

PART NO. ENMADG-NA2-3

HITACHI

Reliable solutions

# Operator's Manual

# ZAXIS

## 30U-5N

## 35U-5N

## 50U-5N

## 60USB-5N

## Hydraulic Excavator

Serial No.	
ZX30U-5N	265001 and up
ZX35U-5N	270001 and up
ZX50U-5N	280001 and up
ZX60USB-5N	285001 and up

ZX30U-5N • 35U-5N • 50U-5N • 60USB-5N HYDRAULIC EXCAVATOR OPERATOR'S MANUAL

ENMADG-NA2-3

 **Hitachi Construction Machinery Co., Ltd.**  
URL:<http://www.hitachi-c-m.com>

PRINTED IN JAPAN (E) 2020, 07



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## INTRODUCTION

**Read this manual** carefully to learn how to operate and service your machine correctly. Failure to do so could result in personal injury or equipment damage.

**This standard specification machine** can be operated under the following conditions without being modified.  
Atmospheric Temperature: -20 °C to 40 °C (-4 °F to 104 °F)  
Altitude: 0 m to 1500 m (0 ft to 4900 ft)

In case the machine is used under conditions other than described above, consult your authorized dealer.

**This manual should be considered** a permanent part of your machine and should remain with the machine when you sell it.

**This machine is of metric** design. Measurements in this manual are metric. Use only metric hardware and tools as specified.

- SI Units (International System of Units) are used in this manual.

For reference MKS system units and English units are also indicated in parentheses after the SI units.

Example : 24.5 MPa (250 kgf/cm<sup>2</sup>, 3560 psi)

**Right-hand and left-hand** sides are determined by facing in the direction of forward travel.

**Write product identification numbers** in the Machine Numbers section. Accurately record all the numbers to help in tracing the machine should it be stolen. Your dealer also needs these numbers when you order parts. If this manual is kept on the machine, also file the identification numbers in a secure place off the machine.

Use only diesel fuel with quality specified in JIS K-2204, EN-590, ASTM D-975, GOST R52368 or GB19147. Failure to use diesel fuel with quality as specified above may allow the engine to emit exhaust gas which cleanliness can not conform to the requests in various relevant regulations. In addition, serious damage to the engine may result. Consult with your authorized dealer for detailed information.

**Warranty** is provided as a part of Hitachi's support program for customers who operate and maintain their equipment as described in this manual. The warranty is explained on the warranty certificate which you should have received from your dealer.

This warranty provides you the assurance that Hitachi will back its products where defects appear within the warranty period. In some circumstances, Hitachi also provides field improvements, often without charge to the customer, even if the product is out of warranty. **Should the equipment be abused, or modified to change its performance beyond the original factory specifications, the warranty will become void and field improvements may be denied.** Setting fuel delivery above specifications or otherwise overpowering machines will result in such action.

Only qualified, experienced operators officially licensed (according to local law) should be allowed to operate the machine. Moreover, only officially licensed personnel should be allowed to inspect and service the machine.

**PRIOR TO OPERATING THIS MACHINE, INCLUDING COMMUNICATION SYSTEM, IN A COUNTRY OTHER THAN A COUNTRY OF ITS INTENDED USE, IT MAY BE NECESSARY TO MAKE MODIFICATIONS TO IT SO THAT IT COMPLIES WITH THE LOCAL REGULATORY STANDARDS (INCLUDING SAFETY STANDARDS) AND LEGAL REQUIREMENTS OF THAT PARTICULAR COUNTRY. PLEASE DO NOT EXPORT OR OPERATE THIS MACHINE OUTSIDE OF THE COUNTRY OF ITS INTENDED USE UNTIL SUCH COMPLIANCE HAS BEEN CONFIRMED. PLEASE CONTACT HITACHI CONSTRUCTION MACHINERY CO., LTD. OR ANY OF OUR AUTHORIZED DISTRIBUTOR OR DEALER IF YOU HAVE ANY QUESTIONS CONCERNING COMPLIANCE.**

### CALIFORNIA Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

All information, illustrations and specifications in this manual are based on the latest product information available at the time of publication. The right is reserved to make changes at any time without notice.

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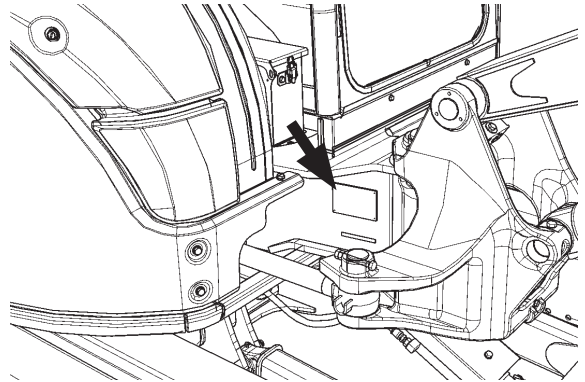
# MACHINE NUMBERS

The manufacturing Nos. explained in this group is the individual number (serial No.) given to each machine and hydraulic components. These numbers are requested when inquiring any information on the machine and/or components. Fill these serial Nos. in the blank spaces in this group to immediately make them available upon request.

## Machine

MODEL / TYPE: \_\_\_\_\_

PRODUCT IDENTIFICATION NUMBER:  
\_\_\_\_\_



MADB-00-002

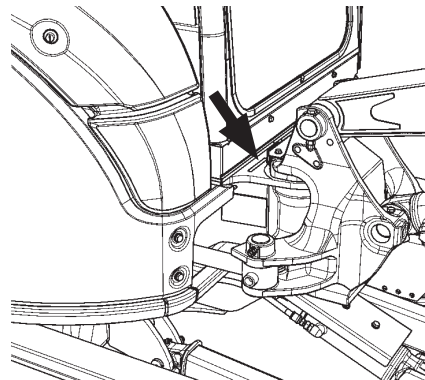
## Product Identification Number

PRODUCT IDENTIFICATION NUMBER:  
\_\_\_\_\_

 NOTE:

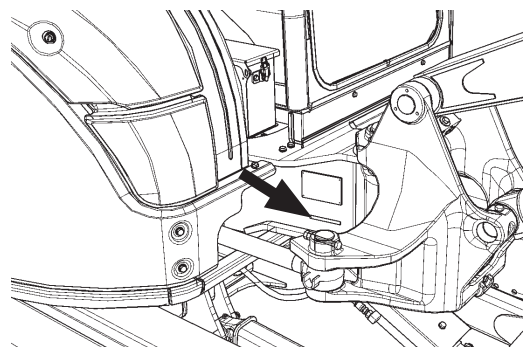
\*HCMADG00X00270001\*      Marks to indicate the start and end of the PIN

PRODUCT IDENTIFICATION NUMBER (PIN)



ZX30U-5N, 35U-5N

MADB-00-003



ZX50U-5N, 60USB-5N

MADB-00-002

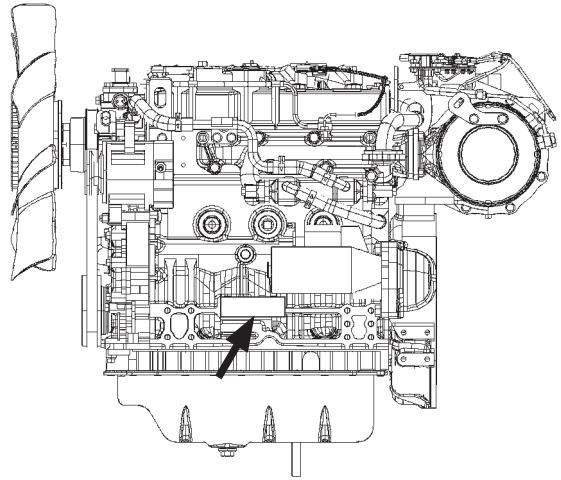
# MACHINE NUMBERS

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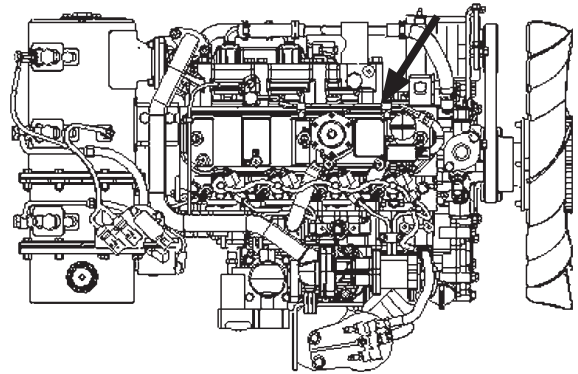
## Engine

TYPE: \_\_\_\_\_

MFG. NO.: \_\_\_\_\_



MADG-00-022



MADG-00-001

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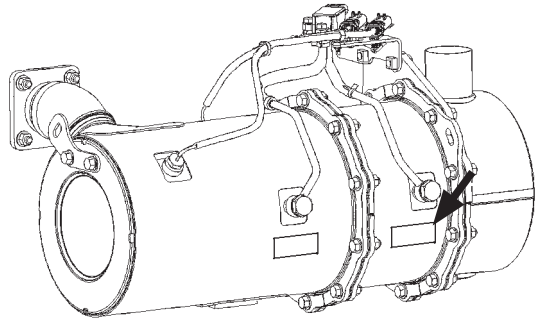
# MACHINE NUMBERS

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## Muffler Filter

TYPE: \_\_\_\_\_

MFG. NO.: \_\_\_\_\_



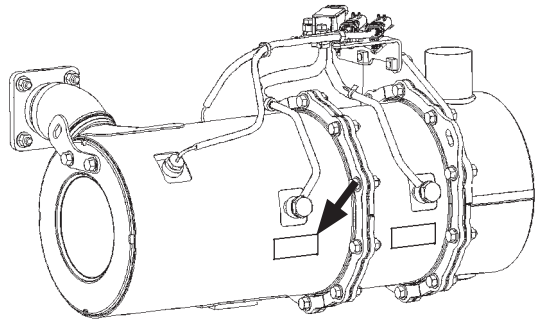
ZX50U-5N, 60USB-5N

MADG-00-017

## DOC (Diesel Oxidation Catalyst)

TYPE: \_\_\_\_\_

MFG. NO.: \_\_\_\_\_



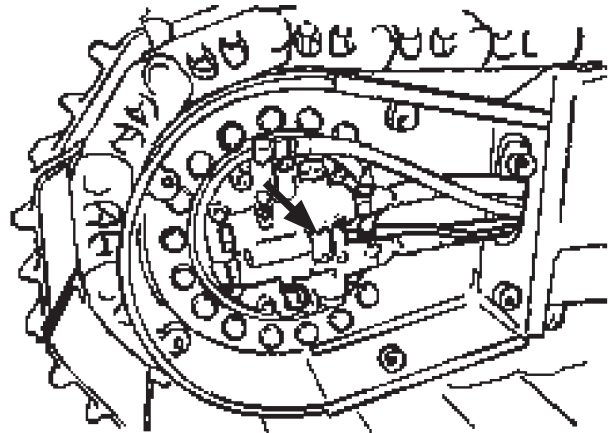
ZX50U-5N, 60USB-5N

MADG-00-017

## Travel Motor

TYPE: \_\_\_\_\_

MFG. NO.: \_\_\_\_\_



M1M0-00-004

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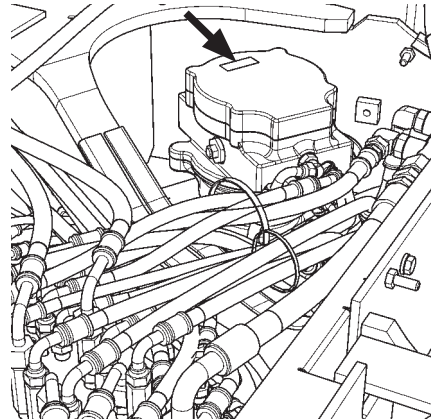
# MACHINE NUMBERS

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## Swing Motor

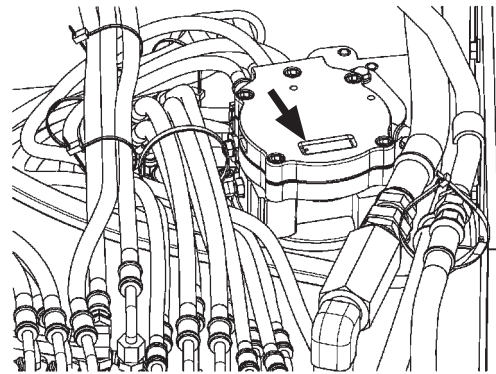
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MFG. NO.: \_\_\_\_\_



ZX30U-5N, 35U-5N, 50U-5N

MADB-00-005



ZX60USB-5N

MADC-00-001

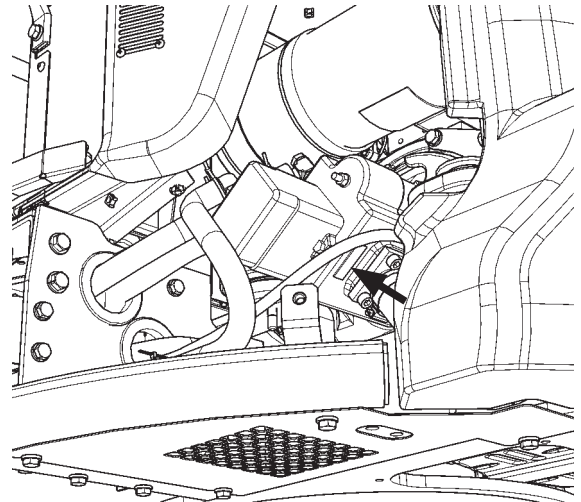
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# MACHINE NUMBERS

## Hydraulic Pump

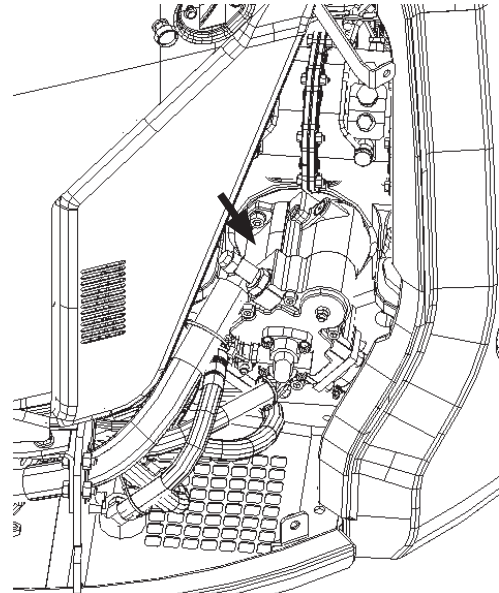
TYPE: \_\_\_\_\_

MFG. NO.: \_\_\_\_\_



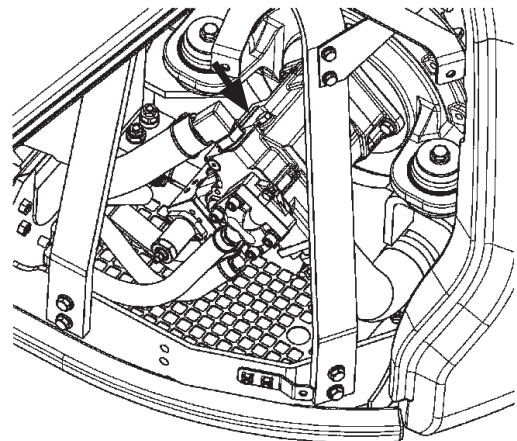
ZX30U-5N, 35U-5N

MADB-00-006



ZX50U-5N

MADB-00-021



ZX60USB-5N

MADC-00-002



## SAFETY

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### Recognize Safety Information

- These are the **SAFETY ALERT SYMBOLS**.
  - When you see these symbols on your machine or in this manual, be alert to the potential for personal injury.
  - Follow recommended precautions and safe operating practices.



SA-2644

### Understand Signal Words

- On machine safety signs, signal words designating the degree or level of hazard - **DANGER**, **WARNING**, or **CAUTION** - are used with the safety alert symbol.
  - **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
  - **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
  - **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
  - **DANGER** or **WARNING** safety signs are located near specific hazards. General precautions are listed on **CAUTION** safety signs.
  - Some safety signs do not use any of the designated signal words above after the safety alert symbol are occasionally used on this machine.
- To avoid confusing machine protection with personal safety messages, a signal word **IMPORTANT** indicates a situation which, if not avoided, could result in damage to the machine.
-  **NOTE** indicates an additional explanation for an element of information.



SA-1223

## SAFETY

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### Follow Safety Instructions

- Carefully read and follow all safety signs on the machine as well as all safety messages in this manual.
- Safety signs must be installed, maintained and replaced if damaged.
  - If a safety sign or this manual is damaged or missing, order a replacement from your authorized dealer in the same way you order other replacement parts (be sure to state machine model and serial number when ordering).
- Allow only properly trained, qualified, authorized personnel to operate the machine.
- Learn how to correctly operate and service the machine.
- Keep your machine in proper working condition.
  - Unauthorized modifications of the machine may impair its function and/or safety and affect machine life.
  - Do not modify any machine parts without authorization. Failure to do so may deteriorate the part safety, function, and/or service life. In addition, personal accident, machine trouble, and/or damage to material caused by unauthorized modifications will void Hitachi Warranty Policy.
  - Never modify the air inlet and exhaust parts and/or disassemble the muffler filter on the machines equipped with the muffler filter. Avoid giving shocks on the muffler filter by striking elements with other objects or dropping the elements. Failure to do so may affect the exhaust gas purifying device, possibly damaging it or lowering its performance.
  - Do not use attachments and/or optional parts or equipment not authorized by Hitachi. Failure to do so may deteriorate the safety, function, and/or service life of the machine. In addition, personal accident, machine trouble, and/or damage to material caused by using unauthorized attachments and/or optional parts or equipment will void Hitachi Warranty Policy.
- The safety messages in this SAFETY chapter are intended to illustrate basic safety procedures of machines. However it is impossible for these safety messages to cover every possible hazardous situation you may encounter. If you have any questions concerning safety, you should first consult your supervisor and/or your authorized dealer before operating or performing maintenance work on the machine.



SA-003



## SAFETY

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### Prepare For Emergencies

- Be prepared if a fire starts or if an accident occurs.
  - Keep a first aid kit and fire extinguisher on hand.
  - Thoroughly read and understand the label attached on the fire extinguisher and use it properly.
  - To ensure that a fire extinguisher can be always used when necessary, check and service the fire extinguisher at the recommended intervals as specified in the fire-extinguisher manual.
  - Establish emergency procedure guidelines to cope with any fire or accidents which may occur.
  - Keep emergency numbers for doctors, ambulance service, hospitals, and fire department posted near your telephone.



SA-437

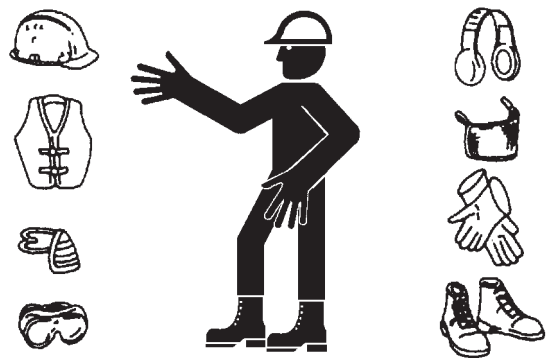
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### Wear Protective Clothing

- Wear close fitting clothing and safety equipment appropriate to the job.  
You may need:
  - A hard hat
  - Safety belt
  - Safety shoes
  - Safety glasses, goggles, or face shield
  - Heavy gloves
  - Hearing protection
  - Reflective clothing
  - Wet weather gear
  - Respirator or filter mask

Be sure to wear the correct equipment and clothing for the job. Do not take any chances.

- Avoid wearing loose clothing, jewelry, or other items that can catch on control levers or other parts of the machine.
- Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating the machine.



SA-438

## SAFETY

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### Protect Against Noise

- Prolonged exposure to loud noise can cause impairment or loss of hearing.
  - Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortably loud noises.



SA-434

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### Inspect Machine

- If any abnormality is found, be sure to repair it immediately before operating the machine.
  - In the walk-around inspection, be sure to cover all points described in the “Daily Inspection” section in the operator’s manual.



SA-435

## SAFETY

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### General Precautions for Cab

- Always keep inside the cab clean by observing instructions below, to prevent any personal accidents from occurring.
  - Before entering the cab, thoroughly remove all dirt and/or oil such as mud, grease, soil or stones that may mess up the cab from the soles of your work boots. If any controls such as a pedal is operated while with dirt and/or oil on the soles of the operator's work boots, the operator's foot may slip off the pedal, possibly resulting in a personal accident.
  - Do not mess up around the operator's seat with parts, tools, soil, stones, obstacles that may fold up or turn over, cans or lunch box. The levers or pedals become inoperable if obstacle jams in operation stroke of the travel levers/pedals, pilot control shut-off lever or control levers, which may result in serious injury or death.
  - Avoid storing transparent bottles in the cab. Do not attach any transparent type window decorations on the windowpanes as they may focus sunlight, possibly starting a fire.
  - Refrain from listening to the radio, or using music headphones or mobile telephones in the cab while operating the machine.
  - Keep all flammable materials and/or explosives away from the machine.
  - After using the ashtray, always cover it to extinguish the match and/or tobacco.
  - Do not leave cigarette lighters in the cab. If the temperature in the cab increases, the lighter may explode.
  - Use proper floor mat dedicated to the machine. If another floor mat is used, it may be displaced and contact with the travel pedals during operation, resulting in serious injury or death.

## SAFETY

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### Use Handrails and Steps

- Falling is one of the major causes of personal injury.
  - When you get on and off the machine, always use the crawler instead of the step for safety. Be sure you have adequate footing on the crawler when getting on or off the machine.
  - When you get on and off the machine, always face the machine.
  - Maintain a three-point contact with the steps and handrails.
  - Do not use any controls as handholds.
  - Never jump on or off the machine. Never mount or dismount a moving machine.
  - In case adhered slippery material such as oil, grease, or mud is present on steps, handrails, or platforms, thoroughly remove such material.
  - Never get on and off the machine with tools in your hands.



SA-439

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### Adjust the Operator's Seat

- A poorly adjusted seat for either the operator or the work at hand may quickly fatigue the operator leading to misoperation of the machine.
  - The seat should be adjusted whenever the operator for the machine changes.
  - The operator should be able to fully depress the pedals and to correctly operate the control levers with his back firmly against the seat back.
  - If not, readjust the seat forward or backward, and check again.



SA-378

## SAFETY

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### Ensure Safety Before Rising From or Leaving Operator's Seat

- Before rising from the operator's seat to open/close cab front window or to adjust the seat position, be sure to first lower the front attachment to the ground and then move the pilot control shut-off lever to the LOCK position. Failure to do so may allow the machine to unexpectedly move when a body part unintentionally comes in contact with a control lever, possibly resulting in serious personal injury or death.
- Before leaving the machine, be sure to first lower the front attachment to the ground and then move the pilot control shut-off lever to the LOCK position. Turn the key switch OFF to stop the engine.
- Before leaving the machine, close all windows, doors, and access covers and lock them up.

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### Fasten Your Seat Belt

- If the machine should overturn, the operator may become injured and/or thrown from the cab. Additionally the operator may be crushed by the overturning machine, resulting in serious injury or death.
  - Be sure to remain seated with the seat belt securely fastened whenever operating the machine.
  - Prior to operating the machine, thoroughly examine webbing, buckle and attaching hardware. If any item is damaged or worn, replace the seat belt or component before operating the machine. Replace the seat belt at least once every 3 years regardless of appearance.



SA-237

## SAFETY

### Move and Operate Machine Safely

- Always be aware that there is a potential danger around the machine while operating the machine.
- Take extra care not to run over bystanders. Confirm the location of bystanders before moving, swinging, or operating the machine.
- Always keep the travel alarm and horn in working condition (if equipped).
- Before starting to move or operate the machine, sound the travel alarm and horn to alert bystanders.
- Use a signal person when moving, swinging, or operating the machine in congested areas. Locate the signal person so that the operator can always witness the signal person.
- Coordinate the meanings of all safety signs, hand signals and marks before starting the machine. Appoint a person who is responsible to make a signal and/or guidance.
- Never allow any persons or obstacles to enter the machine operation areas.
- Use appropriate illumination.



SA-1291

### Operate Only From Operator's Seat

- Inappropriate engine starting procedures may cause the machine to runaway, possibly resulting in serious injury or death.
- Start the engine only when seated in the operator's seat.
- NEVER start the engine while standing on the tracks or on ground.
- Do not start engine by shorting across starter terminals. A hazardous situation may be created and/or possible damage to the machine may result.
- Before starting the engine, confirm that all control levers are in neutral.



SA-444

### Jump Starting

- Failure to follow correct jump starting procedures could result in a battery explosion or a runaway machine.
- If the engine must be jump started, be sure to follow the instructions shown in the "OPERATING ENGINE" chapter.
- The operator must be seated in the operator's seat so that the machine will be under control when the engine starts. Jump starting is a two-person operation.
- Never use a frozen battery.



SA-032

## SAFETY

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### Keep Riders Off Machine

- Riders on machine are subject to injury such as being struck by foreign objects and being thrown off the machine.
- Riders also obstruct the operator's view, resulting in the machine being operated in an unsafe manner.
- Only the operator is allowed on the machine. Keep riders off.

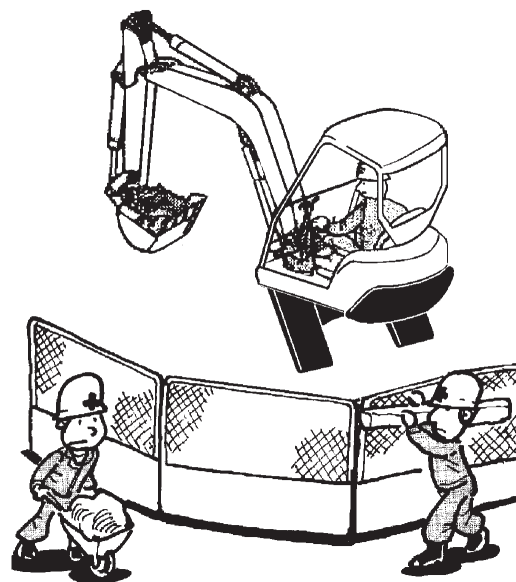


SA-1292

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### Precautions for Operations

- Investigate the work site before starting operations.
  - Be sure to wear close fitting clothing and safety equipment appropriate for the job, such as a hard hat, etc. when operating the machine.
- Clear all persons and obstacles from area of operation and machine movement. Do not permit persons other than the operator to enter areas where there is danger such as flying objects. Always beware of the surroundings while operating. When working in a small area surrounded by obstacles, take care not to hit the upperstructure against obstacles.
- When loading onto trucks, bring the bucket over the truck beds from the rear side. Take care not to swing the bucket over the cab or over any person.



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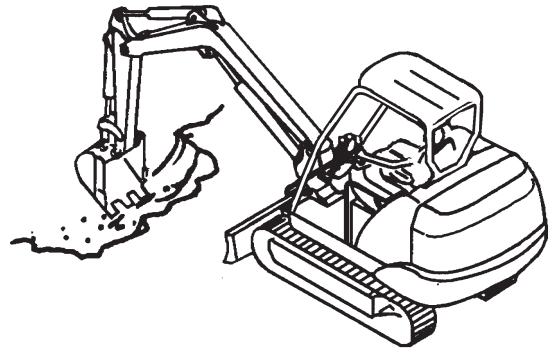
## SAFETY

### Investigate Job Site Beforehand

- When working at the edge of an excavation or on a road shoulder, the machine could tip over due to collapse of the ground, possibly resulting in serious injury or death.
  - Investigate the configuration and ground conditions of the job site beforehand to prevent the machine from falling and to prevent the ground, stockpiles, or banks from collapsing.
  - Make a work plan. Use machines appropriate to the work and job site.
  - Reinforce ground, edges, and road shoulders as necessary. Keep the machine well back from the edges of excavations and road shoulders.
  - When working on an incline or on a road shoulder, employ a signal person as required.
  - Never allow bystanders to enter the working area such as swing radius or traveling range.
  - When the footing is weak, reinforce the ground before starting work.
  - When working on frozen ground, be extremely alert. As ambient temperatures rise, footing may become loose and slippery.
  - When operating the machine near open flame, sparks, and/or dead grass, a fire may easily break out. Use special care not to cause a fire.
- Make sure the work site ground has sufficient strength to firmly support the machine. When working close to an excavation or on road shoulders, operate the machine with the tracks positioned perpendicular to the cliff face with travel motors at the rear and with the blade at the front, so that the machine can more easily evacuate if the cliff face collapses.
- If working at the bottom of a cliff or on a high bank is required, be sure to investigate the area first and confirm that no danger of the cliff or bank collapsing exists. If any possibility of cliff or bank collapsing exists, do not work in that area.
- Soft ground may collapse when operating the machine on it, possibly causing the machine to tip over. When working on a soft ground is required, be sure to reinforce the ground first using large pieces of steel plates strong enough and firm to easily support the machine.
- Note that there is always a possibility of machine tipping over when working on rough terrain or on slopes. Prevent machine tipping over from occurring. Operate the machine slowly to ensure safe operation.



SA-1293



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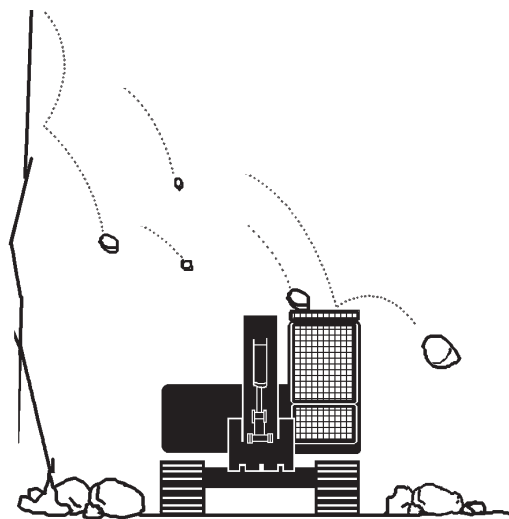
## SAFETY

### Equipment of OPG

- In case the machine is operated in areas where the possibility of falling stones or debris exists, equip genuine Hitachi OPG guard. Contact your nearest Hitachi dealer for installation method of the OPG guard. Depending on the specifications applied to your machine, modification of the machine to meet ROPS standards will be possible.
- To maintain unimpaired operator protection and manufacturer's protective structure.
  - Damaged ROPS, OPG guard must be replaced, not repaired or revised.
  - Any alternation to the ROPS or OPG guard must be approved by the manufacturer.

ROPS : Roll Over Protective Structure

OPG : Operator Protective Guard



SA-490

### Restriction of Attachment Installation

- Do not install an attachment which exceeds specified weight for the machine structure.

### Provide Signals for Jobs Involving Multiple Machines

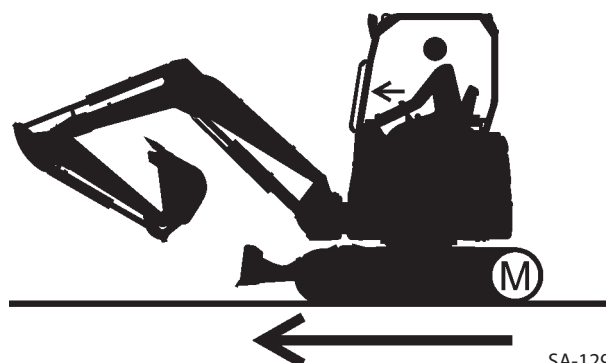
- In case more than one machine is operated in the same job site, accidental collision between machines may cause serious injury or death.
- For jobs involving multiple machines, provide signals commonly known by all personnel involved. Also, appoint a signal person to coordinate the job site. Make sure that all personnel obey the signal person's directions.



SA-481

### Confirm Direction of Machine to be Driven

- Incorrect travel pedal/lever operation may result in serious injury or death.
  - Before driving the machine, confirm the position of the undercarriage in relation to the operator's position.
  - If the travel motors are located towards the front of the cab, the machine will move in the reverse direction when travel pedals/levers are operated.

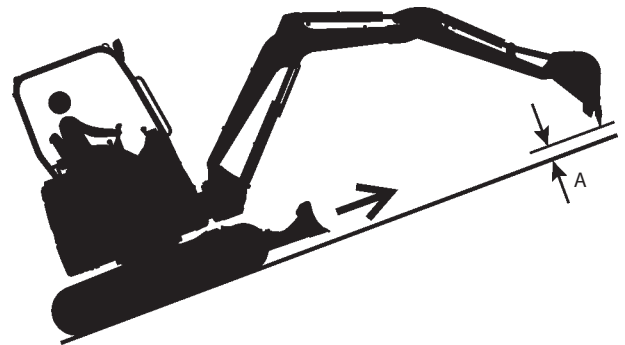


SA-1294

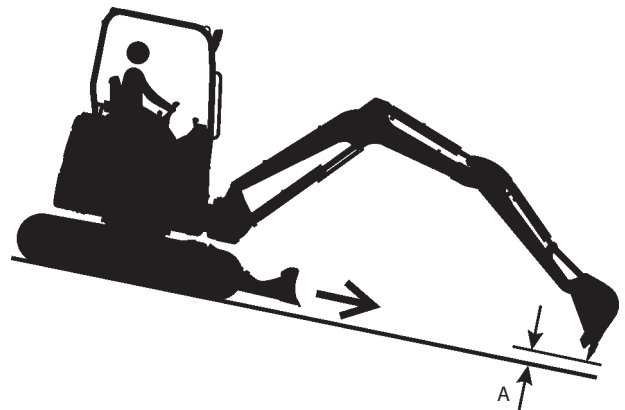
## SAFETY

### Drive Machine Safely

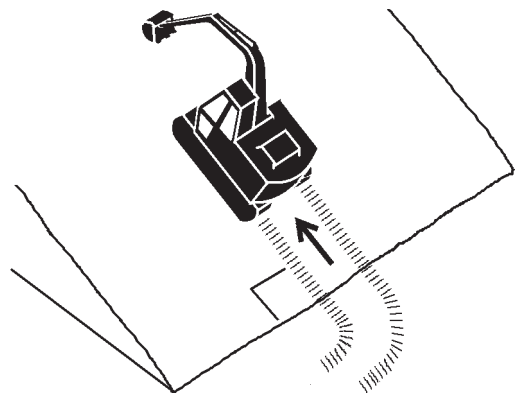
- Use a signal person when traveling the machine along road shoulders or in congested areas.
- Driving the machine in the incorrect direction may result in serious injury or death and/or severe damage to property.
- Before driving the machine, always confirm that the travel pedals/levers direction corresponds to the direction you wish to drive.
  - Be sure to detour around any obstructions.
  - Avoid traveling over obstructions. Soil, fragments of rocks, and/or metal pieces may scatter around the machine. Do not allow personnel to stay around the machine while traveling.
- Driving on a slope may cause the machine to slip or overturn, possibly resulting in serious injury or death.
  - Never attempt to ascend or descend 30 degrees or steeper slopes.
  - Be sure to fasten the seat belt.
  - When driving up or down a slope, keep the bucket facing the direction of travel, approximately 200 to 300 mm (8 to 12 in) (A) above the ground.
  - If machine starts to skid or becomes unstable, immediately lower the bucket to the ground and stop.
  - Driving across the face of a slope or steering on a slope may cause the machine to skid or turnover. If the direction must be changed, move the machine to level ground, then, change the direction to ensure safe operation.
  - Avoid swinging the upperstructure on slopes. Never attempt to swing the upperstructure downhill. The machine may tip over. If swinging uphill is unavoidable, carefully operate the upperstructure and boom at slow speed.
  - If the engine stalls on a slope, immediately lower the bucket to the ground. Return the control levers to neutral. Then, restart the engine.
  - Be sure to thoroughly warm up the machine before ascending steep slopes. If hydraulic oil has not warmed up sufficiently, sufficient performance may not be obtained.



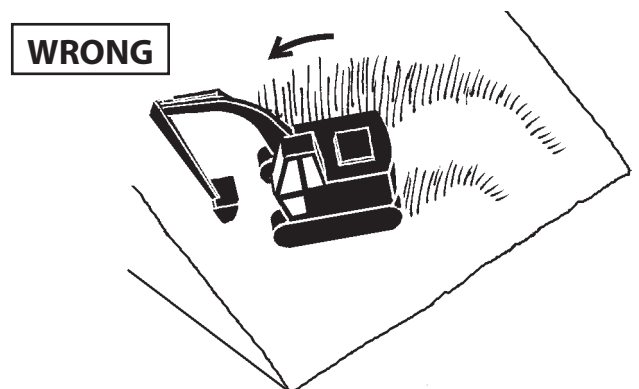
SA-1295



SA-1296




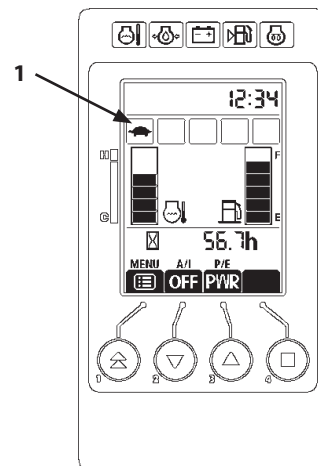
SA-441



SA-589

## SAFETY

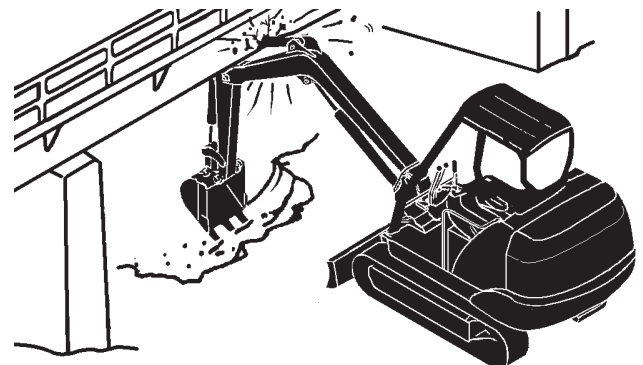
- When the machine descends a slope at high speed, machine weight accelerates descending speed. It may cause collision accident due to misjudging of braking distance or machine turnover due to running on an unexpected obstacle.  
Always ensure that travel mode display (1) on the monitor is , and then reduce the engine speed before descending a slope.
- Select a travel route that is as flat as possible. Steer the machine as straight as possible, making small gradual changes repeatedly in direction.
- Check the strengths of bridges and road shoulders before traveling on them, and reinforce if necessary.
- When the machine is equipped with steel shoes, cover the road surface with wood plates in order not to damage the road surface. Be careful of steering when operating on asphalt roads in summer.
- When crossing train tracks, lay wood plates over the tracks not to allow the machine to ride on only the rails.
- Check that the machine can pass under a bridge and electric lines before driving the machine.
- When crossing a river, drive the machine slowly while measuring the depth of the river using the bucket. Do not cross the river when the depth of the river is deeper than the upper track shoe surface.
- Reduce the engine speed when traveling on rough terrains. Select a slow travel speed. Slower speed will reduce possible damage to the machine.
- Drive the machine so that the travel motors do not come in contact with loose rocks. If the machine crosses over an obstruction, abnormally large loads may be loaded on the machine. Avoid contact with an obstruction while traveling the machine.
- During freezing weather, always clean snow and ice from track shoes before driving the machine on snowy and/or frozen roads, or loading and unloading the machine for transportation, to prevent the machine from slipping.



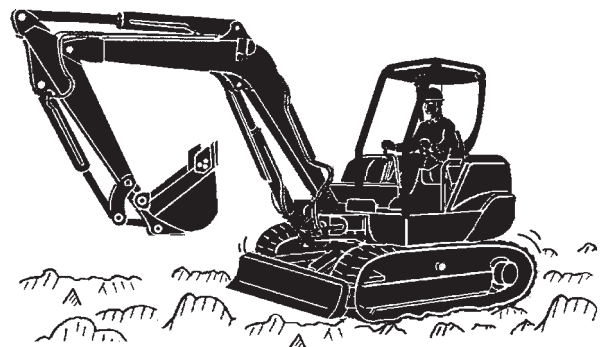
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SA-673



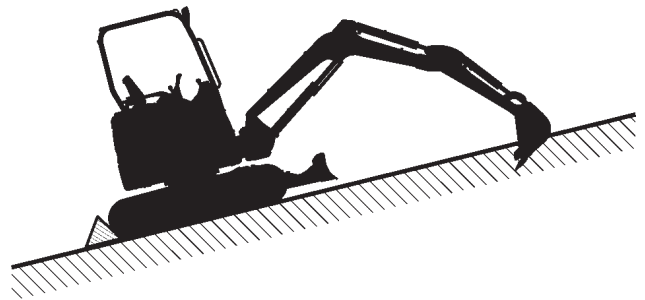
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## SAFETY

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### Avoid Injury From Rollaway Accidents

- Death or serious injury may result if you attempt to mount or try to bodily stop a moving machine.
- Park the machine in compliance with the safe parking procedures described on page S-20 to prevent the machine from running away.
  - Block both tracks and lower the bucket to the ground, thrust the bucket teeth into the ground if you must park on a grade.
  - Park at a reasonable distance from other machines.



SA-1297

## SAFETY

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### Avoid Injury From Back-over and Swing Accidents

- If any person is present near the machine when backing or swinging the upperstructure, the machine may hit or run over that person, resulting in serious injury or death.

To avoid back-over and swing accidents:

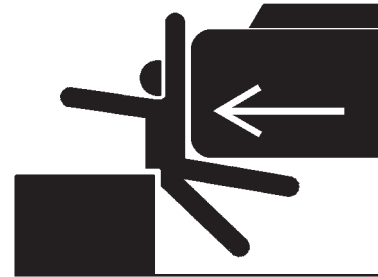
- Always look around BEFORE YOU BACK UP AND SWING THE MACHINE. BE SURE THAT ALL BYSTANDERS ARE CLEAR.
- Keep the travel alarm in working condition (if equipped). ALWAYS BE ALERT FOR BYSTANDERS MOVING INTO THE WORK AREA. USE THE HORN OR OTHER SIGNAL TO WARN BYSTANDERS BEFORE MOVING MACHINE.
- USE A SIGNAL PERSON WHEN BACKING UP IF YOUR VIEW IS OBSTRUCTED. ALWAYS KEEP THE SIGNAL PERSON IN VIEW.

Use hand signals, which conform to your local regulations, when work conditions require a signal person.

- No machine motions shall be made unless signals are clearly understood by both signal person and operator.
- Learn the meanings of all flags, signs, and markings used on the job and confirm who has the responsibility for signaling.
- Keep windows, mirrors, and lights clean and in good condition.
- Dust, heavy rain, fog, etc., can reduce visibility. As visibility decreases, reduce speed and use proper lighting.
- Read and understand all operating instructions in the operator's manual.



SA-383



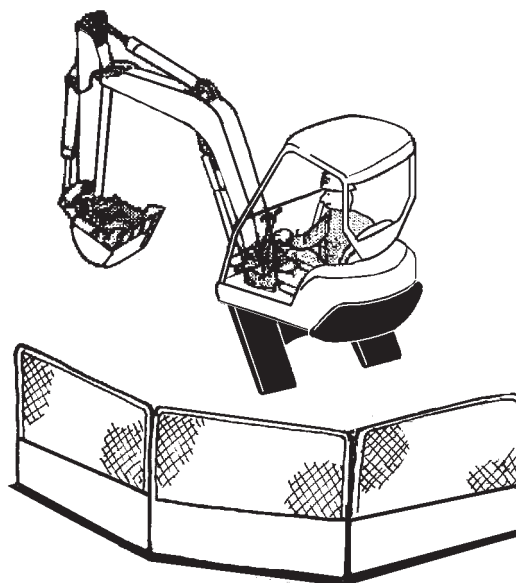
SA-384

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## SAFETY

### Keep Person Clear From Working Area

- A person around the operating machine may be hit severely by the swinging front attachment or counterweight, be caught in other objects, and/or be struck by flying objects, resulting in serious injury or death.
  - Set up barriers and/or put a NO ADMISSION sign at the machine operating site and areas exposed by flying objects to prevent anyone from entering the work area.
  - Check that all personnel or obstacles other than the signal person are not present in the working area before operating the machine.



SA-667

### Never Position Bucket Over Anyone

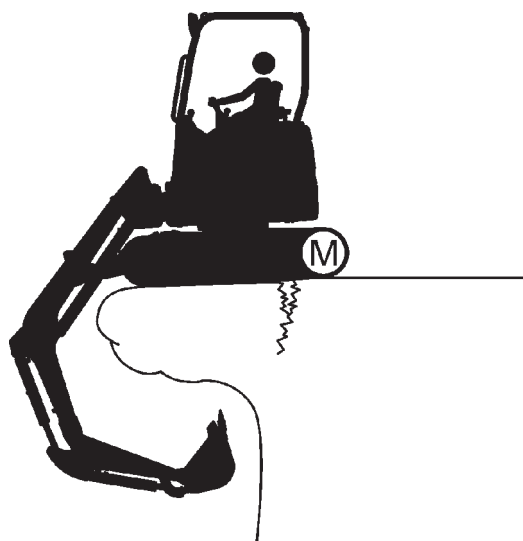
- Never lift, move, or swing bucket above anyone or a truck cab. Serious injury or machine damage may result due to bucket load spill or due to collision with the bucket.
  - Never allow the bucket to pass over anyone to avoid personal injury or death.



SA-668

### Avoid Undercutting

- In order to retreat from the edge of an excavation if the footing should collapse, always position the undercarriage perpendicular to the edge of the excavation with the travel motors at the rear.
  - If the footing starts to collapse and if retreat is not possible, do not raise the front attachment in a panic. Lowering the front attachment may be safer in most cases.



SA-1300

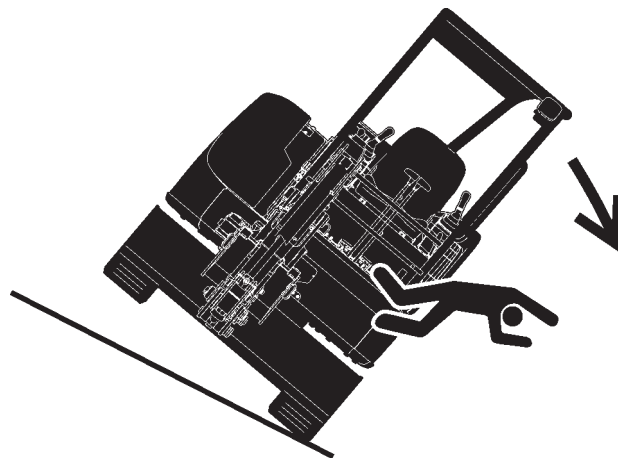
## SAFETY

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### Avoid Tipping

- The danger of tipping is always present when operating on a grade, possibly resulting in serious injury or death.  
To avoid tipping:
  - Be extra careful before operating on a grade.
  - Prepare machine operating area flat.
  - Keep the bucket low to the ground and close to the machine.
  - Reduce operating speeds to avoid tipping or slipping.
  - Avoid changing direction when traveling on grades.
  - NEVER attempt to travel across a grade steeper than 15 degrees if crossing the grade is unavoidable.
  - Reduce swing speed as necessary when swinging loads.
- Be careful when working on frozen ground.
  - Temperature increases will cause the ground to become soft and make ground travel unstable.

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SA-1301

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### Never Undercut a High Bank

- The edges could collapse or a land slide could occur causing serious injury or death.



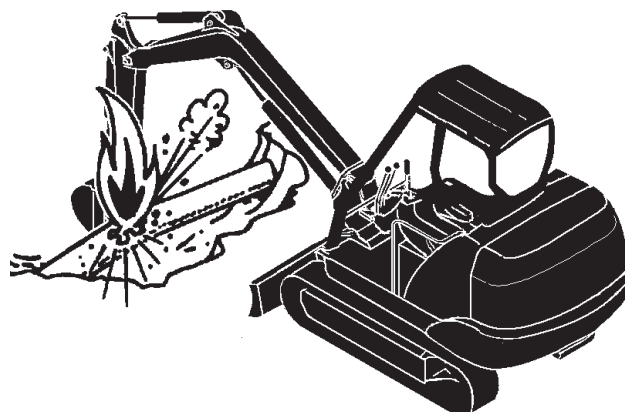
SA-1302

## SAFETY

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### Dig With Caution

- Accidental severing of underground cables or gas lines may cause an explosion and/or fire, possibly resulting in serious injury or death.
  - Before digging check the location of cables, gas lines, and water lines.
  - Keep the minimum distance required, by law, from cables, gas lines, and water lines.
  - If a fiber optic cable should be accidentally severed, do not look into the end. Doing so may result in serious eye injury.
  - Contact your local “diggers hot line” if available in your area, and/or the utility companies directly. Have them mark all underground utilities.

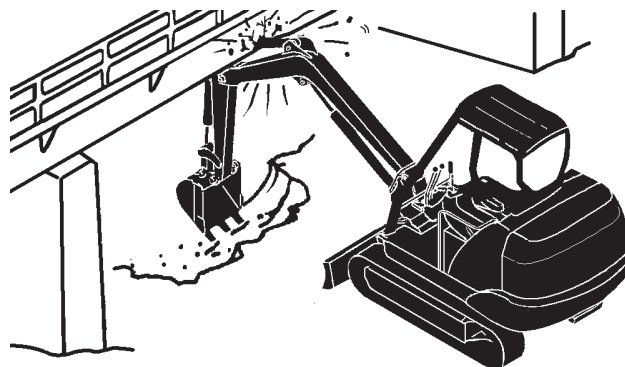


SA-672

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### Operate With Caution

- If the front attachment or any other part of the machine hits against an overhead obstacle, such as a bridge, both the machine and the overhead obstacle will be damaged, and personal injury may result as well.
  - Take care to avoid hitting overhead obstacles with the boom or arm.

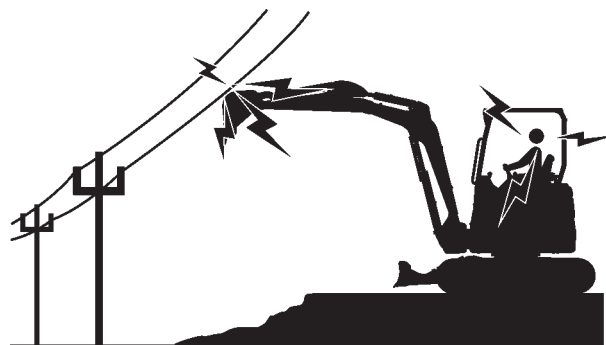


SA-673

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### Avoid Power Lines

- Serious injury or death can result if the machine or front attachments are not kept a safe distance from electric lines.
  - When operating near an electric line, NEVER move any part of the machine or load closer than 3 m (10 ft) plus twice the line insulator length.
  - Check and comply with any local regulations that may apply.
  - Wet ground will expand the area that could cause any person on it to be affected by electric shock. Keep all bystanders or co-workers away from the site.



SA-1305



## SAFETY

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### Precautions for Lightning

- Lightning may strike the machine.

If lightning comes close, immediately stop the operation, and take the following action.

- When you are around the machine or operating cab-less machine, evacuate to a safe place far away from the machine.
- When you are in the cab, stay in the cab until lightning has passed and safety is secured. Close the cab doors and windows. Lower the bucket to the ground, and stop the engine. Put your hands on your lap to avoid contact with any metal surfaces. Never go out of the cab.

If lightning strikes the machine or near the machine, check all of the machine safety devices for any failure after lightning has passed and safety is secured. If any trouble is found, operate the machine only after repairing it.

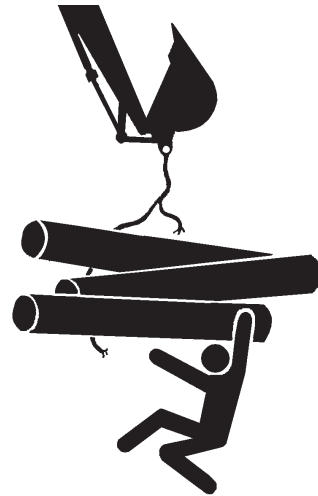


SA-1805

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### Object Handling

- If a lifted load should fall, any person nearby may be struck by the falling load or may be crushed underneath it, resulting in serious injury or death.
  - When using the machine for craning operations, be sure to comply with all local regulations.
  - Do not use damaged chains or frayed cables, cables, slings, or ropes.
  - Before craning, position the upperstructure with the travel motors at the rear.
  - When using the machine for craning operations, always park the machine on a solid and level ground.
  - Move the load slowly and carefully. Never move it suddenly.
  - Keep all persons well away from the load.
  - Never move a load over a person's head.
  - Do not allow anyone to approach the load until it is safely and securely situated on supporting blocks or on the ground.
  - Never attach a sling or chain to the bucket teeth. They may come off, causing the load to fall.



SA-014

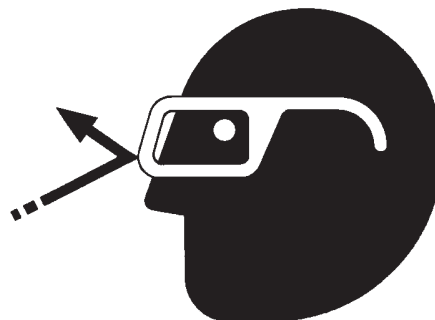
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## SAFETY

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### Protect Against Flying Debris

- If flying debris such as soil, rock fragments or metal pieces hit eyes or any other part of the body, serious injury may result.
- Guard against such injuries when working in a job site where possibility of flying pieces of metal or debris exist, or when removing or installing pins using a hammer; wear goggles or safety glasses.
- Keep bystanders away from the working area before striking any object.



SA-432

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### Park Machine Safely

- Unless the machine is correctly parked, any hazardous situations such as running away of the machine or damage by vandalism may result, causing the machine to operate unsafely when the engine is restarted. Follow instructions described below when parking the machine.
- Park the machine on solid level surface to prevent the machine from running away.
- Lower the bucket and/or blade to the ground.
- Pull the pilot control shut-off lever to the LOCK position.
- Turn the auto-idle switch OFF. Failure to do so may create a hazardous condition as the engine speed may unexpectedly increase.
- Run the engine at slow idle speed without load for 5 minutes.
- Turn key switch to OFF to stop engine. Remove the key from the key switch.
- Before leaving the machine, close all windows, roof vent, and cab door. Lock all access doors and compartments.



SA-1306

## SAFETY

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### Handle Fluids Safely --- Avoid Fires

- Handle fuel with care; it is highly flammable. If fuel ignites, an explosion and/or a fire may occur, possibly resulting in serious injury or death.
  - Do not refuel the machine while smoking or when near open flame or sparks.
  - Always stop the engine before refueling the machine.
  - Fill the fuel tank outdoors.
- All fuels, most lubricants, and some coolants are flammable.
  - Store flammable fluids well away from fire hazards.
  - Do not incinerate or puncture pressurized containers.
  - Do not store oily rags; they can ignite and burn spontaneously.
  - Securely tighten the fuel and oil filler caps.



