2017-06)

Draft ETSI EN 301 489-52 V1.1.0 (2016-11)

Draft ETSI EN 301 489-17 V3.2.0 (2017-03)

Draft ETSI EN 301 489-1 V2.2.0 (2017-03)

Draft ETSI EN 301 489-19 V2.1.0 (2017-03)

EN 55032: 2015

ETSI EN 301 511 V12.5.1 (2017-03)

ETSI EN 301 908-1 V11.1.1 (2016-07)

ETSI EN 301 908-2 V11.1.2 (2017-08)

(Title(s) of regulations, standards, etc.)

**All essential radio test suites have been carried out.**

The tests were carried out by a notarized 3<sup>rd</sup> party certification lab MICOM Labs inc.

This Declaration of Conformity is issued under the sole responsibility of ZTR Control Systems (or the manufacturer).

Please direct any test results questions or concern to ZTR's Engineering Group for clarification.

Regards,

Brent Horne  
Director of Product Development  
ZTR Control Systems

## **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                            TB20e

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.

Harmonized norms: EN474-1:2006+A6:2019, EN474-5:2006+A3:2013.

Compiler of the technical files:

Daniel Bailli  
Parc d'Activités des Béthunes  
3, avenue de la Mare 95310 SAINT OUEN L'AUMONE  
CS 29258 – SOA

Issued in Sakaki, Japan  
Akio Takeuchi, Chairman





# **WARNING:**

Cancer and Reproductive Harm –  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)