SA-018

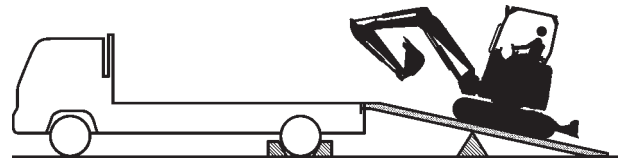


SA-019

## SAFETY

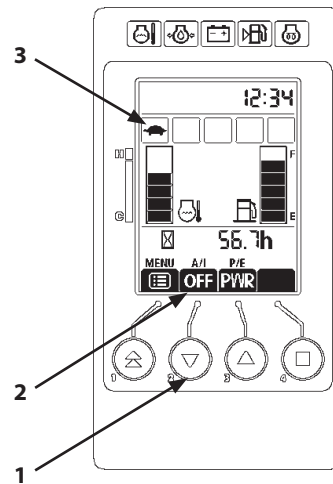
### Safety Transporting

- The danger of tipping is present when loading/unloading the machine onto/from a truck or trailer bed.
  - Be sure to observe local regulations when transporting the machine on public roads.
  - Provide an appropriate truck or trailer for transporting the machine.
  - Be sure to have a signal person.
  - Take the following precautions when loading/unloading the machine.




SA-1307

1. Select firm level ground.
2. Be sure to use a loading dock or ramp strong enough to support the machine weight.
3. Ramps must be sufficient in width, length, and strength. Be sure that the incline of the ramp is less than 15 degrees.
4. Loading docks must be sufficient in width and strength to support the machine and have a gradient of less than 15 degrees.
5. Push auto-idle switch (1) to turn A/I display (2) OFF.
6. Select the slow travel mode for loading or unloading the machine.



MADH-01-009

Always ensure that travel mode display (3) on the monitor is , before traveling the machine.

7. Avoid steering while driving up or down the ramp as it is extremely dangerous. If steering is unavoidable, first move back to the ground or flatbed, modify traveling direction, and begin to drive again.
8. The top end of the ramp where it meets the flatbed is a sudden bump. Take care when traveling over it.
9. Wedge the front and rear of the tracks. Securely fasten the machine to the trailer bed with chains or cables.
10. Do not operate any levers besides the travel levers when driving up or down the ramp.
11. Prevent possible injury from machine tipping while the upperstructure is rotating.
12. Keep the arm tucked under and rotate the upperstructure slowly for best stability.

Refer to "transporting" chapter in this manual for details.

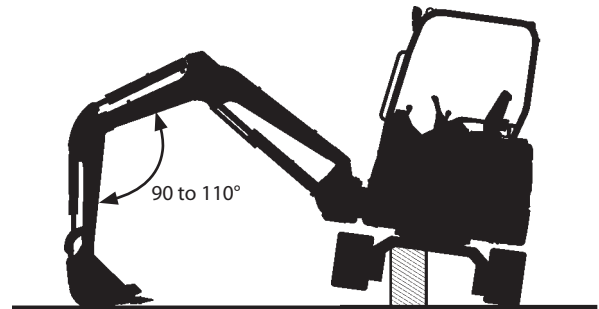
## SAFETY

### Practice Safe Maintenance

- Inspection/maintenance work may produce hazardous situations by contacting and/or accessing a part of body to a moving, high pressure, and/or high temperature part of the machine. To avoid serious personal injury or death, follow the instructions described below.
  - Thoroughly coordinate the working procedures to be taken hereafter with the co-workers before beginning work such as inspecting/servicing the machine, or replacing the attachment.
  - Safely park the machine in accordance with the instructions for "Park Machine Safely."
  - Keep the work area clean and orderly.
  - Attach a "DO NOT OPERATE" tag in an easy-to-see location such as on a door or a control lever.
  - If moisture permeates into the electrical system, malfunction and/or erroneous movement of the machine may result. Do not clean sensors, cable connectors, and the cab inside using water and/or steam.
  - Wait to begin to work until the engine and hydraulic oil temperatures have cooled down to the safety range.
  - In case inspection/maintenance must be performed with the engine running, be sure to appoint an overseer.
  - Never lubricate or service the machine while moving it.
  - Repair the cracked windowpane before servicing the machine. Failure to do so may cause personal injury.
  - When raising the machine above the ground using the front attachment function, maintain the angle between the boom and the arm in the range of 90 to 110°. Never allow anyone to enter under the machine raised with the front attachment function.
  - In case working under the machine raised above the ground is unavoidably required, securely hold the machine with stays or blocks strong enough to support the machine weight.
  - Never work under the raised bucket.
  - Keep all parts in good condition and properly installed.
  - Always use the specified tools correctly.
  - Always use a clean tool.
  - Fix any damage found immediately. Replace worn or broken parts.
  - Remove any buildup of grease, oil, or debris.
  - When cleaning parts, use a non-combustible cleaning solvent. Never use an inflammable fluid such as diesel fuel, or gasoline.



SA-028



M1M7-04-006



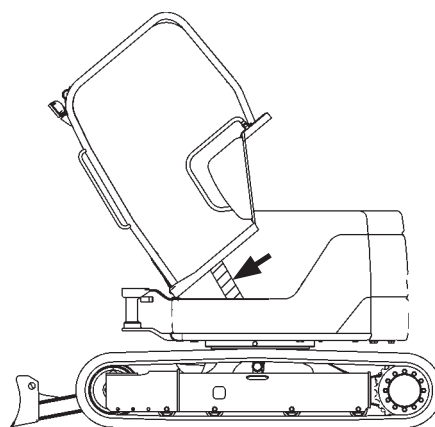
SA-527

## SAFETY

- Disconnect battery ground cable (–) before making adjustments to electrical systems or before welding on the machine.
- Sufficiently illuminate the work site. Use a maintenance work light when working under or inside the machine.
- Always use a work light protected with a guard. In case the light bulb is broken, spilled fuel, oil, antifreeze fluid, or window washer fluid may catch fire.
- When the floor tilt mechanism check and/or maintenance is conducted, the operator's station is tilted upward. Before conducting maintenance work, refer to page 13-23 in this manual for the detailed operation procedures and correctly operate the machine.
- When required to work under the floor, support the raised operator's station with the fall prevention bars (red color) to ensure safety.
- When the inspection/maintenance work is complete, tilt the operator's station downward after housing the fall prevention bars. Be sure to slowly lower the operator's station at the time.
- Be careful not to allow the operator's station to tilt down without first stowing the fall prevention bars. Damage to the tilt mechanism may result.



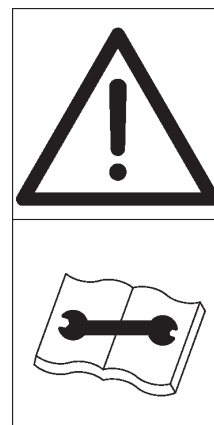
SA-037



M1MW-07-031

### Warn Others of Service Work

- Unexpected machine movement can cause serious injury.
  - Before performing any work on the machine, attach a "Do Not Operate" tag in an easy-to-see place such as on the cab door or control lever.
  - Never attempt to operate the machine with a "Do Not Operate" tag attached.
  - Make it a rule for the inspection/service person to hold the engine start key during inspection/service work.



SS2045102-4

## SAFETY

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### Support Machine Properly

- Never attempt to work on the machine without securing the machine first.
  - Always lower the attachment to the ground before you work on the machine.
  - If you must work on a lifted machine or attachment, securely support the machine or attachment with stays or blocks strong enough to support the machine and/or attachment weight.

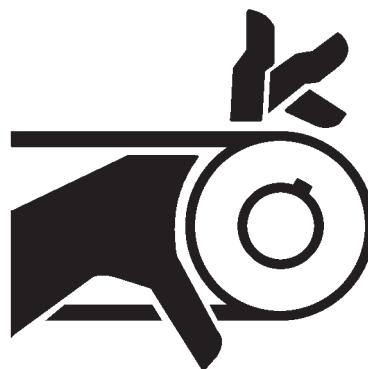


SA-527

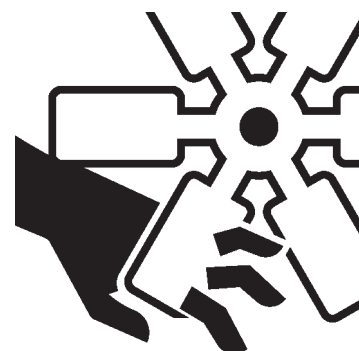
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### Stay Clear of Moving Parts

- Contact with moving parts can cause serious injury or death due to amputation or entanglement.
  - To prevent accidents, care should be taken to ensure that hands, feet, clothing, jewelry and hair do not become entangled when working around rotating parts.



SA-026



SA-2294

## SAFETY

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### Prevent Parts From Flying

- Grease in the track adjuster is under high pressure. Failure to follow the precautions below may result in serious injury, blindness, or death.
  - Do not attempt to remove GREASE FITTINGS or VALVE ASSEMBLIES.
  - As pieces of parts may fly off, be sure to keep body and face away from the valve.
- Travel reduction gears are under pressure.
  - As pieces of parts may fly off, be sure to keep body and face away from AIR RELEASE PLUG to avoid injury.
  - GEAR OIL is hot. Wait for gear oil to cool, then gradually loosen the air release plug to release pressure.

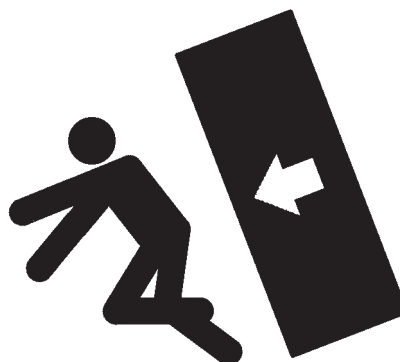


SA-344

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### Avoid Injury from Attachment Falling Accident

- Stored attachments such as buckets, hydraulic hammers, and blades can fall and cause serious injury or death.
  - To avoid possible personal injury from attachment falling accident, use a platform when replacing an attachment.
  - Securely store attachments and implements to prevent falling accidents.
  - Keep children and bystanders away from storage areas.



SA-034



## SAFETY

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### Prevent Burns

#### Hot spraying fluids:

- After operation, engine coolant is hot and under pressure. Hot water or steam is contained in the engine, radiator and heater lines. Skin contact with escaping hot water or steam can cause severe burns.
  - To prevent possible injury from hot spraying water, stop the engine. Begin to work after the engine and radiator are sufficiently cooled
  - DO NOT remove the radiator cap until the engine is cool. When opening, turn the cap slowly to the stop. Allow all pressure to be released before removing the cap.
  - The hydraulic oil tank is pressurized. Again, be sure to release all pressure by slowly removing the cap.



SA-039

#### Hot fluids and surfaces:

- Engine oil, gear oil and hydraulic oil also becomes hot during operation. The engine, hoses, lines and other parts become hot as well.
  - Wait for the oil and components to cool before starting any maintenance or inspection work.



SA-225

## SAFETY

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### Replace Rubber Hoses Periodically

- Rubber hoses that contain flammable fluids such as hydraulic oil or fuel under pressure may break due to aging, fatigue, and abrasion. It is very difficult to gauge the extent of deterioration due to aging, fatigue, and abrasion of rubber hoses by visual inspection alone.
  - Periodically replace the rubber hoses. (Refer to the Periodical Replacement Parts section.)
- Failure to periodically replace rubber hoses may cause a fire, fluid injection into skin, or the front attachment to fall on a person nearby, which may result in severe burns, gangrene, or otherwise serious injury or death.



SA-019

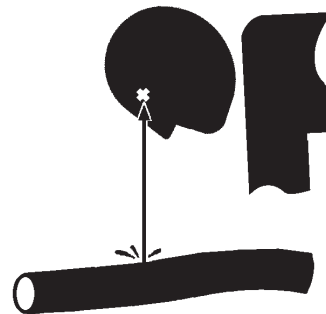
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### Avoid High-Pressure Fluids

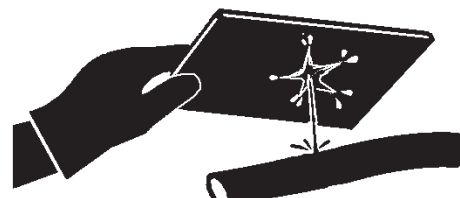
- Fluids such as diesel fuel or hydraulic oil under pressure can penetrate the skin or eyes causing serious injury, blindness or death.
  - Avoid this hazard by relieving pressure before disconnecting hydraulic or other lines. Make sure that all connectors are completely connected before applying pressure.
  - Search for leaks with a piece of cardboard; take care to protect hands and body from high-pressure fluids. Wear a face shield or goggles for eye protection.
  - If an accident occurs, see a doctor familiar with this type of injury immediately. Any fluid injected into the skin must be surgically removed within a few hours, or gangrene may result.



SA-031



SA-292



SA-044

## SAFETY

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### Prevent Fires

#### Check for Oil Leaks:

- Fuel, hydraulic oil and lubricant leaks can lead to fires, possibly resulting in personal injury or death.
  - Check for missing or loose clamps, kinked hoses, lines or hoses that rub against each other, damage to the oil-cooler, and loose oil-cooler flange bolts, for oil leaks.
  - Tighten, repair or replace any missing, loose or damaged clamps, lines, hoses, oil-cooler and oil-cooler flange bolts.
  - Do not bend or strike high-pressure lines.
  - Never install bent or damaged lines, pipes or hoses.



#### Check for Shorts:

SA-019

- Short circuits can cause fires.
  - Clean and tighten all electrical connections.
  - Check before each shift or after eight (8) to ten (10) hours operation for loose, kinked, hardened or frayed electrical cables and wires.
  - Check before each shift or after eight (8) to ten (10) hours operation for missing or damaged terminal caps.
  - DO NOT OPERATE MACHINE if cable or wires are loose, kinked, etc.

#### Precautions for Handling Flammable Materials

- Spilled fuel and oil, and trash, grease, debris, accumulated coal dust, and other flammable materials may cause fires.
  - Prevent fires by inspecting and cleaning the machine daily, and by removing spilled or accumulated flammable materials immediately.
  - Do not store flammable fluid near open flames.
  - Do not burn or crush a pressurized container.
  - Do not store oily cloths. They are liable to catch fire.
  - Do not wind easy-to-absorb-oil material around high-temperature parts such as a muffler or exhaust pipe.

## SAFETY

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### **Clean up Flammable Materials:**

- Spilled fuel and oil, and trash, grease, debris, accumulated coal dust, and other flammable materials may cause fires.
  - Prevent fires by inspecting and cleaning the machine daily, and by removing adhered oil or accumulated flammable materials immediately. Check and clean high temperature parts such as the exhaust outlet and mufflers earlier than the normal interval.
  - Do not wrap high temperature parts such as a muffler or exhaust pipe with oil absorbents.
  - Do not store oily cloths as they are vulnerable to catching fire.
  - Keep flammable materials away from open flames.
  - Do not ignite or crush a pressurized or sealed container.
  - Wire screens may be provided on openings on the engine compartment covers to prevent flammable materials such as dead leaves from entering. However, flammable materials which have passed through the wire screen may cause fires. Check and clean the machine every day and immediately remove accumulated flammable materials.

### **Check Heat Shield Covers around Engine Compartment**

- If the engine compartment heat shield cover becomes broken or lost, fire may break out.
  - If the engine compartment heat shield cover becomes broken or lost, repair or replace it before operating the machine.

### **Check Key Switch:**

- If fire breaks out, failure to stop the engine will escalate the fire, hampering fire fighting.
  - Always check key switch function before operating the machine every day:
    - 1) Start the engine and run it at slow idle.
    - 2) Turn the key switch to the OFF position to confirm that the engine has stopped.
  - If any abnormalities are found, be sure to repair them before operating the machine.

## SAFETY

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### Evacuating in Case of Fire

- If fire breaks out during machine operation, evacuate the machine in the following way:
  - Stop the engine by turning the key switch to the OFF position.
  - Use a fire extinguisher if there is time.
  - Exit the machine using handrails and/or steps.
  - In an emergency, if the cab door or front or rear window can not be opened, break the front or rear window panes with the emergency evacuation hammer to escape from the cab.

Refer to the explanation pages on the Emergency Exit.



SA-393



SS-1510

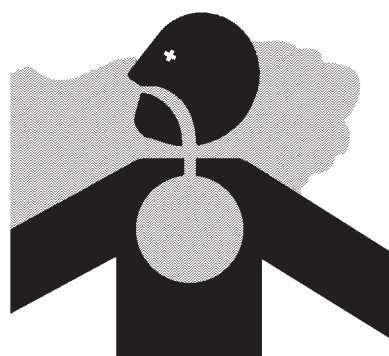
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### Beware of Exhaust Fumes

- Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.
  - If you must operate the machine in a building, be sure there is adequate ventilation. Either use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring enough outside air into the area.

ZX50U-5N, 60USB-5N

- PM (Particle Matter) combustion may generate white smoke during muffler filter regeneration. Do not perform muffler filter manual regeneration indoors without proper ventilation.



SA-016

## SAFETY

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### Precautions for Welding and Grinding

- Welding may generate gas and/or small fires.
  - Be sure to perform welding in a well ventilated and prepared area. Store flammable materials in a safe place before starting welding.
  - Only qualified personnel should perform welding. Never allow an unqualified person to perform welding.
- Grinding on the machine may create a fire hazard. Store flammable materials in a safe place before starting grinding.
- After finishing welding and grinding, recheck that there are no abnormalities such as the area surrounding the welded area still smoldering.



SA-818

### Avoid Heating Near Pressurized Fluid Lines

- Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders.
  - Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials.
  - Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area. Install temporary fire resistant guards to protect hoses or other materials before engaging in welding, soldering, etc.



SA-030

### Avoid Applying Heat to Lines Containing Flammable Fluids

- Do not weld or flame cut pipes or tubes that contain flammable fluids.
- Remove flammable fluids thoroughly with nonflammable solvent before welding or flame cutting pipes or tubes that contained flammable fluids.

### Precautions for Handling Accumulator and Gas Damper

High-pressure nitrogen gas is sealed in the accumulator and the gas damper. Inappropriate handling may cause explosion, possibly resulting in serious injury or death.

Strictly comply with the following items: Do not disassemble the unit.

- Keep the units away from open flames and fire.
- Do not bore a hole, do not cut by torch.
- Avoid giving shocks by hitting or rolling the unit.
- Before disposing the unit, sealed gas must be released. Consult your nearest Hitachi dealer.

## SAFETY

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### Remove Paint Before Welding or Heating

- Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch. If inhaled, these fumes may cause sickness.
  - Remove paint before welding or heating.
  - Avoid potentially toxic fumes and dust.
  - Do all such work outside or in a well-ventilated area. Dispose of paint and solvent properly.
  - Allow fumes to disperse at least 15 minutes after welding or heating.
  - Use attention to the following points when removing paint.
    1. If you sand or grind paint, avoid breathing the dust which is created.  
Wear an approved respirator.
    2. If you use solvent or paint stripper, remove stripper with soap and water before welding.
    3. Remove solvent or paint stripper containers and other flammable materials from area.



SA-029

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### Beware of Asbestos and Silicon Dust and Other Contamination

- Take care not to inhale dust produced in the work site. Inhalation of asbestos fibers may be the cause of lung cancer. Inhalation of silicon dust and other contamination may cause sickness.
  - Depending on the work site conditions, the risk of inhaling asbestos fiber, silicon dust or other contamination may exist. Spray water to prevent asbestos, silicon dust or other contamination from airborne. Do not use compressed air.
  - When operating the machine in a work site where asbestos, silicon dust or other contamination might be present, be sure to operate the machine from the upwind side and wear a mask rated to prevent the inhalation of asbestos, silicon dust or other contamination.
  - Keep bystanders out of the work site during operation.
  - Asbestos might be present in imitation parts. Use only genuine Hitachi Parts.



SA-029

## SAFETY

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### Prevent Battery Explosions

- Battery gas can explode.
  - Keep sparks, lighted matches, and flame away from the top of battery.
  - Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.
  - Do not charge a frozen battery; it may explode. Warm the battery to 16 °C (60 °F) first.
  - Do not continue to use or charge the battery when the electrolyte level is lower than specified. Explosion of the battery may result.
  - When a terminal becomes loose, it may induce sparks. Securely tighten all terminals.
  - Connect terminals to the correct electrical poles. Failure to do so may cause damage to the electrical parts or fire.
- Battery electrolyte is poisonous. If the battery should explode battery electrolyte may be splashed into eyes, possibly resulting in blindness. If electrolyte is splashed into eyes, flush your eyes continuously with water for about 15 minutes. Seek medical attention immediately.
  - Be sure to wear eye protection when checking electrolyte specific gravity.



SA-032

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### Precautions for Handling Refrigerant

- If refrigerant is splashed into eyes or spilled onto skin, blindness or a cold contact burn may result.
  - Refer to the precautions described on the refrigerant container for handling refrigerant.
  - Use a recovery and recycling system to avoid venting refrigerant into the atmosphere.
  - Never allow the skin to directly come in contact with refrigerant.



SA-405



## SAFETY

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### Handle Chemical Products Safely

- Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with your machine include such items as lubricants, electrolyte, coolants, paints, and adhesives.
- A Safety Data Sheet (SDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.
- Check the SDS before you start any job using a hazardous chemical. Then follow the correct procedures and use recommended equipment.
- See your authorized dealer for SDS.

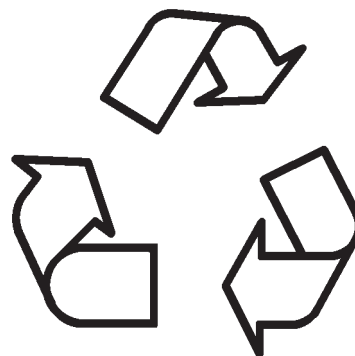


SA-2579

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### Dispose of Waste Properly

- Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with HITACHI equipment includes such items as oil, fuel, coolant, brake fluid, filters, and battery.
- When draining fluid, use a leakproof container with a capacity larger than the drained fluid volume to receive it.
- Do not pour waste onto the ground, down a drain, or into any water source.
- Inquire on the proper way to dispose of harmful waste such as oil, fuel, coolant, brake fluid, filters, and battery from your local environmental or recycling center.



SA-226

## SAFETY

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### Never Ride Attachment

- Never allow anyone to ride attachments or the load. This is an extremely dangerous practice.

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### Notes for Muffler Filter (ZX50U-5N, 60USB-5N)

#### Muffler Filter

The muffler filter removes particle matters (PM) in the exhaust gas. The muffler filter traps PM, and it is automatically regenerated by burning PM when the set amount of PM is accumulated in the filter. Follow the instructions below to prevent the muffler filter from being damaged.

**⚠ WARNING:** Exhaust gas from the muffler filter, muffler and exhaust piping becomes hot during and right after engine running and filter regeneration (burning PM). Keep away from the direction of the exhaust piping and its vicinity during the filter regeneration. Be careful not to let your skin contact with any hot gas from the exhaust piping. It may cause severe burns.

Do not directly touch water coming out of the muffler filter. The water is mildly-acidic by oxidation catalyst mounted in the muffler filter. If filter water spills on your skin, immediately flush it out with clean water.

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### Precautions for Communication Terminal

Electrical wave transmitted from the communication terminal may cause malfunction of other electronic devices. Inquire the device manufacturer for electrical wave disturbance upon using an electronic device near the communication terminal.

## SAFETY

### Notes on Protection of Operator's Station When the Machine Rolls Over

The cab corresponds to the structure to protect the operator by absorbing impact energy when the machine rolls over (Roll-Over Protective Structure (ROPS)).

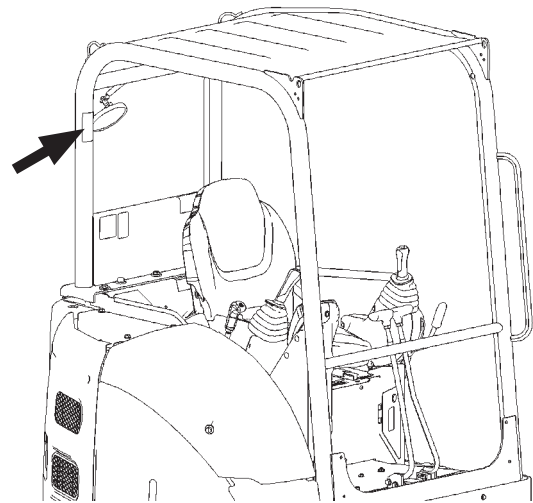
However, when the machine mass exceeds the maximum operating mass described in the ROPS certification by modifying the machine or installing a special attachment, the cab can not fulfill its protective function, possibly causing serious injury or death.

In order to ensure the protective structure, follow the instructions below.

- Consult your authorized dealer before welding parts or drilling a hole on the cab, which possibly reduces the cab strength.
- Be sure to always fasten the seat belt when operating the machine. If the machine rolls over without operator fastening the seat belt, the operator may become injured, may be thrown out from the cab and/or may become crushed under the machine even though the cab has the protective structure.

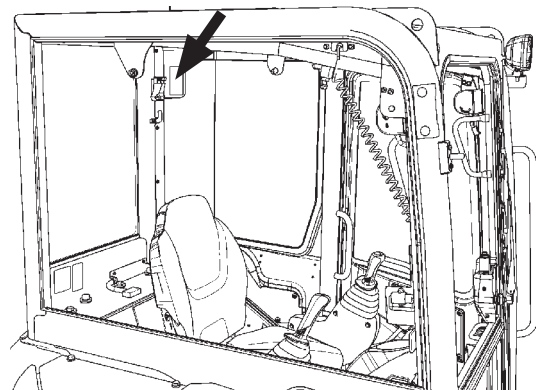
The ROPS certification is valid under the following conditions.

- The machine mass is lower than the maximum operating mass described in the ROPS certification.
- The ROPS is properly installed.
- No modification is made to the ROPS.
- The ROPS is free from damage.



CANOPY

MADB-00-029



CAB

MADB-00-030

Maximum operating Weight  
assuring the ROPS

PROTECTIVE STRUCTURE CERTIFICATION		
MACHINE MAX. OPERATING WEIGHT 4500kg (9920LBS)		
ROPS: ISO3471		
TOPS: ISO12117:EN13531		
OPG TOP GUARD: ISO10262 (LEVEL1)		
MODEL		
ZX30U-5A	ZX33U-5A	ZX30U-5B
ZX33U-5B	ZX35U-5A	ZX30U-5A
ZX35U-5N	ZX35U-5B	ZX30U-5B
ZX30U-5N		
<b>HITACHI</b>		

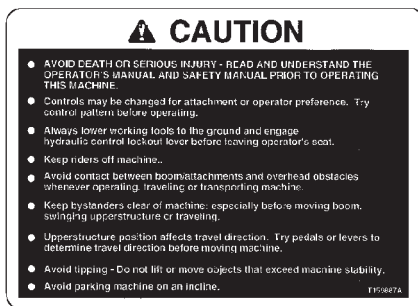
Applicable Machine Model Number

SS-3921

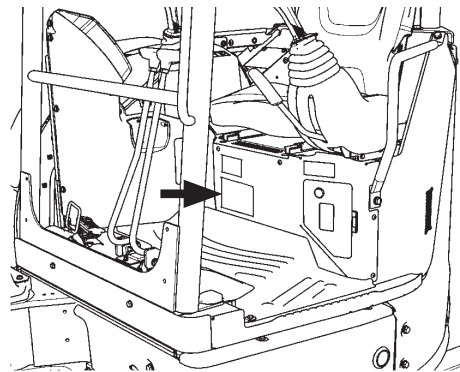
## SAFETY SIGNS

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All safety signs and their locations affixed on the machine are illustrated in this group. Make sure of the contents described in the safety signs through reading actual ones affixed on the machine to ensure safe machine operation. Always keep the safety signs clean. In case a safety sign is broken or lost, immediately, obtain a new replacement and affix it again in position on the machine. Use the part No. indicated under the right corner of each safety sign illustration when ordering it at your authorized dealer.

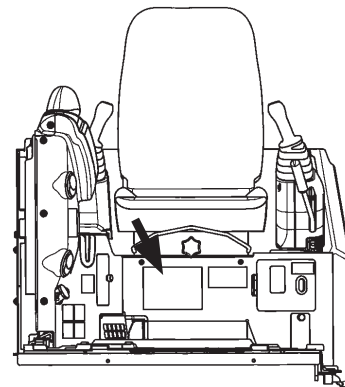


SS3079466



ZX30U-5N, 35U-5N, 50U-5N, 60USB-5N (CANOPY)

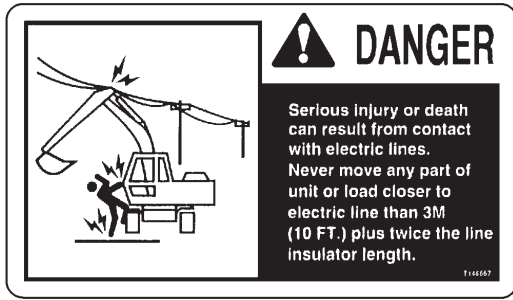
MADG-00-018



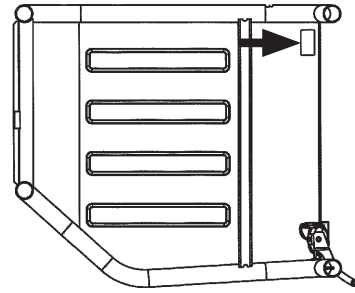
ZX60USB-5N (CAB)

MADG-00-002

## SAFETY SIGNS

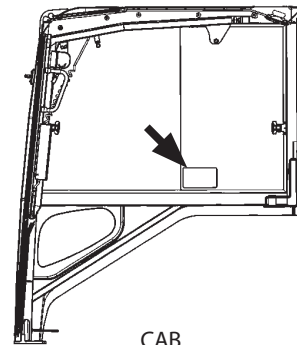


SS-259



CANOPY

MADB-00-023

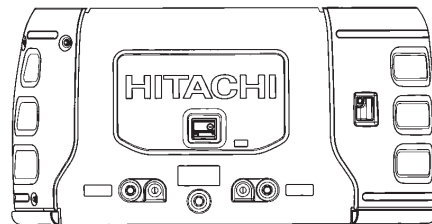


CAB

MADG-00-004

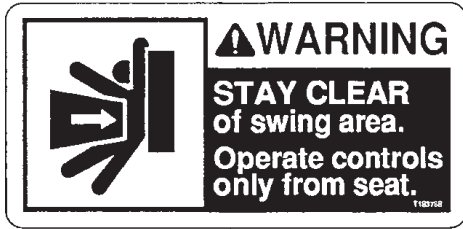


SS-024

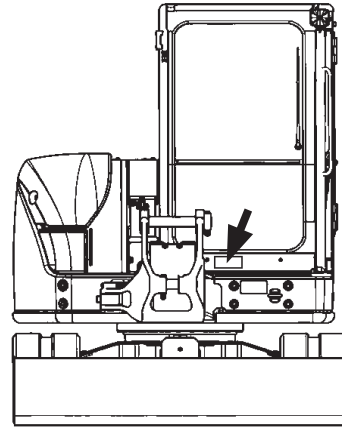


MADG-00-005

## SAFETY SIGNS

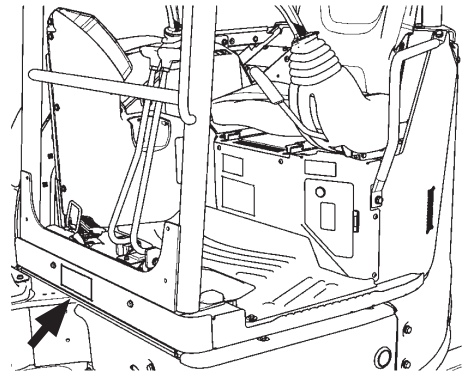


SS3090482



ZX60USB-5N (CAB)

MADG-00-006



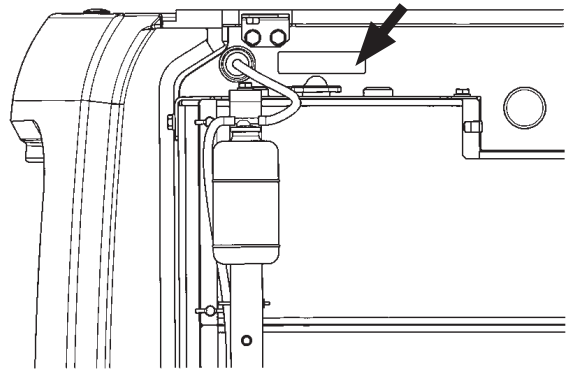
ZX30U-5N, 35U-5N, 50U-5N, 60USB-5N (CANOPY)

MADG-00-019

## SAFETY SIGNS



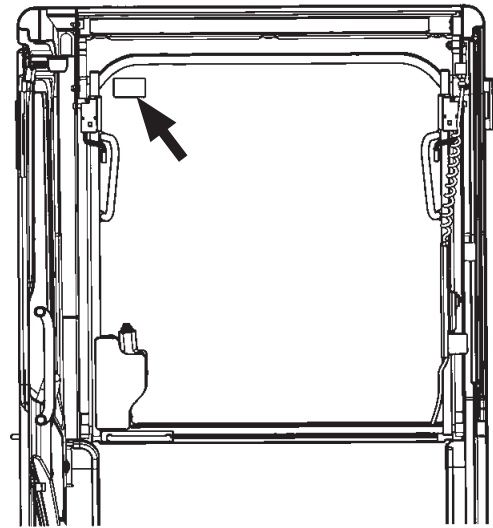
SS4604981



MADG-00-007



SS-1832

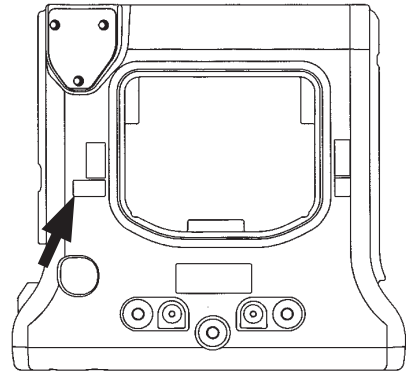


MADG-00-009

## SAFETY SIGNS

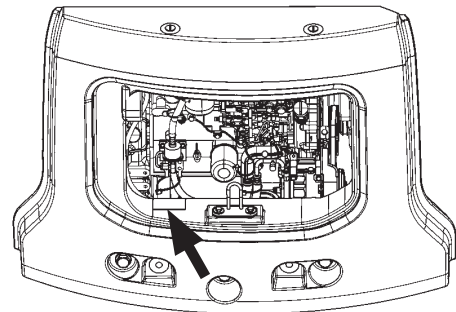


SS4433590



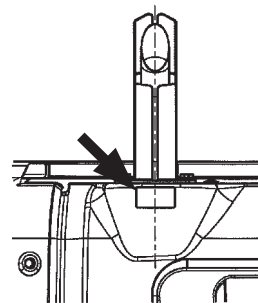
ZX30U-5N, 35U-5N

MADG-00-020



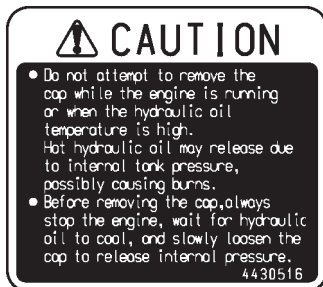
ZX50U-5N, 60USB-5N

MADG-00-011

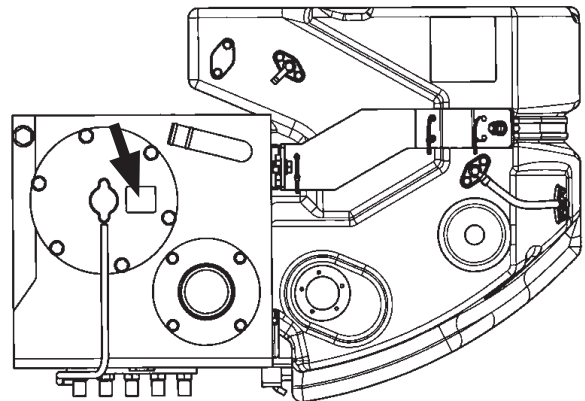


ZX50U-5N, 60USB-5N (CANOPY)

MADB-00-027



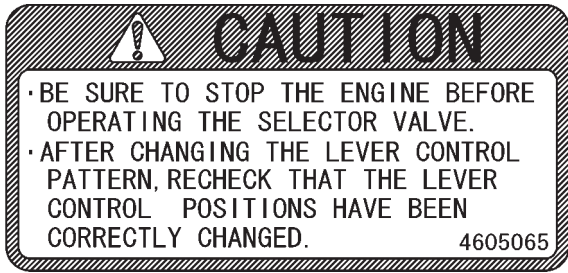
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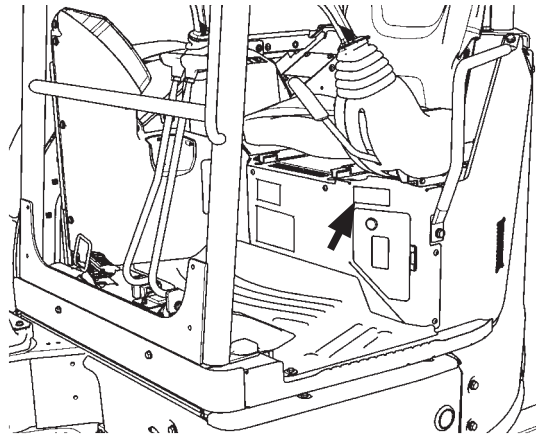
MADG-00-012



## SAFETY SIGNS

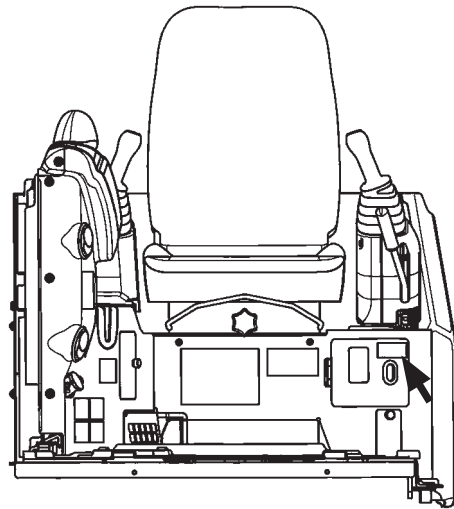


SS4605065



ZX30U-5N, 35U-5N, 50U-5N, 60USB-5N (CANOPY)

MADG-00-018



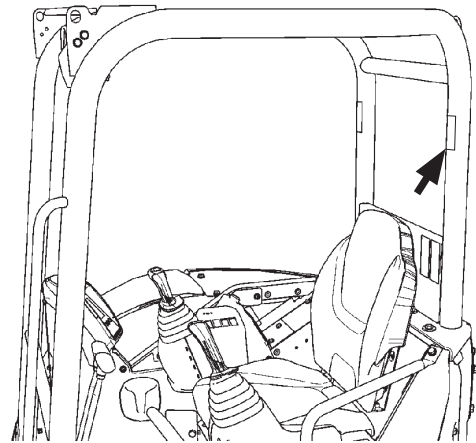
ZX60USB-5N (CAB)

MADG-00-002

# SAFETY SIGNS

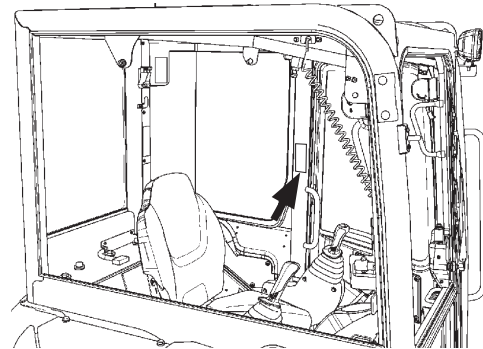


SS3088058



CANOPY

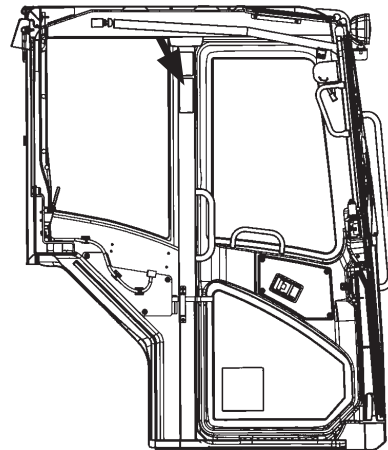
MADB-00-014



CAB

MADB-00-015

ZX30U-5N, 35U-5N, 50U-5N



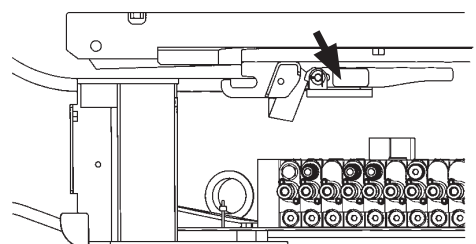
CAB

MADG-00-015

ZX60USB-5N



SSYD00005435



MADG-00-016

# SAFETY SIGNS

**PROTECTIVE STRUCTURE  
CERTIFICATION**

MACHINE MAX. OPERATING WEIGHT  
4500kg (9920LBS)

ROPS: IS03471

TOPS: IS012117:EN13531

OPG TOP GUARD: IS010262  
(LEVEL1)

MODEL

ZX30U-5A	ZX33U-5A	ZX30U-5B
ZX33U-5B	ZX35U-5A	ZX38U-5A
ZX35U-5N	ZX35U-5B	ZX30U-5B
ZX30U-5N		

**HITACHI**

SS-3921

ROPS/FOPS

**PROTECTIVE STRUCTURE  
CERTIFICATION**

MACHINE MAX. OPERATING WEIGHT  
6020kg (13270LBS)

ROPS: IS03471

TOPS: IS012117:EN13531

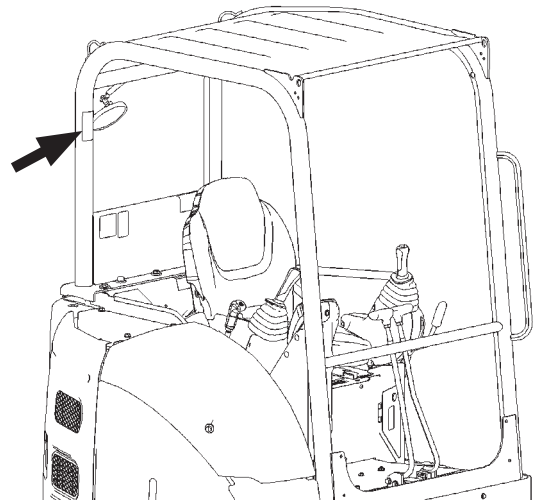
OPG TOP GUARD: IS010262  
(LEVEL1)

MODEL

ZX48U-5A	ZX48U-5B	ZX55U-5A
ZX55USR-5A	ZX50U-5N	ZX55USR-5B
ZX55U-5B		

**HITACHI**

SS-3547



CANOPY

MADB-00-029

**PROTECTIVE STRUCTURE  
CERTIFICATION**

MACHINE MAX. OPERATING WEIGHT  
4670kg (10300LBS)

ROPS: IS03471

TOPS: IS012117:EN13531

OPG TOP GUARD: IS010262  
(LEVEL1)

MODEL

ZX30U-5A	ZX33U-5A	ZX30U-5B
ZX33U-5B	ZX35U-5A	ZX38U-5A
ZX35U-5N	ZX35U-5B	ZX38U-5B
ZX30U-5N		

**HITACHI**

SS-3922

ROPS/FOPS

**PROTECTIVE STRUCTURE  
CERTIFICATION**

MACHINE MAX. OPERATING WEIGHT  
6150kg (13560LBS)

ROPS: IS03471

TOPS: IS012117:EN13531

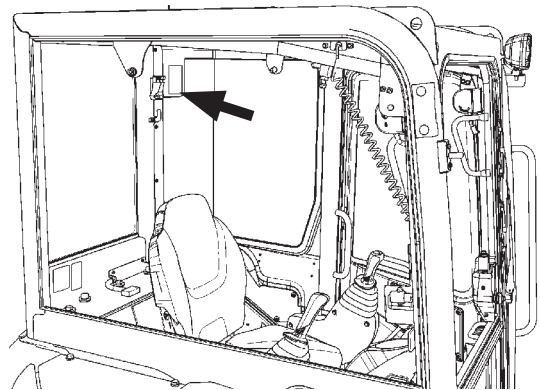
OPG TOP GUARD: IS010262  
(LEVEL1)

MODEL

ZX48U-5A	ZX48U-5B	ZX55U-5A
ZX55USR-5A	ZX50U-5N	ZX55USR-5B
ZX55U-5B		

**HITACHI**

SS-3549



CAB

MADB-00-030

ZX30U-5N, 35U-5N, 50U-5N

**PROTECTIVE STRUCTURE  
CERTIFICATION**

MACHINE MAX. OPERATING WEIGHT  
7250kg (15980LBS)

ROPS: IS03471  
IS012117-2

TOPS: IS012117:EN13531

OPG TOP GUARD:  
(LEVEL1) IS010262

MODEL

ZX65USB-5A	ZX68USR-5A	ZX60USB-5N
ZX65USB-5B	ZX68USR-5B	

**HITACHI**

SS-3550

ROPS/FOPS

**PROTECTIVE STRUCTURE  
CERTIFICATION**

MACHINE MAX. OPERATING WEIGHT  
7080kg (15600LBS)

ROPS: IS03471  
IS012117-2

TOPS: IS012117:EN13531

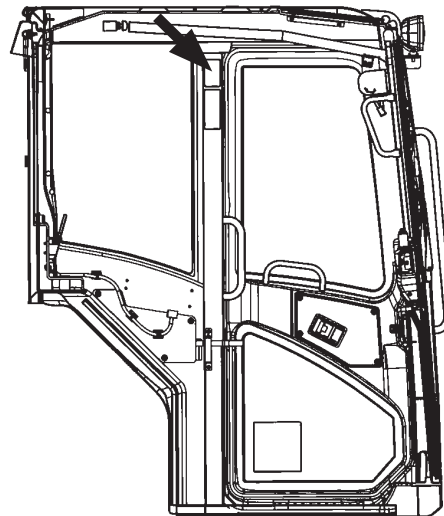
OPG TOP GUARD:  
(LEVEL1) IS010262

MODEL

ZX60USB-5N		
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**HITACHI**

SS-3932



CAB

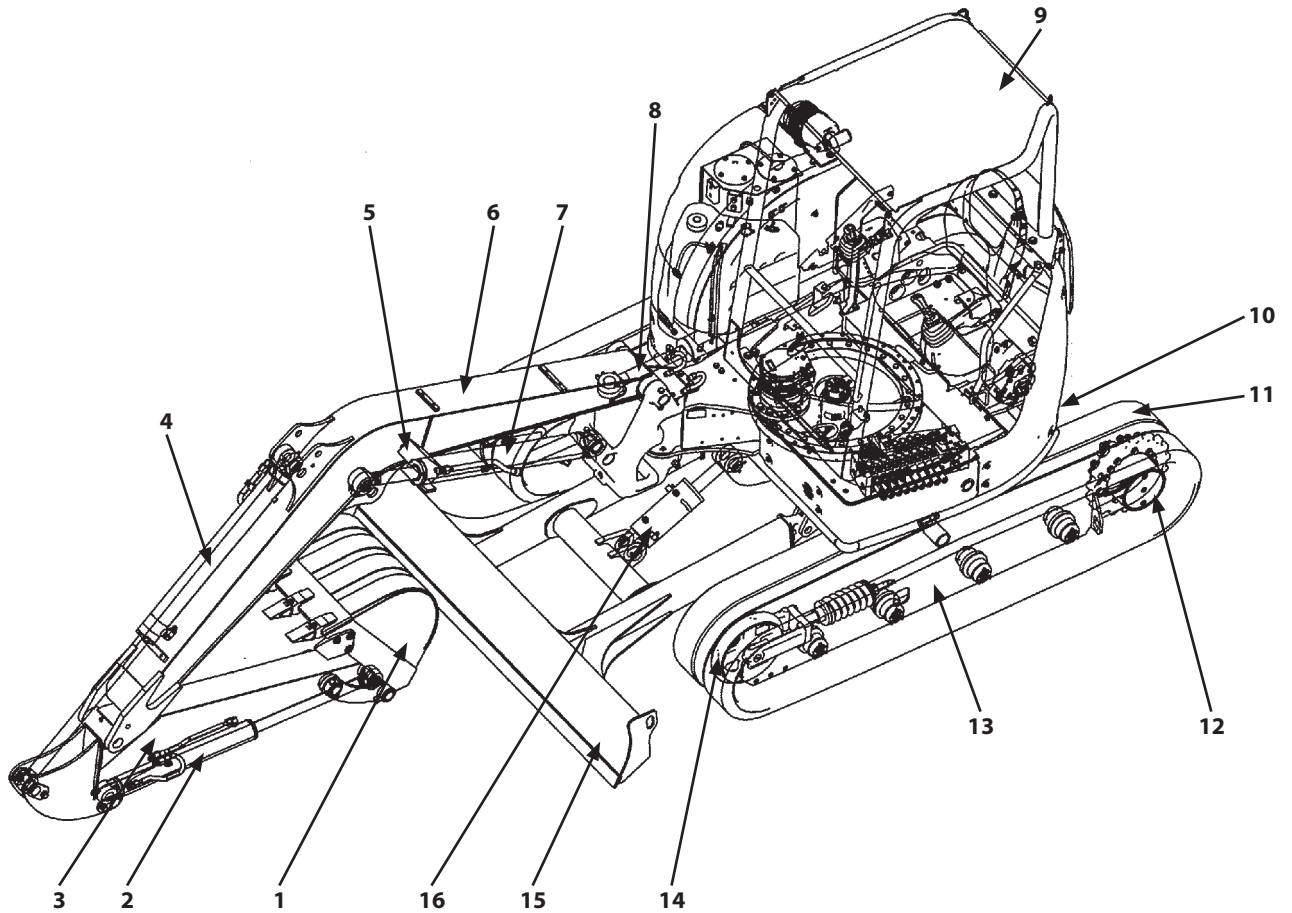
MADG-00-015

ZX60USB-5N



## COMPONENTS NAME

### Components Name



MADB-01-001

1- Bucket

2- Bucket Cylinder

3- Arm

4- Arm Cylinder

5- Work Light

6- Boom

7- Boom Cylinder

8- Boom Swing Cylinder

9- Canopy

10- Counterweight

11- Track Shoe

12- Travel Device

13- Track Frame

14- Front Idler

15- Blade

16- Blade Cylinder

## GETTING ON/OFF THE MACHINE

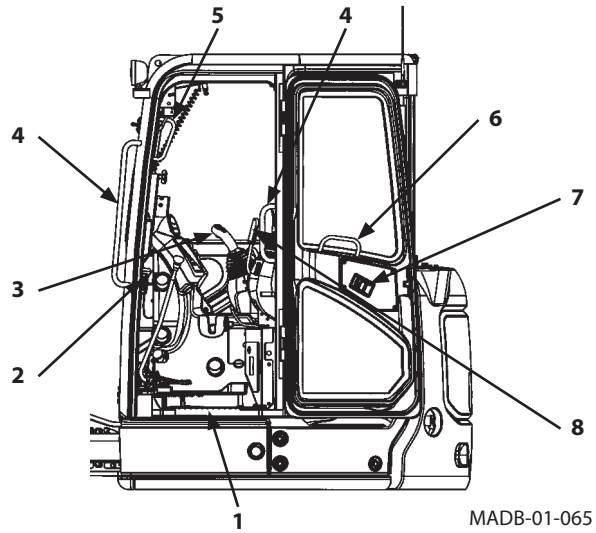
### Getting ON/OFF the Machine

Foot holds (1) and handrails (4) are provided around the entrance. These are used to get on and off the cab safely as well as to do inspection and maintenance of the machine safely.

Never jump on or off the machine as it is very dangerous. Take extra care not to contact to door striker (2).

#### **⚠ WARNING:**

- **Never attach a wire on handrails (4) and door striker (2) to lift the cab or main body, or while transporting the machine on a truck or trailer as it is dangerous.**
- **Door knob (6), handle (5) on the front window and release lever (7) are not a handrail. Do not use them as a handrail when getting on and off the machine.**
- **Do not hold control lever (3) or pilot control shut-off lever (8) when getting on and off the machine.**



MADB-01-065

## OPERATOR'S STATION

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### Muffler Filter (ZX50U-5N, 60USB-5N)

The muffler filter removes particle matters (PM) from the exhaust gas. The muffler filter traps PM, and it is automatically regenerated by burning PM when a set amount of PM is accumulated in the filter. Follow the instructions below to prevent the muffler filter from being damaged.

#### WARNING:

- **Exhaust gas from the muffler filter, exhaust piping and tail piping becomes hot during and right after engine running and filter regeneration (burning PM). Be careful not to let your skin contact any part of exhaust system or hot gas from the exhaust piping.**
- **If flammable materials such as dead leaves or paper scraps are around the muffler, they may cause a fire.**
- **Before maintaining the machine, stop the engine and make sure the engine has sufficiently cooled down in order to prevent burns.**

#### IMPORTANT:

- **Be sure to use fuel that complies with JIS K-2204, EN-590 or ASTM D-975 which contents 15 ppm or lower sulfur. If the fuel described above is not used, exhaust gas that exceeds the regulation values may be discharged and serious problems may arise on the engine.**
- **Use only genuine Hitachi or oil manufacture's engine oil. Using engine oil other than the genuine Hitachi or oil manufacturer may shorten the muffler cleaning interval and increase the fuel consumption rate.**
- **Besides, using bad quality fuel, drainage agent, fuel additives, gasoline, kerosene or alcohol refueled or mixed with specified fuel may deteriorate performance of fuel filters and cause sliding problem at lubricated contacts in the injector. It also affects the engine parts, leading to malfunction.**

## OPERATOR'S STATION

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- **Do not modify the machine without authorization. Never attempt to modify the air inlet and exhaust parts such as the air duct, muffler filter and the exhaust outlet. Also never attempt to disassemble the muffler filter. Avoid giving shocks on the muffler filter by striking elements with other objects or dropping the elements. Failure to do so may affect the exhaust gas purifying device, possibly damaging it or lowering its performance.**
- **PM combustion may generate white smoke during muffler filter regeneration. Do not attempt to do muffler filter manual regeneration in a badly ventilated indoors.**

 NOTE:

- *The muffler filter traps PM, and it is automatically regenerated by burning PM when the set amount of PM is accumulated in the filter. It is called auto-regeneration. Two types of auto-regeneration are provided to take place at non-regular intervals depending on the machine's working conditions. The auto-regeneration may start during operation of the machine; you can continue to operate the machine. (refer to 1-25)*
- *Turning the pilot control shut-off lever to LOCK position while performing auto-regeneration may change the engine sound, this is not a malfunction.*
- *The engine sound may differ from normal sound during auto-regeneration, which is not a malfunction.*
- *Do not stop the engine during regeneration unless absolutely necessary.*
- *The auto-regeneration may be terminated depending on the machine operating condition. At this time, the muffler filter regeneration request indicator will flash, the buzzer will sound, and the engine speed and power will drop. (refer to 1-26) This mark indicates that the muffler filter regeneration is required manually. It is called manual regeneration. Perform manual regeneration following the specified procedure. (refer to 1-27)*



## OPERATOR'S STATION

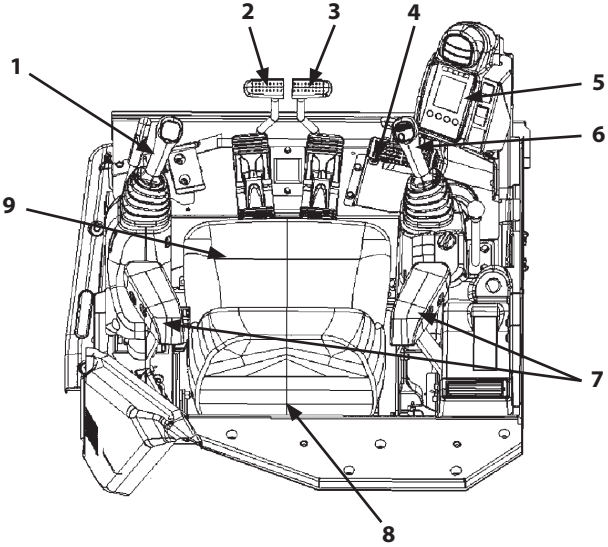
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- *If approximately 3 hours has passed without previous regeneration being completed, the muffler filter regeneration request will flash, the buzzer will sound, and the engine speed and power will drop. (refer to 1-26) Perform manual regeneration following the specified procedure in this case. (refer to 1-27)*
- *When the machine is operated without performing manual regeneration, the muffler filter may be damaged. Immediately move the machine to a safe area and perform manual regeneration.*
- *If the machine is continuously operated without performing manual regeneration, the engine speed and power will drop. The engine will automatically stop approximately after 2 hours. If the muffler filter alarm or engine trouble alarm is displayed, the buzzer will sound and the engine will automatically stop approximately after 30 minutes. At this time, consult your authorized Hitachi dealer for repairing the muffler filter.*
- *Both auto and manual regenerations restore muffler filter function. It is not a malfunction.*
- *If auto-regeneration interval becomes shorter, consult your authorized Hitachi dealer.*
- *White smoke may occur for several minutes after the engine start, this is not a malfunction.*

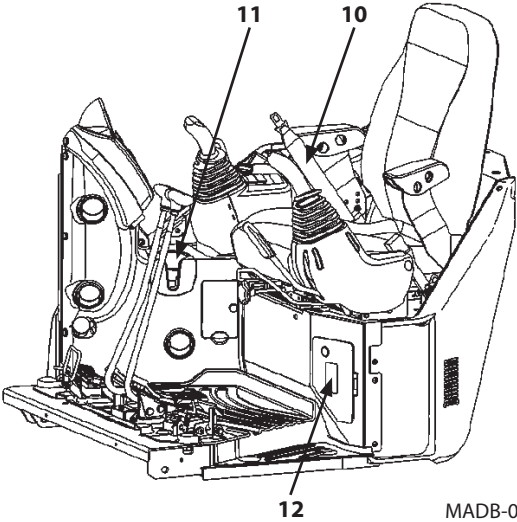
# OPERATOR'S STATION

## Layout

- 1- Left Control Lever
- 2- Left Travel Lever
- 3- Right Travel Lever
- 4- Swing Pedal
- 5- Monitor
- 6- Right Control Lever/Horn Switch
- 7- Arm Rest (Optional)
- 8- Seat Back Box
- 9- Operator's Seat
- 10- Seat Belt
- 11- Drink Holder
- 12- Tool Box



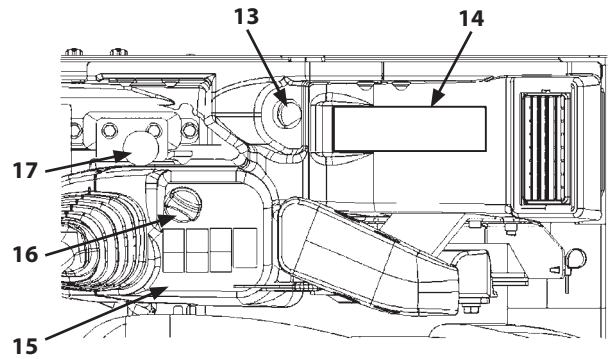
MADG-01-083



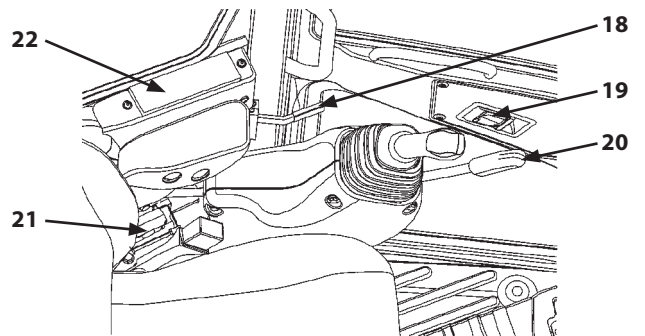
MADB-01-003

## OPERATOR'S STATION

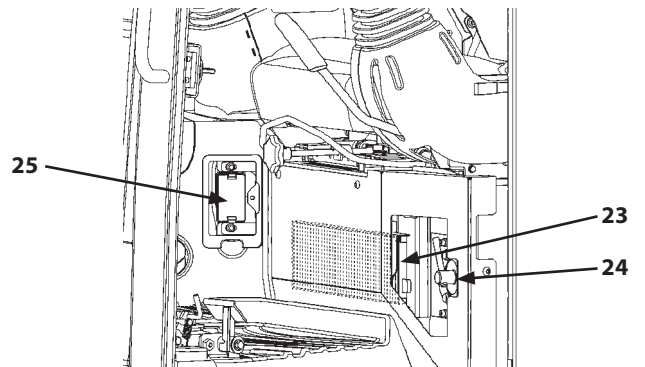
- 13- Key Switch
- 14- Heater/Air Conditioner Control Panel (Cab equipped machine)
- 15- Switch Panel
- 16- Engine Control Dial
- 17- Blade Lever
- 18- Door Lock Release Lever (Cab equipped machine)
- 19- Door Opener (Cab equipped machine)
- 20- Pilot Control Shut-Off Lever
- 21- Fresh Air Filter (Cab equipped machine)
- 22- FM/AM Radio (Cab equipped machine) (Optional)
- 23- Circulating Air Filter (Cab equipped machine)
- 24- 2-Way Multi Lever
- 25- Fuse Box



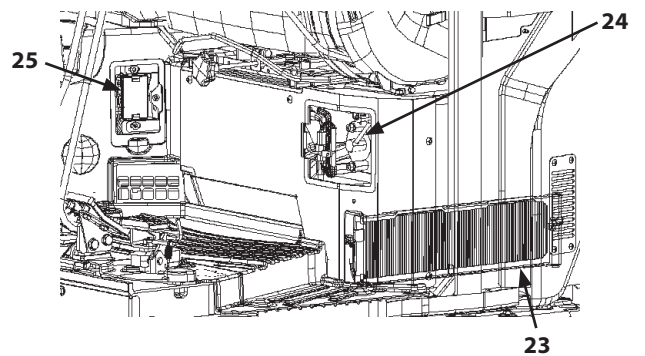
MADG-01-084



MADB-01-005



ZX30U-5N, 35U-5N, 50U-5N MADB-01-006

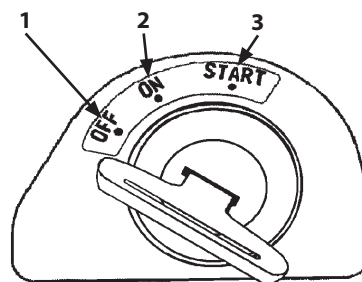


ZX60USB-5N MADC-01-002

## OPERATOR'S STATION

### Key Switch

- 1- OFF (Engine Off )
- 2- ON
- 3- START (Engine Start)



MADB-01-007

### Switch Panel

- 4- Work Light Switch

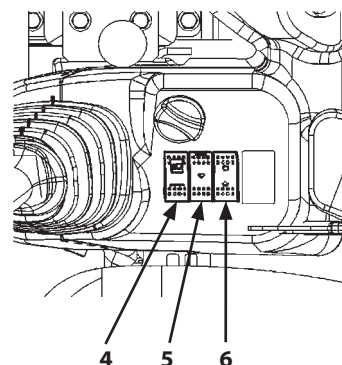
When the upper part of switch (4) is pushed, work lights (8) located on the front side of the boom and canopy (cab equipped machine) come ON.

When the lower part of switch (4) is pushed, work lights (8) go OFF.

- 5- Wiper Switch (Cab equipped machine)


Three (operational) positions are provided on this switch.


- OFF: Neither the wiper nor the washer operates.
- Center: The wiper operates.
- WASHER: The washer operates together with the wiper.




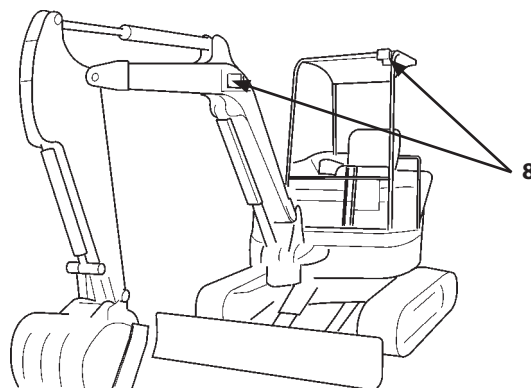
MADG-01-085

- 6- Travel Mode Switch

Push  side of switch (6) to select the fast speed mode. When travel load increases, the travel mode automatically shifts to slow speed mode.

Push  side of switch (6) to select the slow speed mode.

**CAUTION:** When the fast speed mode is set and load becomes heavy, the travel mode will automatically shift slow speed mode while displaying . However, when the travel load becomes light, it will shift to the fast speed mode. Watch out for a sudden speed change.



M1M7-01-025

# OPERATOR'S STATION

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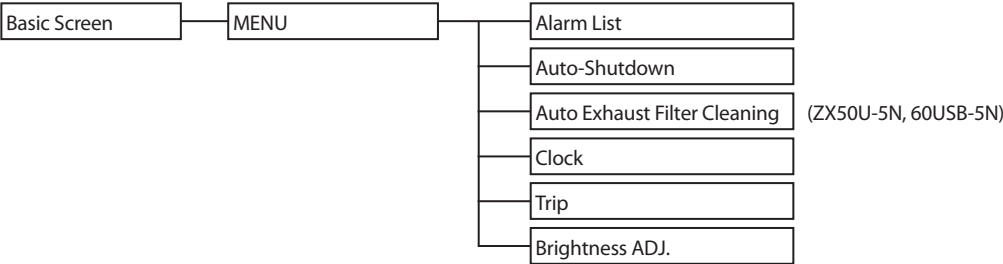
## Monitor

### Feature

The monitor displays various meters, warning indicators and work mode selection.

### Screen Configuration

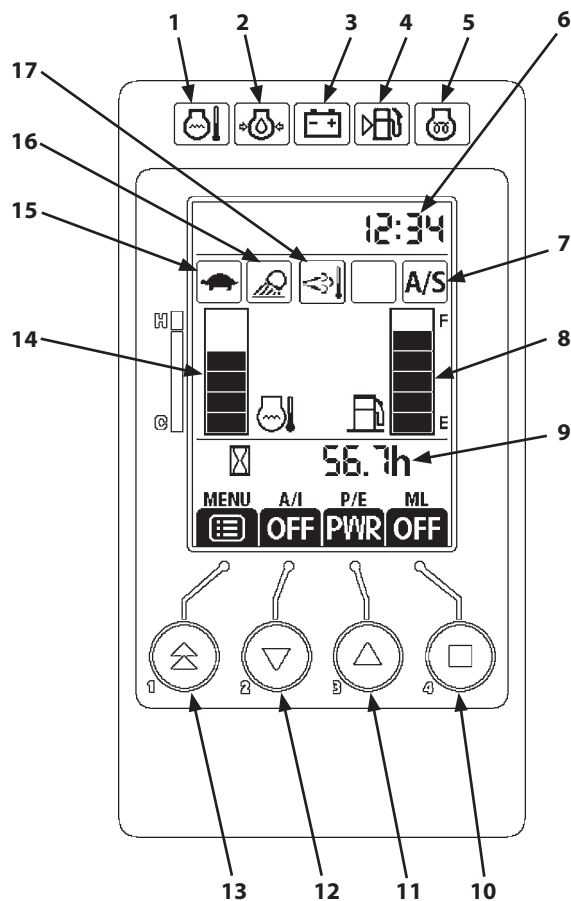
The monitor consists of the following screens.



## OPERATOR'S STATION

### Basic Screen

- 1- Overheat Indicator
- 2- Engine Oil Pressure Indicator
- 3- Alternator Indicator
- 4- Fuel Level Indicator
- 5- Preheat Indicator
- 6- Clock
- 7- Auto Shut-Down Indicator
- 8- Fuel Gauge
- 9- Hour Meter
- 10- Set Switch
- 11- ECO/PWR Mode Selector/Selector Switch
- 12- Auto-Idle/Selector Switch
- 13- Menu/Return Switch
- 14- Coolant Temperature Gauge
- 15- Travel Mode Indicator
- 16- Work Light Indicator
- 17- Muffler Filter Indicator (ZX50U-5N, 60USB-5N)



MADG-01-089

## OPERATOR'S STATION

### Indicators

#### Overheat Indicator (1)

This indicator warns abnormally increased coolant temperature. The red light comes ON and the buzzer sounds simultaneously. When the red light comes ON and the buzzer sounds, immediately stop the machine operation, run the engine at slow idle speed and lower the coolant temperature.

#### Engine Oil Pressure Indicator (2)

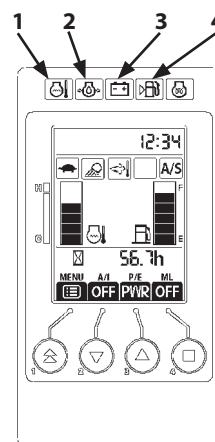
This indicator warns low engine oil pressure. The red light comes ON and the buzzer sounds simultaneously. When the red light comes ON and the buzzer sounds, immediately stop the engine, check the engine oil system and the oil level.

#### Alternator Indicator (3)

This indicator warns abnormality of the electric system while running the engine. When the alternator voltage falls out of the specified range, the red light comes ON. Check the alternator and the battery system.

#### Fuel Level Indicator (4)

When the remaining fuel indicator comes ON at a flat ground, the remaining fuel level will be as follows. Refill fuel as soon as possible.



MADG-01-090

Model	Fuel Level
ZX30U-5N, 35U-5N	Approximately 9 L
ZX50U-5N	Approximately 11 L
ZX60USB-5N	Approximately 12 L

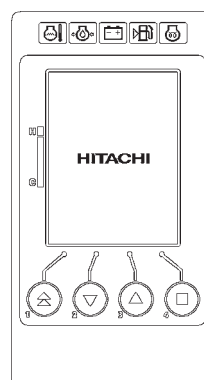
# OPERATOR'S STATION

## How to Use Screens

### Displaying Basic Screen

**IMPORTANT:** Start the engine after the basic screen is displayed.

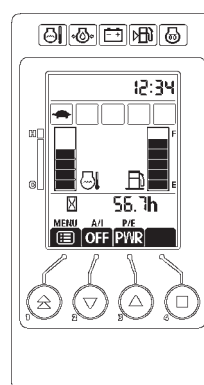
When the key switch is turned to the ON position, the starting screen and the indicators display for about two seconds. After that, the basic screen will be displayed.



Starting Screen

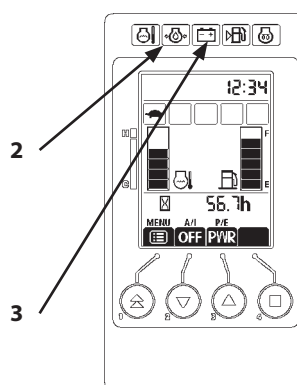
MADH-01-013

**IMPORTANT:** When the key switch is turned to the ON position, engine oil pressure indicator (2) and alternator indicator (3) will be lit. Until the alternator starts generating power after the engine starts, the alternator alarm is displayed on the screen. Until the engine oil pressure exceeds the given pressure, the engine oil indicator (2) will stay lit.



Basic Screen

MADH-01-009

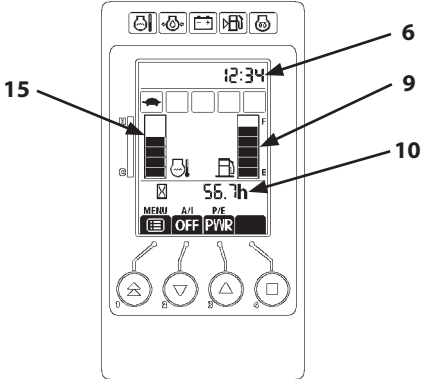


MADH-01-009



# OPERATOR'S STATION

- Display of Meters  
Items to be displayed
- 6- Clock
- 9- Fuel Gauge
- 10- Hour Meter
- 15- Coolant Temperature Gauge



MADH-01-009

## OPERATOR'S STATION

- Preheat Indicator (5)  
The machine will automatically check if preheating is required or not. When preheating is required, preheat indicator (5) is lit automatically.
- Auto Shut-Down Indicator (7)  
When the auto shut-down time is set on the MENU, the indicator turns ON.
- ECO/PWR Mode Selector Switch (11)  
Two engine speed modes, ECO and PWR modes, are selected and displayed by operating this mode switch.

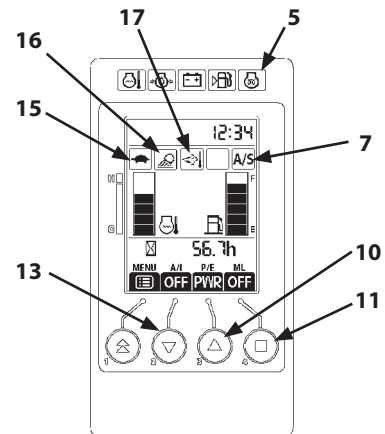
### ECO (Economy) Mode

Although production is slightly reduced more than in the PWR mode, the fuel consumption and noise levels are reduced, allowing the machine to operate efficiently.

### PWR (Power) Mode

Operate the machine in this mode when performing normal work.

- Auto-Idle Switch (12)  
When the auto-idle switch is turned ON, the indicator displays ON and the function is enabled.
- Travel Mode Indicator (15)  
The travel mode selected by the travel mode switch located on the switch panel is displayed.
- Work Light Indicator (16)  
The indicator is displayed while the work light switch on the switch panel is turned ON and the work lights on the front side of the boom and the canopy are lit.
- Muffler Filter Indicator (17) (ZX50U-5N, 60USB-5N)  
Displays condition of the muffler filter.



MADG-01-090

## OPERATOR'S STATION

### Hour Meter

Total (accumulated) machine operation hours counted since the machine started working, are displayed in the unit of HOUR (h). One digit after the decimal point indicates tenths of an hour (6 minutes).



MADM-01-014

### Clock

Indicates the present time. 24h/12h/No display can be selected.

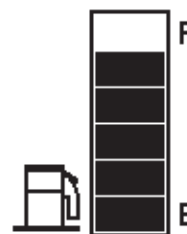
(Refer to "Clock" for switching the display mode.)



MADM-01-015

### Fuel Gauge

Indicates the remaining fuel amount. Refuel before the indicator segment reaches "E". When the fuel sensor circuit is broken or short-circuited, all segments of the fuel gauge will flash.




**IMPORTANT:** If all segments flash, the machine is abnormal. Immediately consult your authorized Hitachi dealer.

MADM-01-016

### Coolant Temperature Gauge

Indicates the engine coolant temperature. Normally the segment shows around the center of the scale during operation. All segments will flash when the coolant temperature sensor malfunctions or the CAN data can not be received.



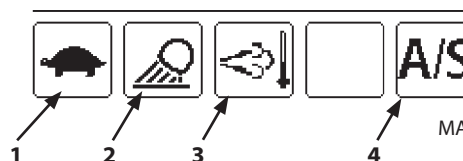
 **NOTE:** 20 When the coolant temperature is 20° or lower, the bottom segment will flash.

**IMPORTANT:** If all segments flash, the machine is abnormal. Immediately consult your authorized Hitachi dealer.

MADM-01-017

### Operating Status Icon Display

Displays icons indicating current status of travel mode (1), work light (2), muffler filter (3) (ZX50U-5N, 60USB-5N) and auto shut-down (4) selected by the switch panel.



MADG-01-091

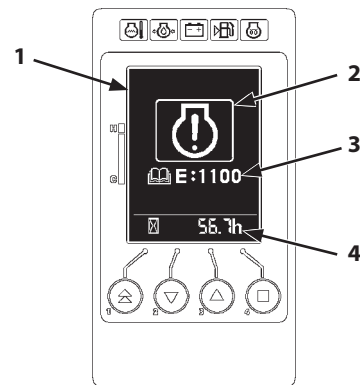
# OPERATOR'S STATION

## Alarm Occurrence Screen

### Error Display Screen

If it occurs abnormality that can cause severe machine damage, the basic screen changes to error display (1) and the buzzer sounds continuously. Alarm mark (2), error code (3) and hour meter (4) are displayed on error display (1). When error display (1) is shown, you can not change the screen.

In case error display (1) is shown, move the machine to the safe place and consult your authorized Hitachi dealer.



Error Display

MADH-01-019

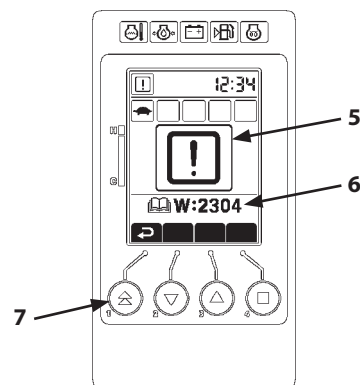
### Warning Display Screen

In case abnormality occurs on the machine, warning mark (5) and warning code (6) are displayed on the middle of the screen.

In this condition, push menu switch (7) to turn off warning mark (5) and return to basic screen(8). Once the warning mark is displayed, it will remain on the top left of screen (9) until the abnormality is resolved.

To check the description of alarm, push menu switch (7) on basic screen (8) to display alarm list (13).

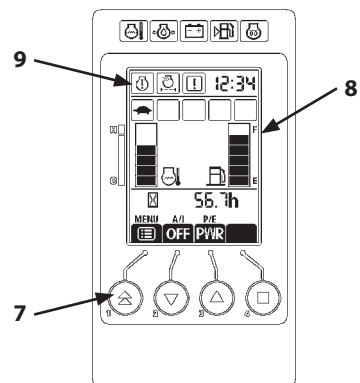
**NOTE:** Up to 3 alarm marks are displayed on the top left of screen (9). If 4 or more alarms occur, check alarm list (13) on menu screen (12).



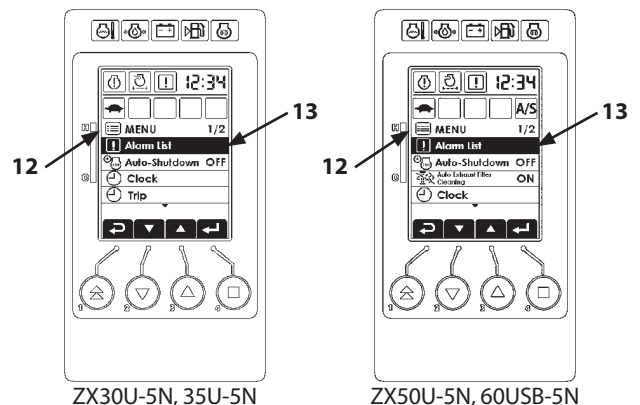
Warning Display

MADH-01-020

The overheat alarm and the engine oil pressure alarm are separately located on the top of the monitor. If either one has failed, the alarm indicator remains ON; thus warning mark will not be displayed on the top left of screen (9). However, it will be displayed on alarm list (13).



MADH-01-021



ZX30U-5N, 35U-5N

ZX50U-5N, 60USB-5N

MADG-01-092

MADG-01-093

# OPERATOR'S STATION

## Alarm List Display

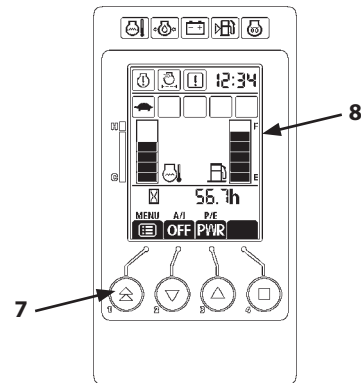
**IMPORTANT:** Warning code (15) that has "ENG" at the code top indicates the engine failure. If it is displayed, immediately consult your authorized Hitachi dealer.

 NOTE:

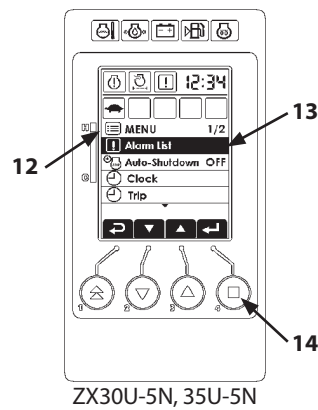
- Alarm list (13) will be displayed on MENU screen (12) only when an alarm occurs.
- Alarm list (13) contains only currently generated alarms.

1. Push menu switch (7) on basic screen (8) to display MENU screen (12).
2. Select Alarm List (13) on MENU screen (12). Push set switch (14).
3. The currently generated alarm is displayed. The alarm mark is displayed on the left side, and the warning code is displayed next to the alarm mark.

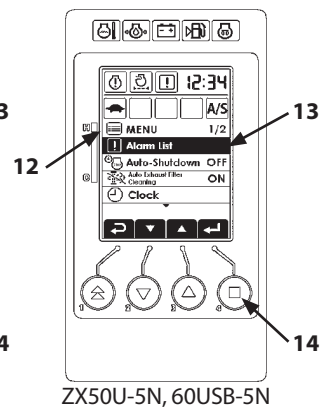
Refer to "Contents of Alarms" on the next page for contents of the warning codes.



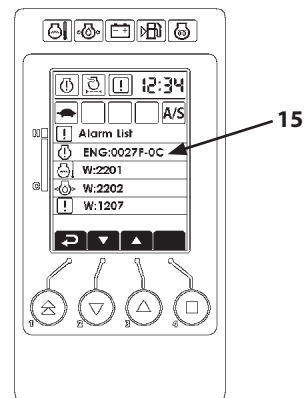
MADH-01-021



MADG-01-092



MADG-01-093




MADG-01-094
















## OPERATOR'S STATION

### Contents of Alarms

#### Error Code












Display	Code	Contents of Alarms	Remedy
	E: 1100	Engine Trouble Alarm	Engine or engine related parts are abnormal. Consult your authorized Hitachi dealer.

#### Warning Codes

Display	Code	Contents of Alarms	Remedy
	W: 1100	Engine Warning	Engine or engine related parts are abnormal. Stop operation, check the detailed code and check the machine.
	W: 1102	*Muffler Filter Regeneration Request	The muffler filter needs immediate regeneration. Otherwise damage to the filter may result. Pull the pilot control shut-off lever to the LOCK position, run the engine at slow idle speed, and push the muffler filter manual regeneration switch.
	W: 1103	*Muffler Filter Regeneration Inhibited Alarm	Muffler filter regeneration is inhibited.
	W: 1111	*Muffler Filter Manual Regeneration Inhibited Alarm	Muffler filter regeneration is inhibited. Even if the muffler filter manual regeneration switch is pushed, regeneration will not operate. Turn regeneration inhibition OFF, and perform manual regeneration.
	W: 2201	Overheat Alarm	Engine coolant temperature has abnormally increased. Stop operation. Run the engine at slow idle speed to lower the coolant temperature.
	W: 2202	Engine Oil Pressure Alarm	Engine oil pressure has decreased. Immediately stop the engine. Check the engine oil system and oil level.
	W: 1206	Air Filter Restriction Alarm	Air filter elements are clogged. Clean or replace air cleaner element.
	W: 1210	*Water Separator Alarm	Water accumulated in the water separator. Immediately drain water by loosening the filter drain plug.
	W: 1207	Coolant Temperature Sensor Failure	Coolant temperature sensor is malfunction or abnormal. Repair or replace.
	W: 2304	Fuel Sensor Failure	Fuel sensor is malfunction or abnormal. Repair or replace.
	W: 1208	Engine Speed Sensor Failure	Engine or engine related parts are abnormal. Consult your authorized Hitachi dealer.
	W: 1209	*Atmospheric Pressure Sensor Failure	Engine or engine related parts are abnormal. Consult your nearest Hitachi dealer.
	W: 1211	*Ambient Temperature Sensor Failure	Engine or engine related parts are abnormal. Consult your nearest Hitachi dealer.
	W: 1104	*Intermediate Gas Temperature Sensor Failure	Engine or engine related parts are abnormal. Consult your nearest Hitachi dealer.
	W: 1105	*Muffler Filter Differential Pressure Sensor Failure	Engine or engine related parts are abnormal. Consult your nearest Hitachi dealer.

\*: Only ZX50U-5N, 60USB-5N

## OPERATOR'S STATION

Display	Code	Contents of Alarms	Remedy
	W: 1106	*Inlet Port Gas Temperature Sensor Failure	Engine or engine related parts are abnormal. Consult your nearest Hitachi dealer.
	W: 1107	*Engine Injection Pressure Sensor Failure	Engine or engine related parts are abnormal. Consult your nearest Hitachi dealer.
	W: 1108	*Exhaust Gas Filter Inlet Air Pressure Sensor Failure	Engine or engine related parts are abnormal. Consult your nearest Hitachi dealer.
	W: 1109	*Engine Inlet Air Piping Abnormal Temperature	Engine or engine related parts are abnormal. Consult your nearest Hitachi dealer.
	W: 1110	**Air Heat Relay Failure	Engine or engine related parts are abnormal. Consult your nearest Hitachi dealer.
	W: 1304	Engine Control Dial Failure	Engine control dial is malfunction or abnormal. Repair or replace.
	W: 2307		
	W: 2306	Boom Bottom Pressure Sensor Failure	Boom bottom pressure sensor is malfunction or abnormal. Repair or replace.
	W: 1303	Combustion Temperature Sensor Failure	Engine or engine related parts are abnormal. Consult your nearest Hitachi dealer.
	W: 1310	CAN Communication Failure	CAN communication device is abnormal. Stop operation. Check the sensors and controllers for any abnormalities.
	W: 2310	EEPROM Failure	Communication system is abnormal. Consult your nearest Hitachi dealer.

\*: Only ZX50U-5N, 60USB-5N  
 \*\*: Only ZX60USB-5N

## OPERATOR'S STATION

### DTC Code List

#### ZX30U-5N, 35U-5N

Monitor Display Code ENG: 00000-00	Error Contents
004BA-04	Rack position sensor error (low voltage)
004BA-03	Rack position sensor error (high voltage)
0005B-04	Accelerator sensor error (low voltage)
0005B-03	Accelerator sensor error (high voltage)
0005B-02	Accelerator sensor intermittent failure
0001D-04	Spare accelerator sensor error (low voltage)
0001D-03	Spare accelerator sensor error (high voltage)
0001D-02	Spare accelerator sensor intermittent failure
0001D-08	Spare accelerator sensor error (pulse communication)
0006C-04	Atmospheric pressure sensor fault (low voltage)
0006C-03	Atmospheric pressure sensor fault (high voltage)
00470-04	ECU temperature sensor error (low voltage)
00470-03	ECU temperature sensor error (high voltage)
00470-02	ECU temperature sensor intermittent failure
00470-00	ECU temperature rise alarm
0006E-04	Cooling water temperature sensor error (low voltage)
0006E-03	Cooling water temperature sensor error (high voltage)
0006E-02	Cooling water temperature sensor intermittent failure
0006E-00	Cooling water temperature rise alarm
00437-04	Sensor 5V error (low voltage)
00437-03	Sensor 5V error (high voltage)
00437-02	Sensor 5V intermittent failure
0009E-01	Power supply voltage error (low voltage)
0009E-00	Power supply voltage error (high voltage)
00436-04	Speed sensor error
7F8A2-04	Spare speed sensor error
7F801-04	Rack actuator relay error A
7F801-03	Rack actuator relay error B
7F801-02	Rack actuator relay intermittent failure
7F803-04	Start assist relay error A
7F803-03	Start assist relay error B
7F803-02	Start assist relay intermittent failure
7F802-04	CSD solenoid valve error A
7F802-03	CSD solenoid valve error B
7F802-02	CSD solenoid valve intermittent failure
7F80B-04	EGR valve error A (step motor A-phase)
7F80B-03	EGR valve error B (step motor A-phase)
7F80C-04	EGR valve error A (step motor B-phase)
7F80C-03	EGR valve error B (step motor B-phase)
7F80D-04	EGR valve error A (step motor C-phase)
7F80D-03	EGR valve error B (step motor C-phase)
7F80E-04	EGR valve error A (step motor D-phase)
7F80E-03	EGR valve error B (step motor D-phase)
00064-04	Oil pressure switch error
00064-01	Oil pressure descend error



## OPERATOR'S STATION

Monitor Display Code ENG: 00000-00	Error Contents
000A7-04	Charge switch error
000A7-01	Charge alarm
7F84A-00	Abnormal water temperature
7F853-00	Air cleaner clogging alarm
7F859-00	Oil/water separator alarm
000BE-00	Overspeed error
0027E-04	Rack actuator error (low current)
0027E-03	Rack actuator error (high current)
0027E-07	Rack actuator mechanical failure
0027E-02	Engine error
0027F-0C	CAN communication error
00276-02	ECU internal EEPROM error (checksum)
00276-0C	ECU internal EEPROM error (read/write error)
00274-0C	ECU internal flash ROM error (checksum A)
00274-02	ECU internal flash ROM error (checksum B)
00274-02	ECU internal flash ROM error (checksum C)
005CD-04	Main relay error
7F9E7-0C	ECU internal sub CPU error A
7F9E7-0C	ECU internal sub CPU error B
7F9E7-0C	ECU internal sub CPU error C
7F9E8-0C	ECU internal map format error

### ZX50U-5N, 60USB-5N

Monitor Display Code ENG: 00000-00	Error Contents
7F8A0-02	Crank signal malfunction
7F8A0-05	No crank signal
7F8A1-02	Cam signal malfunction
7F8A1-05	No cam signal
7F8A1-07	Angle offset failure
0005B-03	Accelerator sensor error (high voltage)
0005B-04	Accelerator sensor error (low voltage)
00033-03	Intake throttle opening sensor fault (high voltage)
00033-04	Intake throttle opening sensor fault (low voltage)
00066-03	EGR low pressure side sensor fault (high voltage)
00066-04	EGR low pressure side sensor fault (low voltage)
004B9-03	EGR high pressure side sensor fault (high voltage)
004B9-04	EGR high pressure side sensor fault (low voltage)
0006E-03	Cooling water temperature sensor error (high voltage)
0006E-04	Cooling water temperature sensor error (low voltage)
0006E-00	Cooling water temperature rise alarm
000AC-03	New air temperature sensor fault (high voltage)
000AC-04	New air temperature sensor fault (low voltage)
000AE-03	Fuel temperature sensor fault (high voltage)
000AE-04	Fuel temperature sensor fault (low voltage)

## OPERATOR'S STATION

Monitor Display Code ENG: 00000-00	Error Contents
000AE-00	Fuel temperature sensor temperature abnormal high
0009D-03	Rail pressure sensor fault (high voltage)
0009D-04	Rail pressure sensor fault (low voltage)
00CB3-03	DPF differential pressure sensor fault (high voltage)
00CB3-04	DPF differential pressure sensor fault (low voltage)
00E19-03	DPF high pressure side sensor fault (high voltage)
00E19-04	DPF high pressure side sensor fault (low voltage)
00CAA-03	DPF inlet temperature sensor fault (high voltage)
00CAA-04	DPF inlet temperature sensor fault (low voltage)
00CB2-03	DPF intermediate temperature sensor fault (high voltage)
00CB2-04	DPF intermediate temperature sensor fault (low voltage)
0006C-03	Atmospheric pressure sensor fault (high voltage)
0006C-04	Atmospheric pressure sensor fault (low voltage)
0006C-0A	Atmospheric pressure sensor characteristic fault
0019C-03	EGR gas temperature sensor fault (high voltage)
0019C-04	EGR gas temperature sensor fault (low voltage)
00069-03	Intake air temperature sensor fault (high voltage)
00069-04	Intake air temperature sensor fault (low voltage)
000AD-03	Exhaust air temperature sensor fault (high voltage)
000AD-04	Exhaust air temperature sensor fault (low voltage)
005CD-07	Main relay contact stuck
005CD-02	Power off without main relay self-holding
7F803-05	Start auxiliary relay interrupted
7F803-06	Start auxiliary relay GND interrupted
0028B-05	Injector 1 open circuit (inherent location of the injector)
0028C-05	Injector 1 open circuit (inherent location of the injector)
0028B-06	Injector 1 coil short circuit
0028C-06	Injector 1 coil short circuit
0028B-03	Injector 1 short circuit
0028C-03	Injector 1 short circuit
0028D-05	Injector 2 open circuit (inherent location of the injector)
0028D-06	Injector 2 coil short circuit
0028D-03	Injector 2 short circuit
0028E-05	Injector 3 open circuit (inherent location of the injector)
0028E-06	Injector 3 coil short circuit
0028E-03	Injector 3 short circuit
0028C-05	Injector 4 open circuit (inherent location of the injector)
0028C-06	Injector 4 coil short circuit
0028C-03	Injector 4 short circuit
010A1-0C	Injector drive IC error
00AED-06	Injector drive circuit (Bank1) short circuit (4TN: Common circuit for No.1, No.4 and all 3TN cylinders)
00AEE-06	Injector drive circuit (Bank2) short circuit (4TN: Circuit for No.2 and No.3 cylinders)
7F94B-03	SCV (MPROP) L side VB short circuit
00279-06	SCV (MPROP) H side GND short circuit
00279-05	SCV (MPROP) open circuit
0009D-00	Actual rail pressure rise error

## OPERATOR'S STATION

Monitor Display Code ENG: 00000-00	Error Contents
0009D-12	Rail pressure deviation error during the actual rail pressure drop
0009D-0F	Rail pressure deviation error during the actual rail pressure rise
0009D-10	PLV PLV open valve
000BE-00	Overspeed error
00B86-05	No-load of throttle valve drive H bridge circuit
00B86-03	Power short circuit of throttle valve drive H bridge output 1
00B87-03	Power short circuit of throttle valve drive H bridge output 2
00B86-04	GND short circuit of throttle valve drive H bridge output 1
00B87-04	GND short circuit of throttle valve drive H bridge output 2
7F964-09	TSC1 reception time out (SA1)
7F965-09	TSC1 reception time out
7F967-09	Y ECR1 reception time out error
7F968-09	Y EC reception time out error
7F971-09	Y ETCP1 reception time out
7F97B-09	Y DPFIF reception thme out
7F972-09	CAN1 (for EGR):Reception time out error
00AE7-0C	Open circuit between the EGR motor coils
00AE7-0C	Short circuit between the EGR motor coils
00AE7-0C	EGR position sensor malfunction
00AE7-07	EGR feedback malfunction
00AE7-07	EGR stuck open valve malfunction
00AE7-07	EGR initialization malfunction
00AE7-09	EGRECM data fault
00AE7-0C	EGR target value out of range
00AE7-00	EGR overvoltage malfunction
00AE7-01	EGR low voltage malfunction
00AE7-01	EGR high temperature thermistor malfunction
00AE7-01	EGR low temperature thermistor malfunction
00276-0C	EEPROM memory deletion error
00276-0C	EEPROM memory read error
00276-0C	EEPROM memory write error
7FAF2-0C	CY146 SPI communication error
7FAF2-0C	Excessive supply 1 voltage error
7FAF2-0C	Dropped supply 1 voltage error
7FAF2-0C	Sensor supply voltage error 1
7FAF2-0C	Sensor supply voltage error 2
7FAF2-0C	Sensor supply voltage error 3
7FAF2-04	Actuator drive circuit 1 GND short circuit
7FAF2-04	Actuator drive circuit 2 GND short circuit
7FAF2-0B	SW reset (recovery) execution 1
7FAF2-0B	SW reset (recovery) execution 2
7FAF2-0B	SW reset (recovery) execution 3
7F853-00	Air cleaner clogging alarm
7F859-00	Oil/water separator alarm
000A7-05	Charge switch error
000A7-01	Charge alarm

## OPERATOR'S STATION

Monitor Display Code ENG: 00000-00	Error Contents
00064-04	Oil pressure switch error
00064-01	Oil pressure descend error
00CB2-01	DPF intermediate temperature sensor temperature abnormal low temperature
7F94D-00	Overaccumulation (method C)
7F94E-00	Overaccumulation (method P)
7F951-0B	Regeneration defect (stationary regeneration not performed)
7F94F-07	Regeneration defect (stationary regeneration failure)
00E88-10	Ash cleaning request 1
00E88-00	Ash cleaning request 2
00E87-10	Stationary regeneration standby
00CAA-00	DPF inlet temperature sensor temperature abnormal high
00CB3-00	DPF differential pressure sensor differential pressure abnormal high
00CB2-00	DPF intermediate temperature sensor temperature abnormal high (post-injection failure)
00E87-00	Backup mode
00066-0D	EGR low pressure side sensor (Abnormal learning value)
004B9-0D	EGR high pressure side sensor (Abnormal learning value)
00CB3-0D	DPF differential pressure sensor (Abnormal learning value)
7F94B-06	High-pressure pump drive circuit (Low side GND short-circuit)
00279-03	High-pressure pump drive circuit (High side VB short-circuit)
7F94C-0B	High-pressure pump drive circuit (Pump overload error)
7F94C-06	High-pressure pump drive circuit (Drive current (high level))
7FCE1-00	Rail pressure fault (The actual rail pressure is too high during PRV limp home)
7FCCE-00	Rail pressure fault (The time of PLV valve opening error)
7FCE3-00	Rail pressure fault (Injector B/F temperature error during PLV4 limp home)
7FCCC-09	Rail pressure fault (Controlled rail pressure error after PLV valve opening)
7FCC4-07	Rail pressure fault (Operation time error during RPS limp home)
7FCC6-0D	IQA corrected injection amount for injector 1 error
7FCC7-0D	IQA corrected injection amount for injector 2 error
7FCC8-0D	IQA corrected injection amount for injector 3 error
7FCC9-0D	IQA corrected injection amount for injector 4 error
00B86-06	Overload on the drive H bridge circuit of throttle valve
7FCCF-06	Actuator drive circuit 3 short to ground
7FCD1-0C	AD converter fault 1
7FCD2-0C	AD converter fault 2
7FCD3-0C	External monitoring IC and CPU fault 1
7FCD4-0C	External monitoring IC and CPU fault 2
7FCD5-0C	ROM fault
7FCD6-0C	Shutoff path fault 1
7FCD7-0C	Shutoff path fault 2
7FCD8-0C	Shutoff path fault 3
7FCD9-0C	Shutoff path fault 4
7FCDA-0C	Shutoff path fault 5
7FCDB-0C	Shutoff path fault 6
7FCDC-0C	Shutoff path fault 7
7FCDD-0C	Shutoff path fault 8
7FCDE-0C	Shutoff path fault 9
7FCDF-0C	Shutoff path fault 10
7FCE0-00	Recognition error of engine speed
00E87-09	Recovery regeneration failure
00E87-07	Recovery regeneration prohibition
7FCC0-00	Use of non-recommended fuels and lubricating oils

## OPERATOR'S STATION

### Muffler Filter (ZX50U-5N, 60USB-5N)

#### Muffler Filter Condition Display

Muffler Filter Display (1) displays the condition of the muffler filter.



This mark indicates that the exhaust temperature is high during the muffler filter regeneration. It lights while auto-regeneration is in process.



#### NOTE:

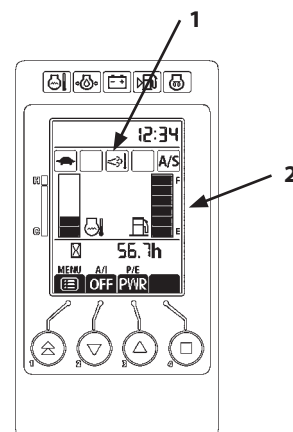
- The auto-regeneration is performed at random times. The auto-regeneration may start during operation of the machine; you can continue to operate the machine. Turning the pilot shut-off lever to LOCK position while performing auto-regeneration may change the engine sound, this is not a malfunction.
- The engine sound may differ from normal sound during auto-regeneration, which is not a malfunction.
- Do not stop the engine during regeneration unless absolutely necessary.

Regeneration may not be completed according to the operating conditions of the machine. In this case, muffler filter manual regeneration request will be displayed on monitor (2). Immediately perform manual regeneration following the procedure.



This mark indicates that the muffler filter regeneration is inhibited. Regeneration will not be performed while this mark is lit. However, auto-regeneration may be performed depending on the working conditions, which is not a malfunction.

**IMPORTANT: Set the muffler filter regeneration to inhibited while operating the machine in a flammable environment. (Refer to 1-31)**



MADH-01-066

## OPERATOR'S STATION

### Muffler Filter Manual Regeneration Request

The muffler filter needs regeneration. Usually, regeneration is performed automatically. However, manual regeneration is required depending on the conditions. In that case, marks described below may be indicated on monitor (1) and (2).

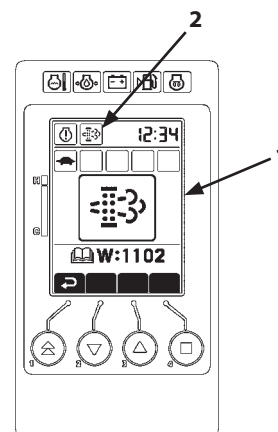


(Blinking)

This mark indicates that immediate muffler filter manual regeneration is required. Perform manual regeneration following the below procedure.



This mark indicates that the muffler filter regeneration is inhibited. It is displayed when the manual regeneration request arises while muffler filter regeneration is inhibited. Move the machine to a safe place. Perform manual regeneration following the below procedure.



MADH-01-050


### IMPORTANT:

- **Manual regeneration that is performed when the muffler filter regeneration request is displayed restores muffler filter function. This is not a malfunction.**
- **If the machine is continuously operated despite the muffler filter regeneration request being displayed, the engine speed and power will drop. The engine will automatically stop approximately after 2 hours. If the muffler filter alarm or engine trouble alarm is displayed, the buzzer will sound and the engine will automatically stop approximately after 30 minutes. At this time, consult your authorized dealer for repairing the muffler filter.**

## OPERATOR'S STATION

### Manual Regeneration Procedure

When the manual regeneration is needed, screens (1) or (2) as shown in the right will be displayed. Screens (1) or (2) are displayed depending on the machine conditions. When screen (2) is displayed, the warning mark of muffler filter regeneration request (8) is displayed simultaneously. When these screens are displayed, you need to perform the manual regeneration. Before starting the manual regeneration, be sure to check the following.

 **NOTE:** The muffler filter regeneration procedure is shown by illustration (3) under the monitor.

- No person is present around the machine
- Keep flammable materials away from the muffler.
- Remaining fuel alarm (4) does not light.

1. Park the machine in a safe place. Lower the front attachment onto the ground.
2. Pull the pilot control shut-off lever to the LOCK position.
3. Set the engine control dial to slow idle.
4. Push and hold muffler filter manual regeneration switch (5) (about 1 second).
5. When pushing the muffler filter manual regeneration switch (5), screen (6) as shown in the right will be displayed and the manual regeneration starts. Bar graph (7) on the screen indicates progress of the regeneration process.

**IMPORTANT:** The regeneration does not start unless the pilot control shut-off lever is in the LOCK position and the engine control dial is in slow idle. When touching the pilot shut-off lever or the engine control dial during regeneration, the regeneration process is aborted. When the process is aborted, start over again.

6. When the regeneration is finished, "Regeneration Has Completed." message will be displayed. If "Regeneration Has Failed." message is displayed, start over the regeneration process again. Failure of regeneration process may happen in the conditions other than above (such as malfunction of a sensor that affects regeneration at low ambient temperature).

 **NOTE:**

- Normally, manual regeneration takes 25 to 30 minutes. Regeneration time differs depending on the working conditions.
- When push muffler filter manual regeneration switch (5) at the engine start, the regeneration does not start unless the warm-up operation is performed for 15 to 20 minutes.

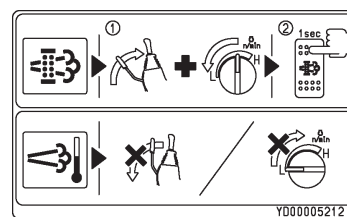
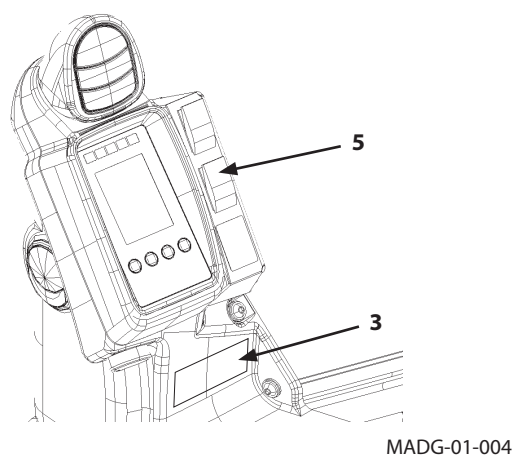
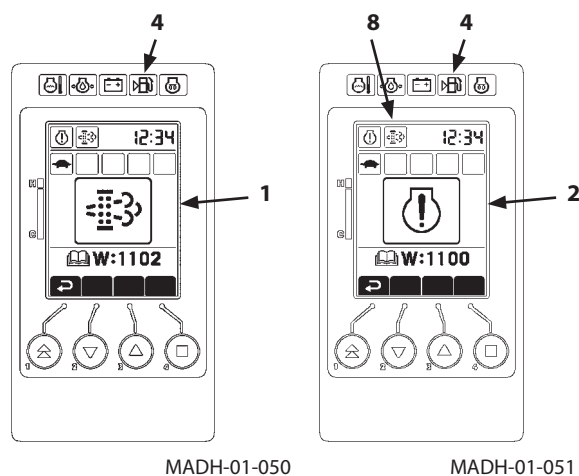
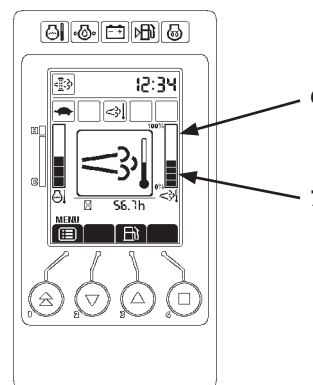


Illustration (3)

MADG-01-088

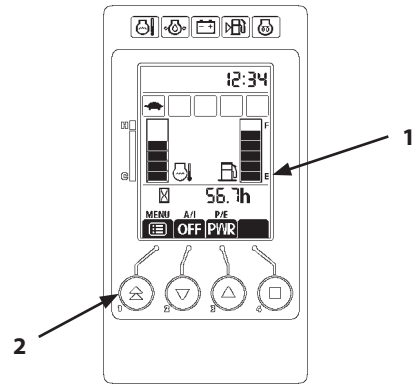


MADH-01-004

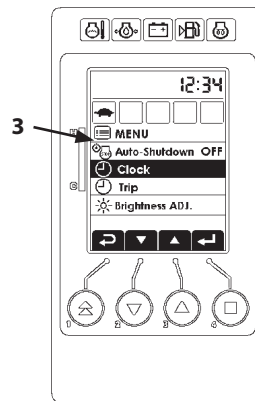
# OPERATOR'S STATION

## Main Menu (MENU)

Push menu switch (2) while displaying basic screen (1) to display main menu (MENU) screen (3). Menu screen (3) contains the items shown in the right figure. Alarm list (4) is displayed only when an alarm is generated.

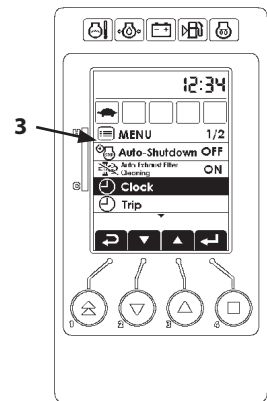


MADH-01-009



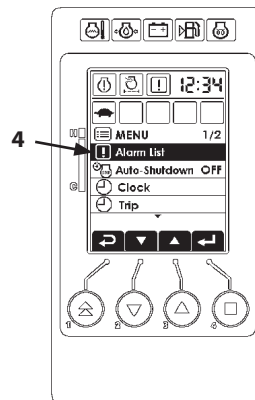
ZX30U-5N, 35U-5N

MADG-01-095



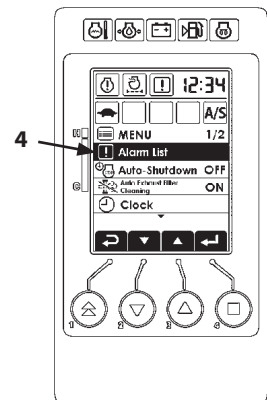
ZX50U-5N, 60USB-5N

MADG-01-096



ZX30U-5N, 35U-5N

MADG-01-097



ZX50U-5N, 60USB-5N

MADG-01-098

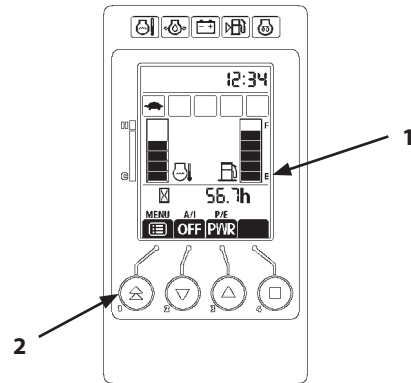


# OPERATOR'S STATION

## Auto Shut-Down

**WARNING:** This function automatically stops the engine. Take extra care on the work and work environment when using this function.

The auto shut-down function can be set in this screen. The engine automatically stops after the preset time at the state in which the control shut-off lever is pulled. 30 seconds before the engine stops, the monitor screen displays remaining time to stop the engine and the indicator starts flashing. The buzzer also sounds. The buzzer sounds once at 30 seconds before, intermittently sounds from 15 seconds. The engine speed decreases to the idling speed, and then stops after 15 seconds. When the control shut-off lever is pushed or the engine control dial is operated before stopping the engine, the auto shut-down is disabled and the engine will not stop.

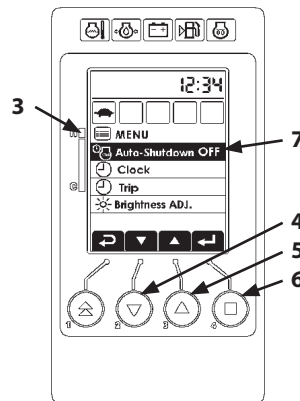


MADH-01-009

**IMPORTANT:** When the engine stops by the auto shut-down function, turn the key switch to OFF once and then turn it to START to restart the engine.

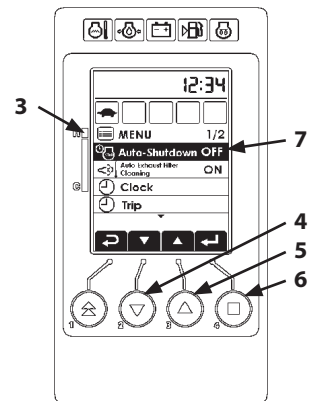
### Auto Shut-Down Time Setting

1. Push menu switch (2) while displaying basic screen (1) to display MENU (3).
2. Select Auto Shut-down (7) by pushing switch (4) or (5), and then push set switch (6) to make the change.
3. Auto shut-down time (8) becomes changeable. Select Time (8) by pushing switch (4) or (5).



ZX30U-5N, 35U-5N

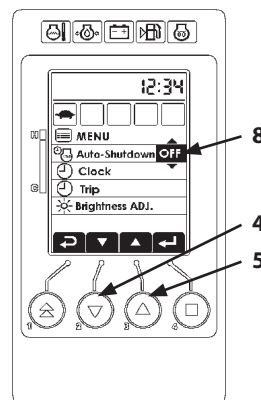
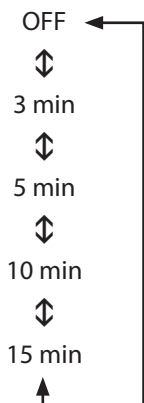
MADG-01-099



ZX50U-5N, 60USB-5N

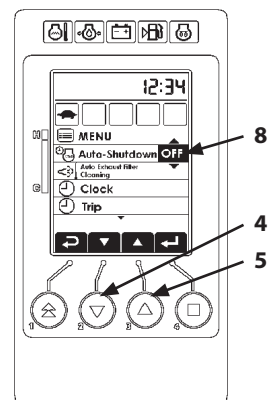
MADG-01-100

### Auto Shut-Down Time



ZX30U-5N, 35U-5N

MADG-01-101

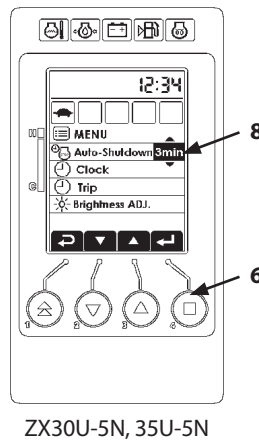


ZX50U-5N, 60USB-5N

MADG-01-102

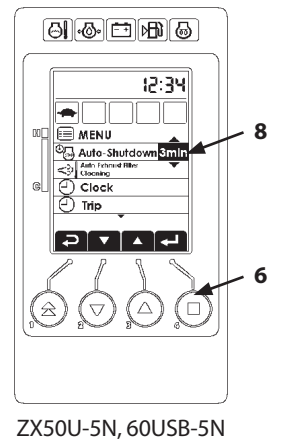
## OPERATOR'S STATION

4. Select Time (8) and then push set switch (6).



ZX30U-5N, 35U-5N

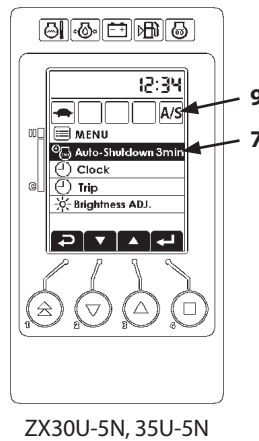
MADG-01-103



ZX50U-5N, 60USB-5N

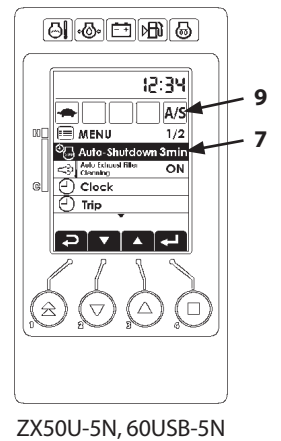
MADG-01-104

5. When Auto Shut-down function is set, "Auto Shutdown" indicator (9), which shows that Auto Shut-down function is enabled, will be displayed.




ZX30U-5N, 35U-5N

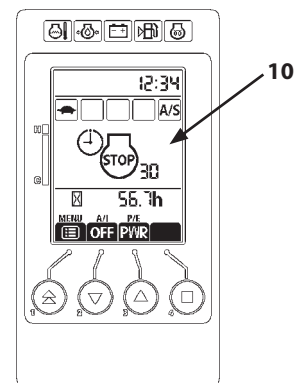
MADG-01-105



ZX50U-5N, 60USB-5N

MADG-01-106

 **NOTE:** When the Auto Shut-down function is turned ON, the monitor will display time (10) which indicates the remaining time to stop the engine 30 seconds before the engine stops. (On the basic screen)



MADH-01-029

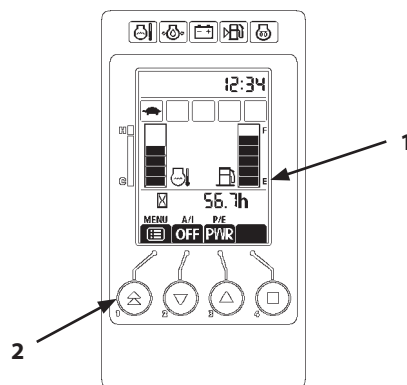
## OPERATOR'S STATION

### Muffler Filter Regeneration Inhibited (ZX50U-5N, 60USB-5N)

**IMPORTANT:** The muffler filter regeneration can be inhibited at this screen to prevent auto regeneration while operating the machine in a dusty area or indoors.

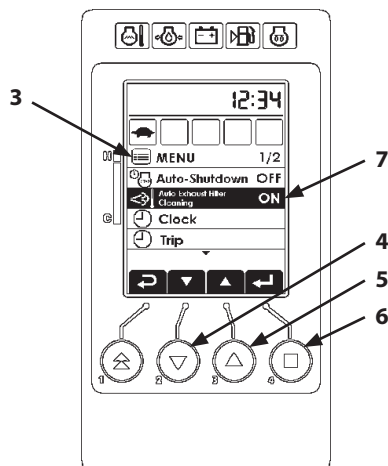
#### Setting Procedure

1. Push menu switch (2) while displaying basic screen (1) to display MENU (3).



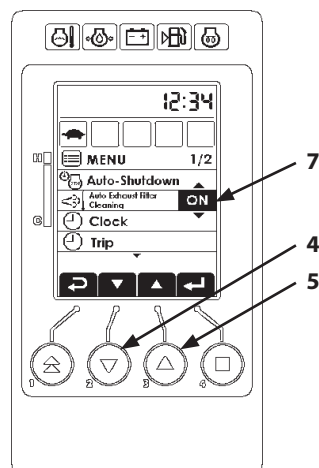
MADH-01-009

2. Highlight Auto Exhaust Filter Cleaning (7) by pushing switch (4) or (5), and then push set switch (6) to make the change.



MADG-01-107

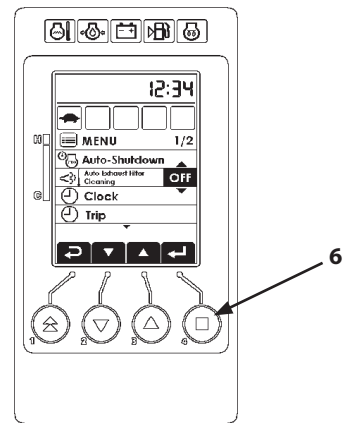
3. Select OFF (7) by pushing switch (4) or (5).



MADG-01-108

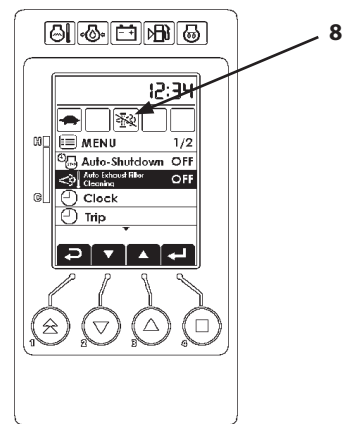
## OPERATOR'S STATION

4. Push switch (6) to make the changes.



MADG-01-109

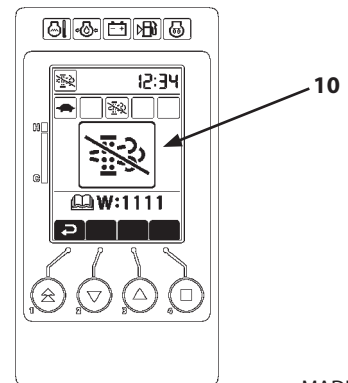
5. When the regeneration inhibition (OFF) is set, regeneration inhibition icon (8) will be displayed on the monitor screen.



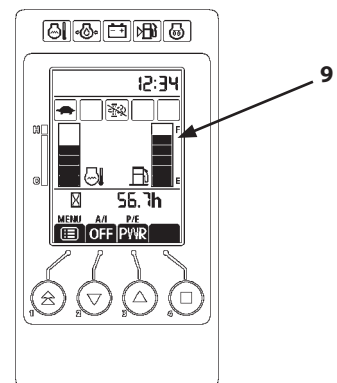
MADG-01-110

**NOTE:** If the muffler filter manual regeneration switch is pushed at the muffler filter regeneration inhibited state, regeneration inhibited alarm screen (10) will be displayed.

When the muffler filter manual regeneration switch is released, the monitor returns to the basic screen(9).



MADH-01-061

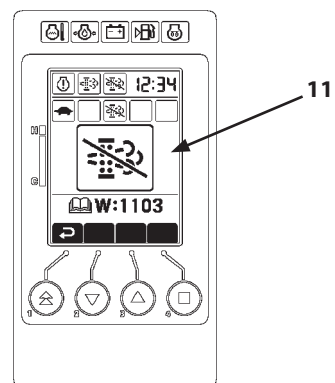


MADH-01-062

## OPERATOR'S STATION

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**IMPORTANT:** When the machine is operated with the muffler filter regeneration inhibited, the muffler filter becomes clogged. When muffler filter regeneration request is detected at the regeneration inhibited state, regeneration inhibited alarm screen (11) will be displayed. Move the machine to a safe place. Perform manual regeneration following the below procedure. Failure to do so may damage the muffler filter. Refer to "Muffler Filter" section for the manual regeneration.



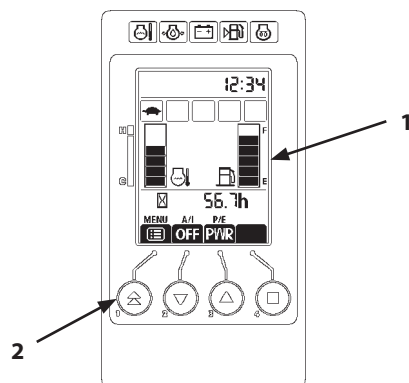
MADH-01-063

# OPERATOR'S STATION

## Clock

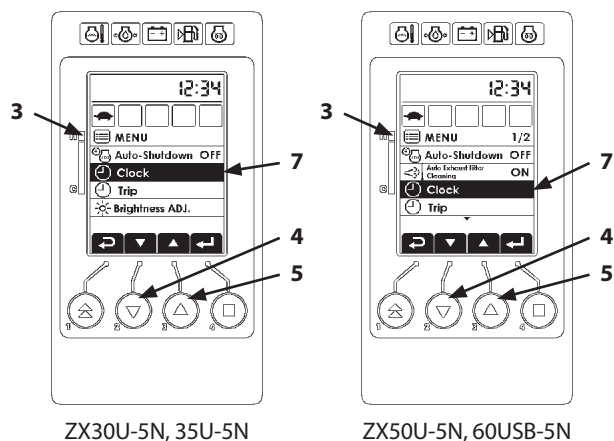
### Clock Adjustment

1. Push menu switch (2) while displaying basic screen (1) to display MENU (3).



MADH-01-009

2. Select Clock (7) by pushing switch (4) or (5).



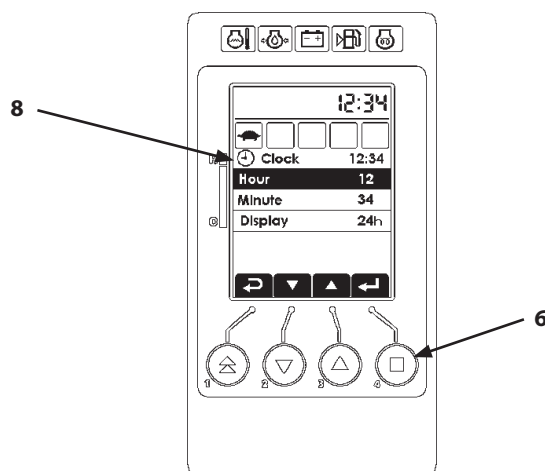
ZX30U-5N, 35U-5N

ZX50U-5N, 60USB-5N

MADG-01-111

MADG-01-112

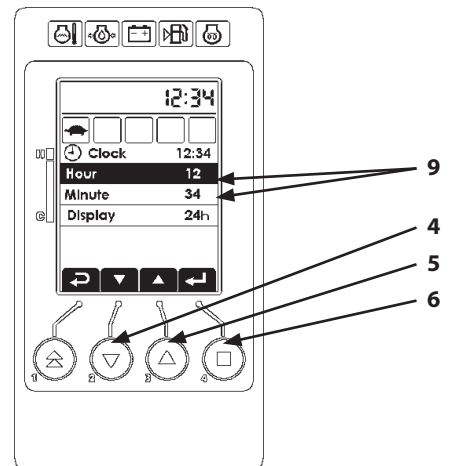
3. Push set switch (6) to display Clock Setting screen (8).



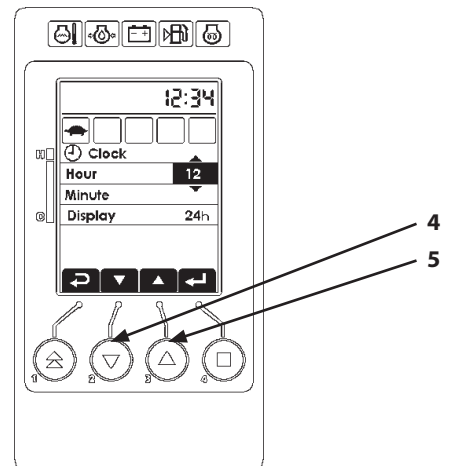
MADG-01-113

## OPERATOR'S STATION

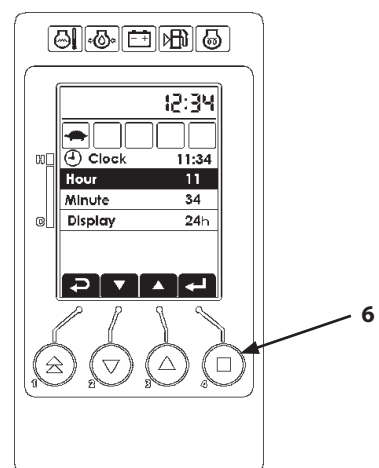
4. Highlight Hour or Minute (9) by pushing switch (4) or (5), and then push set switch (6) to make the change.



5. Push switch (4) or (5) to adjust the clock. Push switch (4) to adjust the number downward, and push switch (5) to increase it.



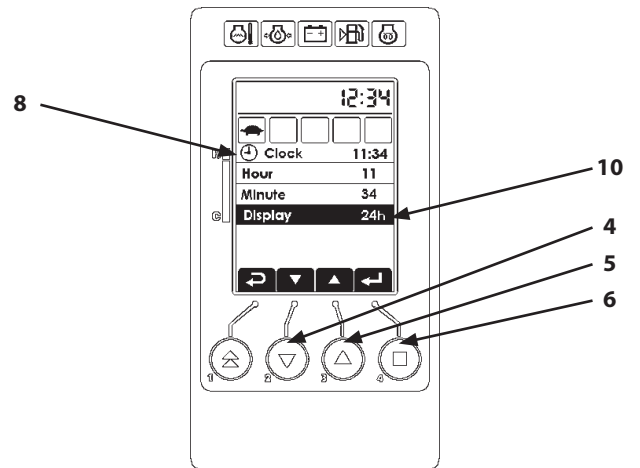
6. Push set switch (6) to end the time setting procedure.



# OPERATOR'S STATION

## Display Mode Setting

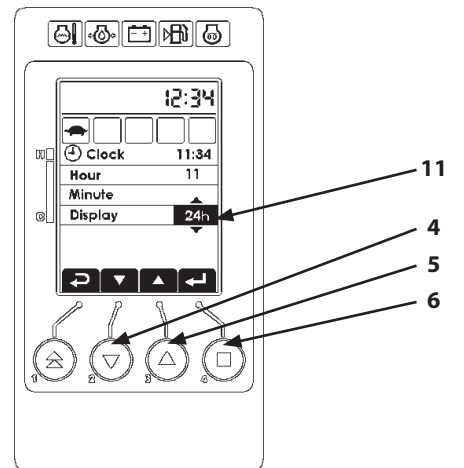
1. Display Clock setting screen (8). Highlight Display (10) by pushing switch (4) or (5), and then push set switch (6) to make the change.



MADG-01-116

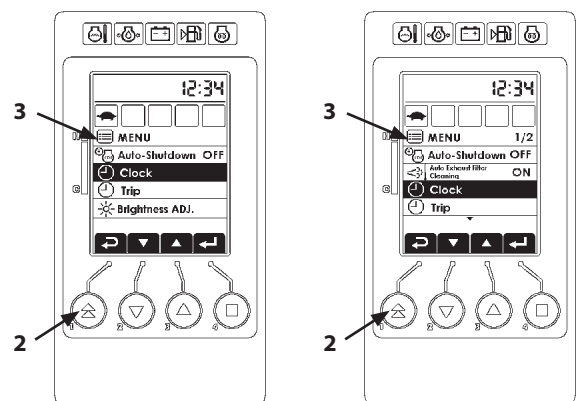
2. Each time switch (4) or (5) is pushed, Display (11) is changed as follows: 24h → 12h → No display.

3. Push switch (6) to make the changes.



MADG-01-117

4. Push menu switch (2) to return to MENU (3) and set the changes.



ZX30U-5N, 35U-5N

ZX50U-5N, 60USB-5N

MADG-01-118

MADG-01-119



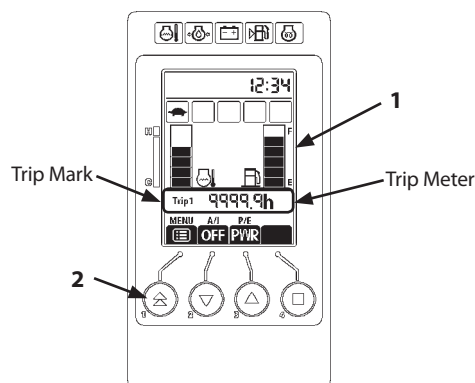
## OPERATOR'S STATION

### Trip

#### Functions of Trip Meter

The trip meter allows the operator to know that the machine operation hours has reached the preset hours by blinking the Trip mark (Trip 1 or Trip 2). The Trip mark blinks for 30 seconds when the machine operation hour reaches the preset hours. After that, every time the key switch is turned ON, the Trip meter blinks for 30 seconds until the meter is reset.

**IMPORTANT:** This "Operation Hour" means the machine operation time counted from the point at which the Trip meter is set. It is different from the "Total Accumulated Machine Operation Time" displayed on the hour meter.



MADH-01-036

**NOTE:** Once the Trip meter is set, it will continuously count the machine operation time regardless of the LCD display status. When the machine operation hour reaches the preset hours, the Trip mark on LCD display (1) blinks.

If Trip mark is displayed on the monitor screen when the Trip mark starts blinking, the Trip mark stays ON after blinking.  
If the Trip mark is not displayed on the monitor screen when the Trip mark starts blinking, the Trip mark goes OFF after blinking.

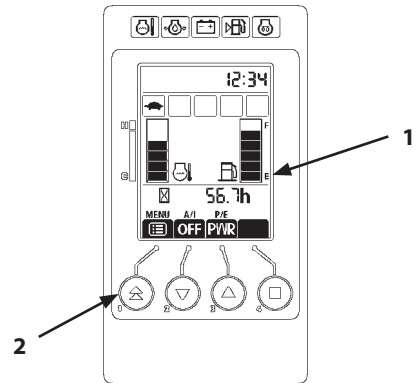
If the Trip mark is not used, set sufficiently long time.  
(Example: 3000 h)

**NOTE:** The trip meter is set 9999.9h when the machine is shipped from the factory.

# OPERATOR'S STATION

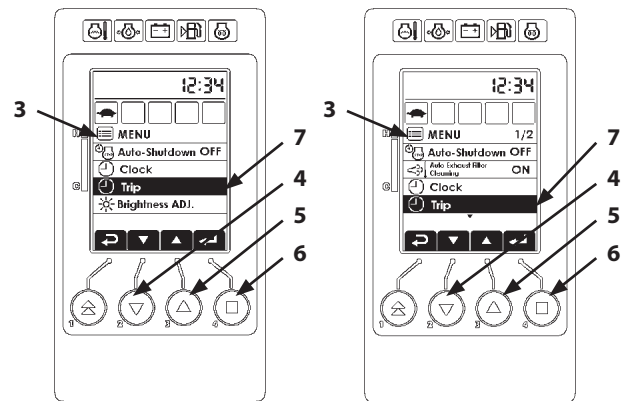
## Displaying Trip Meter (1)

1. Turn the key switch to ON position. Push menu switch (2) while displaying basic screen (1) to display MENU (3).



MADH-01-009

2. Select Trip (7) by pushing switch (4) or (5).



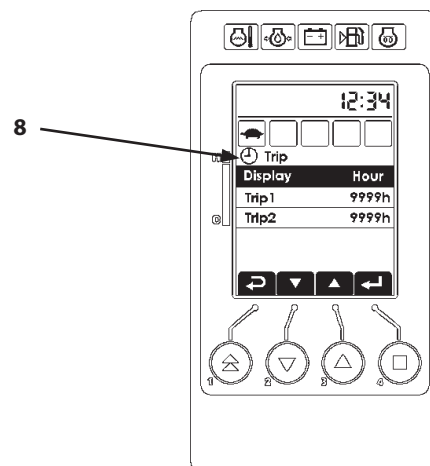
ZX30U-5N, 35U-5N

ZX50U-5N, 60USB-5N

MADG-01-120

MADG-01-121

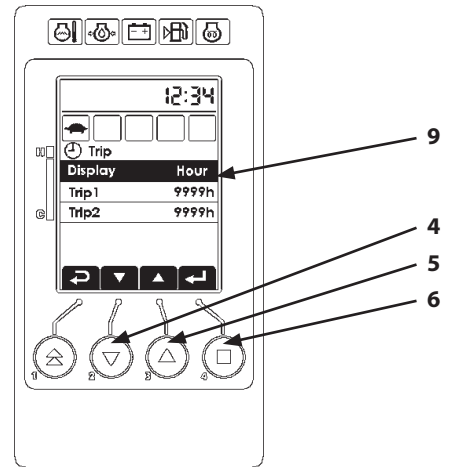
3. Push set switch (6) to display Trip Setting screen (8).



MADG-01-122

## OPERATOR'S STATION

4. Highlight Display (9) by pushing switch (4) or (5), and then push set switch (6) to make the change.

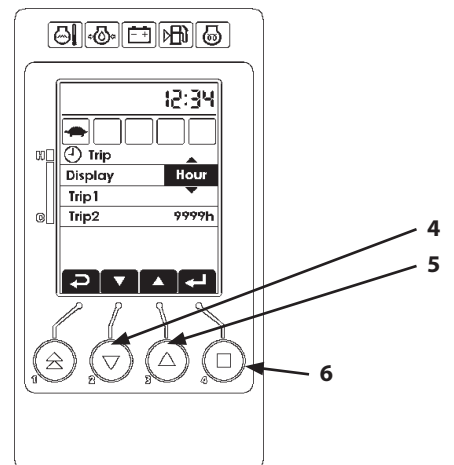


MADG-01-122

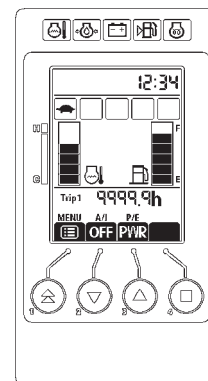
5. Each time switch (4) or (5) is pushed, the display will be changed as follows: Hour → Trip 1 → Trip 2.

If Hour is selected, the hour meter is displayed on the basic screen. If Trip 1 is selected, set time for Trip 1 is displayed; and if Trip 2 is selected, set time for Trip 2 is displayed.

6. Push switch (6) to make the changes.



MADG-01-123



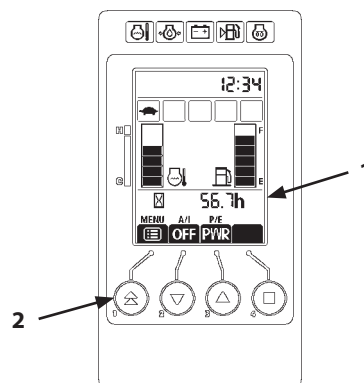
MADH-01-040

<Example: "Trip 1" is set on the display screen>

## OPERATOR'S STATION

### Displaying Trip Meter (2)

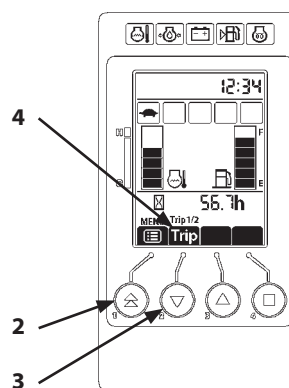
1. Turn the key switch to ON position. Keep pushing menu switch (2) while basic screen (1) is displayed.



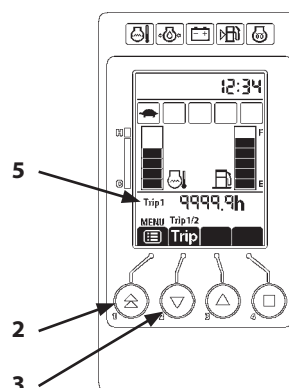
MADH-01-009

2. When menu switch (2) is held down, "Trip" will be displayed on short cut key (4). When switch (3) is pushed while holding down menu switch (2), the display will change to Trip 1 (5).

Each time switch (3) is pushed while menu switch (2) is held down, the display will change as follows: Trip 2 → Hour Meter → Trip 1 → Trip 2 .....



MADH-01-041

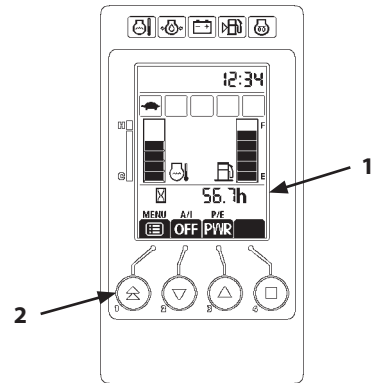


MADH-01-042

# OPERATOR'S STATION

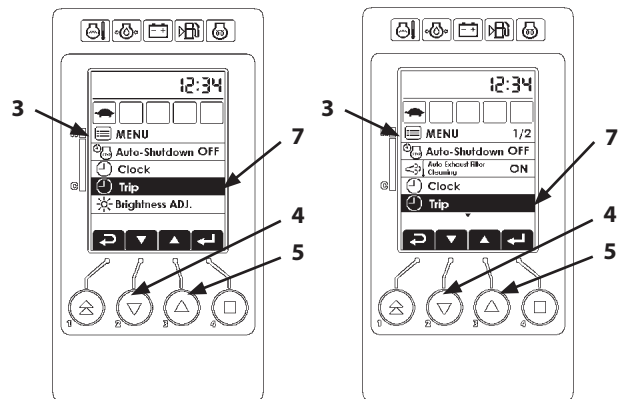
## Change Trip Meter Set Time

1. Turn the key switch to ON position. Push menu switch (2) while displaying basic screen (1) to display MENU (3).



MADH-01-009

2. Select Trip (7) by pushing switch (4) or (5).



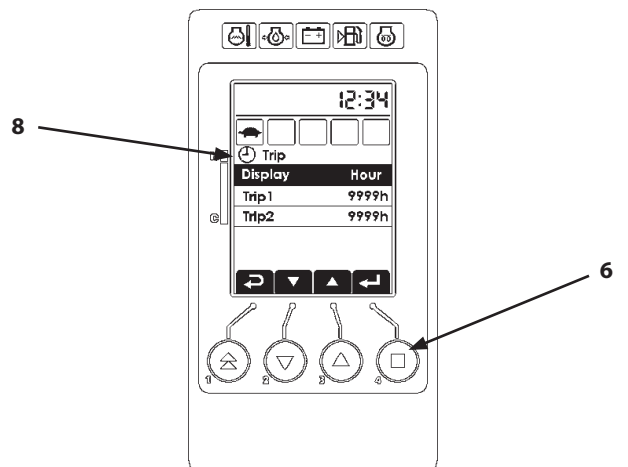
ZX30U-5N, 35U-5N

ZX50U-5N, 60USB-5N

MADG-01-120

MADG-01-121

3. Push set switch (6) to display Trip Setting screen (8).



MADG-01-122

## OPERATOR'S STATION

4. Highlight Trip 1 (10) or Trip 2 (11) by pushing switch (4) or (5), and then push set switch (6) to make the change.

 **NOTE:** Time for "Trip 1" and "Trip 2" can be set individually.


5. Each time switch (4) or (5) is pushed, the set time will be changed as follows.

By using switch (4) to change

Current value (example)		Changed set time
35.2	→	3000
184.7	→	150

By using switch (5) to change

Current value (example)		Changed set time
35.2	→	50
184.7	→	200


 **NOTE:** The set time is 9999.9h when the machine is shipped from the factory.

6. Each time switch (4) or (5) is pushed, the set time will be changed as follows.

50>100>150>200>250>300>400>500>750>1000>1250  
>1500>2000>2500>3000

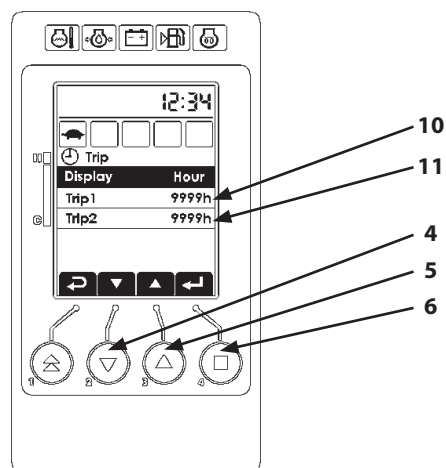
7. When display item is set for "Trip 1" or "Trip 2" while displaying desired set time, time displayed on the basic screen will be reset to the set time.

**IMPORTANT:** When the setting is changed, the operation time is counted from the point at which it is reset. Please note that displayed time does not indicate the accumulated operation time from the point at which it is first set.

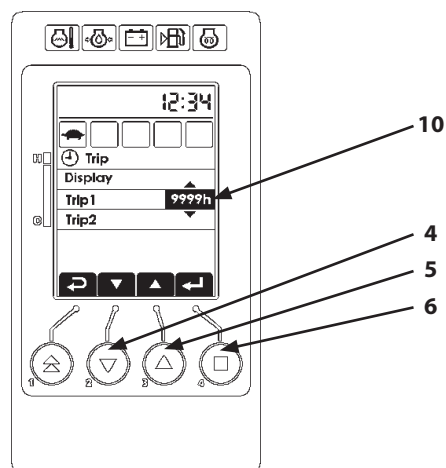
 **NOTE:** When "Trip" is set, remaining time to reach the preset operation hours will be displayed on Display (12).

Therefore, when the Trip mark starts blinking, the Trip meter display is 0 hr.

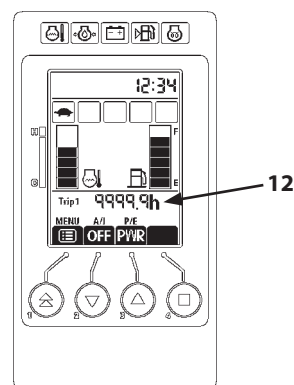
After that, Trip meter displays negative value until it is reset.



MADG-01-122



MADG-01-124

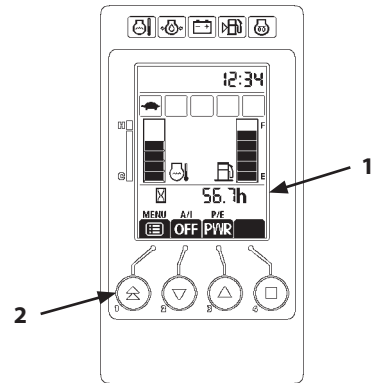


MADH-01-036

# OPERATOR'S STATION

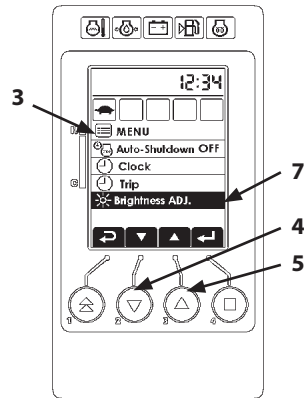
## Brightness Adjustment

1. Push menu switch (2) while displaying basic screen (1) to display MENU (3).



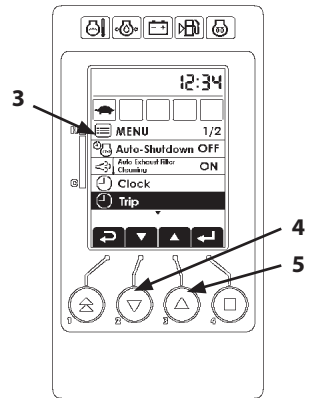
MADH-01-009

2. Highlight Time (7) by pushing switch (4) or (5).



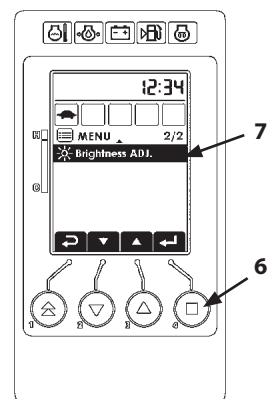
ZX30U-5N, 35U-5N

MADG-01-125



ZX50U-5N, 60USB-5N

MADG-01-121

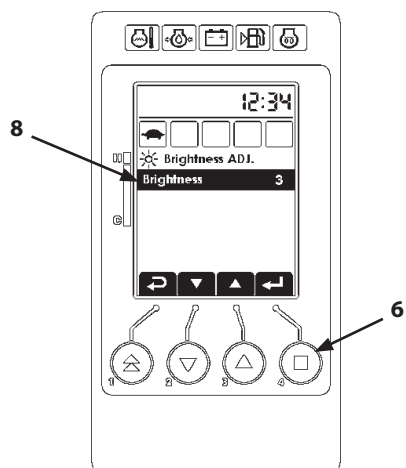


ZX50U-5N, 60USB-5N

MADG-01-126

## OPERATOR'S STATION

3. Push set switch (6) to display Brightness Adjustment (8).

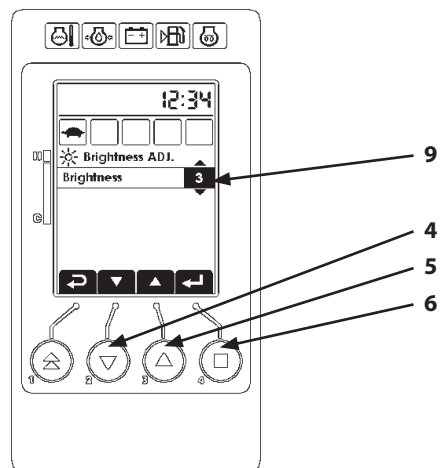


MADG-01-127

4. Highlight Brightness (9) by pushing switch (4) or (5), and then push set switch (6) to make the change.

The brightness is adjusted in 5 steps.

High Low  
5>4>3>2>1

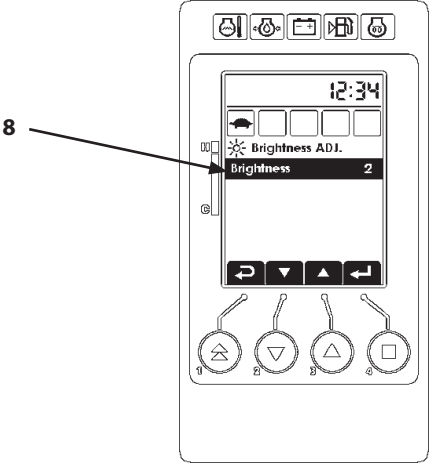


MADG-01-128

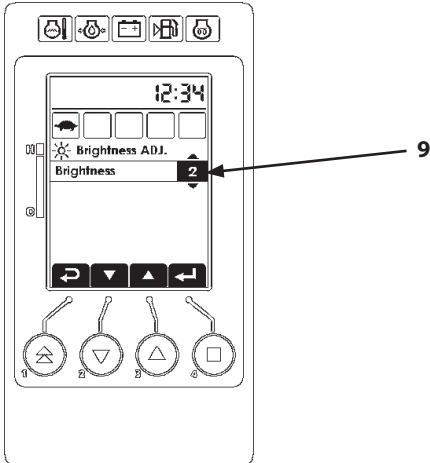


# OPERATOR'S STATION

5. Night mode can be set on Brightness Adjustment screen (8) by performing steps 1 through 4 after turning the work light switch ON.



MADG-01-129

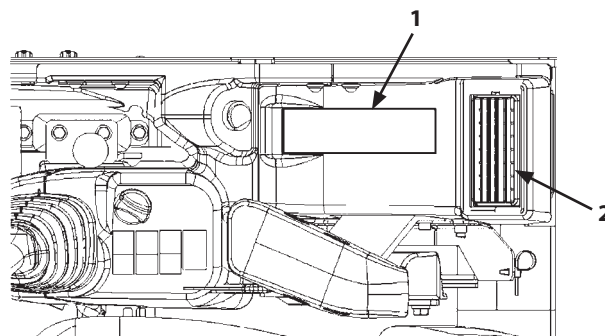


MADG-01-130


## OPERATOR'S STATION

### Heater Operation (ZX30U-5N, 35U-5N, 50U-5N)

- 1- Control Panel
- 2- Right Rear Vent
- 3- Foot Vent
- 4- Right Front Vent
- 5- Right Front Vent (Defroster)

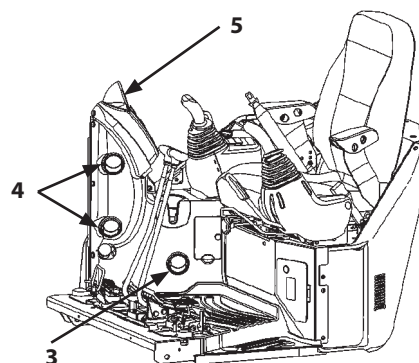


MADG-01-084




 **NOTE:** Adjust air flow direction by rotating right front vent (5) horizontally. It can be used as a defroster.

### Name and Function of Each Part of Control Panel

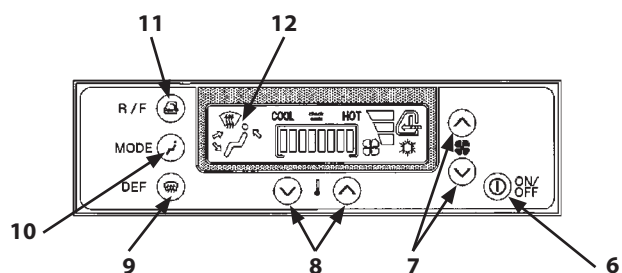
- 6- Heater Power Switch  
Push heater power switch (6) to turn the heater ON.
- 7- Blower Switch  
Heater blower speed is controlled in 3 steps.
- 8- Temperature Control Switch  
The set temperature decreases each time the down arrow switch is pushed, and increases each time the up arrow switch is pushed.
- 9- Defroster Switch  
Air will blow out from right front vents (4) and (5).
- 10- Mode Switch  
The air vent location is selected. Each time switch (10) is pushed, mode indicator (12) changes in the order shown below.



MADB-01-003

-  Air will blow out from right front vents (4) (5) and right rear vent (2).
-  Air will blow out from right front vents (4) (5), foot vent (3) and right rear vent (2).
-  Air will blow out from right front vents (4) (5) and foot vent (3).

- 11- Circulation Air/Fresh Air Selection Switch  
Circulation air and fresh air mode can be selected.



MADB-01-073

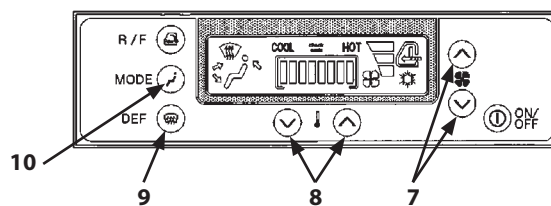
## OPERATOR'S STATION

### Heating Operation

Push mode switch (10) to select the vent position, and then push temperature control switch (8) to set temperature display rightward.

Control air temperature in the cab by operating temperature control switch (8).

Control blower speed by using blower switch (7).



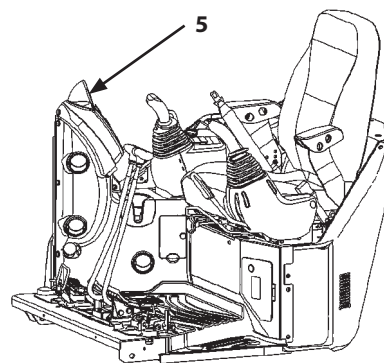
MADB-01-073

### Defroster Operation

Select the right front air vent by operating defroster switch (9).

Adjust the louvers on right front air vent (5) as required.

Control blower speed by using blower switch (7). Control air temperature in the cab by using temperature control switch (8).



MADB-01-003

## OPERATOR'S STATION

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### Tips for Optimal Heater Usage

#### **When Windows Become Clouded**

If inside of the windows becomes clouded during rainy weather or on humid days, operate the heater to aid in keeping the windows clear.

When the atmosphere is very damp, and if the heater has run excessively, outside of the windows may become clouded. If this happens, turn OFF the heater to adjust the temperature in the cab.

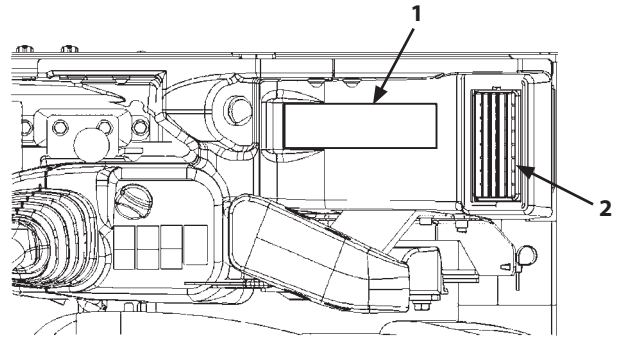
#### **IMPORTANT:**

- **Keep open flames away from the control panel.**
- **Refer to the item "Clean and Replace Heater/Air Conditioner Filter" in the Maintenance Section for maintenance of filters.**


## OPERATOR'S STATION

### Air Conditioner Operation (Optional)

- 1- Control Panel
- 2- Right Rear Vent
- 3- Foot Vent
- 4- Right Front Vent
- 5- Right Front Vent (Defroster)

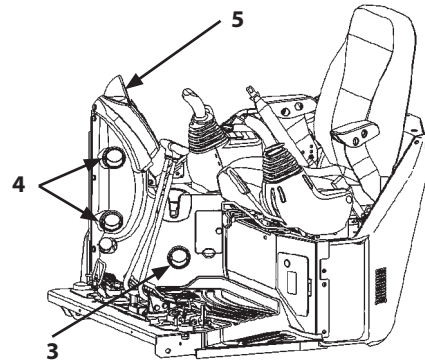


MADG-01-084




 **NOTE:** Adjust air flow direction by rotating right front vent (5) horizontally. It can be used as a defroster.

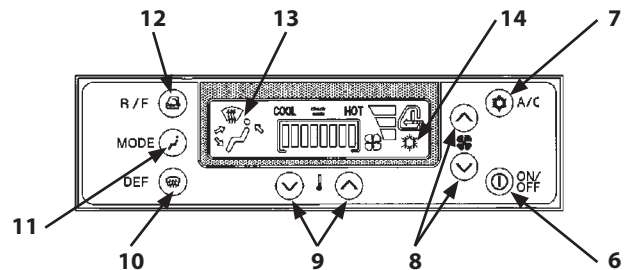
### Name and Function of Each Part of Control Panel

- 6- Air Conditioner Power Switch  
Push air conditioner power switch (6) to turn it ON.
- 7- Air Conditioner Switch  
Push air conditioner switch (7) to turn air conditioner ON and indicator (14) lights.
- 8- Blower Switch  
Air conditioner blower speed is controlled in 3 steps.
- 9- Temperature Control Switch  
The set temperature decreases each time the down arrow switch is pushed, and increases each time the up arrow switch is pushed.
- 10- Defroster Switch  
Air will blow out from right front vents (4) and (5).
- 11- Mode Switch  
The air vent location is selected. Each time switch (11) is pushed, mode indicator (13) changes in the order shown below.



MADB-01-003

-  Air will blow out from right front vents (4) and (5) as well as right rear vent (2).
-  Air will blow out from right front vents (4) and (5), foot vent (3) and right rear vent (2).
-  Air will blow out from right front vents (4) and (5) as well as foot vent (3).



MADB-01-066

- 12- Circulation Air/Fresh Air Selector Switch  
Circulation air and fresh air mode can be selected.

# OPERATOR'S STATION

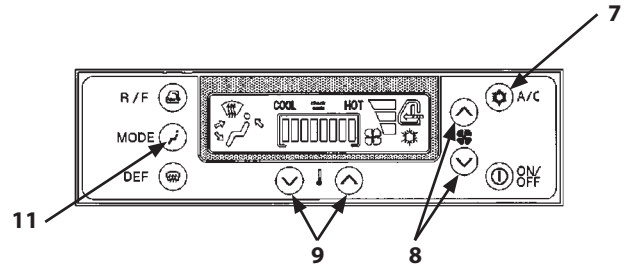
## Heating Operation

Push mode switch (11) to select the vent position, and then push temperature control switch (9) to set temperature display rightward.

Control air temperature in the cab by operating temperature control switch (9).

Control blower speed by using blower switch (8).

When air conditioner switch (7) is turned ON during heating operation, air in the cab will be dehumidified.



MADB-01-066

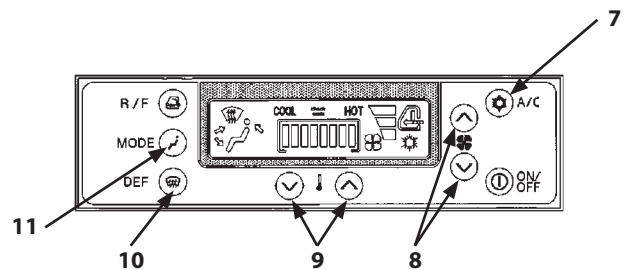
## Cooling Operation

Push mode switch (11) to select the vent position, and then push temperature control switch (9) to set temperature display leftward.

Control air temperature in the cab by operating temperature control switch (9).

Control blower speed by using blower switch (8).

When air conditioner switch (7) is turned ON, cool air will blow out from right front vent.



MADB-01-066

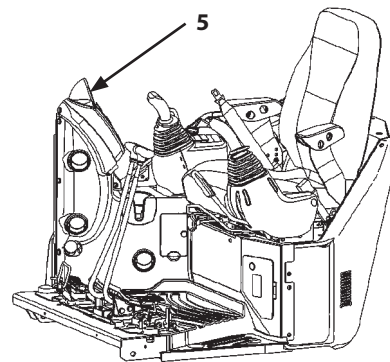
## Defroster Operation

Select the right front air vent by operating defroster switch (10).

Adjust the louvers on right front air vent (5) as required.

Control blower speed by using blower switch (8). Control air temperature in the cab by using temperature control switch (9).

If the windowpanes become clouded in rainy season or when dehumidifying, turn the air conditioner switch (7) ON.



MADB-01-003


## OPERATOR'S STATION

### Tips for Optimal Air Conditioner Usage

#### For Rapid Cooling

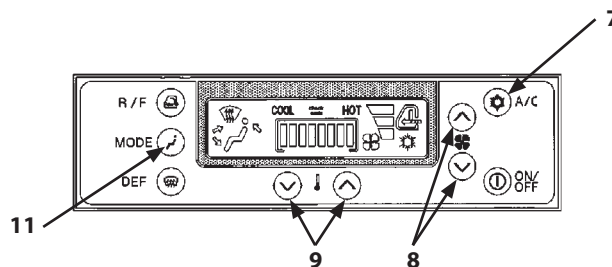
Temperature in the cab may rise over 80°C (176°F) when the machine is exposed to sun light in the summer.

In this case, ventilate air in the cab first by opening the windows for rapid cooling.

After starting the engine, set the temperature control toward the far left end using temperature control switch (9). Set mode switch (11) to  the right front and rear vents. Set blower switch (8) at the slow speed position. Turn air conditioner switch (7) ON.

After running the engine at slightly faster speed (1300 to 1400 min<sup>-1</sup> [rpm] or higher) for 2 to 3 minutes, increase the blower speed.

Close the window when the cab cools down to the ambient temperature.



MADB-01-066

#### When Windows Become Clouded

If inside of the windows becomes clouded during rainy weather or on humid days, operate the air conditioner to aid in keeping the windows clear.

When the atmosphere is very damp, and if the air conditioner has run excessively, outside of the windows may become clouded. If this happens, turn OFF the air conditioner to adjust the temperature in the cab.

#### Off-Season Air Conditioner Maintenance

To protect each part of the compressor from a lack of lubricant, operate the air conditioner at least once a month for several minutes with the engine running at a slow speed during off-season.

When the cab temperature is lower than 15°C (59°F), the air conditioner may not operate. If this happens, warm the cab using the heater first.

#### IMPORTANT:

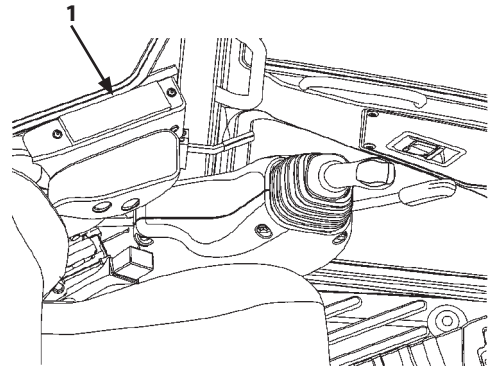
- **Do not suddenly increase the engine speed. Failure to do so may damage the compressor.**
- **Keep open flames away from the control panel.**
- **Refer to the item "Clean and Replace Heater/Air Conditioner Filter" in the Maintenance Section for maintenance of filters.**

## OPERATOR'S STATION

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### Radio (Cab equipped machine) (Optional)

1- Radio/Clock





MADB-01-005

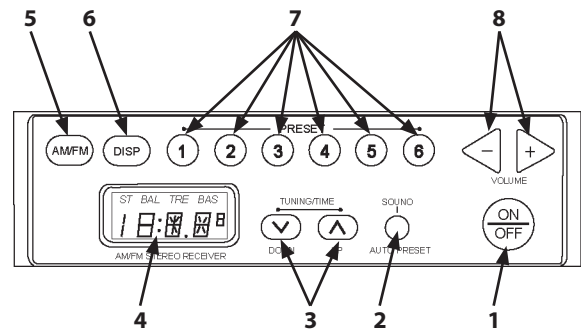


## OPERATOR'S STATION

### AM/FM Radio Operation (Cab equipped machine)

#### Part Name and Function

- 1- Power Switch  
Push this switch to turn ON/OFF the radio.
- 2- Sound Control Switch (SOUND)  
Push this switch to adjust sound (Balance/Bass/Treble).
- 3- Up/Down Buttons (UP/DOWN)  
This button is used to change the radio wave frequency, adjust the sound parameter and clock setting.
- 4- Display  
Time, radio receiving frequency and operation mode is displayed.
- 5- AM/FM Switch (AM/FM)  
"FM" and "AM" are switched over alternately each time the switch is pressed.  
The display indicates the receiving station frequency.
- 6- Display Switch (DISP)  
Push this switch to switch over the display between radio wave frequency and time.
- 7- Preset Switch (PRESET)  
One FM and MW (AM) station per button can be preset using these respective buttons.
- 8- Volume Control Button (VOL)  
Push this switch to adjust the volume.  
Push the  button to increase the volume by one step.  
Push the  button to decrease the volume in a step by step manner.



M1NE-01-003

#### Radio Operation

1. Turn the engine key switch to ON position. Push radio power switch (1) ON.
2. Select either MW (AM) or FM by operating AM/FM switch (5).
3. Select the station desired to listen using PRESET buttons (7) or UP/DOWN buttons (3).
4. Adjust the volume and tone according to your preference.
5. When turning the radio OFF, repress power switch (1).

## OPERATOR'S STATION

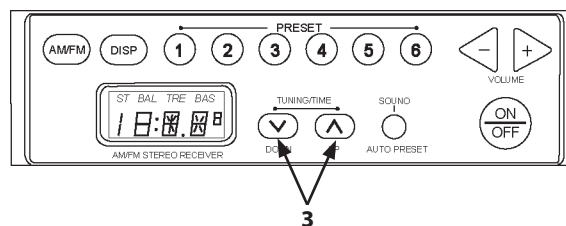
### Tuning Procedure

#### 1. Manual Tuning Procedure

Push UP (▲) button (3) to increase the frequency by one step. Push DOWN (▼) button (3) to decrease the frequency by one step.

#### 2. Automatic Tuning (Auto-Seeking)

Long push UP (▲) button (3) or DOWN (▼) button (3) to scan the frequency upward or downward. When a station is received, the auto-seeking function is deactivated so that the received frequency station is tuned in.



M1NE-01-003

### Station Presetting Procedure


#### 1. Select MW (AM) or FM by pushing AM/FM switch (5).

2. Long push one of PRESET buttons (7) to save the current receiving frequency in memory. When the preset procedure completes, the PRESET button No. flashes 3 times and frequency display becomes ON.

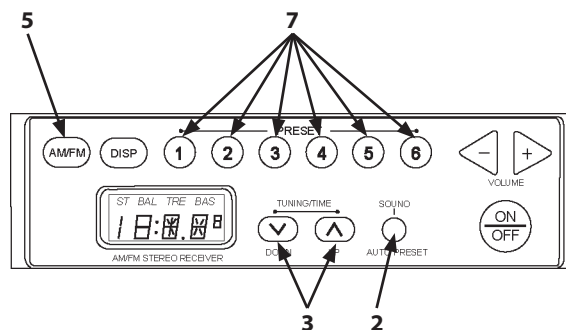
#### 3. Repeat steps 1 through 2 for other PRESET buttons (7).

#### • Station Auto-Presetting Procedure

Long push of SOUND control switch (2) with the radio switch ON will search the optimum receiving radio frequency stations and automatically allocate each station in preset memory buttons (1 to 6).

 **NOTE:** Performing auto-presetting operation will delete the stations previously saved in memory.

*If it is difficult to set the memory of the desired station to the desired button, conduct preset operation.*



M1NE-01-003

### Deletion of Preset Memory

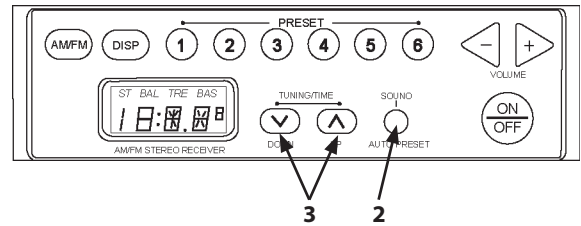
If the battery power is disconnected while servicing the machine or by removing the radio, the preset memory in PRESET buttons (7) will be deleted. In this case, preset the stations again.

# OPERATOR'S STATION

## Sound Control

Pushing SOUND switch (2) with the radio switch ON will make the sound items adjustable. Each time SOUND switch (2) is pushed, sound items changes in the order of BAL → TRE → BAS. Push SOUND switch (2) with BAS adjustment mode to quit from the sound control mode.

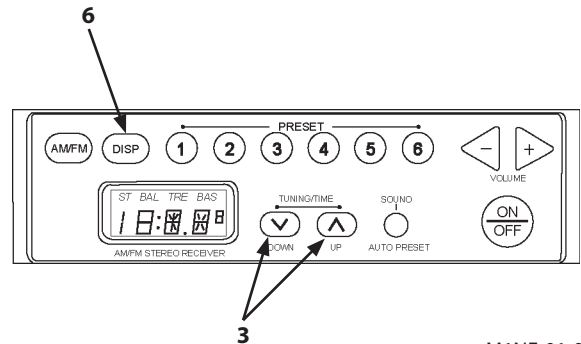
- Balance Adjustment (BAL)  
Each time UP button (3) is pushed at BAL adjustment mode, audio output shifts from L to R by one step. Also, each time DOWN button (3) is pushed at BAL adjustment mode, audio output shifts from R to L by one step.
- Treble Level Adjustment (TRE)  
Each time UP button (3) is pushed at TRE adjustment mode, treble level increases by one step. And each push of DOWN button (3) will decrease treble level by one step.
- Bass Level Adjustment (BAS)  
Each time UP button (3) is pushed at BAS adjustment mode, bass level increases by one step. And each push of DOWN button (3) will decrease bass level by one step.



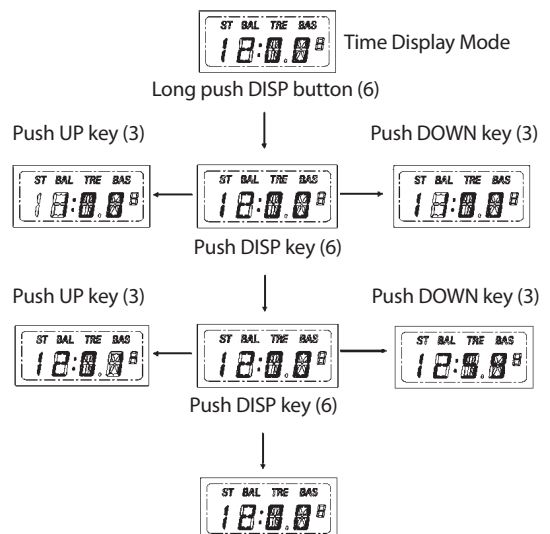
M1NE-01-003

## Digital Clock Setting Procedure

Long push of DISP button (6) at the clock display mode makes the clock adjustable. Pushing DISP button (6) at the clock adjustment mode will switch over the time unit from hours to minutes. Push UP or DOWN button (3) to adjust corresponding time unit. Push DISP button (6) at minutes adjustment mode to quit the time adjustment.



M1NE-01-003



M1NE-01-007

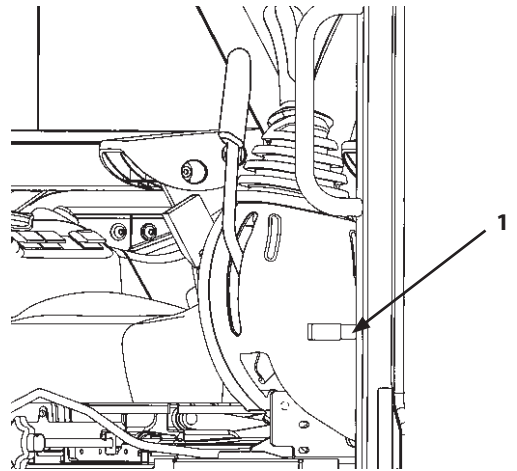
## OPERATOR'S STATION

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### Door Lock Release Lever (Cab equipped machine)

**⚠ CAUTION:** Open the door all the way until it securely locks in the latch on the side of the cab.

To unlock the door, push down door lock release lever (1) located at the left side of the operator's seat.



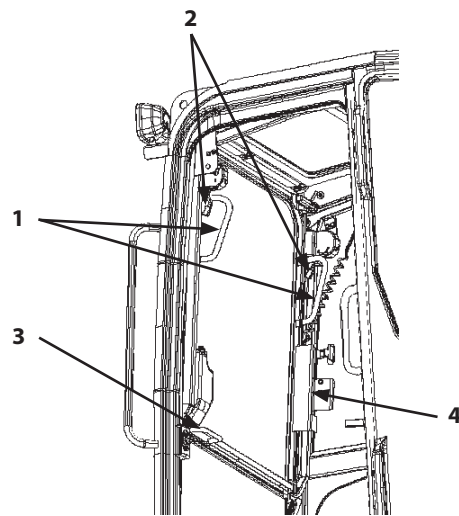
MADB-03-001

## OPERATOR'S STATION

### Opening Upper Front Window (cab equipped machine)

#### Front Window

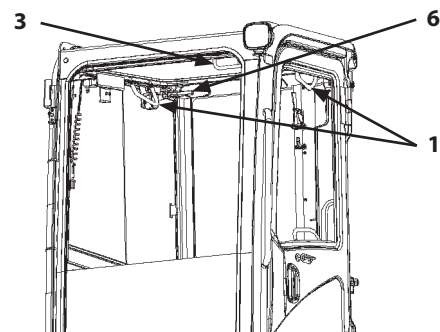
1. Hold handle (1) at upper part of the front door and pull lock lever (2) with your finger. Release lock to open the front window.
2. Pull the upper front window up and back along with the rail until it securely catches into lock lever (2). This time, use handle (3) on the lower front window.
3. After confirming that the window securely catches into lock lever (2), slide lock pin (6) to lock the window in position.



MADB-01-058

#### **CAUTION:**

- Slowly close the upper front window so that not to catch your fingers.
- Switch (4) is provided on the front window to prevent the wiper from operating when the front window is opened. Before closing the front window, ensure the wiper switch is turned OFF.
- When opening the front window, ensure the left and right locks are definitely working.



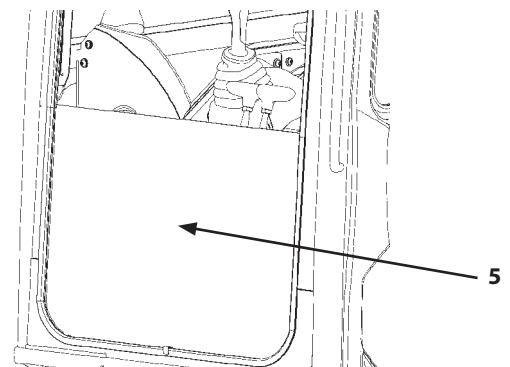
MADB-01-059

3. Close the upper front window by following steps 1 through 2 in the reverse order.

#### Removing and Storing Lower Front Window

1. Open the upper front window beforehand when removing the lower front window. While pulling lower front window (5) inward, raise it along with the window sash to remove. Install the lower front window by following the steps in the reverse order.

- CAUTION:** Lower window (5) breaks easily by dropping or shock, so carefully place and keep the removed windowpane in the safe storage area.



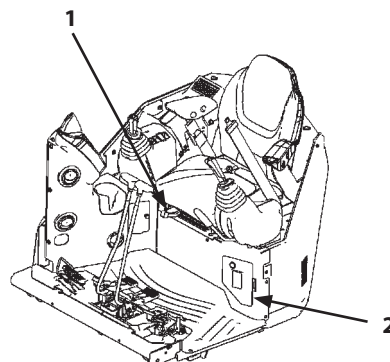
MADB-01-060

## OPERATOR'S STATION

### Adjusting the Seat

#### Seat Fore-aft Adjustment

Release the seat lock by pulling in adjuster bar (1) horizontally. Move the seat backward and forward. Seat fore-aft is adjustable in 120mm range in 6 steps, 20mm per step.



MADB-01-071

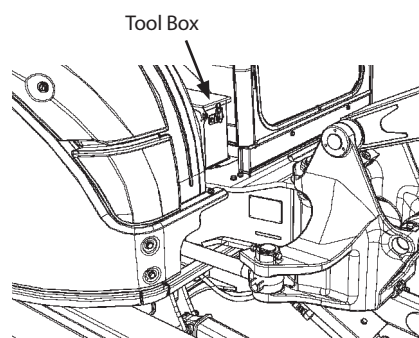
### Tool Box

#### ZX30U-5N, 35U-5N

The tool box is located at the right side in cover (2).

#### ZX50U-5N, 60USB-5N

The tool box is located at the right side in cover (2) and the left side of cab.

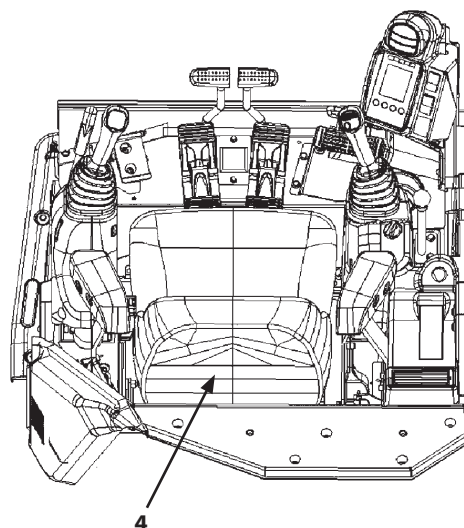


ZX50U-5N, 60USB-5N

MADG-01-131

### Seat Back Box

Pocket (4) is located at the back side of the seat. Put the operator's manual inside.



MADG-01-083

## OPERATOR'S STATION

### Emergency Exit (cab equipped machine)

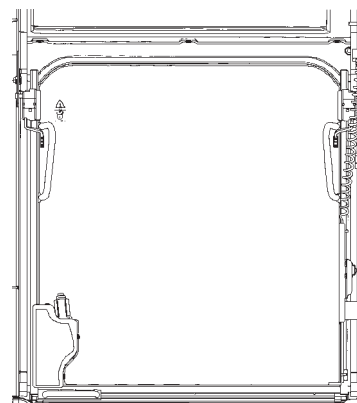
Escape from the cab in emergency in the following methods:

**CAUTION:** There is always a danger of downfall when escaping from the cab in emergency, which may result in serious personal injury. Escape from the cab as safely as possible, depending on the posture of machine and the outside situation.

1. Open the cab door. Escape through the door.
2. If the cab door is difficult to open or use, open the upper front window. Escape through the window. See page "OPENING UPPER FRONT WINDOW" for the opening method of the upper front window.

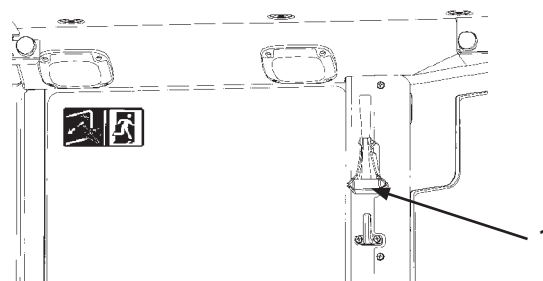
**CAUTION:** Take care not to be injured with pieces of broken window glass.

3. If the front window can not be opened, break the window glass by using the emergency evacuation tool (1) located at cab rear. Then escape through the broken window.
4. If the front window is not available for escaping, break the rear window glass by using the emergency evacuation tool (1).



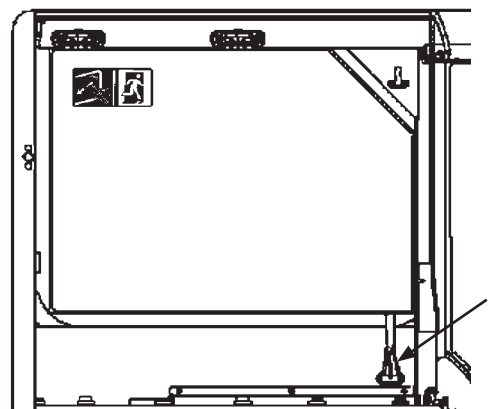
Front

MADC-01-004



Emergency Evacuation Tool, Rear  
ZX30U-5N, 35U-5N, 50U-5N

MADC-01-009



Emergency Evacuation Tool, Rear  
ZX60USB-5N

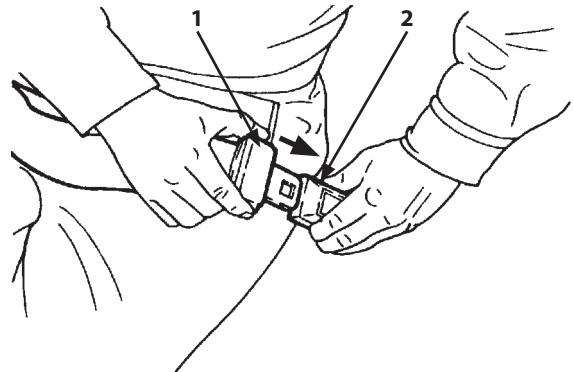
MADC-01-005

## OPERATOR'S STATION

### Seat Belt

#### WARNING:

- Be sure to use seat belt (1) when operating the machine.
- Before operating the machine, be sure to examine seat belt (1) and hardware attached for any failure. If any damage and/or wear are found, replace the damaged part.
- Replace seat belt (1) every 3 years regardless of appearance.

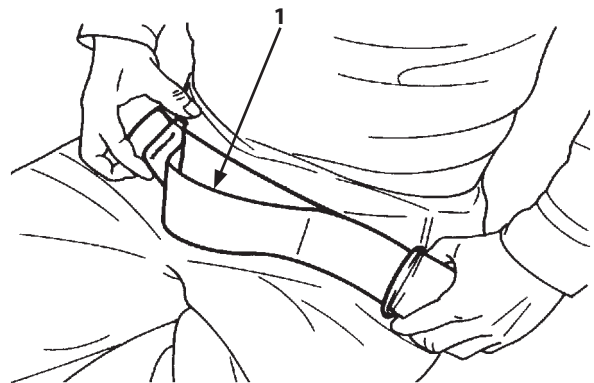


M573-01-014

### Seat Belt

1. Confirm that seat belt (1) is not twisted. Securely insert the end of seat belt (1) into buckle (2). Lightly pull on the belt to confirm that the buckle latches securely.
2. Push button (3) on buckle (2) to unfasten seat belt (1).

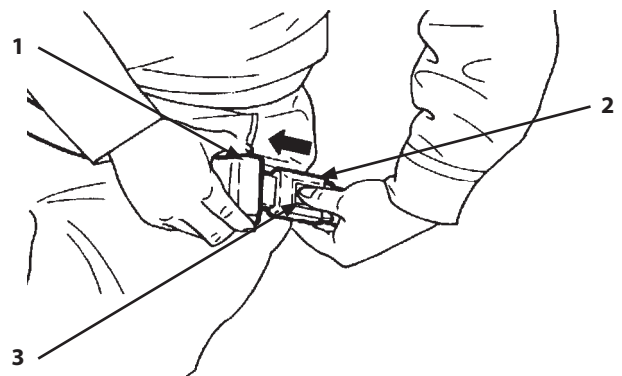
Replace the seat belt if they are damaged or worn out, or if the seat belt had external damage due to accident.



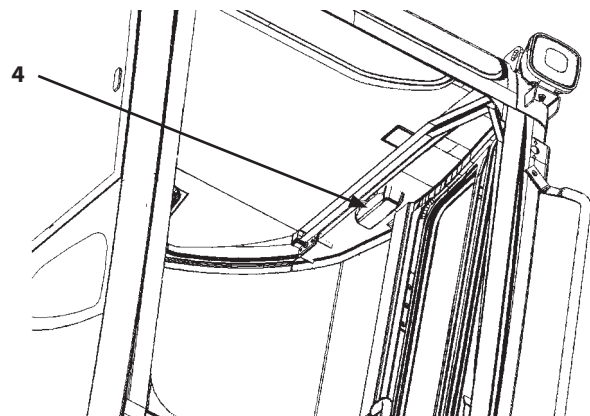
M107-01-045

### Room Lamp (cab equipped machine)

Push switch (4) on the cab light to turn the cab light ON. (The light comes ON while the key switch is ON.)



M573-01-015



M1M7-01-021



## BREAK-IN

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### Breaking in New Machine

**IMPORTANT: Operating a new machine at full load without first breaking in can cause scratches and/or seizures, consequently affecting the service life of the machine. Thoroughly perform break-in operation.**

The service life and performance of the machine can be greatly affected by operation and maintenance of the machine during the initial stage of operation. Perform break-in operation with the engine output less than 80% of the maximum output for the first 50 hours.

# BREAK-IN

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## MEMO

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## OPERATING THE ENGINE

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### Inspect Machine Daily Before Starting

Perform the required daily check before starting the engine.

- Refer to "Maintenance" section for detailed information.

#### Engine

- Level and contamination of engine oil and coolant
- Starting easiness, exhaust gas color, and noise
- Oil and water leaks, damage to hoses and pipe lines
- Clogging and damage to radiator, oil cooler and intercooler
- Looseness and missing of mounting bolts and nuts
- Clean around muffler filter (ZX50U-5N, 60USB-5N)

#### Upperstructure

- Fuel level, leaks and contamination of fuel in tank
- Hydraulic oil level, leaks and contamination of hydraulic oil tank
- Movement, play and operating force of all control levers
- Operation of all hydraulic components, oil leaks and damage to pipe lines and hoses
- Deformation, break and abnormal noise of upper structure
- Looseness and missing of mounting bolts and nuts
- Washer Fluid

#### Undercarriage

- Sag, wear and break of crawler
- Oil leaks and wear on upper/lower rollers and front idlers
- Oil leaks from travel devices
- Looseness and missing of mounting bolts and nuts

#### Working Device

- Check cylinders, pipe lines and hoses for oil leaks and damages
- Wear and damage of the bucket
- Check bucket teeth for looseness, wear and missing
- Lubrication state of the working device
- Check for pin anti-extraction pins, stoppers, rings and bolts for damage
- Looseness and missing of mounting bolts and nuts

#### Others

- Operation of instruments, switches, lights and buzzer/horn
- Function of parking brake
- Deformation and break of head guard
- Abnormal outside appearance of machine
- Wear and damage of the seat belt


## OPERATING THE ENGINE

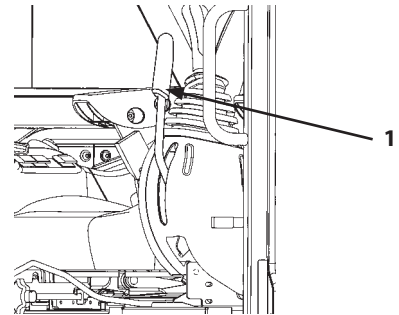
### Before Starting Engine

1. Confirm that pilot control shut-off lever (1) is in the LOCK position.
2. Confirm that all control levers are placed in neutral.
3. Insert key switch (2). Turn it to ON position. The starting screen is displayed on the monitor. All warning indicators are ON. They stay on for 2 seconds, and the basic screen is displayed. Alternator alarm indicator (4) and engine oil pressure indicator (3) stay ON.

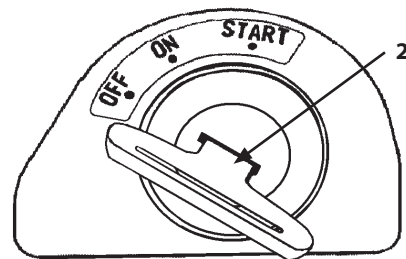
**IMPORTANT:** The monitor panel indicates the machine operating conditions. If the machine is operated with an indicator bulb or a warning lamp burned out, the alarm will not be displayed even if any abnormality occurs on the machine. Accordingly, in case any of the indicator bulbs or the warning lamps do not come ON, immediately contact your authorized dealer for repair. If any of alternator (4), or engine oil pressure (3) indicator fails to light after the basic screen is displayed, the machine may have trouble. Immediately contact your authorized dealer for repair.

4. Adjust the seat to allow full pedal and control levers stroke with operator's back against the backrest. Fasten the seat belt.

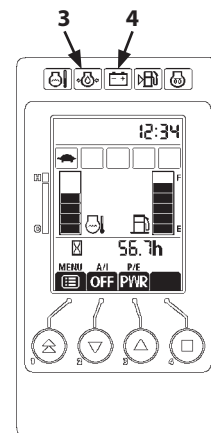
 **NOTE:** The monitor surface is a resin product. When the surface becomes dusty, lightly wipe the surface with a wet cloth. Never use an organic solvent.



MADB-03-001



MADB-03-002



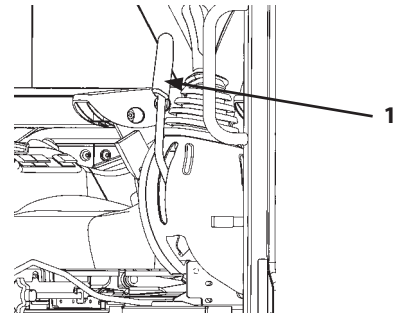
MADH-01-009

# OPERATING THE ENGINE

## Starting the Engine

### Starting the Engine in Ordinary Temperature

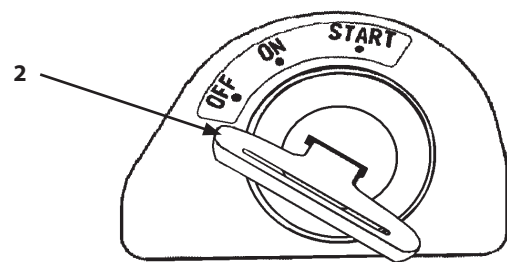
1. Confirm that pilot control shut-off lever (1) is in the LOCK position.
2. Turn engine control dial (3) to the slow idle position.
3. Sound horn to alert bystanders
4. Insert key switch (2). Turn it to ON position.
5. The basic screen (4) will be displayed on the monitor.
6. Turn key switch (2) to START position to rotate the starter. The engine will start.



MADB-03-001


**IMPORTANT: Never operate the starter for more than 15 seconds at a time. If engine fails to start, return key switch to OFF. Wait for more than 30 seconds, then try again. Failure to do so may cause damage to the starter and/or discharging the batteries.**

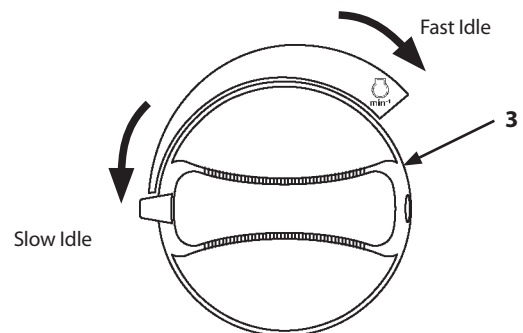
**This machine adopts the starter energizing time restriction control. The starter power will be automatically cut after running 30 seconds.**



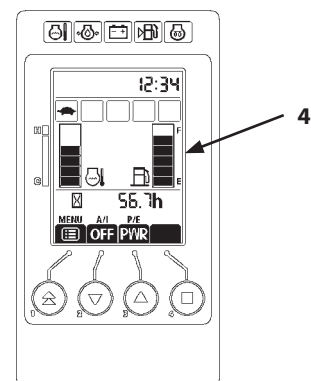
MADB-03-002

7. Release key switch (2) immediately after the engine has started. Key switch (2) will automatically return to ON position.

 **NOTE:** The horn sounds even though key switch (2) is turned OFF. The engine does not start unless pilot control shut-off lever (1) is in the LOCK position.



MADB-01-067



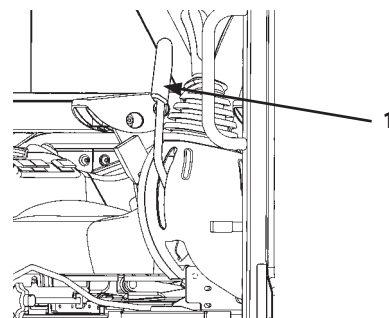
MADH-01-009

## OPERATING THE ENGINE

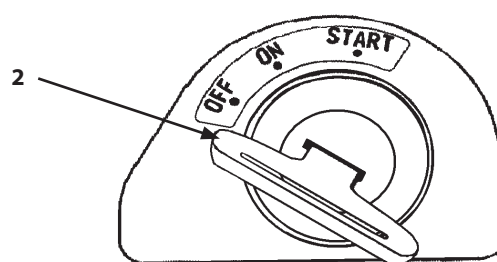
### Starting in Cold Weather (ZX30U-5N, 35U-5N)

#### Preheating

1. Confirm that pilot control shut-off lever (1) is in the LOCK position.
2. Turn engine control dial (3) to around the middle between the slow idle and fast idle position.
3. Sound the horn to alert bystanders.
4. Insert key switch (2). Turn it to ON position.
5. The basic screen will be displayed on the monitor. The machine will automatically check if preheating is required or not. When preheating is required, preheat indicator (4) is lit for automatically.
6. As soon as preheat indicator (4) goes OFF, turn key switch (2) to START position to rotate the starter.



M1M7-03-001



MADB-03-002

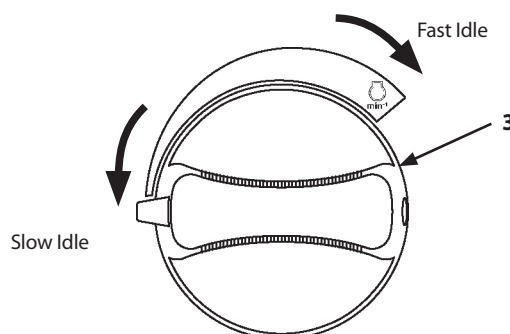
**IMPORTANT: Never operate the starter for more than 15 seconds at a time. If engine fails to start, return key switch to OFF. Wait for more than 30 seconds, then try again. Failure to do so may cause damage to the starter and/or discharging the batteries.**

**This machine adopts the starter energizing time restriction control. The starter power will be automatically cut after running 30 seconds.**

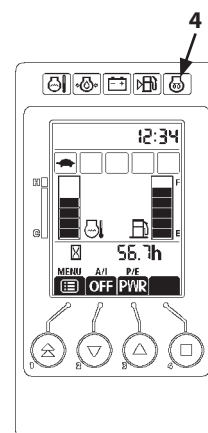
7. Release key switch (2) immediately after the engine has started. Key switch (2) will automatically return to ON position.

#### NOTE:

- For a while after the engine starts, the automatic heating system operates, the engine speed will temporarily increase.
- White smoke may occur for several minutes after the engine start, this is not a malfunction.



MADB-01-067



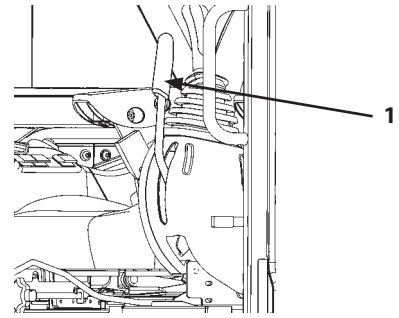
MADH-01-009

## OPERATING THE ENGINE

### Starting in Cold Weather (ZX50U-5N, 60UBS-5N)

#### Preheating

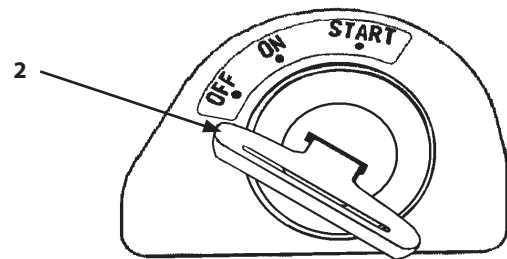
1. Confirm that pilot control shut-off lever (1) is in the LOCK position.



M1M7-03-001

**IMPORTANT:** Engine speed will rapidly increase after starting, so start the engine at slow idle speed. If engine is started other than the slow idle speed, the service life of hydraulic equipments may be adversely affected.

2. Turn engine control dial (3) to around the the slow idle position.
3. Sound the horn to alert bystanders.
4. Insert key switch (2). Turn it to ON position.
5. The basic screen will be displayed on the monitor. The machine will automatically check if preheating is required or not. When preheating is required, preheat indicator (4) is lit for automatically.
6. As soon as preheat indicator (4) goes OFF, turn key switch (2) to START position to rotate the starter.

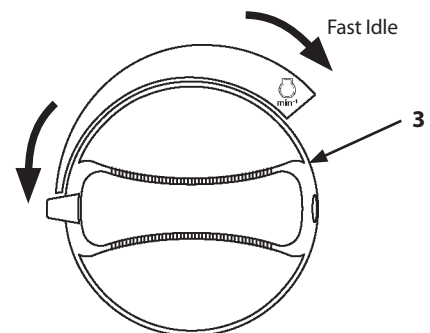


MADB-03-002

**IMPORTANT:** Never operate the starter for more than 15 seconds at a time. If engine fails to start, return key switch to OFF. Wait for more than 30 seconds, then try again. Failure to do so may cause damage to the starter and/or discharging the batteries.

**This machine adopts the starter energizing time restriction control. The starter power will be automatically cut after running 30 seconds.**

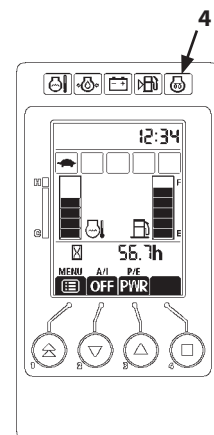
7. Release key switch (2) immediately after the engine has started. Key switch (2) will automatically return to ON position.



MADB-01-067

#### NOTE:

- For a while after the engine starts, the automatic heating system operates, the engine idle speed will be higher than the slow idle speed. The engine speed slows down as the coolant temperature rises.
- White smoke may occur for several minutes after the engine start, this is not a malfunction.



MADH-01-009

## OPERATING THE ENGINE

### Check Instruments After Starting Engine

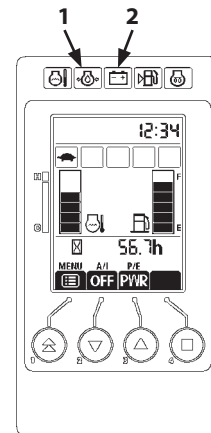
#### Checking instruments through monitor functions

After starting the engine, check the following points through the monitor functions.

1. Check that alternator alarm indicator (2) is OFF. In case alternator alarm indicator (2) stays ON, immediately stop the engine. Inspect the alternator and battery system for any abnormality.

2. Check that low engine oil pressure indicator (1) is OFF.

In case low engine oil pressure indicator (1) stays ON, immediately stop the engine. Inspect the engine oil pressure system and the oil level.




**IMPORTANT:** In case any abnormality is found on the monitor unit, immediately stop the engine. Inspect the cause of the trouble.

MADH-01-009

#### Check engine noise and exhaust gas color:

Check that the engine noise and exhaust gas color is normal.

 **NOTE:** Check the exhaust gas color as follows. (After warm-up operation, run the engine with no loads.)

ZX30U-5N, 35U-5N

Clear : Normal (Perfect combustion)

Black : Abnormal (Imperfect combustion, abnormal fuel system)

White : Abnormal (Oil is leaking into the combustion chamber, abnormal fuel system)

ZX50U-5N, 60USB-5N

Clear : Normal (Perfect combustion)

Black : Abnormal (Imperfect combustion, abnormal muffler filter, abnormal fuel system)

White : Abnormal (Oil is leaking into the combustion chamber, abnormal muffler filter, abnormal fuel system)



## OPERATING THE ENGINE

### Using Booster Battery

#### **⚠ WARNING:**

- An explosive gas is produced while battery is in use or being charged. Keep open flames and sparks away from the battery area. Do not continue to use or charge the battery when electrolyte level is lower than specified. Explosion of the battery may result.
- Park the machine and a machine with the booster battery on a dry or concrete surface, not on steel plates. If the machine is parked on steel plates, dangerous sparks may be unexpectedly created on the machine.
- Never connect a positive terminal to a negative terminal, as a dangerous short circuit will occur.



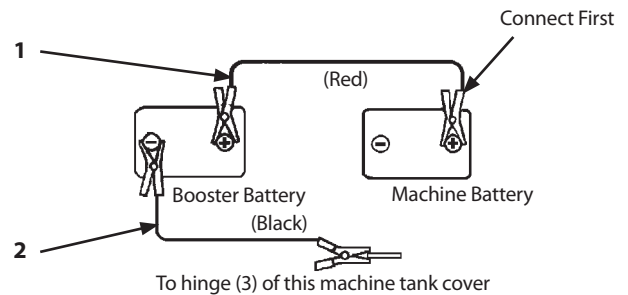
SA-032

**IMPORTANT:** The machine electrical system is a 12 volt negative (-) ground. Use only 12 volt booster battery with sufficient capacity to start this machine.

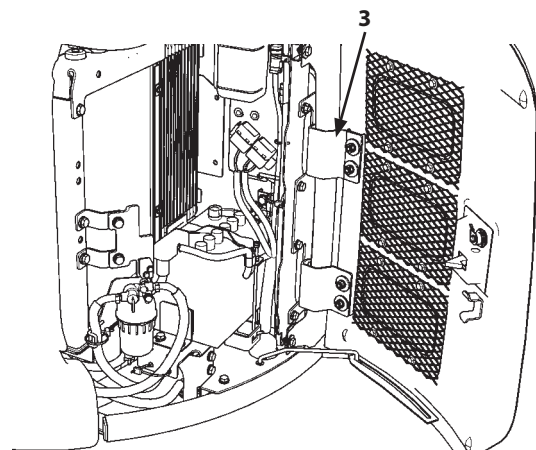
When the machine battery is exhausted, start the engine using booster battery as shown below.

#### **Connecting the booster batteries**

1. Stop the engine of the machine on which booster battery is mounted.
2. Connect one end of red cable (1) to the positive (+) terminal of the machine battery, and the other end to the positive (+) terminal of the booster battery.
3. Connect one end of black cable (2) to the negative (-) terminal of the booster battery, and then connect the other end to hinge (3) of this machine cover. In the last connection to frame, sparks may fly. Be sure to connect the cable end as far away from the machine battery as possible.
4. After securely connecting the booster cables, start the engine of the machine on which booster battery is mounted. Run the engine at a middle speed.
5. Start the engine of this machine.
6. After the engine starts, disconnect booster cables (2) and (1), following the procedure below.



M503-03-002



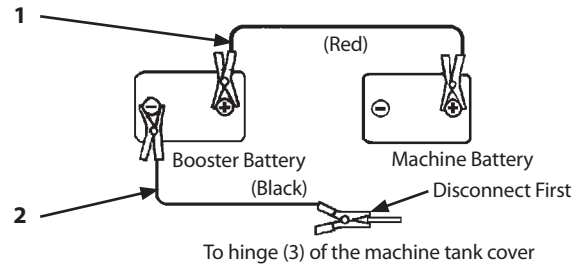
MADB-07-022

## OPERATING THE ENGINE

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### Disconnecting the booster cables

1. Disconnect black booster negative (-) cable (2) from hinge (3) of the machine cover first.
2. Disconnect the other end of black booster negative (-) cable (2) from the booster battery.
3. Disconnect red booster positive (+) cable (1) from the booster battery.
4. Disconnect red booster positive (+) cable (1) from the machine battery.



M503-03-002

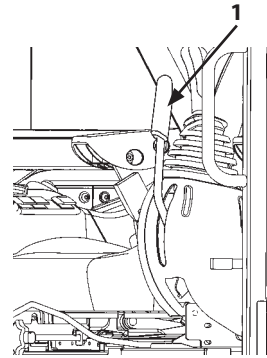
## OPERATING THE ENGINE

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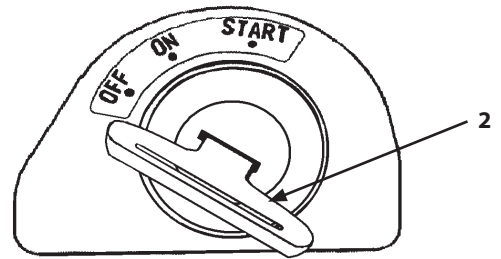
### Stopping the Engine

#### Engine Stop Procedure

1. Except for special cases, before stopping the engine, lower the bucket and the blade to the ground.
2. Pull pilot control shut-off lever (1) to LOCK position.
3. Turn the engine control dial to the slow idle position and run the engine for 5 minutes to cool the engine.
4. Turn key switch (2) OFF to stop the engine.



MADB-03-001



MADB-03-002

## OPERATING THE ENGINE

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### MEMO

A series of horizontal dotted lines for taking notes.

## DRIVING THE MACHINE

### Travel Levers and Pedals (Optional)

Travel operation can be performed with either the levers or pedals.

**WARNING:** In the standard travel position, the front idlers are positioned at the front of the machine and the travel motors at the rear. If the travel motors are positioned at the front of the machine, the control actions of the travel pedals will be reversed. Be sure to confirm the position of the travel motors before traveling.

**NOTE:** Travel lever dampers are provided for smooth control. In extremely cold weather (lower than  $-20^{\circ}\text{C}$  ( $-68^{\circ}\text{F}$ )), the travel lever (or pedal) will become heavy to operate. This is caused by increase in oil viscosity which is not abnormal.

- Forward/Reverse Travel

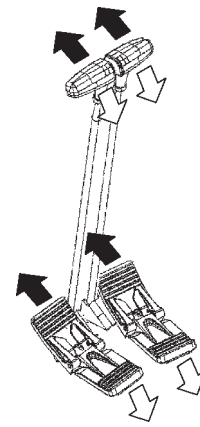
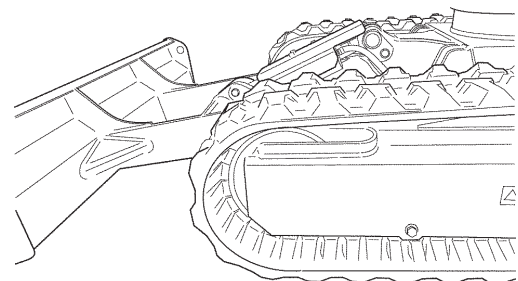
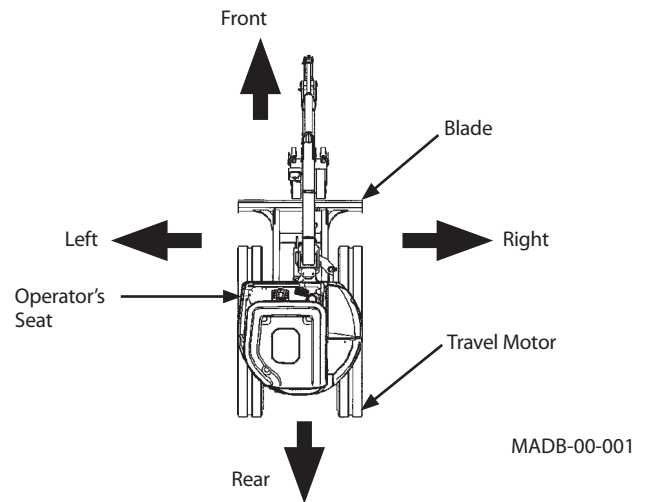
Move both levers (or pedals) forward together to travel forward.

Pull the levers (or pedals) back together to travel in reverse. The travel speed can be controlled by adjusting the lever (or pedal) operating stroke.

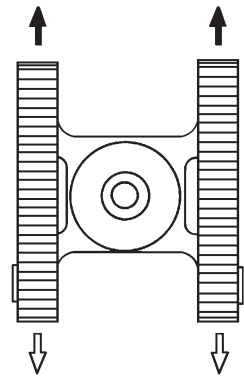
- Ascending/Descending Slopes

The machine gradeability is  $30^{\circ}$  (58%). Slowly operate the travel levers (or pedals) when descending a slope. When the travel levers are placed in neutral, the travel brakes are automatically applied to stop the machine.

**NOTE:** The travel pedal on this machine is a folding type. When traveling the machine using the travel pedals, unfold the pedals.

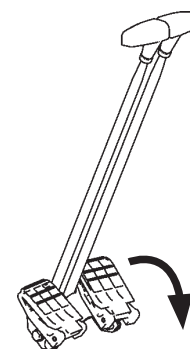


M1M7-04-011



M104-04-003

Forward and Reverse



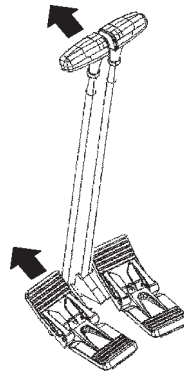
M1M7-04-010

Travel Pedal Folding Position

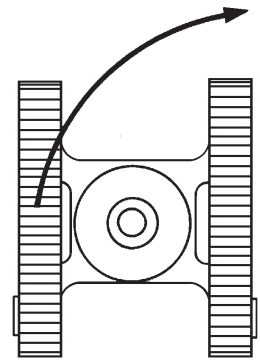
## DRIVING THE MACHINE

- Pivot Turn

Steer the machine by driving only one side crawler. Operate either of the travel levers (or pedals).



M1M7-04-012



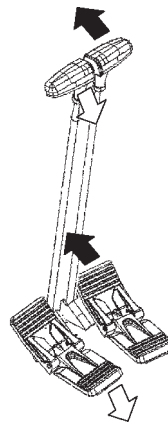
M104-04-005

Pivot Turn

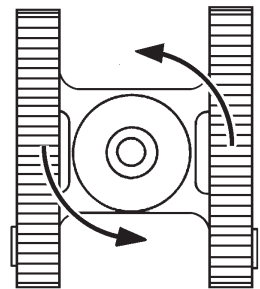
- Spin Turn

Steer the machine in a position by driving both side crawlers in opposite directions each other. Push one lever (or pedal) forward and pull the other back at the same time.

**WARNING:** During pivot or spin turn machine operations, the base machine may shake. When turning the machine in a tight area, slowly operate the machine while taking care not to allow the machine to come in contact with the surrounding objects.



M1M7-04-013



M104-04-007

Spin Turn

## DRIVING THE MACHINE

### Travel Mode Switch

**⚠ WARNING:** Tipping-over accidents can cause serious personal injury. Do not change travel mode switch (1) while traveling; especially, changing to fast mode when descending slopes will create a very dangerous situation. Always stop the machine before changing the travel speed mode.

Press the RABBIT mark side on travel mode switch (1) to select the fast travel mode.

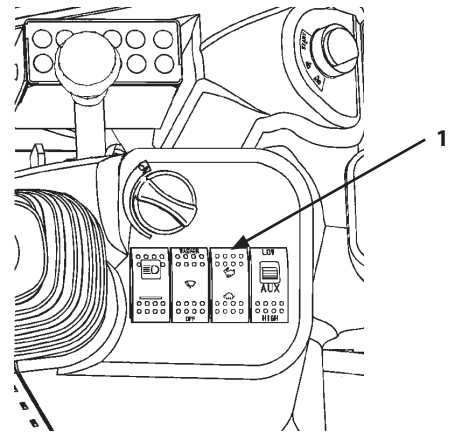
Press the TURTLE mark side on travel mode switch (1) to select the slow travel mode.

**✎ NOTE:** In cold weather season, when the machine is traveling with travel mode switch (1) in the fast travel mode position, the slow travel mode may not automatically be selected even if the traveling loads increase. This symptom is not abnormal. Drive the machine after conducting sufficient warm-up operation.

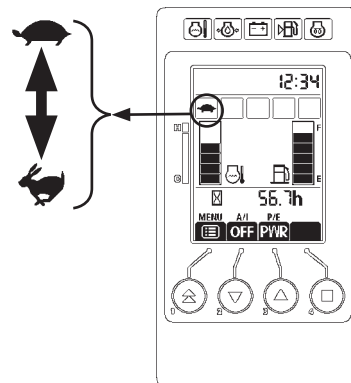
The slow travel mode will automatically be selected if the traveling loads increase.

RABBIT mark is displayed on the monitor. Return fast travel mode if the traveling loads decrease.

If the key switch is turned OFF while the machine is running at fast speed, the travel mode shifts to slow speed when restarting the engine.



MADC-01-003



MADH-01-009

## DRIVING THE MACHINE

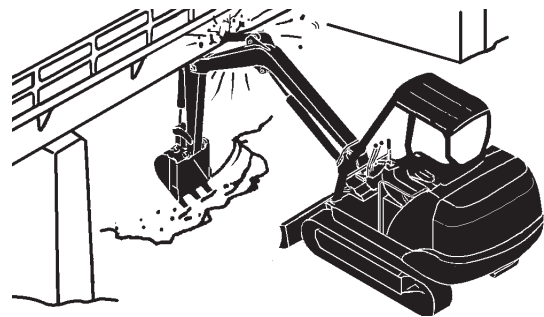
### Traveling

**CAUTION:** Use a signal person when traveling the machine along road shoulders or in congested areas. Coordinate hand signals before starting the machine.

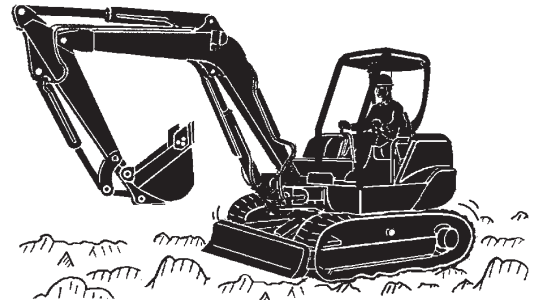
- Be sure to confirm the position of travel motors before traveling and operate the travel levers/pedals.
- Select a travel route that is as flat as possible. Steer the machine as straight as possible, making small gradual changes in direction.
- Before traveling on them, check the strengths of bridges and road shoulders, and reinforce if necessary.
- Use wood plates in order not to damage the road surface. Be careful of steering when operating on asphalt roads in summer.
- When crossing train tracks, use wood plates in order not to damage them.
- Do not make contact with electric wires or bridges.
- When crossing a river, measure the depth of the river using the bucket, and cross slowly. Do not cross the river when the depth of the river is deeper than the upper edge of the upper roller.
- When traveling on rough terrain, reduce engine speed. Select slow travel speed. Slower speed will reduce possible damage to the machine.
- Avoid operations that may damage the track and undercarriage components.
- During freezing weather, always clean snow and ice from track shoes before loading and unloading machine, to prevent the machine from slipping.



M104-05-008



SA-673



M586-05-002



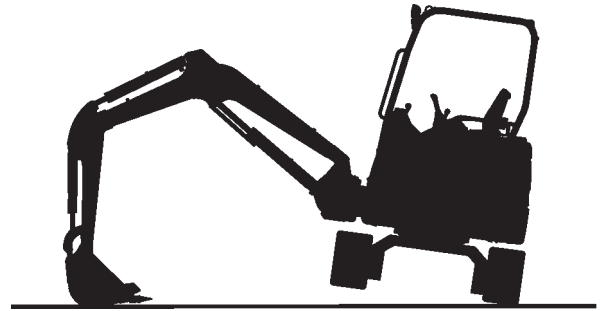
## DRIVING THE MACHINE

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### Traveling on Soft Ground

Avoid traveling on soft ground as much as possible. If traveling on a soft ground is unavoidable, carefully operate the machine while observing the following points.

- Drive the machine as far as the machine can move by own propelling power. Towing the machine may become necessary. Do not drive the machine to a deeper location than towing machine is possible.
- In case it becomes impossible for the machine to travel by own propelling power, lower the bucket to the ground. While supporting the machine weight with the boom and the arm, slowly pull the arm to evacuate the machine. Operate the boom, arm, and travel levers simultaneously at this time to prevent the machine from being loaded abnormally.
- If the track frame bottom comes in contact with the ground, or if mud and/or grabbles are tightly packed into the undercarriage, the machine may become impossible to travel. Raise one side track above the ground with the boom and arm extended, remove mud and/or grabbles from the track. Then, evacuate the machine. Rotate the raised track in forward or reverse directions alternately to remove the packed rocks and/or mud from the track.
- Tow the machine with other machine if the machine becomes stuck in soft ground and impossible to evacuate by own propelling power. Refer to the descriptions for TOWING MACHINE for the correct rope attaching method.



M1M7-04-005

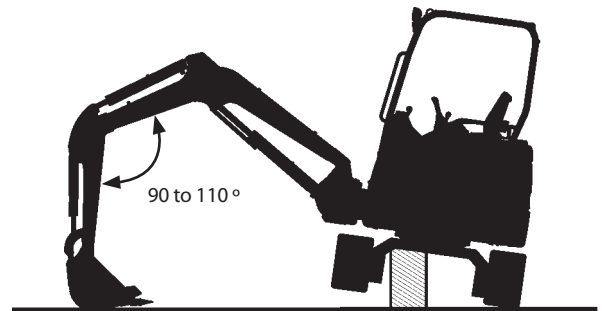
## DRIVING THE MACHINE

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### Raise One Track Using Boom and Arm

**⚠ WARNING:** Operate the machine carefully. The machine may slide. Keep the angle between boom and arm 90 to 110° and position the bucket's round side on the ground.

1. Swing the upperstructure 90°.
2. Position the boom and the arm so that the angle between them becomes to 90 to 110°. Push the ground with the round bucket bottom to raise track off ground.
3. Do not raise the track with the boom and the arm when the boom is swung.
4. Place blocks under machine frame to support the machine.



M1M7-04-006

## DRIVING THE MACHINE

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### Towing Machine

**⚠ CAUTION:** Cables, straps, or ropes can break causing serious injury. Do not tow machine with damaged chains, frayed cables, slings, straps, or wire ropes. Always wear gloves when handling cable, straps or wire ropes.

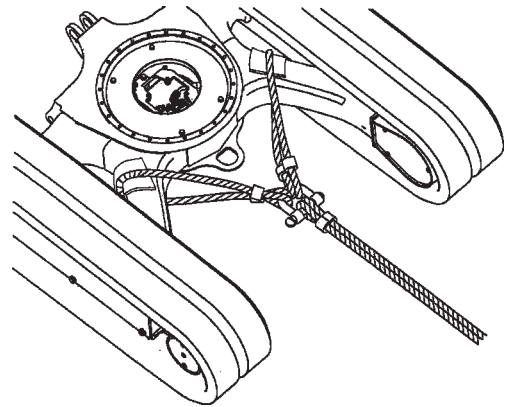
When your machine becomes stuck but the engine is still operational, attach wire ropes to the machine as illustrated at right, and slowly tow your machine to firm ground using another machine.

Be sure to attach the wire ropes around the track frames of both machines as illustrated.

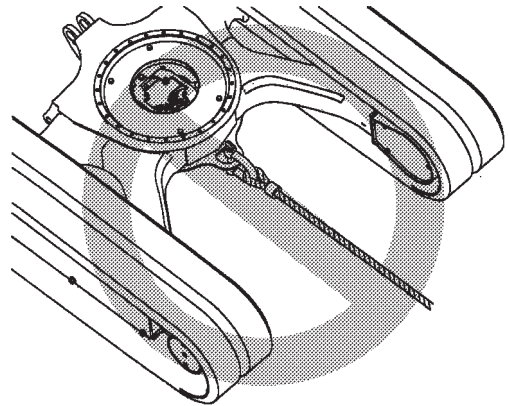
To prevent the wire ropes from being damaged, place some protective material between the track frame and the wire ropes.

#### IMPORTANT:

- On some machines, a bracket is provided on the track frame to install a shackle for towing a lightweight object.
- Never attempt to tow the machine using this lightweight object-towing bracket. Breaking the towing bracket may result.
- Refer to the descriptions on Shackle Bracket Usage on page 5-27 in "Operating the Machine" section for usages of the shackle bracket.
- In addition, do not tow the machine with the complete machine lifting holes prepared on the blade. The lifting holes may be damaged.



M1NE-04-001



MZX5-04-001

## DRIVING THE MACHINE

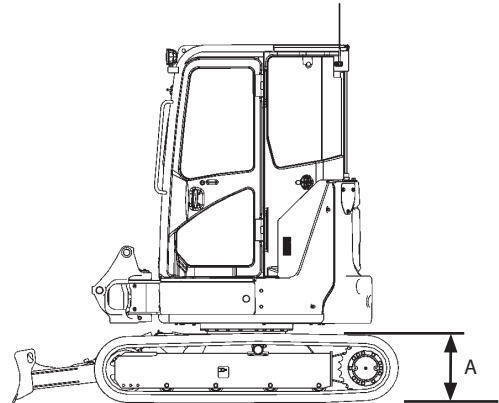
### Operating in Water or Mud

The machine can be operated in water up to the upper edge of the upper rollers only if worksite footing has sufficient strength to prevent the machine from sinking past the upper edge of the upper roller, and only if the water is flowing slowly.

When operating in such conditions, check the machine's position often. Reposition the machine if necessary.

Avoid submerging the swing bearing, swing gears and center joint.

**IMPORTANT: If the swing bearing, swing gears and center joint are submerged in water or mud by mistake, premature wearing on parts such as the swing bearing may result. Grease must be changed or overhauling will be required immediately. Stop operating the machine as soon as possible, and contact your authorized dealer.**



MADB-05-005

Model	A
ZX30U-5N, 35U-5N	485 mm (7.1 in)
ZX50U-5N, 60USB-5N	545 mm (9.5 in)

### Swing Internal Gear Grease Capacity

Model	Grease Capacity
ZX30U-5N, 35U-5N	3.0 to 3.3 L (3.2 to 3.5 US qt)
ZX50U-5N, 60USB-5N	3.2 to 3.5 L (3.4 to 3.7 US qt)

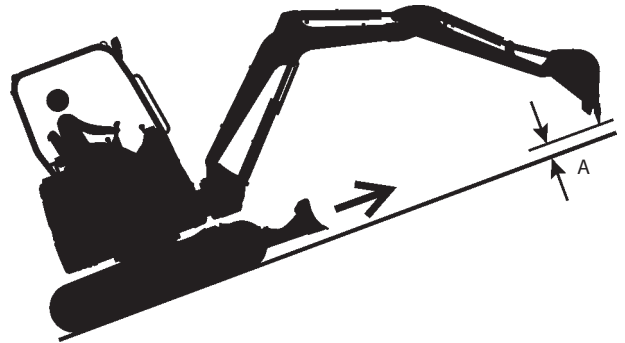
Lubricate swing bearing. (See Maintenance Guide, 500 hours)

## DRIVING THE MACHINE

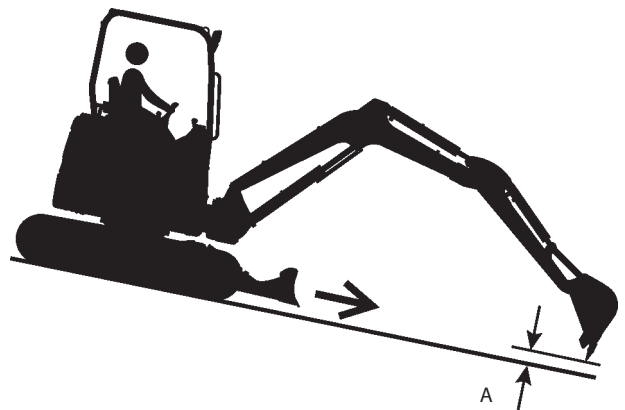
### Precautions for Traveling on Slopes

**CAUTION:** Avoid possible injury from traveling on slopes. Tipping over or skidding down of the machine may result. Thoroughly read and understand precautions below and be sure to travel at slow speed on slopes. Never attempt to travel on slopes with the bucket loaded or any load suspended by the bucket.

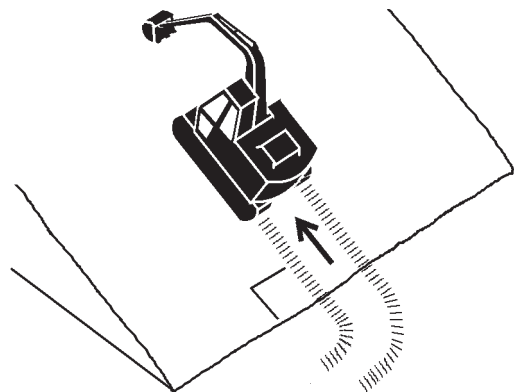
- Never attempt to ascend or descend 30 degrees or steeper slopes.
- Be sure to fasten the seat belt.
- Keep the bucket pointed in the direction of travel, approximately 200 to 300 mm (8 to 12 in) (A) above the ground. If the machine starts to skid or becomes unstable, lower the bucket immediately.
- Driving across the face of a slope or steering on a slope may cause the machine to skid or turnover. If the direction must be changed, move the machine to level ground, then, change the direction to ensure safe operation.
- Avoid swinging the upperstructure on slopes. Never attempt to swing the upperstructure downhill. The machine may tip over. If swinging uphill is unavoidable, carefully operate the upperstructure and boom at slow speed.
- If the engine stalls on a slope, immediately lower the bucket to the ground. Return the control levers to neutral. Then, restart the engine.
- Be sure to thoroughly warm up the machine before ascending steep slopes. If hydraulic oil has not warmed up sufficiently, sufficient performance may not be obtained.



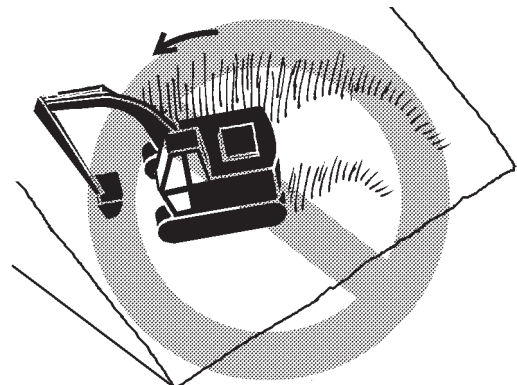
SA-1295



SA-1296



SA-441



MZX5-04-002

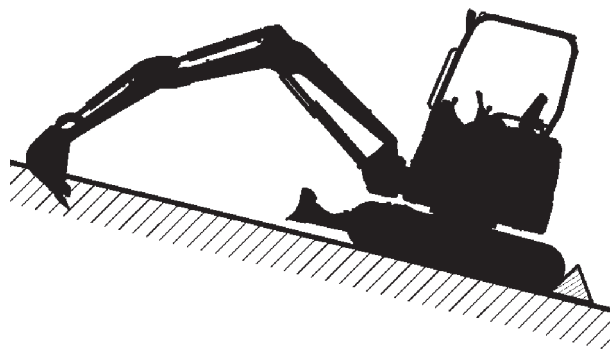
## DRIVING THE MACHINE

### Parking the Machine on Slopes

**⚠ WARNING:** Avoid parking and/or stopping machine on slopes. The machine may tip over, possibly resulting in personal injury.

If parking the machine on a slope is unavoidable:

- Thrust the bucket teeth into the ground.
- Return the control levers to neutral and pull pilot control shut-off lever (1) to the LOCK position.
- Block both tracks.



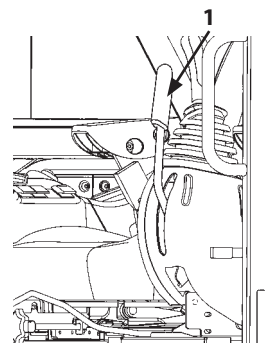
M1M7-04-009

### Parking the Machine

1. Park the machine on a level surface.
2. Lower the bucket and the blade to the ground.
3. Turn the auto-idle switch off.

**IMPORTANT:** Turbocharger may be damaged if the engine is not properly shut down.

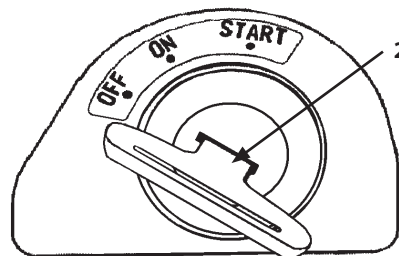
4. Turn the engine control dial counterclockwise to the slow idle position. Run the engine at slow idle speed for approximately 5 minutes to cool the engine.
5. Turn the key switch to OFF. Remove key (2) from the key switch.
6. Pull pilot control shut-off lever (1) to the LOCK position.



MADB-03-001

**IMPORTANT:** Protect cab electrical components from bad weather. Always close windows, roof vent and cab door when parking the machine.

7. Close windows, roof vent, and cab door, if the cab is provided.
8. Lock all access doors and covers.



MADB-03-002

# OPERATING THE MACHINE

## Control Lever (ISO Pattern)

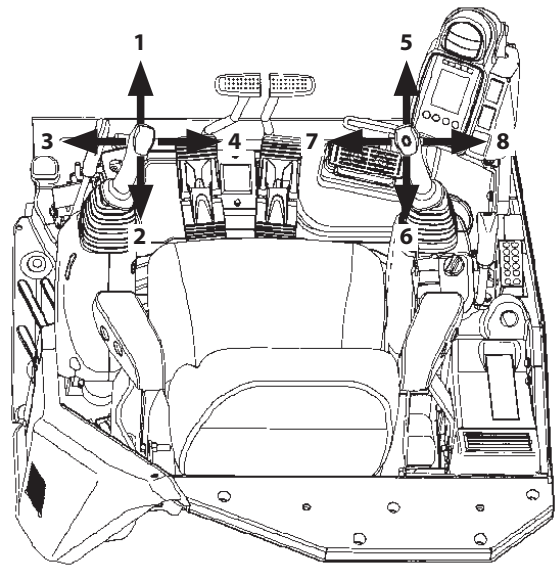
### ⚠ WARNING:

- Never place any part of body beyond window frame. It could be crushed by the boom if boom control lever is accidentally bumped or otherwise engaged. Never remove the window sash bar.
- Make sure you know the location and function of each control before operating.
- Do not change the control lever operation pattern. Failure to do so may result in operation mistake of the machine.

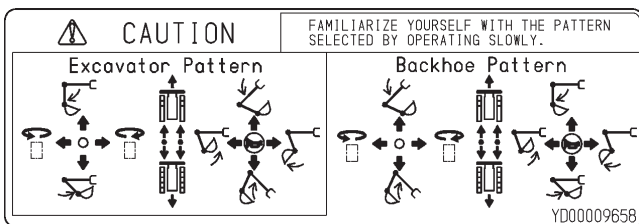
Labels showing the lever control pattern are provided around the operator's seat. As illustrated below, the labels indicate the control patterns. (Refer to the illustration)

### Lever Control Pattern Label Location

Canopy	Roof
Cab	Right side in the cab



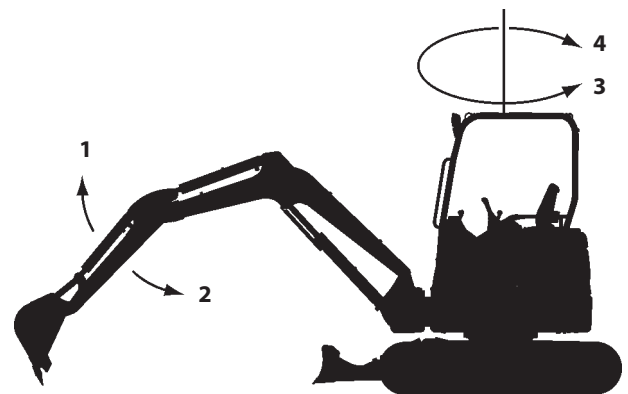
MADB-01-062



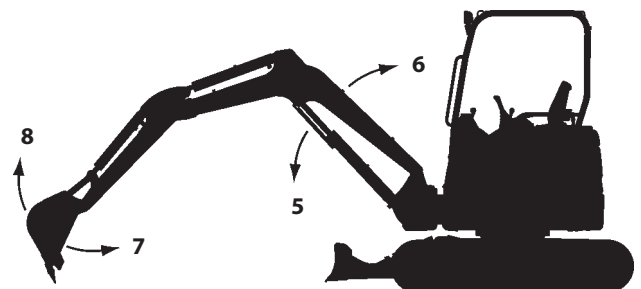
MADG-05-006

When a lever is released, it will automatically return to neutral, and that machine function will stop.

- 1- Arm Roll-Out
- 2- Arm Roll-In
- 3- Swing Left
- 4- Swing Right
- 5- Boom Lower
- 6- Boom Raise
- 7- Bucket Roll-In
- 8- Bucket Roll-Out



M1M7-05-001



M1M7-05-002

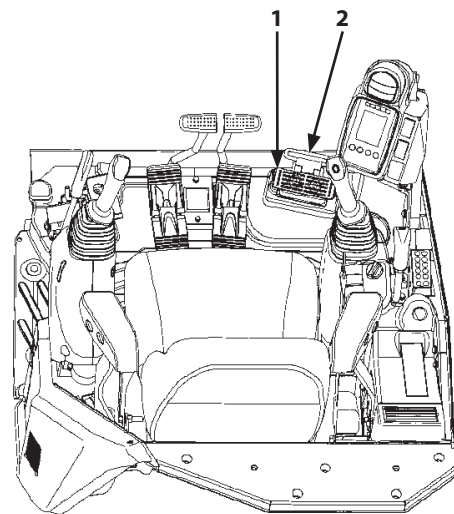
## OPERATING THE MACHINE

### Boom-Swing Pedal

Use the boom swing function to efficiently operate the machine when excavating grooves along roadsides or near walls. The boom swing operation is performed using boom-swing pedal (1) located at the operator's right foot as illustrated to the right.

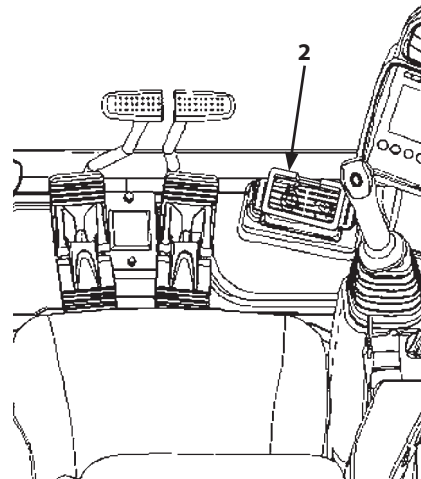
#### Boom-Swing Operation

1. Turn cover (2) for boom-swing pedal (1) forward.
2. Step on the left side of boom-swing pedal (1) to swing left. Step on the right side of pedal (1) to swing right.
3. Turn cover (2) backward over boom-swing pedal (1) when boom-swing operation is no longer required.



Unlock Position

MADB-01-062

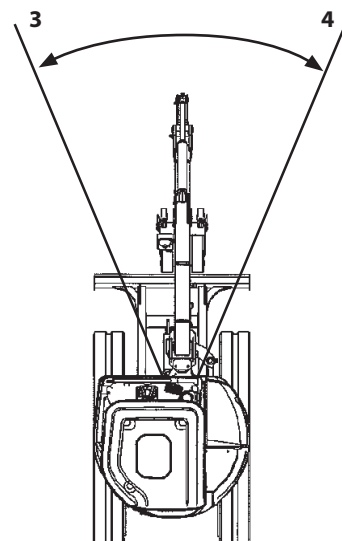


Lock Position

MADB-05-001

3- Swing Left

4- Swing Right



MADB-00-001

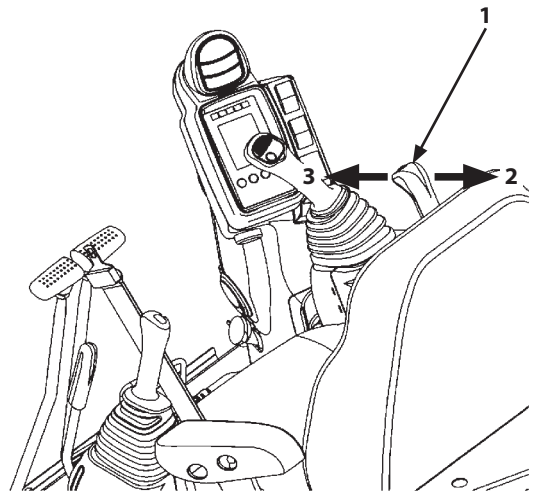


## OPERATING THE MACHINE

### Blade Lever

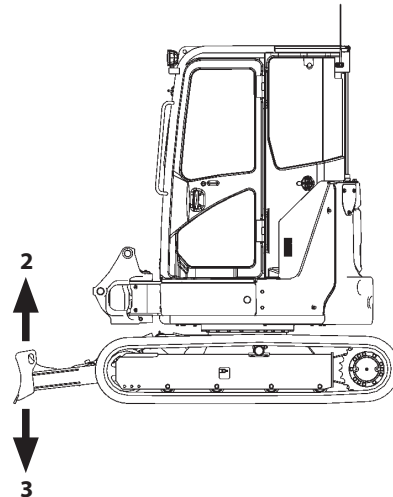
Use blade lever (1) on the operator's right to raise and lower the blade.

When blade lever (1) is released, it automatically returns to neutral, holding the blade in the present position until lever (1) is operated again.



MADB-05-002

- 2- Blade Raise
- 3- Blade Lower



MADB-05-005

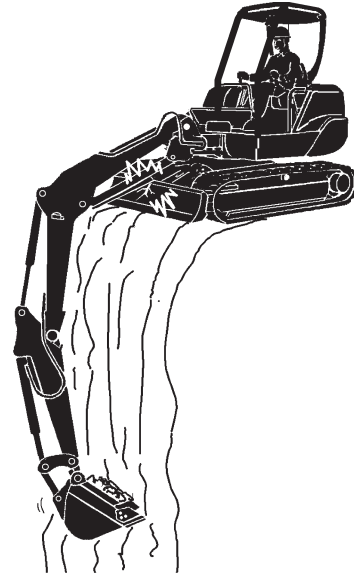
## OPERATING THE MACHINE

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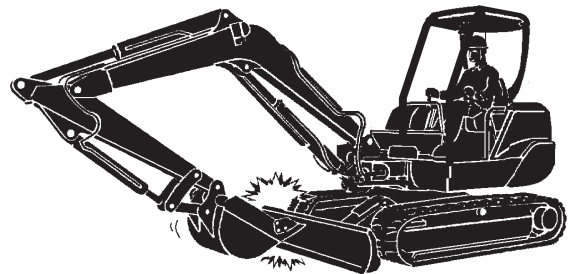
### Precautions for Blade Operation

This blade is designed as a light service attachment of the hydraulic excavator. Please keep the following points in mind:

- This blade is designed for bull dozing work only. Do not attempt to dig deeply with the blade. Doing so may damage not only the blade but the undercarriage as well.
- Do not apply concentrated or uneven loads to the blade. Never allow the blade to forcefully collide with a load by running the machine into the load. Failure to do so may result in damage to the blade and the undercarriage.
- When jacking up the machine with this blade, the surface beneath the blade comes under high pressure, increasing the risk of surface collapse. Always be sure that the surface is strong enough to support the weight of the machine before jacking up the machine. Avoid dangerous uneven distribution of weight to the blade by maintaining even contact between the blade and the ground.
- While digging with the blade positioned in the front of the machine, take care not to allow the bucket to come into contact with the blade.
- When digging, take care not to allow the boom cylinder to come in contact with the blade.



M586-05-016



M586-05-017

## OPERATING THE MACHINE

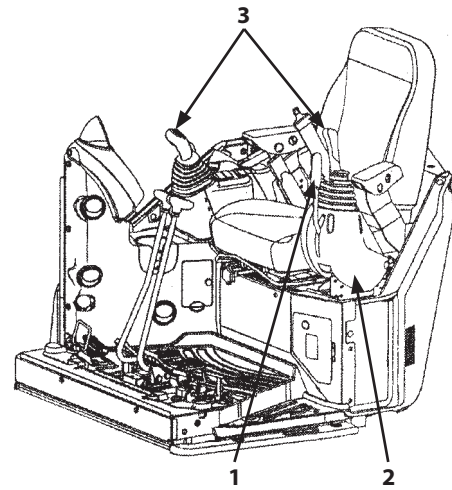
### Pilot Control Shut-Off Lever

Pilot control shut-off lever (1) functions to prevent misoperation of the machine from occurring if the control levers are accidentally moved when leaving the operator's seat or when entering the cab.

Pilot control shut-off lever (1) is linked to console (2) latch mechanism so that console (2) is raised in the LOCK position to aid in entering and exiting the operator's station and for maintenance.

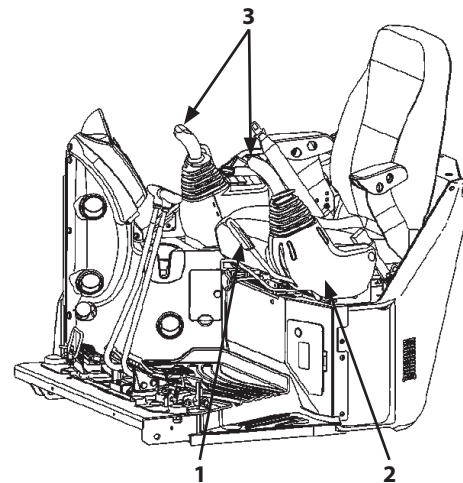
#### WARNING:

- **To deactivate control lever (3) and pedal functions, be sure to pull pilot control shut-off lever (1) and raise console (2) to the fully locked position. To reactivate control lever (3) function, always hold and push pilot control shut-off lever (1) down. Never attempt to lower raised console (2) or control lever (3) to reactivate all control lever function without holding pilot control shut-off lever (1).**
- **Be sure not to touch control lever (3) when operating pilot control shut-off lever (1). Failure to do so may allow the machine to unexpectedly move when a body part unintentionally comes in contact with the control lever, possibly resulting in serious personal injury or death.**
- **When leaving the machine, always stop the engine. Then, pull the pilot control shut-off lever (1) up to the LOCK position.**
- **Always check to be sure that the pilot control shut-off lever (1) is pulled up to the LOCK position before transporting the machine or leaving the machine at the end of the shift.**



Lock Position

MADB-05-003



Unlock Position

MADB-01-003

### Before Leaving the Machine

1. Park the machine on a firm and level surface. Lower the bucket and the blade to the ground. Return all control levers to neutral. Properly shut down the engine.
2. Pull pilot control shut-off lever (1) and raise console (2) to the full LOCK position.

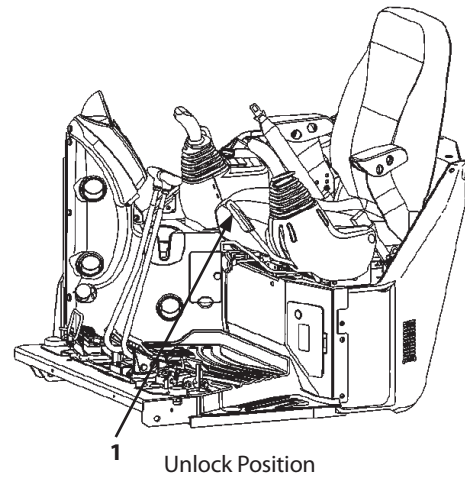
## OPERATING THE MACHINE

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### Before Starting Operation:

Confirm that pilot control shut-off lever (1) is pulled up to the LOCK position before starting the engine.  
Slowly push down control shut-off lever (1) to UNLOCK position before starting operation.  
Confirm that all control levers and pedals are in neutral and that no part of the machine is in motion.

**⚠ WARNING:** If any part of the machine (any actuator) moves when pilot control shut-off lever (1) is lowered to the UNLOCK position despite the fact that all controls are placed in neutral, the machine is malfunctioning. Immediately pull pilot control shut-off lever (1) back to the LOCK position, and stop the engine. Then, see your authorized dealer.



MADB-01-003


## OPERATING THE MACHINE

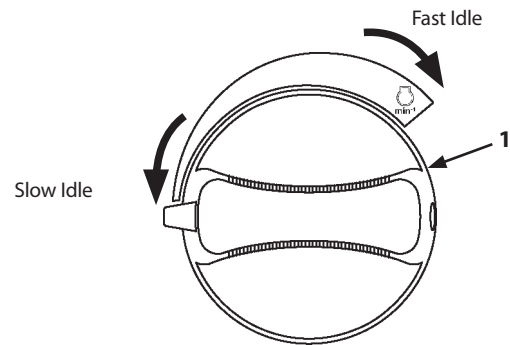
### Warming Up Operation

In cold weather, warm up the machine until coolant and hydraulic oil temperature increases to the appropriate operating temperature.

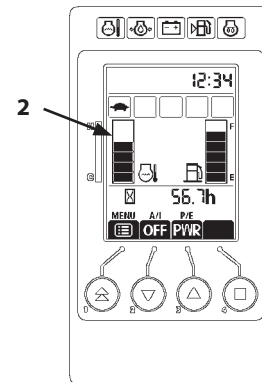
**IMPORTANT:** The appropriate hydraulic oil operating temperature on this machine is 50 to 80 °C. Hydraulic components may be seriously damaged if the machine is operated with low temperature hydraulic oil. In case warming up the machine by relieving the hydraulic system, continuously relieve the relief valve for 10 to 15 seconds while taking a pause for 5 to 10 seconds.

1. Turn engine control dial (1) to the slow idle position.  
(Do not operate the machine until the first segment of coolant temperature gauge (2) stops flashing and changes to stay ON.)
2. After the first segment of coolant temperature gauge (2) stops flashing and changes to stay ON, turn engine control dial (1) to around medium position.
3. Operate the boom, arm and bucket cylinders slowly to each stroke end several times. If the machine equipped with various attachments, operate the attachment function slowly to allow hydraulic oil to circulate through the system.
4. Operate the travel and swing functions slowly to allow hydraulic oil to circulate through the systems.
5. Warming up operation ends after the above operation is completed.

 **NOTE:** During cold weather season, the warm-up operation system automatically operates so that the engine speed increases for a moment even though the engine control dial (1) is in the slow idle position.



MADB-01-067



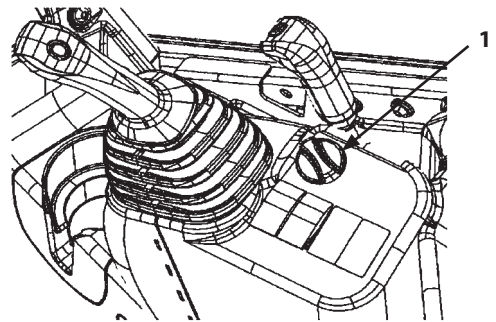
MADH-01-009

## OPERATING THE MACHINE

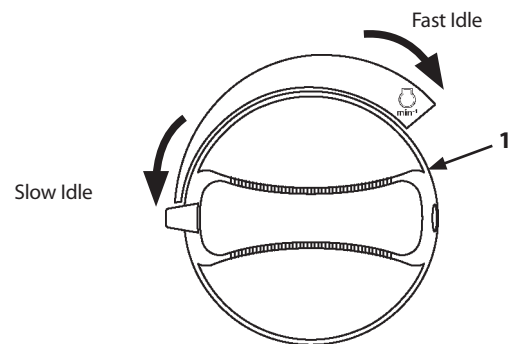
### Engine Speed Control

Increase and decrease the engine speed using engine control dial (1) located on the switch panel, as illustrated.

- Turn engine control dial (1) clockwise to increase the engine speed. Turn engine control dial (1) counterclockwise to decrease the engine speed.
- Note that the auto-idle function will be deactivated if engine control dial (1) is operated while the engine is running at the auto-idle setting.
- Before stopping the engine, always turn engine control dial (1) counterclockwise to the stop (to the slow idle setting). Run the engine five minutes to cool the engine. Then, turn the key switch to OFF position to stop the engine.



MADB-05-004



MADB-01-067

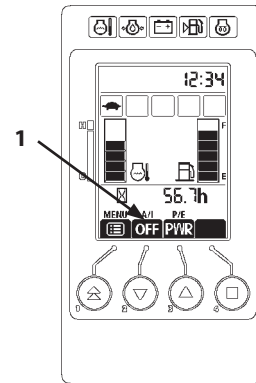
## OPERATING THE MACHINE

### Auto-Idle

#### Auto-Idle Function

With the auto-idle function turned to the ON position, approximately 4 seconds after all control levers are returned to neutral, the engine speed decreases to the auto-idle setting to save fuel consumption.

The engine speed will immediately increase to the speed set by the engine control dial when the engine control dial is operated with the pilot control shut-off lever pulled, or when either the control lever or engine control dial is operated with the pilot control shut-off lever pushed down.



MADH-01-009

#### **!** WARNING:

- **Prevent the machine from unexpected movement. Be sure to turn the auto-idle function to the OFF position when unexpected machine movement is undesirable, especially when loading/unloading the machine for transportation.**
- **The engine speed will increase to the speed set by the engine control dial when any control lever is operated from the neutral position while auto-idle display (1) indicates "ON". If the operator is not aware of the high engine speed setting, the engine speed will unexpectedly increase when any control lever is operated, causing unexpected machine movement, thus possibly resulting in serious personal injury.**

**IMPORTANT:** Always check if auto-idle indicator (1) is ON or OFF before starting operation. If the indicator is ON, the auto-idle function will be activated.

**NOTE:** Use the auto-idle function only after warm-up operation is complete. Failure to do so may not reduce the engine speed.

## OPERATING THE MACHINE

### Auto-Idle ON/OFF

Note that auto-idle function can be turned ON or OFF by pushing auto-idle switch (2).

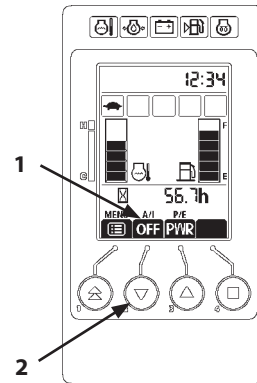
Check if the auto-idle function is turned ON or OFF with auto-idle indicator (1).

### Auto-Idle Switch

Auto-Idle Indicator (1) ON : Auto-Idle Function ON

Auto-Idle Indicator (1) OFF : Auto-Idle Function OFF

After the key switch is turned OFF when the auto-idle function is activated [with auto-idle indicator (1) ON], when the engine is restarted, auto-idle indicator (1) flashes for 10 seconds and the auto-idle function becomes activated later.



MADH-01-009

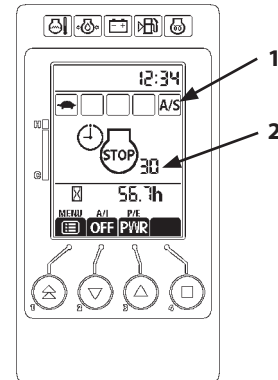


## OPERATING THE MACHINE

### Auto Shut-Down

**WARNING:** This function automatically stops the engine. Take extra care on the work and work environment when using this function.

When the auto shut-down function is turned ON, the engine automatically stops after the preset time at the state in which the control shut-off lever is pulled. 30 seconds before the engine stop, monitor (2) displays a message that engine will be stopped and indicator (1) starts flashing. Also the buzzer sounds. The buzzer sounds once at 30 seconds before, continuously sounds from 15 seconds. The engine speed decreases to the idling speed, and then stops after 15 seconds. When the control shut-off lever is pushed or engine control dial is operated before stopping the engine, the auto shut-down is disabled and the engine will not stop.



MADH-01-029

#### IMPORTANT:

- Ensure that the ON or OFF status of auto shut-down indicator (1). If the indicator is ON, the auto shut-down function will be activated.
- When the engine stops by the auto shut-down function, turn the key switch to OFF once and then turn it to START to restart the engine. Do not leave the machine after auto shut-down. Failure to do so may discharge the batteries.
- When the key switch is turned to OFF position while the auto shut-down function is ON, the setting will be maintained. If the auto-idling function is required to be turned OFF when starting the engine, consult your authorized Hitachi dealer.

#### Operating Condition

- The auto shut-down function is ON.
- The engine is running.
- The pilot control shut-off lever is in the LOCK position.
- The overheat indicator is OFF.
- The engine control dial is not operated.
- The muffler filter is not in regenerating process.

## OPERATING THE MACHINE

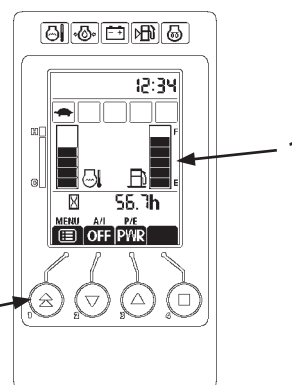
### IMPORTANT:

- Even if the auto shut-down function is ON, the engine will not stop during the regeneration of the muffler filter.
- When the auto shut-down activates and the engine stops, the air conditioner will also stop.

### Setting the auto shut-down function

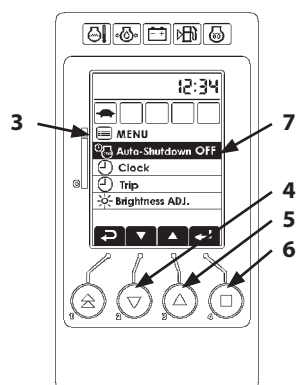
#### Auto Shut-Down: ON/OFF

1. Press menu switch (2) while displaying Basic Screen (1) to display MENU (3).



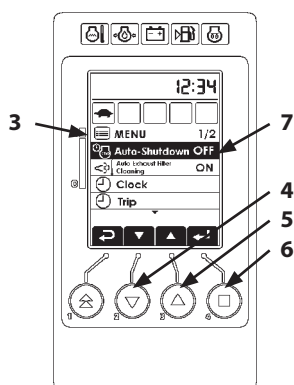
MADH-01-009

2. Select Auto-Shutdown (7) by pressing switch (4) or (5), and then press set switch (6) to set it.



ZX30U-5N, 35U-5N

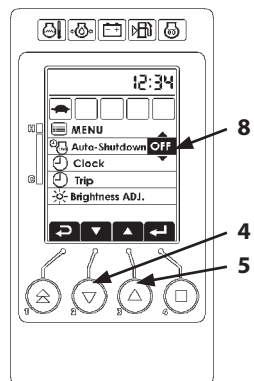
MADG-01-099



ZX50U-5N, 60USB-5N

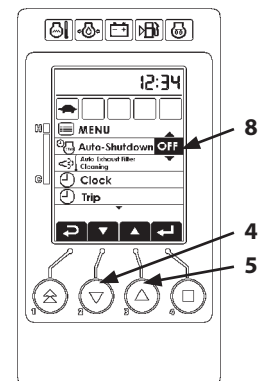
MADG-01-100

3. Select acting time (8) by pressing switches (4) or (5).



ZX30U-5N, 35U-5N

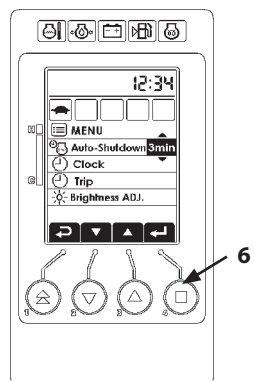
MADG-01-101



ZX50U-5N, 60USB-5N

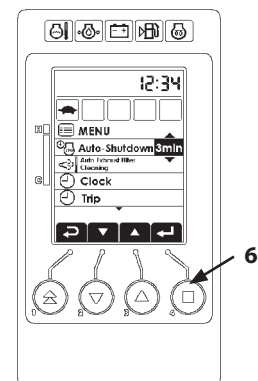
MADG-01-102

4. Press set switch (6) to set the selected acting time.



ZX30U-5N, 35U-5N

MADG-01-103




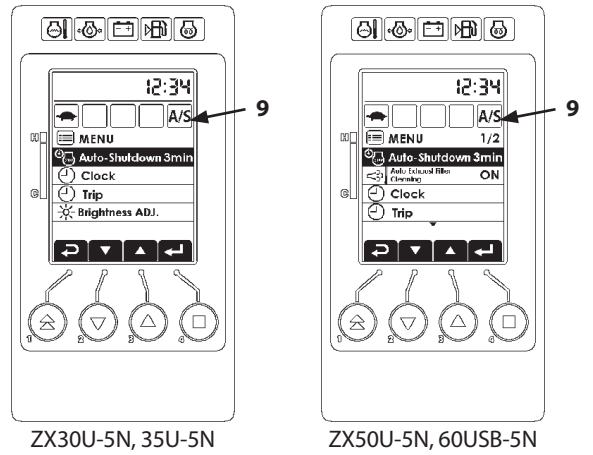
ZX50U-5N, 60USB-5N

MADG-01-104

## OPERATING THE MACHINE

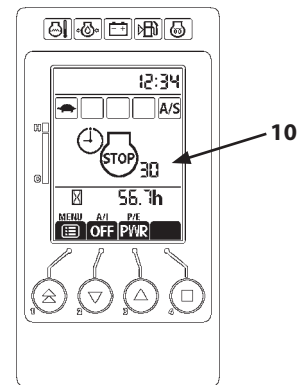
- When auto shut-down function is set, "A/S" indicator (9), which shows that auto shut-down function is enabled, will be displayed.

 **NOTE:** When the auto shut-down function is turned ON, the monitor will display time (10) which indicates the remaining time to stop the engine 30 seconds before the engine stops. (On the basic screen)



MADG-01-105

MADG-01-106



MADH-01-029

# OPERATING THE MACHINE

## Muffler Filter Manual Regeneration

### Manual Regeneration Procedure

When the manual regeneration is needed, screens (1) or (2) as shown in the right will be displayed. Screens (1) or (2) are displayed depending on the machine conditions. When screen (2) is displayed, the warning mark of muffler filter regeneration request (8) is displayed simultaneously. When these screens are displayed, you need to perform the manual regeneration. Before starting the manual regeneration, be sure to check the following.

**NOTE:** The muffler filter regeneration procedure is shown by illustration (3) under the monitor.

- No person is present around the machine
  - Keep flammable materials away from the muffler.
  - Remaining fuel alarm (4) does not light.
1. Park the machine in a safe place. Lower the front attachment onto the ground.
  2. Pull the pilot control shut-off lever to the LOCK position.
  3. Set the engine control dial to slow idle.
  4. Push and hold muffler filter manual regeneration switch (5) (about 1 second).
  5. When pushing the muffler filter manual regeneration switch (5), screen (6) as shown in the right will be displayed and the manual regeneration starts. Bar graph (7) on the screen indicates progress of the regeneration process.

**IMPORTANT:** The regeneration does not start unless the pilot control shut-off lever is in the LOCK position and the engine control dial is in slow idle. When touching the pilot shut-off lever or the engine control dial during regeneration, the regeneration process is aborted. When the process is aborted, start over again.

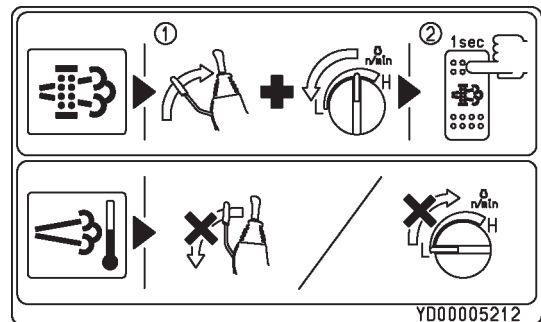
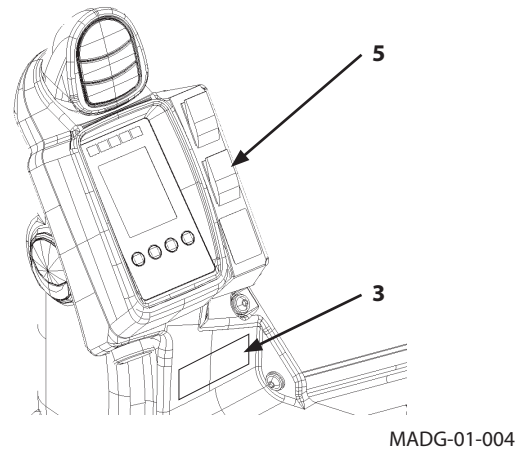
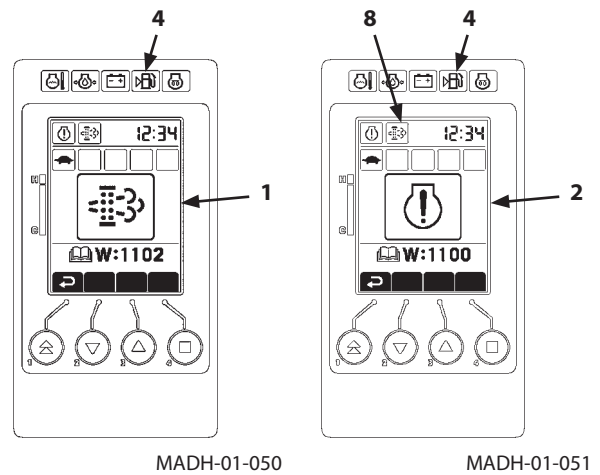
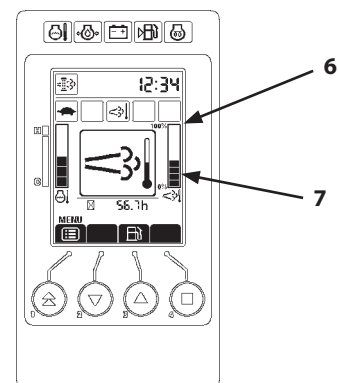
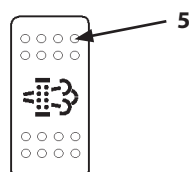


Illustration (3) MADG-01-088



MADG-01-006

MADH-01-004

## OPERATING THE MACHINE


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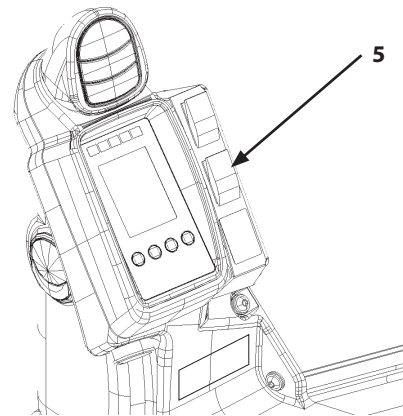
- When the regeneration is finished, "Regeneration Has Completed." message will be displayed. If "Regeneration Has Failed." message is displayed, start over the regeneration process again. Failure of regeneration process may happen in the conditions other than above (such as malfunction of a sensor that affects regeneration at low ambient temperature).

 **NOTE:**

- The engine sound may change and the engine speed may increase when the manual regeneration starts, but it is not a malfunction.
- Regeneration time varies depending on the ambient temperature.
- White smoke may temporarily be generated from the tail pipe during the regeneration process due to the burning of particle matter (PM), but it is not a malfunction.
- Manual regeneration process completes earlier right after the engine has been running than when it is cold.
- Coolant temperature may increase during the manual regeneration.

**IMPORTANT:** If regeneration must be interrupted, push the pilot control shut-off lever to UNLOCK position or operate the engine control dial. The regeneration process is aborted, but the machine becomes operable. In this case, regeneration should be performed again. Restart the manual regeneration as soon as possible.

 **NOTE:** When push muffler filter manual regeneration switch (5) at the engine start, the regeneration does not start unless the warm-up operation is performed for 15 to 20 minutes.



MADG-01-004

## OPERATING THE MACHINE

### Power Mode

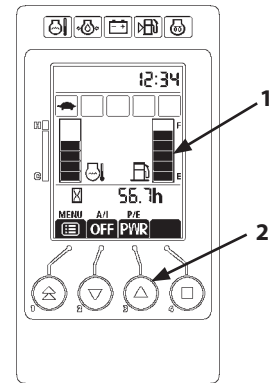
Two engine speed modes, ECO and PWR modes are selected by pushing ECO/PWR mode switch (2) while displaying basic screen (1).

#### ECO (Economy) Mode

This mode slightly reduces the engine speed according to the operating condition. Digging power is same as the PWR mode. Although production is slightly reduced more than in the PWR mode, the fuel consumption and noise levels are reduced, allowing the machine to operate efficiently.

#### PWR (Power) Mode

Operate the machine in this mode when performing normal work.



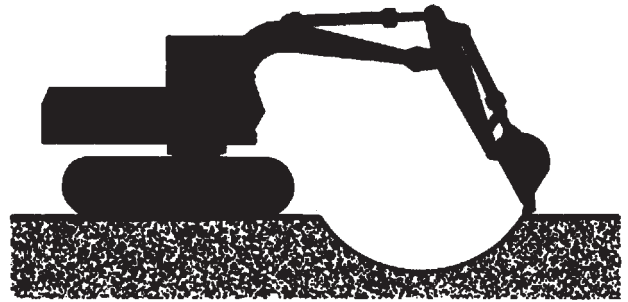
MADH-01-009

## OPERATING THE MACHINE

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### Operating Backhoe

- Use the appropriate arm and bucket for the work. (Refer to the "Bucket Types and Applications" in the Specifications section.)
- Pull the bucket toward the machine using the arm as the main digging force.
- When soil sticks to the bucket, remove it by moving the arm and/or bucket rapidly back and forth.
- Place the bucket teeth on the ground with the bottom of the bucket at a 45 degree angle to the ground.
- When trenching a straight line, position the tracks parallel to the trench. After digging to the desired depth, move the machine as required to continue the trench.
- When operating with hydraulic cylinders fully retracted or extended, all hydraulic cylinders and equipment may be damaged.



M107-05-037

#### IMPORTANT:

- **When digging at an angle, avoid striking the tracks with the bucket teeth.**
- **When lowering the boom, avoid sudden stops that may cause shock load damage to the machine.**
- **When digging a deep excavation, avoid striking the boom or bucket cylinder hoses against the ground.**
- **When operating the machine with the blade positioned towards the front, the bucket teeth may come in contact with the blade if you are not careful.**
- **When the bucket load is dumped with the boom raised, falling material may hit the base machine and/or the canopy. Always be aware of loads in the bucket during operation.**

## OPERATING THE MACHINE

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### Grading Operation

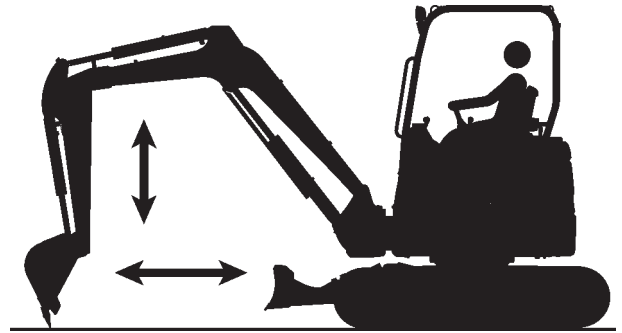
Use the blade for soil refilling and general grading operations after excavation. Grading operation can be also performed by operating the boom, arm, and bucket simultaneously.

**IMPORTANT: Do not pull or push dirt with the bucket when traveling. Excess force will be applied on each part, and the machine may be damaged.**

#### **When grading by operating the boom, arm, and bucket simultaneously:**

1. When grading from the forward to the backward, slowly roll in the arm while slightly raising the boom. As soon as the arm passes the vertical position, slowly lower the boom so that the bucket can be horizontally moved.
2. When grading from the backward to the forward, operate the arm and bucket rolled back as described step 1.

Do the slope finishing work in the same procedure as described in steps 1 and 2.



M1M7-05-012

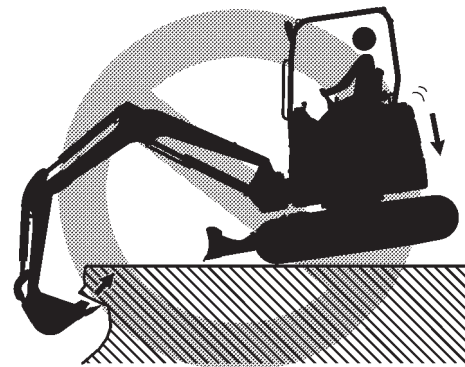
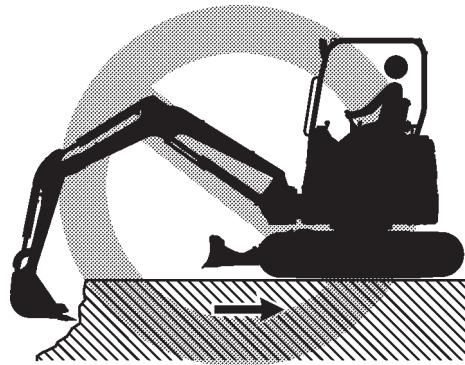


## OPERATING THE MACHINE

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### Avoid Abusive Operation

Do not use travel while thrusting the bucket teeth into the ground and do not raise rear of the machine to use the machine's weight as additional digging force. Severe machine damage may result.



MZX5-05-002

### Avoid Excavation Using Upperstructure and/or Boom Swing Power

Never attempt to move rocks or excavate a cliff face by hitting the bucket using upperstructure and/or boom swing power. Damage to the front attachment, or shortening of the service life of the swing systems may result.

## OPERATING THE MACHINE

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### Avoid Driving Bucket Teeth into Ground

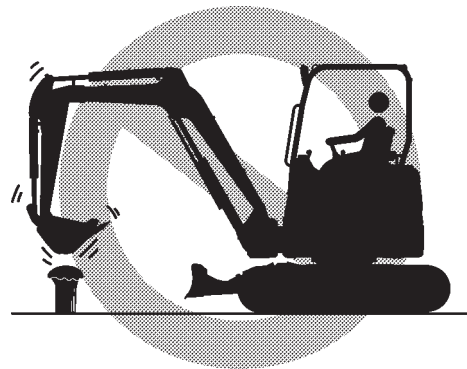
**⚠ WARNING:** If the bucket teeth are forcedly driven into the ground, crushed material may spatter, possibly resulting in injury of the operator and/or co-workers around the machine. Furthermore, the service lifetimes of all front attachment parts may be shortened.

If the bucket teeth are forcedly driven into the ground, the service lifetime of all front attachment parts (especially the bucket) may be severely shortened. When excavating tightly fastened gravelly soil, use the bucket digging out force. Operate the boom, arm, and bucket simultaneously so that the bucket teeth can be effectively penetrated into the excavation surface. Carefully operate the machine to prevent crushed material from spattering, possibly resulting in injury to the operator and/or co-workers around the machine.

### Avoid Striking With Bucket

**⚠ WARNING:** The bucket bottom is curved. Therefore, hammering or piling work with the bucket is very hazardous. In addition, damage to the bucket and the front attachment parts may result.

Hammering or piling work with the bucket may create hazardous situations. Never attempt to perform hammering or piling work with the bucket. Damage to the bucket and the front attachment parts may also result.



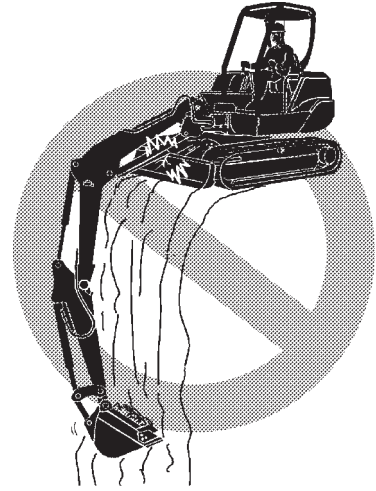
MZX5-05-001

## OPERATING THE MACHINE

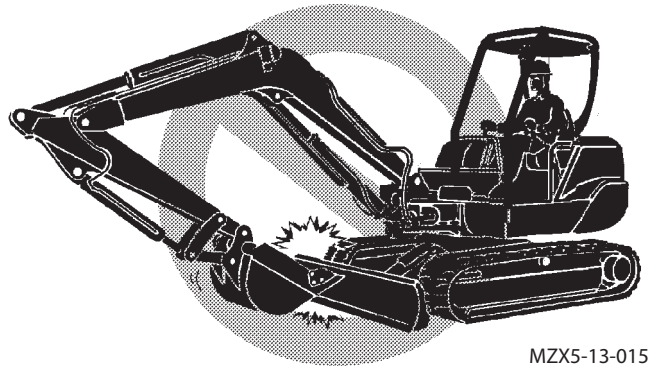
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### Boom Cylinder may Hit Blade

When digging deeply with the blade positioned at the front, the boom cylinder or bucket may accidentally hit the blade, causing damage. Take care to prevent this from happening.



MZX5-13-014

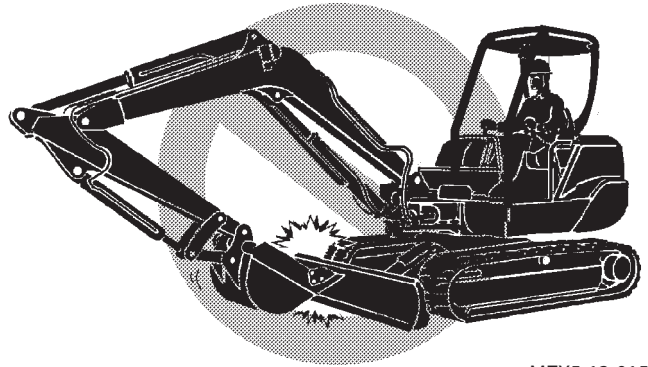


MZX5-13-015

## OPERATING THE MACHINE

### Avoid Hitting Blade With Bucket

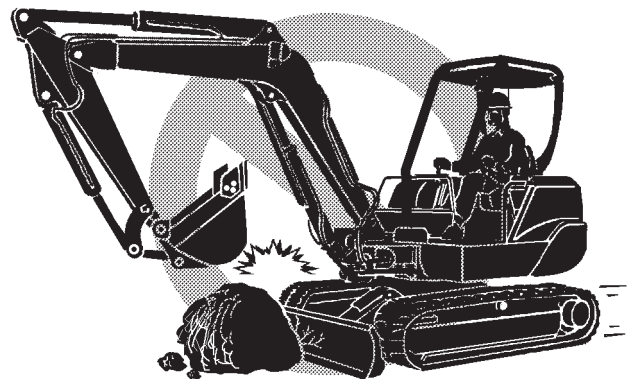
When rolling in the arm in a travel or transportation position, be careful not to hit the blade with the bucket.



MZX5-13-015

### Avoid Colliding Blade Against Rocks

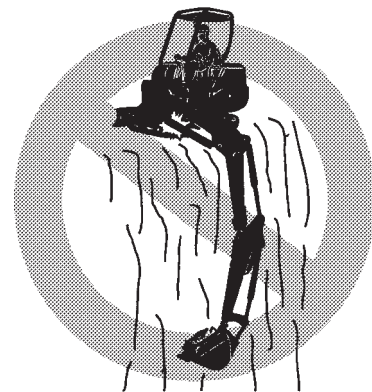
Do not attempt to allow the blade to collide with rocks. Premature damage to the blade and the blade cylinders may result.



MZX5-13-016

### Avoid Colliding Boom Cylinder With Track

When digging deeply with the front attachment positioned at an angle, as illustrated, the boom cylinder may accidentally collide with the track, causing damage. Take extra care to prevent this from happening.



MZX5-13-018

### Precautions for Installing Wide Bucket or Special Type Bucket

If the boom is fully offset to the left and raised on the cab-equipped machine with a bucket wider than shown to the right installed, the bucket will come in contact with the cab. Be sure to install a specially arranged bucket only after consulting your authorized dealer to prevent the cab collision with the bucket.

ZX30U-5N:	600 mm (24 in)
ZX35U-5N:	600 mm (24 in)
ZX50U-5N:	650 mm (26 in)
ZX60USB-5N:	700 mm (28 in)

## OPERATING THE MACHINE

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### Use Correct Track Shoe

Never use rubber crawlers or wide track shoes on rough terrain with scattered rocks, gravel or boulders. Failure to do so may cause breakages of rubber crawlers, shoe bending, looseness of shoe bolts, or damage to shoe track parts such as track links, or rollers. (Refer to the table for Types and Applications in the specification chapter.) Soil may easily become packed into the crawler during travel operation on sandy ground. If the machine is driven without removing the packed soil from the crawlers, the rubber crawlers will be overloaded, possibly resulting in breakage of the crawlers. Avoid causing the crawlers to become packed with soil by removing soil as often as possible.



M1M7-05-015

## OPERATING THE MACHINE

### Using Rubber Crawler

Rubber crawlers are designed to allow the machine to travel without damaging road surfaces such as paved road surfaces. Avoid damage to the rubber crawlers by following the precautions below:

#### Forbidden Operations

1. Do not operate or steer the machine on or near river-terrace, boulder and boulder mixed ground, crushed-stone ground, uneven hardpan surfaces, stumps, reinforcing bars, scraps, and steel plate edges. Failure to do so may shorten the service life of the rubber crawlers to a great extent.
2. Do not leave engine oil, fuel, and other kinds of lubricants remaining on the rubber crawlers, and avoid traveling on road surface covered with oil to reduce the danger of sliding.
3. Do not travel the machine while raising one side crawler off the ground with the front attachment. Shear or damage to the rubber crawler may result.

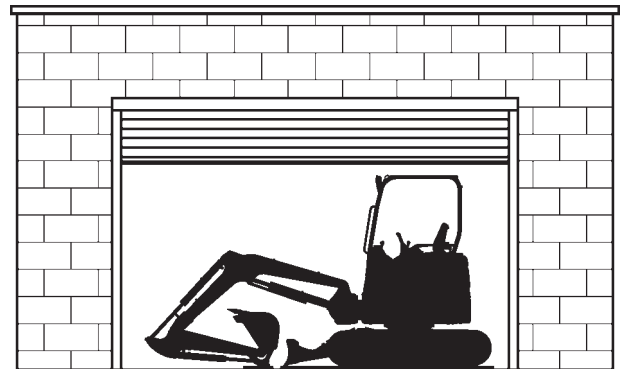


M1M7-05-015

#### Precautions for Using Rubber Crawlers

**⚠ WARNING: The rubber crawler machine is less stable than the steel crawler machine, as the edge of the rubber crawler is easier to deform than steel crawler. Pay attention when operating the machine at an angle to the tracks.**

1. Do not store the rubber crawlers in a place where they will be exposed to direct sunlight for a period of more than three months.
2. Avoid unnecessary steering operations on concrete roads, possibly resulting in premature wear of shoe lugs and core metals. Also, avoid operating the machine on high temperature [over 60 °C (140 °F)] road surfaces during asphalt pavement work, possibly causing premature wear of the rubber crawlers as well as damage to the road surface.

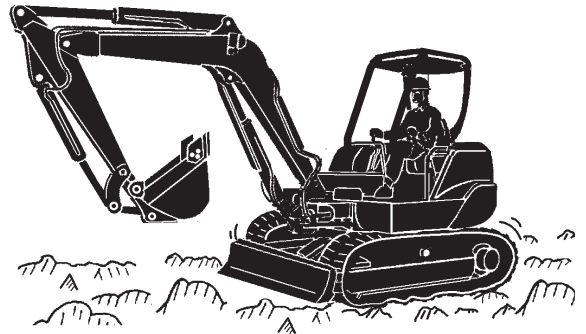


M1M7-05-016

## OPERATING THE MACHINE

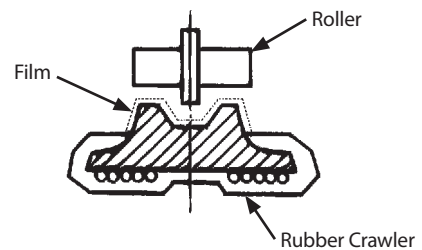
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3. Operating the machine with rubber crawlers sagging on uneven surfaces can result in derailment of rubber crawler, possibly causing the rubber crawlers to be damaged.



M586-05-024

4. When lowering the machine raised above the ground using the front attachment, slowly lower the machine to the ground.
5. The new rubber crawler has a thin rubber film (shown in dotted line) on its roller tread. During operation of a new machine, or immediately after the rubber crawlers are replaced, the rubber film may come off due to contact with the rollers. This is not abnormal. (See the right illustration.)
6. If the rubber crawler is damaged and the rubber crawler core wire rusts, the service lifetime of the rubber crawler will become short. If damaged, the rubber crawler must be repaired. Contact your authorized dealer.



M503-05-040

## OPERATING THE MACHINE

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### Avoid other than Specified Machine Operations

**This machine has been exclusively designed for excavation and loading works.**

Do not apply this machine to works other than excavation and loading. Do not operate the machine under any conditions beyond these specifications.

#### CAUTION:

##### Precautions for Lifting Work

- **Operate the machine on level ground. Operating the machine on a slope may cause the machine to become unstable, possibly resulting in tipping accident.**
- **When lifting a load, carefully swing the machine not to cause the lifted load to come in contact with personnel working near the machine. Reduce the engine speed to slowly swing the machine. Failure to do so may cause the machine to tip over by swing centrifugal force.**
- **If traveling the machine with a lifted load is unavoidable, reduce the engine speed to slowly travel the machine.**
- **Never move the front attachment and/or swing the machine while traveling the machine with a lifted load. The lifted load may sway, possibly creating a hazardous situation.**



## OPERATING THE MACHINE

### Shackle Bracket Usage

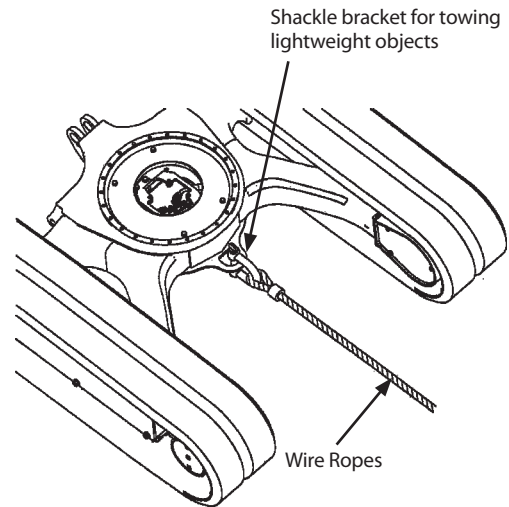
A shackle bracket is provided on the track frame to tow light weight objects as specified below.

**IMPORTANT:** Be sure to conform to the restrictions and precautions stated below when towing a light weight object using the shackle bracket provided on the track frame. The track frame and/or the shackle bracket may be damaged otherwise.

- The maximum drawbar pull.

Model	Maximum Drawbar Pull
ZX30U-5N	9300 N (950 kgf)
ZX35U-5N	9300 N (950 kgf)
ZX50U-5N	13200 N (1350 kgf)
ZX60USB-5N	17200 N (1750 kgf)

- Be sure to use a shackle.
- Keep the tow line horizontal, straight, and parallel to the tracks.
- Select the slow travel mode. Slowly drive the machine when towing.



M1NE-04-002

## OPERATING THE MACHINE

### Emergency Boom Lowering Procedure

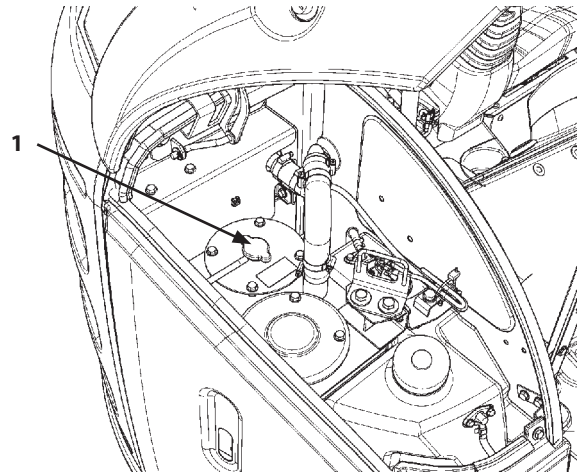
**⚠ WARNING: Prevent personal injury. Confirm that no one is under the front attachment before starting the procedure below.**

If the engine stalls and cannot be restarted, lower the boom to lower the bucket to the ground referring to the emergency boom lowering procedure stated below.

1. Remove the cover above the hydraulic oil tank. Loosen filler cap (1) on the hydraulic oil tank to release air pressure from the hydraulic oil tank.

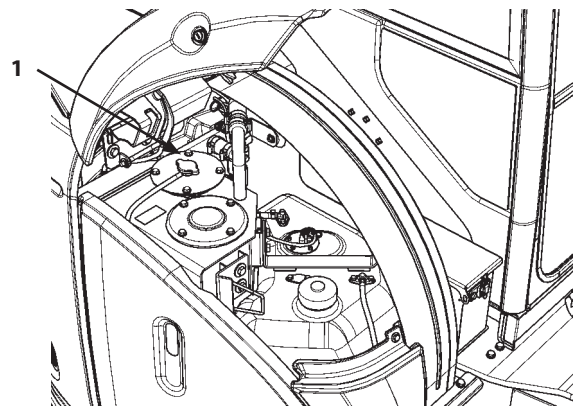
**⚠ WARNING: Be sure to work only after oil temperature is low or before operation. Failure to do so may allow high temperature oil to spray, possibly causing severe burns.**

2. Remove bolts (2) from the front and left side of cover (3) to remove cover (3).
3. Lower the boom in the procedures on the next page.



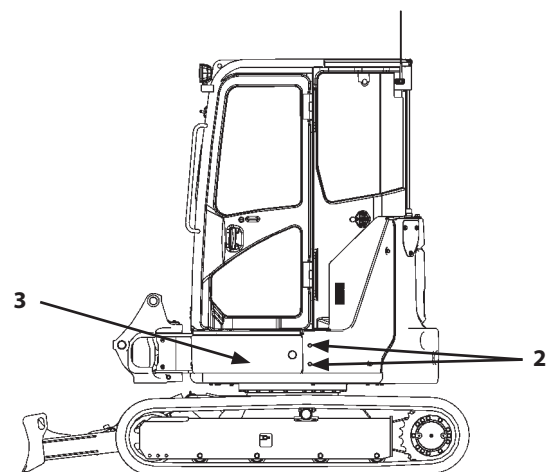
ZX30U-5N, 35U-5N

MADB-00-017



ZX50U-5N, 60USB-5N

MADB-00-018



MADB-05-005

## OPERATING THE MACHINE

### If the front attachment is not loaded

ZX30U-5N, 35U-5N

**⚠ WARNING:** Loosen overload relief valve slowly. If it is loosened rapidly, the boom may also lower rapidly. Do not loosen it more than 3/4 turns, as the hydraulic oil may spout.

1. Loosen the overload relief valve slowly by checking the movement of boom.
2. After checking that the boom is completely lowered, tighten the overload relief valve.

Model	Tightening Torque
ZX30U-5N, 35U-5N	70 to 80 N·m (7 to 8 kgf·m, 52 to 59 lbf·ft)
ZX50U-5N	60 to 64 N·m (6 to 6.4 kgf·m, 44 to 47 lbf·ft)
ZX60USB-5N	60 to 70 N·m (6 to 7 kgf·m, 44 to 52 lbf·ft)

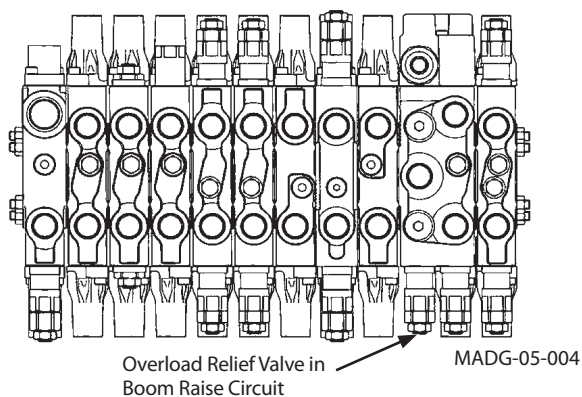
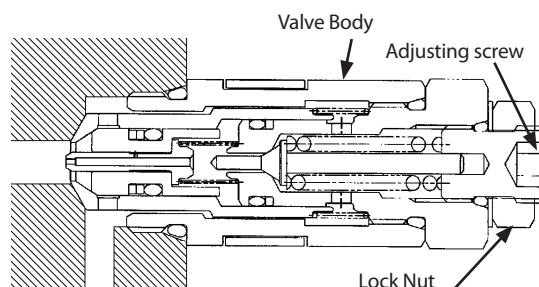


Fig. 1



T152-03-03-015

### If the front attachment is loaded

1. Put the matching marks on lock nut in overload relief valve and adjusting screw in the boom raise circuit (cylinder bottom side).

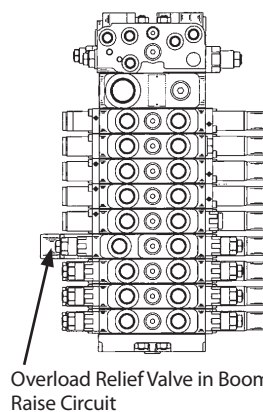
**⚠ WARNING:** Loosen the adjusting screw slowly. If it is loosened rapidly, the boom may also lower rapidly.

2. Loosen the lock nut. Loosen adjusting screw slowly by checking the movement of boom.
3. After checking that the boom is completely lowered, align the matching marks and tighten the lock nut.

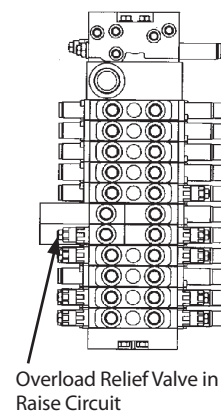
Torque:            28 to 32 N·m  
                           (2.8 to 3.2 kgf·m, 20 to 23 lbf·ft)

ZX50U-5N

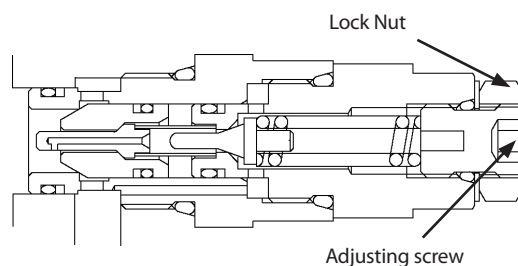
ZX60USB-5N



MADG-05-001



MADG-05-005



T566-03-03-018

## OPERATING THE MACHINE

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### Precautions for After Operations

- After finishing the day's operation, drive the machine to a firm, level ground where no possibility of falling stones, ground collapse, or floods are present.  
(Refer to the group for "PARKING THE MACHINE" in the DRIVING THE MACHINE section.)
- Fully refill the fuel in the fuel tank.
- Clean the machine.



M1M7-05-024

## TRANSPORTING

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### Transporting by Road

When transporting the machine on public roads, be sure to first understand and follow all local regulations.

- When transporting the machine using a truck, check the width, height, length and weight of the trailer with the machine loaded. Note that transporting weight and dimensions may vary depending on the type of shoe or front attachments installed.
- Investigate beforehand the conditions of the route to be traveled, such as dimensional limits, weight limits, and traffic regulations.

In some cases, getting the permission from the local authority concerned or disassembling the machine to bring it within dimensional limits or weight limits of local regulations may become necessary.

Notify the nearest dealer that you are transporting the unit.

## TRANSPORTING

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### Loading/Unloading on a Truck

Always load and unload the machine on a firm, level surface.

**⚠ WARNING:** Be sure to use a loading dock or a ramp for loading/unloading. Never load or unload the machine onto or off a truck or trailer using the front attachment functions when driving up or down the ramp.

#### Ramp/Loading Dock:

1. Before loading, thoroughly clean the ramps, loading dock and flatbed. Dirty ramps, loading docks, and flatbeds with oil, mud, or ice on them are slippery and dangerous.
2. Place blocks against the truck wheels while using a ramp or loading dock.
3. Ramps must be sufficient in width, length, and strength. Be sure that the incline of the ramp is less than 15 degrees.
4. Loading docks must be sufficient in width and strength to support the machine and have an incline of less than 15 degrees.
5. When transporting the machine equipped with a blade, take care not to hit the blade.

## TRANSPORTING

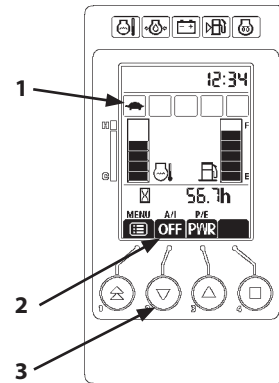
### Loading

#### WARNING:

- Push auto-idle switch (3) to turn A/I display (2) OFF. If the machine is operated with A/I display (2) ON, it may cause the engine speed to suddenly change.
- The engine speed changes at the muffler filter regeneration. Set the muffler filter manual regeneration switch to the inhibition position.
- Always select the slow speed mode with the travel mode switch.

Make sure that travel mode display (1) on the monitor is "".

- Never steer while driving up or down a ramp as it is extremely dangerous and may cause the machine to turnover. NEVER attempt to change directions whilst positioned on the ramp. If repositioning is necessary, first move back to the ground or flatbed, modify traveling direction, and begin to drive again.
- The top end of the ramp where it meets the flatbed is a sudden bump. Take care when traveling over it as the balance may be lost.
- Extreme care must be taken when swinging the upper structure when the machine is on the truck flatbed. If the front attachment is fitted, swing slowly with the arm fully roll-in underneath the boom being careful not to lose the balance of the machine.

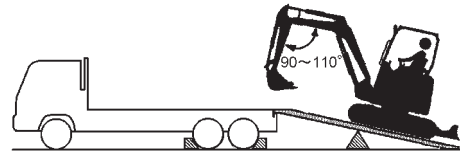


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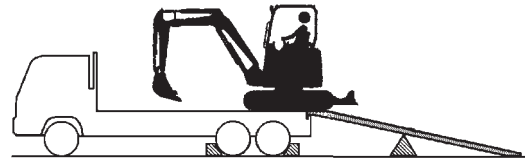
## TRANSPORTING

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1. Load the machine so that the centerline of the machine aligns with the centerline of the trailer flatbed.
2. Drive the machine onto the ramp slowly.
3. Determine a position for the bucket in line with the truck. Adjust the angle of the boom and the arm at 90 to 110°.
4. Lower the bucket onto to the deck of the truck before the unit passes over the end of the ramp for support.
5. Move the machine as illustrated right. And then, slowly rotate the upperstructure 180° while keeping the arm fully rolled in.
6. Reverse the machine to the specified position.
7. Rest the front attachment on supports such as wooden blocks placed on the truck flatbed. Also lower the blade onto the deck at this time (if fitted).
8. Stop the engine. Remove the key from the key switch.
9. Place the pilot control shut-off lever in the LOCK position.
10. Cover the openings on the machine to prevent wind and/or rain from coming in.



MADB-06-001



MADG-06-001

**⚠ CAUTION:** In cold weather, be sure to warm up the machine before loading or unloading it.



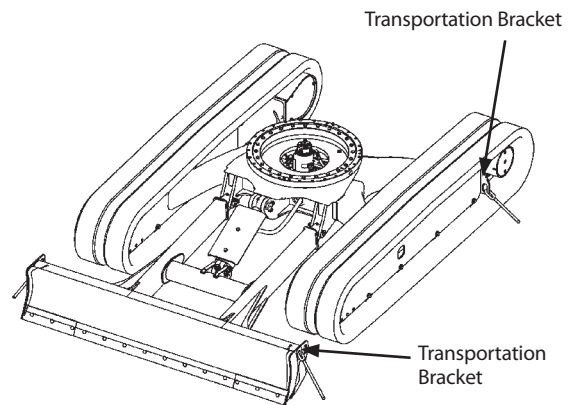
## TRANSPORTING

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### Fastening Machine for Transporting

**CAUTION:**

- Securely fasten the machine to the flatbed with wire ropes.
  - Fasten the machine using the transportation bracket of the truck frame to the truck flatbed with wire ropes. Be careful not to allow the wire rope to come in contact with the track shoe.
1. Place cog stoppers or blocks in front of and behind the tracks to help secure the unit.
  2. Fasten each corner of the machine and front attachment to the truck with appropriate strength of chains or cables.



MADB-06-003

### Transporting the machine equipped with rubber crawlers

When securing the machine to the flatbed, do not directly tighten the rubber crawler with wire ropes. Tighten the machine to the trailer flatbed with wire ropes at the travel motor side by using the bracket.

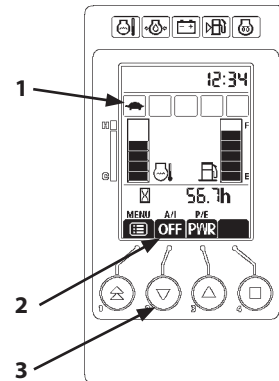
Tighten the machine firmly to the trailer flatbed with wire rope at the front idler side by using the transportation bracket located on the left and right sides of the blade.

## TRANSPORTING

### Unloading

#### WARNING:

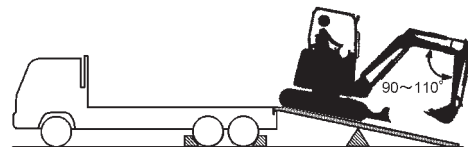
- Always turn the auto-idle switch (2) OFF when loading or unloading the machine. In the auto-idle mode, speed may automatically increase.
- The engine speed changes at the muffler filter regeneration. Set the muffler filter manual regeneration switch to the inhibition position.
- Always select the slow speed mode (1) with the travel mode switch.
- Never steer while driving up or down a ramp as it is extremely dangerous and may cause the machine to turnover. NEVER attempt to change directions whilst positioned on the ramp. If repositioning is necessary, first move back to the ground or flatbed, modify traveling direction, and begin to drive again.
- The top end of the ramp where it meets the flatbed is a sudden bump. Take care when traveling over it as the balance may be lost.



MADH-01-009

**IMPORTANT:** Make sure that the angle of the boom and the arm is kept between 90 to 110 ° when unloading the unit.

Damage to the unit is possible if the arm is kept in a suspended state during unloading.



MADB-06-004

1. Travel extremely slowly with the bucket on the ground and the angle of the arm and the boom kept at between 90 to 110 ° when moving from the edge of the truck onto the ramp.

**IMPORTANT:** When driving the machine over the ramp, do not allow the machine to hit the ground too hard with the arm. Possible damage to the hydraulic cylinders may result.



MADB-06-005

2. The bucket must be on the ground before the machine begins to tip forward.
3. As the machine moves forward, raise the boom and extend the arm until the machine is completely off the ramp.

## TRANSPORTING

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### Lifting Machine



#### **WARNING:**

- **Use lifting cables and other lifting tools being free from any damage and/or aging, and having sufficient strength.**
- **Consult your nearest Hitachi dealer for correct lifting procedures, and the size and types of lifting cable and tools.**
- **Pull the pilot control shut-off lever to the LOCK position so that the machine does not accidentally move while being lifted.**
- **Incorrect lifting procedure and/or incorrect wire rope attachment will cause the machine to move (shift) while being lifted, resulting in machine damage and/or personal injury.**
- **Do not lift the machine quickly. Excessive load will be applied to the lifting wire ropes and/or lifting tools, possibly causing them to break.**
- **Do not allow anyone to come close to or under the lifted machine.**
- **The indicated gravity center is for the standard specification machine. The gravity center will vary depending on the kinds of attachments and/or optional equipment to be installed or their position to be taken. Therefore, take care not to lose the balance of the machine while lifting.**
- **Be sure to set the blade position with the engine running. Failure to do so may cause the blade to be moved from the set-position when lifted with a crane.**

## TRANSPORTING

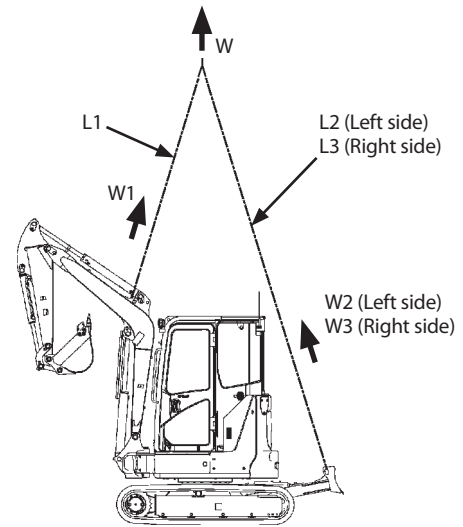
1. Swing the upperstructure so the blade is positioned at the rear of the counterweight.
2. Fully retract the blade cylinder.
3. Fully extend the boom, arm and bucket cylinders, as illustrated to the right.
4. Position the boom straight ahead of the upperstructure. Apply the boom swing pedal lock.
5. Pull the pilot control shut-off lever to the LOCK position.
6. Stop the engine. Remove the key from the key switch.
7. Set a crane in an appropriate position.
8. Attach shackles to the boom and blade hooks. Securely thread wire ropes through the shackles.

When lifting using a wire rope, ensure that it is long enough so that the rope does not come in contact with the machine.

(Refer to: Wire Rope Length while lifting the Machine, Wire Rope Load Bearing Values)

To prevent damage to the machine cover the wire rope in cloth as required.

9. Slowly lift the machine so that shock loads will not be applied to the machine. Take sufficient care not to lose the balance of the machine.



Position before Lifting

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## TRANSPORTING

### Wire Rope Length while lifting the Machine, Wire Rope Load Bearing Values

The values in this chart are not a guarantee of safety.  
When lifting, use this as a reference.

#### Wire rope length and operating weight


	Length of Wire Rope 1	Length of Wire Rope 2, 3	Operating Weight
	L1	L2, L3	W
UNIT	mm (in)	mm (in)	ton
ZX30U-5N	2000 (79)	4200 (165)	3.13
ZX35U-5N	2000 (79)	4200 (165)	3.54
ZX50U-5N	1600 (67)	4100(161)	4.85
ZX60USB-5N	1300 (51)	3900(154)	6.00

#### Load applied to wire rope

	Tension of Wire Rope 1	Tension of Wire Rope 2, 3
	W1	W2, W3
UNIT	t	t
ZX30U-5N	2.53	0.36
ZX35U-5N	2.67	0.54
ZX50U-5N	3.94	0.69
ZX60USB-5N	5.17	0.79

Based on the above, working load of each wire rope using a safety factor of 6.

	Working load of Wire Rope 1	Working load of Wire Rope 2, 3
	6*W1	6*W2, 6*W3
UNIT	t	t
ZX30U-5N	15.17	2.18
ZX35U-5N	16.03	3.26
ZX50U-5N	23.62	4.15
ZX60USB-5N	31.00	4.73

 *Note: Values marked\* are calculated using the operating weight.*

When lifting the machine, use a wire rope able to hold the load mentioned above.



## MAINTENANCE

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### Correct Maintenance and Inspection Procedures

Learn how to service your machine correctly. Follow the correct maintenance and inspection procedures shown in this manual.

Inspect machine daily before starting.

- Check controls and instruments.
- Check coolant, fuel and oil levels.
- Check for leaks, kinked, frayed or damaged hoses and lines.
- Walk around machine checking general appearance, noise, heat, etc.
- Check for loose or missing parts.

If there is any problem with your machine, repair it before operating or contact your authorized dealer.

#### IMPORTANT:

- **Use only recommended fuel and lubricants.**
- **Be sure to use only genuine Hitachi parts. Failure to do so may result in serious injury or death and/or machine breakdown.**
- **Failure to use recommended fuel, lubricants, and genuine Hitachi parts will result in loss of Hitachi product warranty.**
- **Never adjust engine governor or hydraulic system relief valve.**
- **Protect electrical parts from water and steam.**
- **Never disassemble electrical components such as main controller, sensors, etc.**
- **Never adjust parts of engine fuel system or hydraulic equipment.**
- **Using bad quality fuel, drainage agent, fuel additives, gasoline, kerosene or alcohol refueled or mixed with specified fuel may deteriorate performance of fuel filters and cause sliding problem at lubricated contacts in the injector. It also affects the engine and muffler filter parts, leading to malfunction.**
- **Use genuine Hitachi high performance filter.**



SA-005

## MAINTENANCE

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### **Check the Hour Meter Regularly**

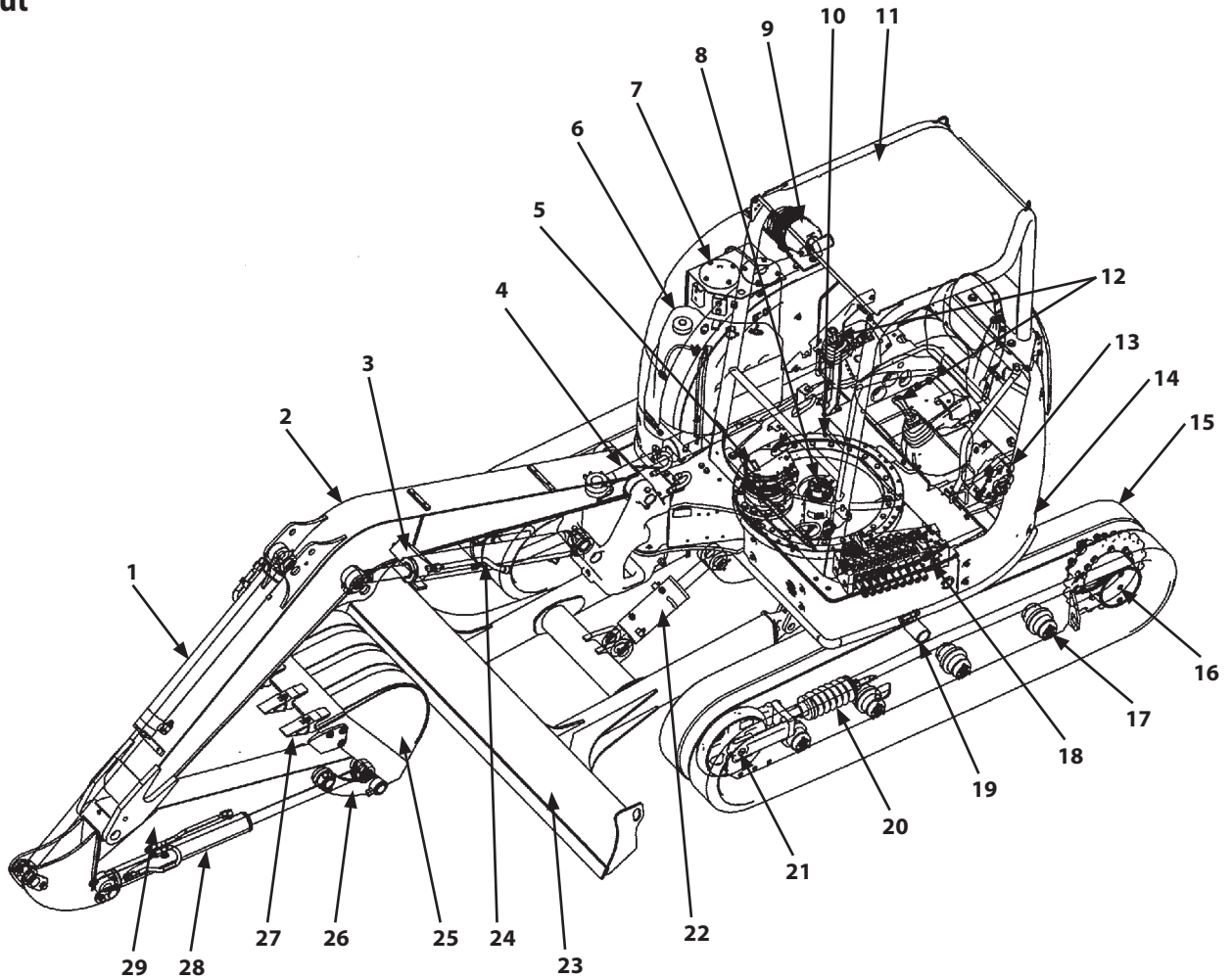
Refer to the List of Check and Maintenance for information about lubricants, check and adjustment intervals. The maintenance guide table is affixed under the seat. Refer to page 7-4.

Check and maintenance intervals shown in this manual are those for the machines to be operated under normal conditions. In case the machine is operated under more severe conditions, shorten the intervals.



# MAINTENANCE

## Layout



MADB-01-001










- |                        |                   |                    |                     |
|------------------------|-------------------|--------------------|---------------------|
| 1- Arm Cylinder        | 9- Air Cleaner    | 17- Lower Roller   | 25- Bucket          |
| 2- Boom                | 10- Swing Bearing | 18- Control Valve  | 26- Link            |
| 3- Work Light          | 11- Canopy        | 19- Upper Roller   | 27- Tooth           |
| 4- Boom Swing Cylinder | 12- Control Lever | 20- Track Adjuster | 28- Bucket Cylinder |
| 5- Swing Device        | 13- Pump          | 21- Front Idler    | 29- Arm             |
| 6- Fuel Tank           | 14- Counterweight | 22- Blade Cylinder |                     |
| 7- Hydraulic Oil Tank  | 15- Track Link    | 23- Blade          |                     |
| 8- Center Joint        | 16- Travel Device | 24- Boom Cylinder  |                     |

## MAINTENANCE

### Maintenance Guide Table

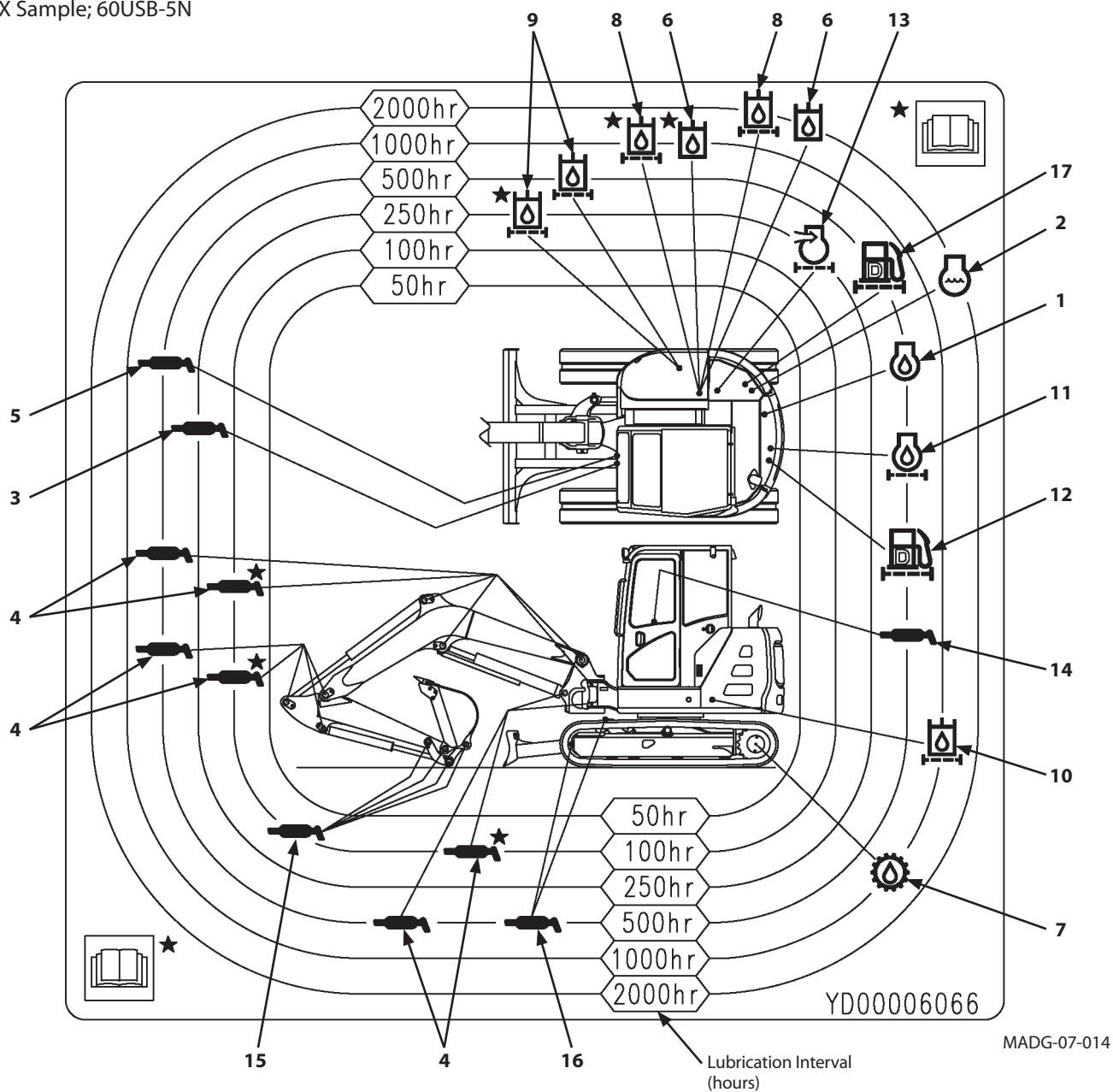
The maintenance guide table is affixed under the seat. Lubricate and/or service the parts at the intervals as instructed in the table so that all necessary maintenance can be performed regularly.

- **Symbol Marks**  
The following marks are used in the maintenance guide table.

	Grease (Front Joint Pin, Swing Bearing, Swing Gear)		Hydraulic oil filters (Pilot Filter, Hydraulic Oil Tank Filter, Suction Filter)
	Gear Oil (Travel Reduction Device)		Air Cleaner Element
	Engine Oil		Coolant (Long-Life Coolant)
	Engine Oil Filter		Fuel Filter (Fuel Main Filter, Pre-Filter)
	Hydraulic Oil		

# MAINTENANCE

- Maintenance Guide Table  
ZX Sample; 60USB-5N



Item	Item	Page	Item	Page
1 Engine Oil	10 Hydraulic Oil Filter (Pilot)	7-25	11 Engine Oil Filter	7-25
2 Coolant (Long-Life Coolant)	11 Engine Oil Filter	7-68	12 Fuel Main Filter	7-58
3 Grease (Swing Bearing)	12 Fuel Main Filter	7-22	13 Air Cleaner Element	7-61
4 Grease (Every 100 hours during first time operation up to 500 hours)	13 Air Cleaner Element	7-19	14 Grease (Control Lever)	7-23
5 Grease (Swing Gear)	14 Grease (Control Lever)	7-23	15 Grease (Bucket)	7-19
6 Hydraulic Oil	15 Grease (Bucket)	7-37	16 Grease (Blade)	7-21
7 Gear Oil (Travel Device)	16 Grease (Blade)	7-29	17 Fuel Pre-Filter (ZX50U-5N, 60USB-5N)	7-59
8 Hydraulic Oil Filter (Suction)	17 Fuel Pre-Filter (ZX50U-5N, 60USB-5N)	7-37		
9 Hydraulic Oil Filter (Full Flow)		7-41		

## MAINTENANCE

### Preparations for Inspection and Maintenance

Except in special cases, park the machine by following the procedure before servicing the machine.

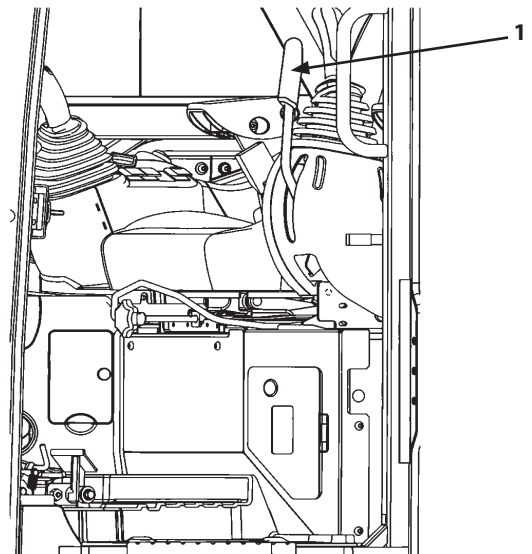
1. Park the machine on a level surface.
2. Lower the bucket and the blade to the ground.
3. Turn the auto-idle switch OFF.
4. Turn engine control dial to the slow idle position and run the engine for 5 minutes to cool the engine.
5. Turn the key switch OFF to stop the engine. Remove the key.
6. Pull pilot control shut-off lever (1) to the LOCK position.
7. After putting a tag for "Under Serving" on the easy-to-see cab door or control lever, begin the work.

**⚠ WARNING: Never attempt to maintain the machine when the engine is running in order to prevent the accident. If maintenance work while engine running is unavoidable, strictly comply with the following items.**

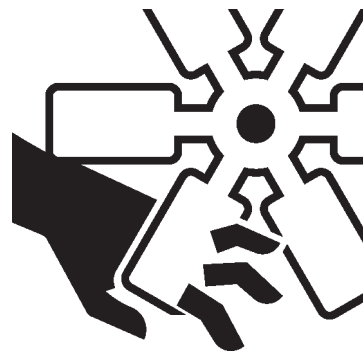
- One person should take the operator's seat to be ready to stop the engine any time while communicating with other workers.
- When working around moving parts is unavoidable, pay special attention to ensure that hands, feet, and clothing do not become entangled.
- If parts or tools are dropped or inserted into the fan or the belt, they may fly off or be cut off. Do not drop or insert parts and tools into the moving parts.
- Move pilot control shut-off lever (1) to LOCK position so that the front attachment will not move.
- Never touch the control levers and pedals. If operating the control levers or pedals is unavoidable, signal co-workers to evacuate to safer place.



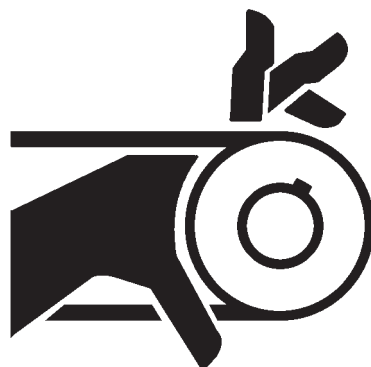
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SA-026

# MAINTENANCE

## Access Covers

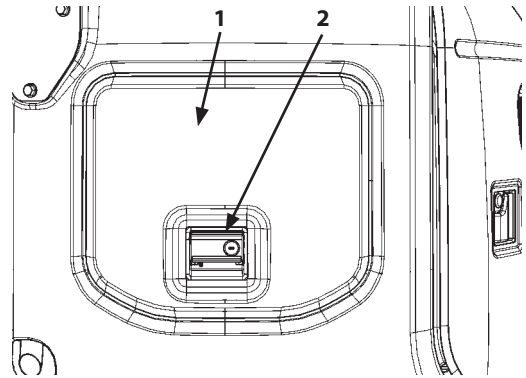
### Engine Cover

#### WARNING:

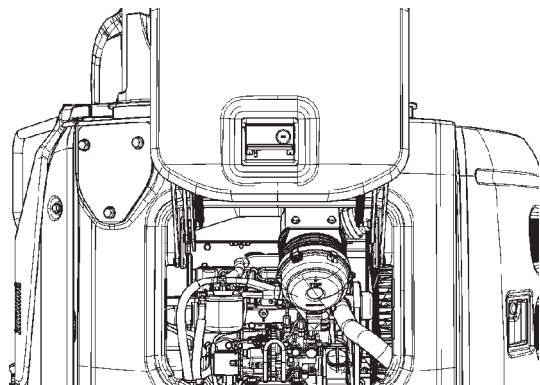
- Do not keep the access covers open when the machine is parked on a slope, or while the wind is blowing hard. The access covers may close accidentally, possibly resulting in personal injury.
- When opening or closing the access covers, take extra care not to catch in fingers between the base machine and the access covers.

Pull up latch (2) to open cover (1). Cover (1) is raised by link mechanism (3). Be sure to fully raise cover (1). After checking that stopper (4) provided on the left link is placed in LOCK position (5), remove your hand from cover (1). Cover (1) will be locked in place.

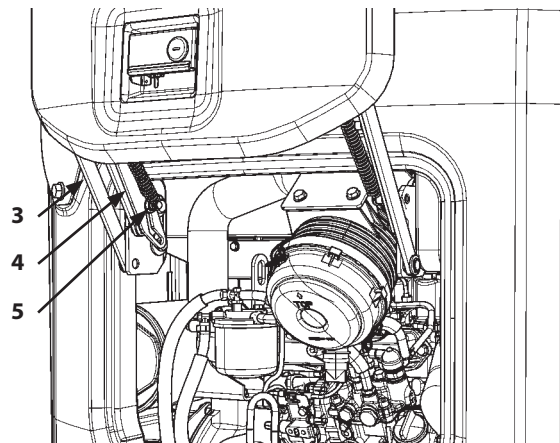
When closing cover (1), while raising cover (1), push stopper (4) at the arrowed position (a)  $\Rightarrow$  to disengage the lock. While pushing stopper (4), lower cover (1). When cover (1) is lowered by the 1/4 stroke, leave stopper (4). Then, lower cover (1) further to completely close it. Be sure to completely remove your hand, which is pushing stopper (4), out of cover (1) at this time. Failure to do so may cause your hand to be caught in cover (1), possibly resulting in severe injury.



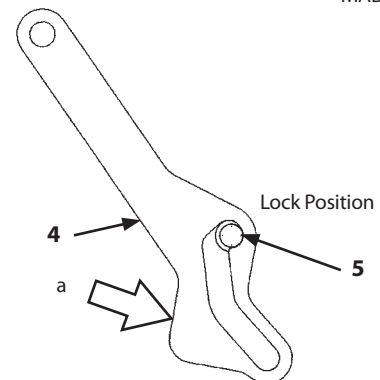
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MADB-00-004



MADB-07-003



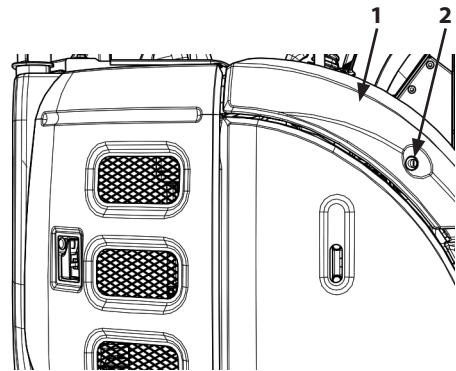
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## MAINTENANCE

### Tank Cover

**⚠ WARNING:**

- Do not keep the access covers open when the machine is parked on a slope, or while the wind is blowing hard. The access covers may close accidentally, possibly resulting in personal injury.
- When opening or closing the access covers, take extra care not to catch fingers between the base machine and the access covers.

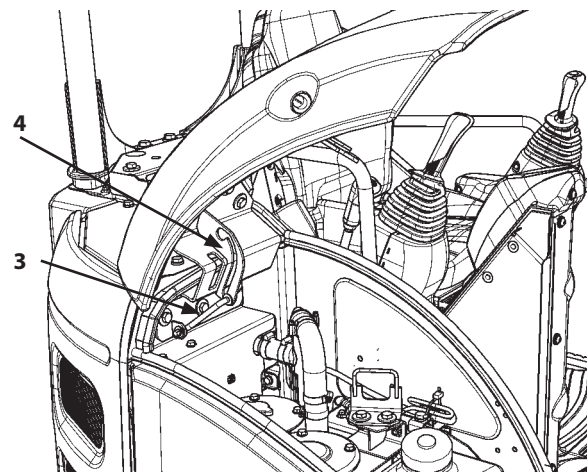


MADB-07-004

1. Press button (2) and raise cover (1) to open cover (1).
2. Raise cover (1) until stopper (3) fits into the lock position on bracket (4).
3. Confirm that stopper (3) is in the LOCK position before releasing your hands.

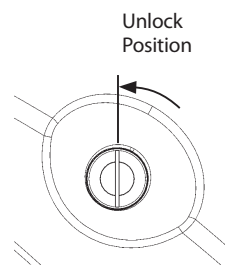
**⚠ CAUTION: When closing cover (1), confirm that cover (1) is securely locked.**

4. When closing cover (1), push stopper (3) while raising cover (1) by hand.
5. Lower cover (1) while pushing stopper (3). Release stopper (3) when cover (1) is lowered by 1/4 of its movable distance.

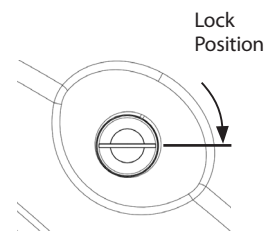


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**✎ NOTE:** Button (2) can be locked with the key.

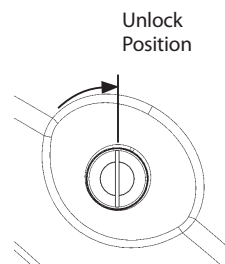


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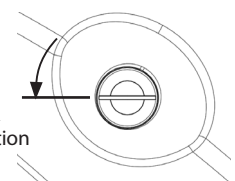


MADB-07-006

ZX30U-5N, 35U-5N



MADB-07-005



MADB-07-006

ZX50U-5N, 60USB-5N

## MAINTENANCE

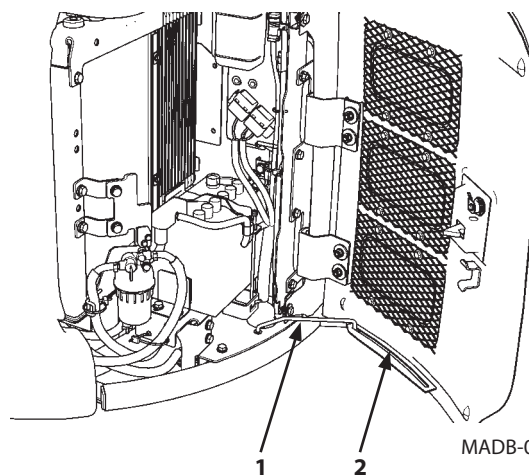
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### Radiator front Cover

**⚠ WARNING:**

- Do not keep the access covers open when the machine is parked on a slope, or while the wind is blowing hard. The access covers may close accidentally, possibly resulting in personal injury.
- When opening or closing the access covers, take extra care not to catch fingers between the base machine and the access covers.

Open the radiator front cover until rod (1) fits into the lock position on rail groove (2).  
Raise rod (1) to release lock before closing the radiator front cover.



## MAINTENANCE

### Maintenance Guide

#### A. Greasing

Parts			Quantity	Interval (hours)						Page		
				8	50	100	250	500	1000		2000	
1.	Front Joint Pins	Bucket and Link Pins	ZX30U-5N, 35U-5N, 50U-5N	5	★							7-19
			ZX60USB-5N	6	★							7-19
			Swing Post and Others	10	★		★★				or every year	7-19
2.	Blade Pins			4							or every year	7-21
3.	Swing Bearing			2								7-22
4.	Swing Internal Gear			1								7-23
5.	Control Lever Universal Joint			2							or every year	7-23

★ : In case excavations are performed in water, grease the pin after operation is complete.

★★ : Grease all pins every 100 hours during first time operation up to 500 hours.

**IMPORTANT: Grease front joint pins every day until break-in operation (50 hours) is complete.**

#### B. Engine

Parts			Quantity	Interval (hours)						Page		
				8	50	100	250	500	1000		2000	
1.	Engine Oil	Check Oil Level		1								7-24
2.	Engine Oil	Change	ZX30U-5N, 35U-5N	6.7 L (1.8 US gal)								7-25
			ZX50U-5N	7.4 L (2.0 US gal)					★			
			ZX60USB-5N	10.5 L (2.8 US gal)								
3.	Engine Oil Filter	Replace		1								7-25

★ : As the oil life is shortened more than normal under high temperature operating condition, shorten the maintenance interval.

#### C. Transmission

Parts			Quantity	Interval (hours)						Page			
				8	50	100	250	500	1000		2000		
1.	Travel Reduction Gear	Check Oil Level		2								7-28	
		Change	ZX30U-5N, 35U-5N	0.6 L×2 (0.63 US qt)									7-29
			ZX50U-5N, 60USB-5N	0.9 L×2 (0.95 US qt)									



## MAINTENANCE

### D. Hydraulic System

Parts		Quantity	Interval (hours)								Page		
			8	50	100	250	500	1000	1500	2000		3000	
1.	Check Hydraulic Oil Level	1										7-35	
2.	Drain Hydraulic Oil Tank Sump	1										7-36	
3.	Change Hydraulic Oil	ZX30U-5N, 35U-5N	43 L (11.4 US gal)										7-37
		ZX50U-5N	66 L (17.4 US gal)					★	★	★	★		
		ZX60USB-5N	107.5 L (28.4 US gal)										
4.	Clean Suction Filter	1	Each time when hydraulic oil is changed								7-37		
5.	Replace full-flow filter Element	Filter-Paper Element	1				★★	★					7-41
		High Performance Element (Optional)	1					★★	★				7-41
6.	Replace Pilot Oil Filter Element	1										7-43	
7.	Check Hoses and Lines	for leaks, loose	–									7-45	
		for cracks, bend, etc.	–									7-45	

★ : Changing interval differs according to the brand of hydraulic oil used, kind of filter element or average attachment operating availability.

Refer to the "Change Hydraulic Oil" and "Replace Full-Flow Filter Element". See recommended oil chart.

★★ : Maintenance required only during first time.

### E. Fuel System

Parts		Quantity	Interval (hours)						Page		
			8	50	100	250	500	1000		2000	
1.	Check Fuel Level	1									7-53
2.	Drain Fuel Tank Sump	1	As required						7-54		
3.	Drain Water Separator	ZX30U-5N, 35U-5N	1								7-55
4.	Drain Fuel Pre-Filter	ZX50U-5N, 60USB-5N	1								7-56
5.	Replace Fuel Main Filter Element	1									7-58
6.	Replace Fuel Pre-Filter Element (ZX50U-5N, 60USB-5N)	1									7-59
7.	Check Fuel Hoses	for leaks, cracks	–								7-60
		for cracks, bend, etc.	–								7-60

### F. Air Cleaner

Parts		Quantity	Interval (hours)						Page	
			8	50	100	250	500	1000		2000
1.	Air Cleaner Outer Element	Clean	1	(or when indicator is lit)		★				7-61
		Replace	1	After cleaning 6 times or 1 year						7-61
2.	Air Cleaner Inner Element (Optional)	Replace	1	When outer element is replaced						7-61

★ : Shorten the interval in a dusty work site.

## MAINTENANCE

### G. Cooling System

Parts		Quantity	Interval (hours)							Page	
			8	50	100	250	500	1000	2000		
1.	Check Coolant Level	1								7-64	
2.	Check and Adjust Fan Belt Tension	1		★★						7-65	
3.	Change Coolant	ZX30U-5N, 35U-5N	5.0 L (1.3 US gal)	Twice a year *							7-68
		ZX50U-5N	6.5 L (1.7 US gal)								
		ZX60USB-5N	7.7 L (2.0 US gal)								
4.	Clean Radiator and Oil Cooler	Outside	1							7-70	
		Inside	1	When coolant is changed							7-70
5.	Clean Air Conditioner Condenser	–								7-71	
6.	Clean Air Conditioner Condenser Front Screen	–								7-71	
7.	Clean Fuel Cooler	–								7-71	

★: Shorten the maintenance interval when the machine is operated in dusty areas.

★★: Maintenance required only during first time check.

\*: When genuine Hitachi Long-Life Coolant (LLC) is used, change every two years or 2000 operating hours, whichever comes first.

#### IMPORTANT:

- **Use soft water as a coolant. Do not use strong acid or alkaline water. Use the coolant with genuine Hitachi Long-Life Coolant (LLC) mixed by 30 to 50 %. If a coolant mixed with less than 30 % of genuine Hitachi Long-Life Coolant (LLC) is used, service life of the cooling parts may be shortened due to damage by freezing or corrosion of coolant system parts.**
- **If mineral-rich water is used for coolant, water stain or scale may build up inside the engine or radiator, causing overheat due to deterioration of coolant performance.**

### H. Electrical System

Parts		Quantity	Interval (hours)							Page	
			8	50	100	250	500	1000	2000		
1.	Battery	Check Electrolyte Level	1	Every month							7-74
		Check electrolyte specific gravity	1	Every month							7-75
2.	Replacing Fuses	Replace	–	As required							7-76

## MAINTENANCE

### I. Miscellaneous

Parts		Quantity	Interval (hours)								Page		
			8	50	100	250	500	1000	1500	2000		3000	
1.	Check and Replace Bucket Teeth	–										7-77	
2.	Change Bucket	–	As required								7-79		
3.	Adjust Track Sag (Rubber Crawler) and Check for Damage	2										7-80	
4.	Replace Rubber Crawler	2	As required								7-82		
5.	Check Track Sag (Steel Crawler) (Optional)	2										7-84	
6.	Check and Replace Seat Belt	1		Every 3 years							7-87		
7.	Check Air Conditioner (Cab Equipped Machine)	–										7-88	
8.	Clean and Replace Heater/Air Conditioner Filter	Circulating Air Filter	Clean	1								7-91	
			Replace	1	After cleaning 6 times or so								7-91
		Fresh Air Filter	Clean	1									7-93
			Replace	1	After cleaning 6 times or so								7-93
9.	Clean Cab Floor	–	As required								7-96		
10.	Check, Clean and Function Check of Injection Nozzle (ZX30U-5N, 35U-5N)	–							*			7-97	
11.	Check, Clean and Function Check Injector (ZX50U-5N, 60USB-5N)	–									*	7-97	
12.	Inspect and Adjust Valve Clearance	–						*				7-97	
13.	Check and Adjust Injection Timing (ZX30U-5N, 35U-5N)	–							*			7-97	
14.	Measure Engine Compression Pressure	–						*				7-97	
15.	Check Starter and Alternator	–						*				7-97	
16.	Check Crankcase Breather	–							*			7-97	
17.	Check Radiator Cap	–								*		7-98	
18.	Clean EGR Cooler (ZX50U-5N, 60USB-5N)	–							*			7-98	
19.	Check Intake Throttle Valve (ZX50U-5N, 60USB-5N)	–									*	7-98	
20.	Check, Clean and Function Check EGR Valve (ZX50U-5N, 60USB-5N)	–									*	7-98	
21.	Tightening and Retightening Torque of Nuts and Bolts	–		★★			*					7-99	

★★: Maintenance required only during first time check.

 NOTE: \* Contact your nearest Hitachi dealer for maintenance. Instruction plate for the recommended grease and lubricants is affixed under the seat.

### J. Muffler Filter (ZX50U-5N, 60USB-5N)

Parts		Quantity	Interval (hours)							Page	
			8	50	100	250	500	1000	2000		3000
1.	Check and Clean Filter Element of Muffler Filter	1								*	7-105
2.	Check and Clean Muffler Filter	–	As required							7-105	

 NOTE: \* Contact your nearest Hitachi dealer for maintenance.


## MAINTENANCE

### Periodic Replacement of Parts

To ensure safe operation, be sure to conduct periodic inspection of the machine. In addition, the parts listed below, if defective, may pose serious safety/fire hazards.

These parts may cause serious safety/fire hazards due to deterioration, wear, or fatigue being attributed to material aging or repeated operation. It is very difficult to gauge the extent of deterioration, fatigue, or weakening of the parts listed below simply by visual inspection alone. For this reason, replace these parts at the intervals shown in the table below. Consult your authorized dealer for correct replacement.

Periodic Replacement Parts		Replacement Intervals	
Engine	Fuel hose (Fuel tank, Filter to Engine)	Every 2 years	
	Fuel hose (Engine to Fuel tank)	Every 2 years	
	Fuel hose (Engine, Fuel Cooler to Fuel Tank)	Every 2 years (ZX50U-5N, 60USB-5N)	
	Heater hose (Heater to engine)	Every 2 years	
	Engine rubber vibration insulator	ZX30U-5N, 35U-5N, 50U-5N	Every 5 years or 3000 hours whichever comes first
		ZX60USB-5N	Every 5 years or 4000 hours whichever comes first
	Pump coupling	ZX30U-5N, 35U-5N, 50U-5N	Every 5 years or 3000 hours whichever comes first
ZX60USB-5N		Every 5 years or 4000 hours whichever comes first	
EGR differential pressure hose (Differential sensor to Differential Pipe)		Every 3000 hours (ZX50U-5N, 60USB-5N)	
Hydraulic System	Base Machine	Pump suction hose	Every 2 years or 4000 hours whichever comes first
		Pump delivery hose	Every 2 years or 4000 hours whichever comes first
		Swing hose	Every 2 years or 4000 hours whichever comes first
		Auxilliary hose	Every 2 years or 4000 hours whichever comes first
		Oil cooler hose (C/V to Oil cooler)	Every 2 years or 4000 hours whichever comes first
	Working Device	Boom cylinder line hose	Every 2 years or 4000 hours whichever comes first
		Arm cylinder line hose	Every 2 years or 4000 hours whichever comes first
		Bucket cylinder line hose	Every 2 years or 4000 hours whichever comes first
		Pilot hose	Every 2 years or 4000 hours whichever comes first
	Floor mounting rubber	ZX30U-5N, 35U-5N, 50U-5N	Every 5 years or 3000 hours whichever comes first
ZX60USB-5N		Every 5 years or 4000 hours whichever comes first	
Seat Belt		Every 3 years	

 **NOTE:** Be sure to replace seals, such as O-rings and gaskets, when replacing hoses.

## MAINTENANCE

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### Kind of Oils

#### Recommended Grease

Kind of Grease	Lithium Grease
Application	Front Attachment Joint Pins, Swing Bearing, Swing Internal Gear
Air Temp.	-20 to 40 °C (-4 to 104 °F)
Recommended Products	Hitachi Genuine Grease NLGI EP-2
Alternative Products	Specification NLGI 2 EP

#### IMPORTANT:

- **Hitachi Genuine Greases are specially designed and tested to provide optimum performance for the machine, hence we recommend to use Hitachi Genuine Greases.**
- **If you do not use Hitachi Genuine Greases, use grease conforming to EP-2. Otherwise, the machine may suffer damage.**
- **Do not use greases which do not meet the above specification or requirements. Use of unsuitable grease may lead to damage which is excluded from Hitachi Warranty Policy.**
- **For details, contact your nearest authorized dealer.**

## MAINTENANCE

### Recommended Engine Oil

#### ZX30U-5N,ZX35U-5N

Kind of Oil		Engine Oil	
Application		Engine Crank Case	
Air Temp.		-20 to 30 °C (-4 to 86 °F)	-15 to 40 °C (5 to 104 °F)
Recommended Products		Hitachi Genuine Engine Oil 10W-30 DH-1	Hitachi Genuine Engine Oil 15W-40 DH-1
Alternative Products	Viscosity	10W-30	15W-40
	Specification	JASO DH-1	

#### IMPORTANT:

- **Hitachi Genuine Engine Oils are specially designed and tested to provide optimum performance for the machine, hence we recommend to use Hitachi Genuine Engine Oils.**
- **If you do not use Hitachi Genuine Engine Oil, use engine oil conforming to JASO DH-1. Otherwise, engine and muffler filter may suffer damage, or performance of engine may deteriorate.**
- **Do not use oils which do not meet the above specification or requirements. Use of unsuitable oil may lead to engine damage which is excluded from Hitachi Warranty Policy.**
- **For details, contact your nearest authorized dealer.**

#### ZX50U-5N,ZX60USB-5N

Kind of Oil		Engine Oil	
Application		Engine Crank Case	
Air Temp.		-20 to 30 °C (-4 to 86 °F)	-15 to 40 °C (5 to 104 °F)
Recommended Products		Hitachi Genuine Engine Oil 10W-30 DH-2	Hitachi Genuine Engine Oil 15W-40 DH-2
Alternative Products	Viscosity	10W-30	15W-40
	Specification	JASO DH-2	

#### IMPORTANT:

- **Hitachi Genuine Engine Oils are specially designed and tested to provide optimum performance for the machine, hence we recommend to use Hitachi Genuine Engine Oils.**
- **If you do not use Hitachi Genuine Engine Oil, use engine oil conforming to JASO DH-2. Otherwise, engine and muffler filter may suffer damage, or performance of engine and muffler filter may deteriorate.**
- **Do not use oils which do not meet the above specification or requirements. Use of unsuitable oil may lead to engine damage which is excluded from Hitachi Warranty Policy.**
- **For details, contact your nearest authorized dealer.**

## MAINTENANCE

### Recommended Transmission oil


Application	Travel Reduction Gear	
Kind of Oil	Gear Oil	
Air Temp.	-20 to 40 °C (-4 to 104 °F)	
Recommended Products	Hitachi Gear Oil GL-4 90	
Alternative Products	Specification	API GL-4

#### IMPORTANT:

- **Hitachi Genuine Gear Oil are specially designed and tested to provide optimum performance for the machine, hence we recommend to use Hitachi Genuine Gear Oil.**
- **If you do not use Hitachi Genuine Gear Oil, use gear oil or engine oil conforming to specifications described above. Otherwise, the machine may suffer damage.**
- **Do not use oils which do not meet the above specification or requirements. Use of unsuitable oil may lead to engine damage which is excluded from Hitachi Warranty Policy.**
- **For details, contact your nearest authorized dealer.**

### Recommended Hydraulic Oil

Kind of Lubricant	Hydraulic Oil	
Where to be applied	Hydraulic System	
Change Interval	2000 hours	1000 hours
Environmental Temp.	-20 to 40 °C (-4 to 104 °F)	
Recommended Products	Super EX 46HN	
Alternative Product		Product Conforming to JCMAS HK VG46W

 **NOTE:** A different interval of oil change may be required for Alternative Products.  
For details, contact your nearest authorized dealer.

#### IMPORTANT:

- **Hitachi Genuine Hydraulic Oils are specially designed and tested to provide optimum performance for the machine, hence we recommend to use Hitachi Genuine Hydraulic Oils.**
- **If you do not use Hitachi Genuine Hydraulic Oil, use hydraulic oil conforming to JCMAS HK VG46W. Otherwise, the machine may suffer damage. For the information of JCMAS HK VG46W, refer to JALOS website.**
- **Do not use oils which do not meet the above specification or requirements. Use of unsuitable grease may lead to damage which is excluded from Hitachi Warranty Policy.**

## MAINTENANCE

### Recommended Oil Viscosity

Where to be Applied	Kind of Oil	Air Temperature (degrees Celsius)								
		-30	-20	-10	0	10	20	30		40
Engine Oil Pan	Engine Oil									ZX30U-5N, 35U-5N: Super Wide DH-1 10W30 ZX50U-5N, 60USB-5N; Super Wide DH-2 10W30
										ZX30U-5N, 35U-5N: Super Wide DH-1 15W40 ZX50U-5N, 60USB-5N; Super Wide DH2 15W40
Travel Device	Gear Oil									Hitachi Gear Oil GL-4_90
Hydraulic System (Hydraulic Oil Tank)	Hydraulic Oil									Super EX46HN
Fuel Tank	Diesel Fuel									ASTM Grade No.2-DS15 ASTM Grade No.2-DS500
										ASTM Grade No.1-DS15 ASTM Grade No.1-DS500
Grease fitting	Lithium Grease									SEP Grease
Radiator	Coolant									Genuine Hitachi Long-Life Coolant (LLC)



# MAINTENANCE

## A. Greasing

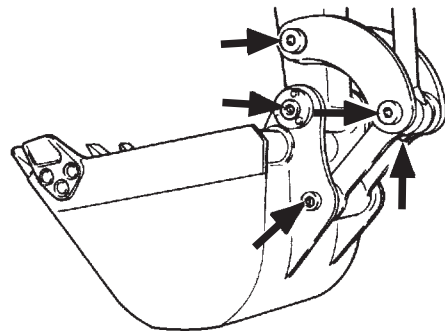
- 1** **Front Joint Pins**
- Bucket**
  - every 100 hours
- Swing Post and Others**
  - every 500 hours or every year
  - (every 100 hours during first time operation up to 500 hours)

Lubricate all fittings shown in the figure.



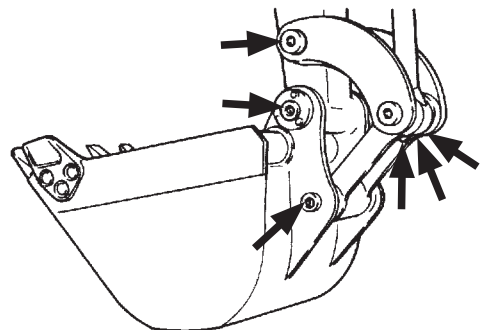
M1M7-05-024

- Bucket



ZX30U-5N, 35U-5N, 50U-5N

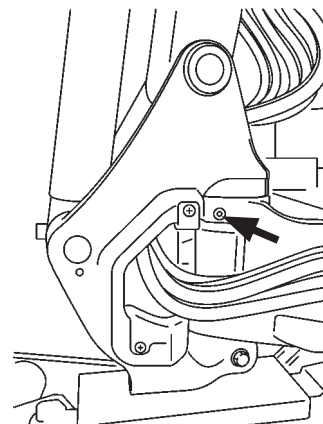
M503-07-092



60USB-5N

MADC-07-001

- Swing Post

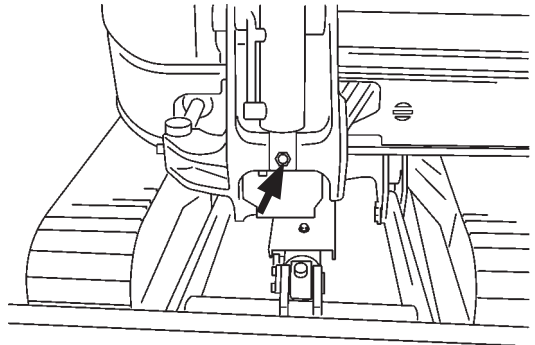


M1M7-07-024

## MAINTENANCE

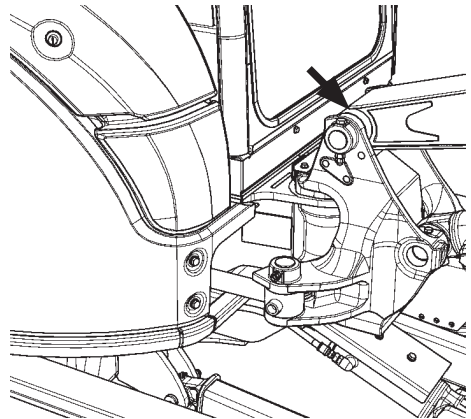
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- Boom Cylinder Bottom Side



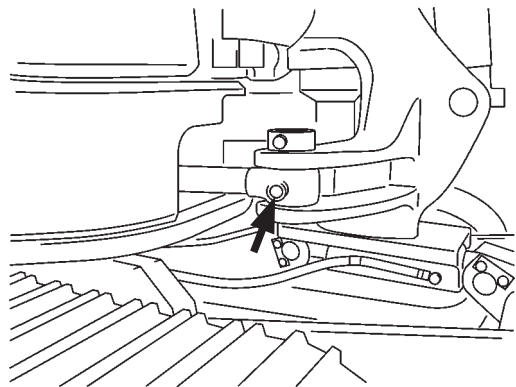
M1M7-07-021

- Boom Foot



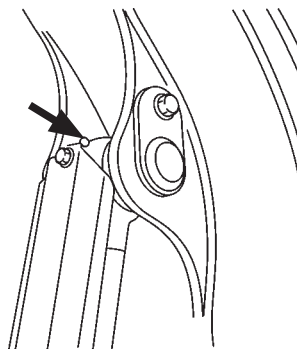
MADB-07-048

- Boom Swing Cylinder



M1M7-07-023

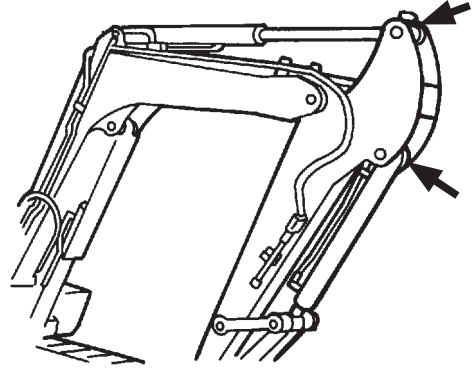
- Boom Cylinder Rod Side



M1M7-07-020

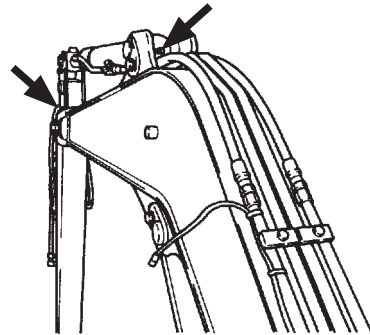
## MAINTENANCE

- Arm Cylinder Rod Side, Bucket Cylinder Bottom Side



M571-07-006

- Boom and Arm Joint Pin, Arm Cylinder Bottom Side



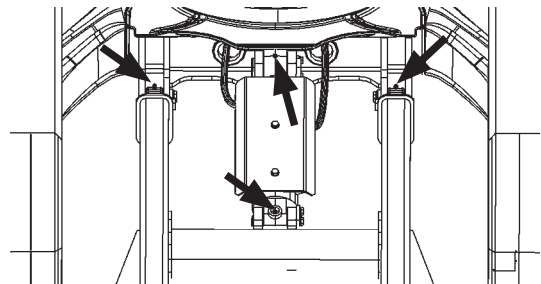
M585-07-046

**2**

### Blade Pins

--- every 500 hours or every year

- Blade Joint Pins
- Blade Cylinder Rod and Bottom Side



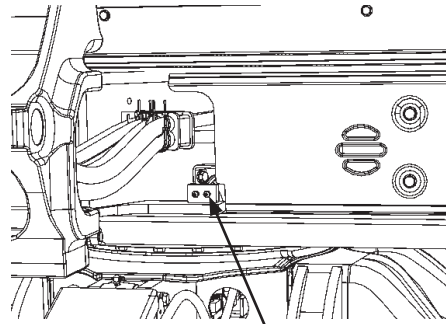
MADB-07-008

## MAINTENANCE

### 3 Swing Bearing --- every 250 hours

**CAUTION:** Lubricating both the swing bearing and gear and rotating the upperstructure must be done by one person. Before you lubricate the swing bearing, clear the area of all persons. Lower the bucket to the ground. Stop the engine. Pull the pilot control shut-off lever to the LOCK position.

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Apply grease via grease fitting (1) with a grease gun by two to three strokes.
3. Start the engine. Push pilot control shut-off lever to the UNLOCK position. Raise the bucket approx. 200 mm (8 in) above the ground and rotate the upperstructure 90° (1/4 turn).
4. Lower the bucket to the ground.
5. Repeat the procedure (Step 1 to 4) 8 times.
6. Apply grease to the swing bearing until grease can be seen escaping from the swing bearing seals. Take care not to supply excessive grease.



1

MADB-07-009

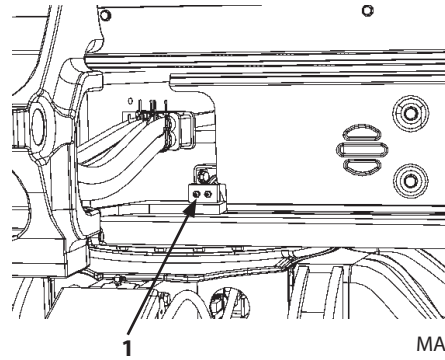
## MAINTENANCE

### 4 Swing Internal Gear --- every 500 hours

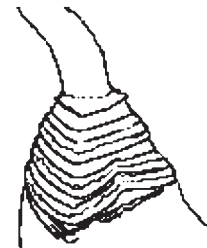
**CAUTION:** Lubricating both the swing bearing and gear and rotating the upperstructure must be done by one person. Before you lubricate the swing bearing, clear the area of all persons. Lower the bucket to the ground. Stop the engine. Pull the pilot control shut-off lever to the LOCK position.

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Remove the cover from the bottom center of the undercarriage. Check if grease is cloudy due to mixing of water or dirt.
3. Apply grease via grease fitting (1).
4. Start the engine. Push the pilot control shut-off lever to the UNLOCK position.
5. Raise the bucket 200 mm off the ground and rotate the upperstructure 90 ° (1/4 turn).
6. Lower the bucket to the ground.
7. Repeat the procedure (Step 1 to 6) four times.
8. Apply grease by the quantity shown in the below table. If the grease is contaminated, remove all old grease and replace with new grease. Take care not to supply excessive grease.

	Grease Quantity	Total Grease Capacity
ZX30U-5N, 35U-5N	0.2 L	3.0 to 3.3 L
ZX50U-5N, 60USB-5N	0.2 L	3.2 to 3.5 L



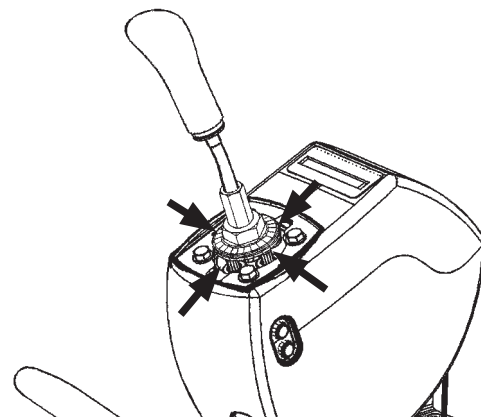
MADB-07-009



MADB-07-010

### 5 Control Lever Universal Joint --- every 500 hours or every year

Pull up the rubber boots under the right and left control levers, and add grease to the four places of the pilot valve pushers as indicated by arrows.



M1M7-07-016

## MAINTENANCE

### B. Engine

- 1** Engine Oil Level  
--- check daily (Before starting the engine)

**IMPORTANT:** This machine adopts the closed air breather system. An incorrect engine oil level may cause trouble on the engine (The oil level should be between the upper and lower marks on oil level gauge (1)).

Even if the engine oil level exceeds the upper limit, control the oil level to the proper quantity before starting the engine.

Check oil level before starting the engine.

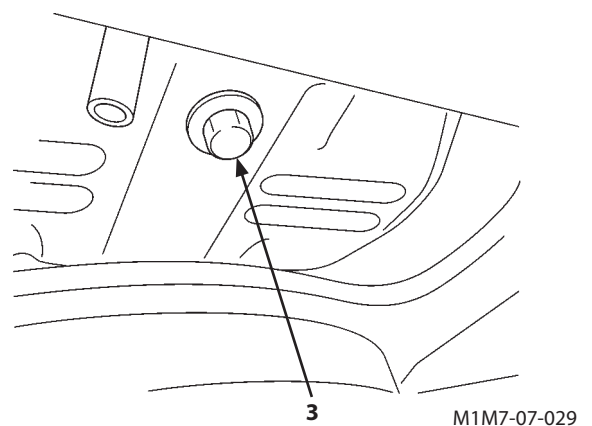
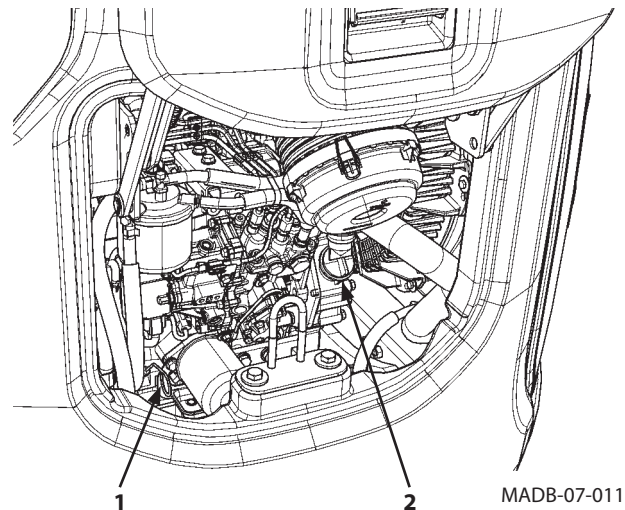
Open the engine cover and pull out oil level gauge (1). Wipe oil level gauge (1) with cloth, re-insert it into the pipe to the end, and then pull it out again.

The oil level should be between the upper and lower marks on oil level gauge (1).

If oil level is below the lower limit mark, add the recommended engine oil via oil filler (2).

If oil level exceeds the upper limit mark, remove drain plug (3) at the bottom of the engine oil pan, to drain oil.

**CAUTION:** Do not spill oil while adding oil. Spilled oil may cause fires.  
After refilling, make sure oil filler cap (2) is securely tighten.



## MAINTENANCE

### 2 Change Engine Oil --- every 500 hours

### 3 Replace Engine Oil Filter --- every 500 hours

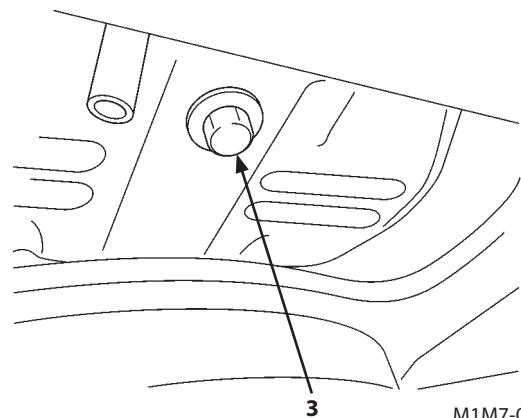
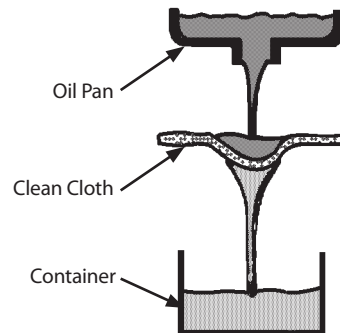
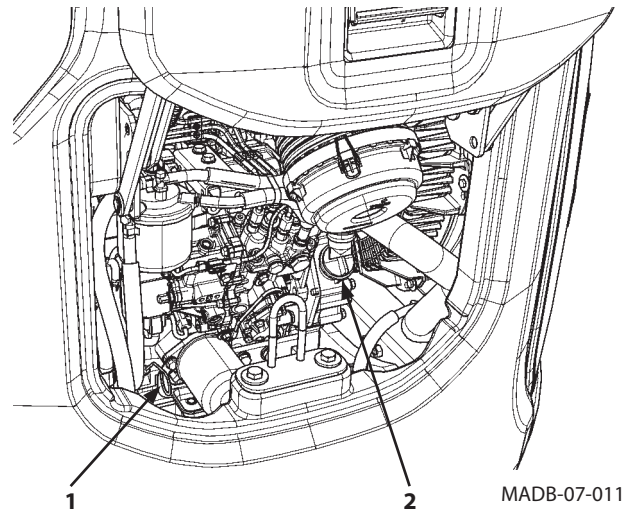
1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.

**CAUTION:** Engine may be hot just after operation.  
Wait for engine to cool before starting work.

2. Place 10 liter (ZX60USB-5N: 15 liter) container under the engine oil pan. Remove oil filler cap (2).
3. Remove drain plug (3) to drain oil.
4. Then, allow oil to drain through a clean cloth into a container.
5. After all oil has been drained, inspect the cloth for any debris such as small pieces of metal.
6. Securely install drain plug (3).

Wrench size: 19 mm

Tightening torque: 90 N·m (9 kgf·m, 65 lbf·ft)



## MAINTENANCE

7. Remove the filter cartridges of engine oil filter cartridge (4) by turning it counterclockwise with the filter wrench.

ZX30U-5N, 35U-5N, 50U-5N

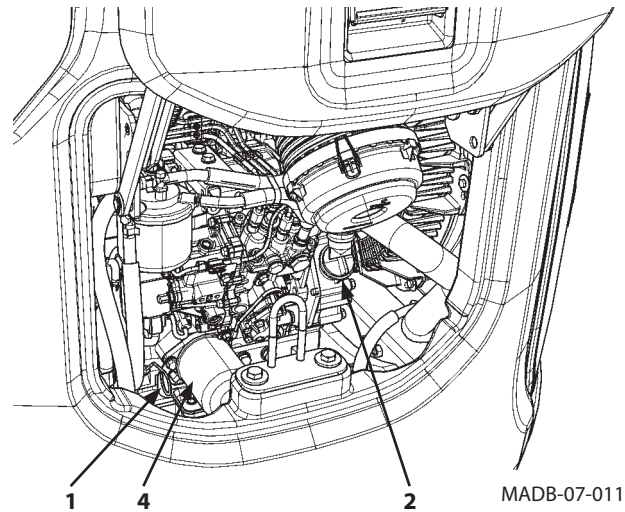
The oil may spill from filter (4) bottom bracket at this time. Use an empty container to catch the spilled oil.

8. Clean the filter cartridge contact area on the engine.

### IMPORTANT:

- **When filling new oil, take care not to allow foreign matter to enter the engine.**
  - **Do not re-use engine oil filter (4). Be sure to use only genuine engine oil filter (4). Failure to use genuine parts or replace oil filter (4), may damage the engine.**
9. Apply a thin layer of clean oil to new oil filter (4) gasket (O-ring).
  10. Install new filter (4). Turn the filter cartridge clockwise by hand until the gasket touches the contact area. Be sure not to damage the gasket when installing filter (4).
  11. Tighten engine oil filter (4) 3/4 to 1 turn more using the filter wrench. Be careful not to overtighten.

Tightening torque: 20 to 24 N·m (2.0 to 2.4 kgf·m, 15 to 17 lbf·ft)



MADB-07-011



## MAINTENANCE

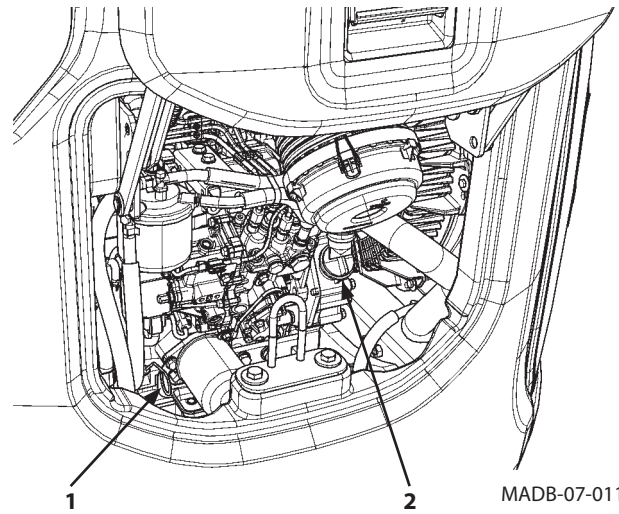
**⚠ CAUTION: Do not spill oil while adding oil. Spilled oil may cause fires.**

12. Fill the engine with recommended oil via oil filler (2). Check that oil level is between the circle marks on oil level gauge (1) after 15 minutes.

Model	Quantity
ZX30U-5N, 35U-5N	6.7 L (1.8 US gal)
ZX50U-5N	7.4 L (2.0 US gal)
ZX60USB-5N	10.5 L (2.8 US gal)

**📌 NOTE:** Refer to the recommended oil and grease chart on page 7-16 for the brand names of oils.

13. Securely tighten oil filler cap (2).
14. Start the engine. Run the engine at slow idle for 5 minutes.
15. Stop the engine. Remove the key from the key switch.
16. Check for any leakage.
17. After 15 minutes, check oil level on the dipstick and add or drain oil to maintain proper oil level. (The oil level should be between the upper and lower limit marks on the oil level gauge.) (Refer to 7-24)



MADB-07-011

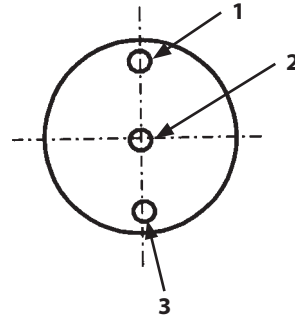
## MAINTENANCE

### C. Transmission

#### 1 Travel Reduction Gear

##### Check Oil Level --- every 500 hours

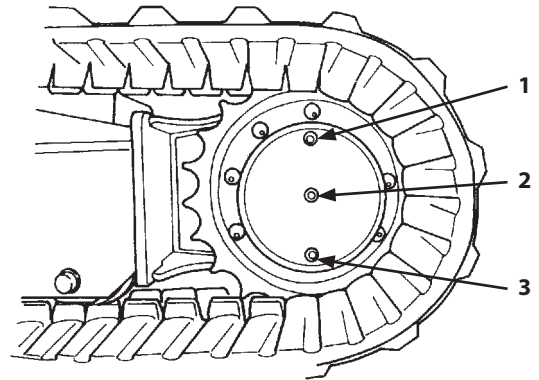
1. Park the machine on a level surface.
2. Rotate the travel motor until the plugs are positioned as illustrated on the right.
3. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.



M503-07-015

**⚠ WARNING: Keep body and face away from the air release plug. Gear oil may be hot just after operation. Wait for gear oil to cool and then gradually loosen the air release plug to release pressure.**

4. After gear oil has cooled, slowly loosen air release plug (1) to release pressure.
5. Remove air release plug (1) and oil level check plug (2). Oil must be up to the bottom of hole.
6. If necessary, add oil until oil flows out of oil level check plug (2) hole. (See gear oil chart)
7. Clean and install air release plug (1) and oil level check plug (2).



M585-07-080

Model		Tightening Torque
ZX30U-5N, 35U-5N	Plug (1)	46 to 51 N·m (4.6 to 5.1 kgf·m, 33 to 36 lbf·ft)
	Plug (2)	12 to 18 N·m (1.2 to 1.8 kgf·m, 9 to 13 lbf·ft)
ZX50U-5N, 60USB-5N	Plug (1)	22 to 24 N·m (2.2 to 2.4 kgf·m, 16 to 17 lbf·ft)
	Plug (2)	16 to 17 lbf·ft

8. Check the gear oil level in the other travel reduction gear.

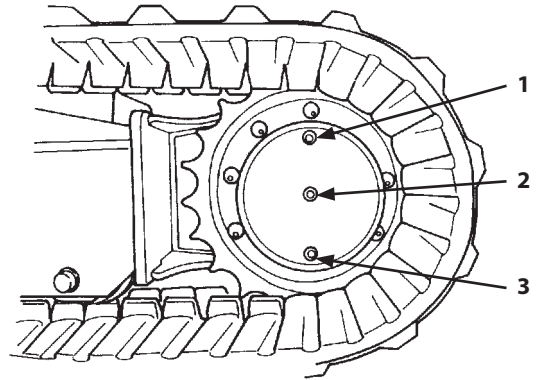
## MAINTENANCE

### Change Gear Oil --- every 1000 hours

**IMPORTANT:** Do not use gear oils other than those listed in the "Brand Names of Recommended Transmission Oil".

1. Park the machine on a level surface.
2. Rotate the travel motor until the plugs are positioned as illustrated on the right.
3. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.

**⚠ WARNING:** Keep body and face away from the air release plug. Gear oil may be hot just after operation. Wait for gear oil to cool and then gradually loosen the air release plug to release pressure.



M585-07-080


4. After gear oil has cooled, slowly loosen air release plug (1) to release pressure, and temporarily retighten plug (1).
5. Remove drain plug (3) and plug (1), in that order, to drain oil.
6. Clean drain plug (3). Tighten plug (3).

Model	Tightening Torque
ZX30U-5N, 35U-5N	46 to 51 N·m (4.6 to 5.1 kgf·m, 33 to 36 lbf·ft)
ZX50U-5N, 60USB-5N	22 to 24 N·m (2.2 to 2.4 kgf·m, 16 to 17 lbf·ft)

## MAINTENANCE

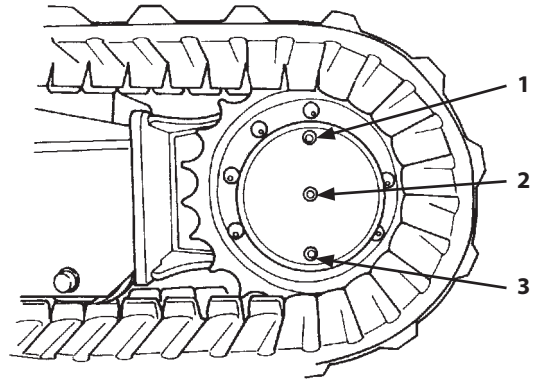
7. Remove oil level check plug (2).
8. Add oil until oil flows out of oil level check plug (2) hole.

Model	Oil Quantity
ZX30U-5N, 35U-5N	0.6 L (0.63 US qt)
ZX50U-5N, 60USB-5N	0.9 L (0.95 US qt)

 **NOTE:** Refer to the recommended oil and grease chart on page 7-17 for the brand names of oils.

9. Clean and tighten the plugs (1) and (2).

Model		Tightening Torque
ZX30U-5N, 35U-5N	Plug (1)	46 to 51 N·m (4.6 to 5.1 kgf·m, 33 to 36 lbf·ft)
	Plug (2)	12 to 18 N·m (1.2 to 1.8 kgf·m, 9 to 13 lbf·ft)
ZX50U-5N, 60USB-5N	Plug (1)	22 to 24 N·m (2.2 to 2.4 kgf·m, 16 to 17 lbf·ft)
	Plug (2)	



M585-07-080

10. Repeat steps 2. to 9. for the other travel reduction gear.

# MAINTENANCE

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## D. Hydraulic System

### Inspection and Maintenance of Hydraulic Equipment

**IMPORTANT:** Never adjust parts of hydraulic equipment.

**⚠ CAUTION:** When checking and/or servicing the hydraulic components, pay special attention to the following points.

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Begin servicing hydraulic components only after components, hydraulic oil and lubricants are completely cooled, and after releasing residual pressure.
  - 2.1 Before checking and/or servicing the hydraulic system, be sure to release the residual pressure from the cylinder circuits of the boom, arm and the bucket, swing piping and pilot piping. An accumulator can be installed on some models of this machine as an option to be capable of moving the front attachment for specified time (around 10 seconds) after stopping the engine.
  - 2.2 Bleed air from the hydraulic oil tank to release internal pressure.
  - 2.3 Immediately after operation, all hydraulic components and hydraulic oil or lubricants are hot and highly pressurized. Begin inspection and/or maintenance work only after the machine has cooled down.

Servicing heated and pressurized hydraulic components may cause plugs, screws and/or oil to fly off or escape suddenly, possibly resulting in personal injury. Hydraulic components may be pressurized even when cooled.

Keep body parts and face away from the front of plugs or screws when removing them.
  - 2.4 Even after air pressure in the hydraulic oil tank is released, when the machine is parking on a slope, the oil pressure in the travel motor and the swing motor circuits are maintained at high pressure as the reaction force of the machine weight is constantly applied to the travel motor. Never check and/or service the machine parking on a slope.

## MAINTENANCE

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### IMPORTANT:

- **When connecting hydraulic hoses and pipes, take special care to keep seal surfaces free from dirt and to avoid damaging them.**
- **Wash hoses, pipes, and the tank interior with a washing liquid and thoroughly wipe it out before reconnecting them.**
- **Only use O-rings that are free of damage or defects. Be careful not to damage them during reassembly. Do not allow high pressure hoses to twist when connecting them. The life of twisted hoses will be shortened considerably.**
- **Do not use hydraulic oils other than those listed in the table "Brand names of recommended hydraulic oil".**
- **When adding hydraulic oil, always use the same brand of oil; do not mix brands of oil. When using another manufacturer's hydraulic oil, be sure to change the full amount.**
- **The new machine is filled with hydraulic oil of Super EX 46HN (change interval: every 2000 hours). When adding or changing the hydraulic oil, continue to use the Super EX 46HN.**
- **Never run the engine without oil in the hydraulic oil tank.**

## MAINTENANCE

### Change Hydraulic Oil and Replace Full-Flow Filter Element

Hydraulic breaker operation subjects the hydraulic system to become contaminated faster and to quickly deteriorate the hydraulic oil.

Failure to adhere to proper maintenance intervals may result in damage to the base machine and the breaker.

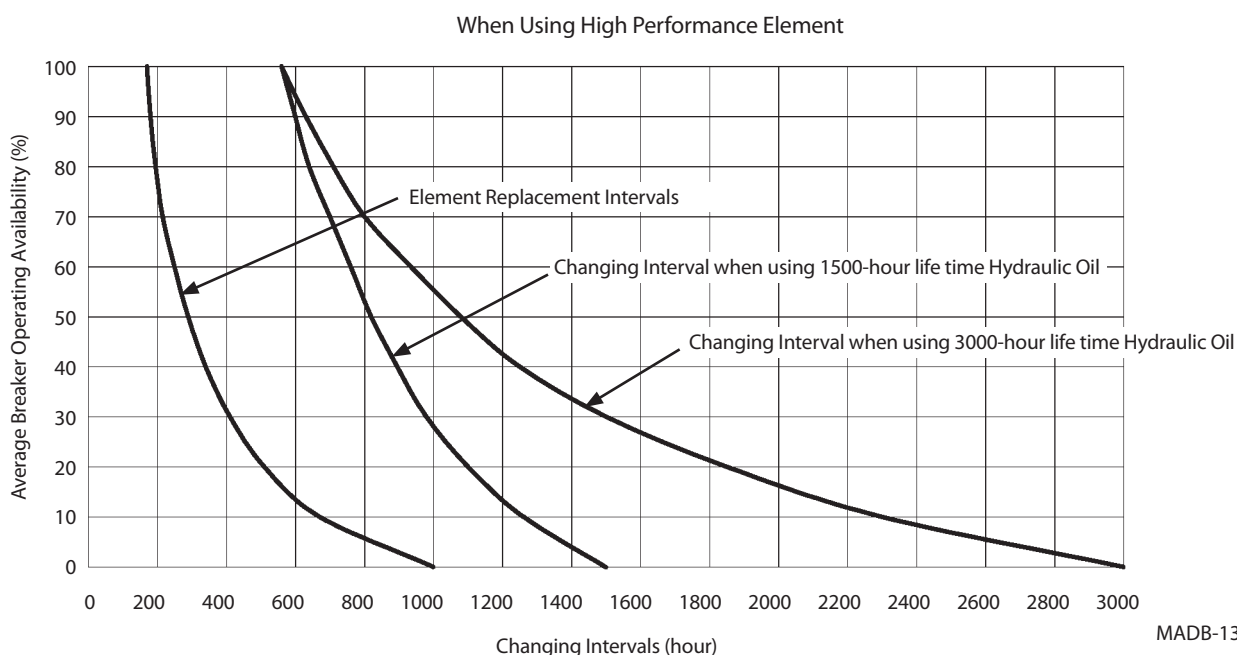
In order to extend the service life particularly of the hydraulic pump, change the hydraulic oil and the full-flow filter element at the specified frequency given below.

(Refer to the "Hydraulic System" in the "MAINTENANCE" chapter.)

Changing intervals differ depending on the brand. (Refer to the "Hydraulic System")

Changing intervals for the high performance element (micro-glass)

Breaker Operating Availability	0 %	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
Full-Flow Filter	1000	670	510	410	340	290	250	215	195	180	170
Hydraulic oil: 1500 hours life time	1500	1260	1100	980	895	820	760	700	640	600	560
Hydraulic oil: 3000 hours life time	3000	2300	1850	1500	1250	1080	935	800	710	630	560

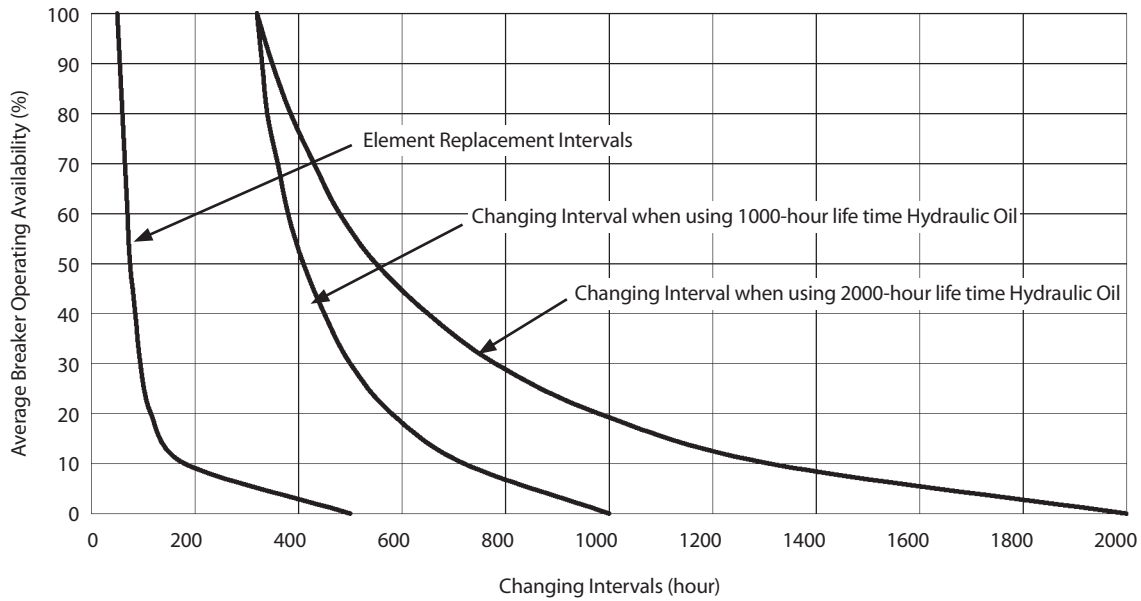


## MAINTENANCE

Changing intervals for the standard filter paper

Breaker Operating Availability	0 %	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
Full-Flow Filter	500	180	115	95	85	75	70	65	60	55	50
Hydraulic oil: 1000 hours life time	1000	720	580	500	450	410	380	360	340	330	320
Hydraulic oil: 2000 hours life time	2000	1310	980	780	650	550	480	430	385	350	320

When using filter-paper element



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### Front Greasing

When using the hydraulic breaker, grease all front joint pins every 50 hours.



## MAINTENANCE

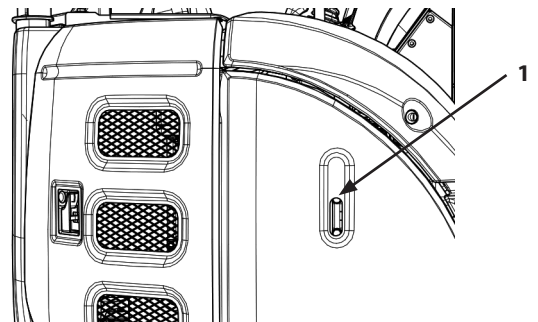
### 1 Check Hydraulic Oil Level --- daily

**IMPORTANT:** If the oil level is not viewed in level gauge (1), immediately refill hydraulic oil up to the appropriate level. Failure to do so may result in a serious failure in the hydraulic system. If the oil level is higher than level gauge (1), remove oil down to the appropriate level using a pump.

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Check oil level with level gauge (1) on hydraulic oil tank. Oil must be between marks on gauge (1). If necessary, add oil.



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MADB-07-004

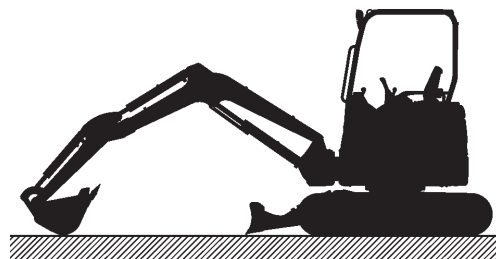
## MAINTENANCE

### 2 Drain Hydraulic Oil Tank Sump

--- every 250 hours

**CAUTION:** Hydraulic oil may be hot just after operation. Wait for oil to cool before starting work.

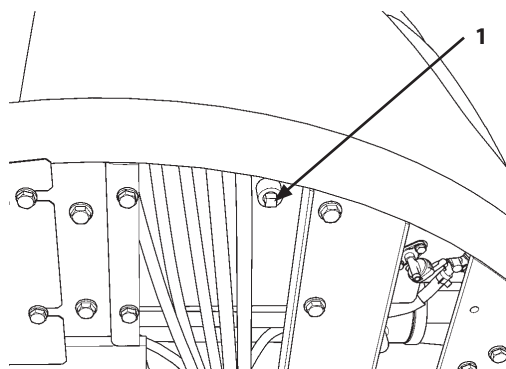
1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Leave the machine without operating the machine until hydraulic oil becomes cool. Then, bleed air pressure from the hydraulic oil tank.



M1M7-05-024

ZX30U-5N, 35U-5N, 50U-5N

3. Slowly loosen drain plug (1) on the bottom of the hydraulic oil tank to drain water and sediment.

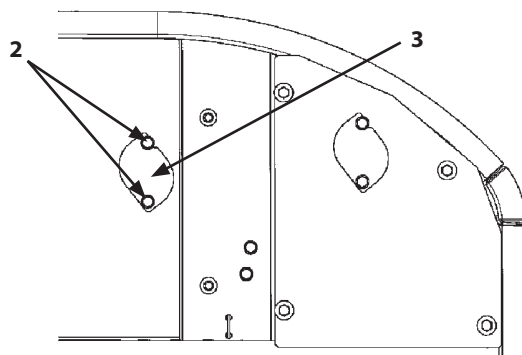


ZX30U-5N, 35U-5N, 50U-5N

MADB-07-012

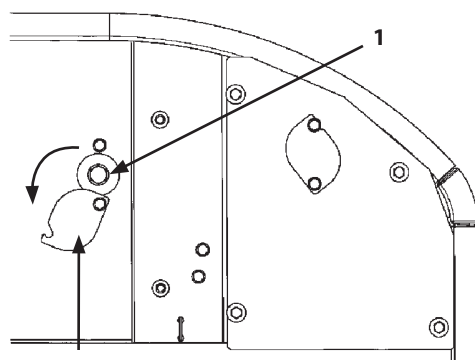
ZX60USB-5N

3. Loosen bolts (2) of drain valve cover (3). Rotate drain valve cover (3) to open the checking port. Slowly loosen drain plug (1) on the bottom of the hydraulic oil tank to drain water and sediment.



ZX60USB-5N

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ZX60USB-5N

MADC-07-010

## MAINTENANCE

- 3** **Change Hydraulic Oil**  
 --- every 1000 hours or 2000 hours  
 (when using the filter-paper element)  
 --- every 1500 hours or 3000 hours  
 (when using the high performance element)

- 4** **Suction Filter Cleaning**  
 --- when hydraulic oil is changed

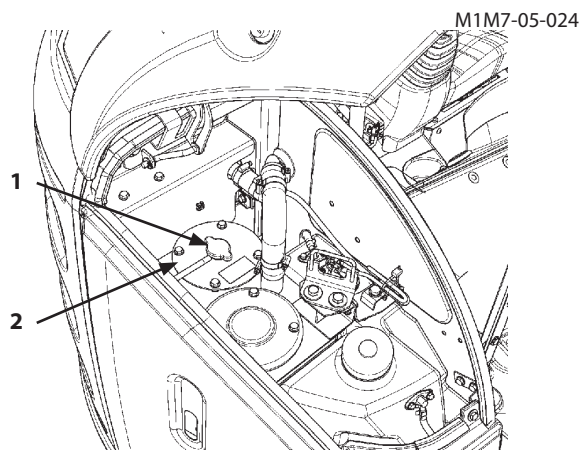
**⚠ CAUTION:** Hydraulic oil may be hot just after operation. Wait for oil to cool before starting work.

**IMPORTANT:**

- Hydraulic oil changing intervals differ according to kind of hydraulic oils, filter elements and attachments used and breaker operating availability. (Refer to 7-33, 7-34 pages)
- Do not use hydraulic oils other than listed in the "Brand Names of Recommended Hydraulic Oil".

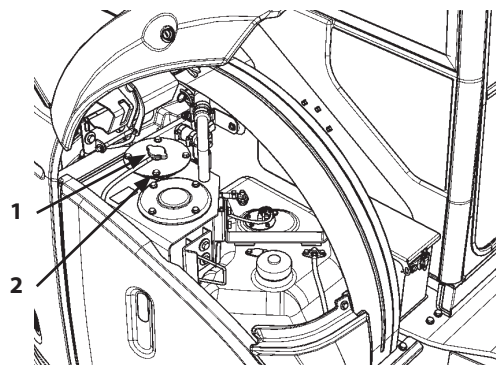
1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Open the tank cover. Clean the top of the hydraulic oil tank to keep dirt out of the hydraulic system.
3. Loosen cap (1) to release pressure from the hydraulic oil tank.
4. Remove cover (2).
5. Remove oil using a suction pump. The hydraulic oil tank capacity up to specified oil level is approximately A.

Model	A
ZX30U-5N, 35U-5N	43 L (11.4 US gal)
ZX50U-5N	66 L (17.4 US gal)
ZX60USB-5N	107.5 L (28.4 US gal)



ZX30U-5N, 35U-5N

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ZX50U-5N, 60USB-5N

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## MAINTENANCE

ZX30U-5N, 35U-5N, 50U-5N


6. Slowly loosen drain plug (3). Allow oil to drain.
7. Remove rod assembly (5) from the hydraulic oil tank.

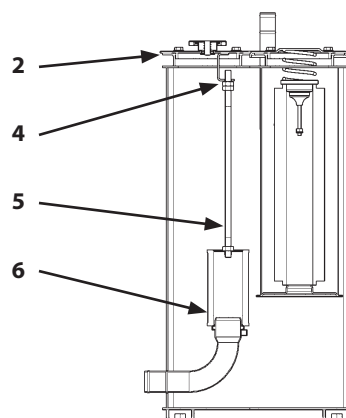
**IMPORTANT: When changing hydraulic oil, take care not to enter foreign matters such as dirt, water, and/or sand into the hydraulic oil tank.**

8. Clean the filter and tank interior. If suction filter (6) is to be replaced, install new filter on rod assembly (5) as shown.
9. Before installing the suction filter, check the dimension of rod assembly (5) shown in figure below. Securely insert rod assembly (5) into the pipe.
10. Clean, install and tighten drain plug (3).

Model	Tightening Torque
ZX30U-5N, 35U-5N	50 N·m (5 kgf·m, 37 lbf·ft)
ZX50U-5N	95 N·m (9.5 kgf·m, 70 lbf·ft)

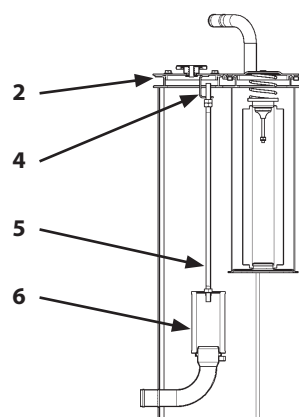
11. Add oil until it is between the marks on the oil level gauge.
12. Before securing cover (2) with bolts, ensure the top edge of the rod assembly (5) is completely inserted into the hole of support (4). Make sure filter and rod assembly (5) are in correct positions. Install cover (2). Tighten the bolts to 10 N·m (1 kgf·m, 7.2 lbf·ft).
13. Be sure to do "Bleed Air from Hydraulic System" shown 7-40 page.

 **NOTE:** Replace element (6) at the regular interval to keep hydraulic oil clean and to extend the service life of the hydraulic components.



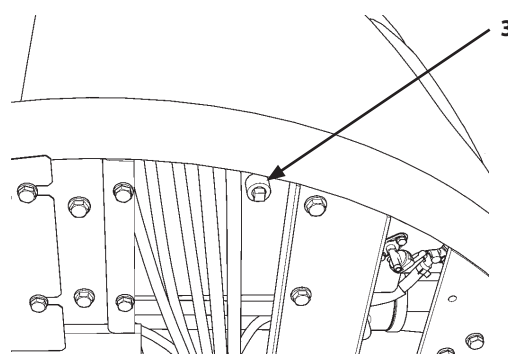
ZX30U-5N, 35U-5N

MADB-07-013



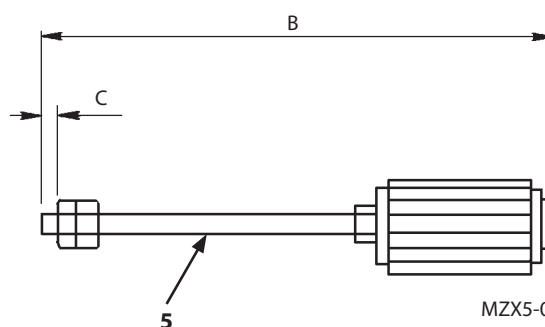
ZX50U-5N

MADB-07-014



MADB-07-012

Model	mm	
	B	C
ZX30U-5N, 35U-5N	465	25
ZX50U-5N	606	39



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## MAINTENANCE

### ZX60USB-5N


6. Loosen bolts (7). Rotate drain valve cover (8) to open the check port. Slowly loosen drain plug (3). Allow oil to drain.
7. Remove rod assembly (5) from the hydraulic oil tank.

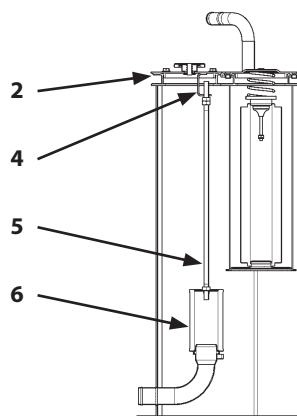
**IMPORTANT: When changing hydraulic oil, take care not to enter foreign matters such as dirt, water, and/or sand into the hydraulic oil tank.**

8. Clean the filter and tank interior. If suction filter (6) is to be replaced, install new filter on rod (5) as shown.
9. Before installing the suction filter, check the dimension of rod assembly (5) shown in figure below. Securely insert rod assembly (5) into the pipe.
10. Clean, install and tighten drain plug (3).

Model	Tightening Torque
ZX60USB-5N	95 N·m (9.5 kgf·m)

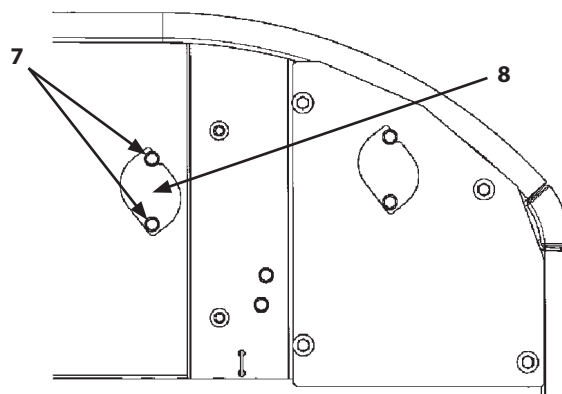
11. Add oil until it is between the marks on the oil level gauge.
12. Before securing cover (2) with bolts, ensure the top edge of the rod assembly (5) is completely inserted into the hole of support (4). Make sure filter and rod assembly (5) are in correct positions. Install cover (2). Tighten the bolts to 50 N·m (5 kgf·m, 36 lbf·ft).
13. Be sure to do "Bleed Air from Hydraulic System" shown 7-40 page.

 **NOTE:** Replace element (6) at the regular interval to keep hydraulic oil clean and to extend the service life of the hydraulic components.

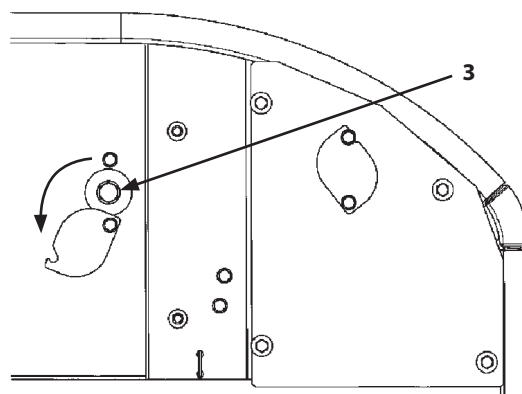


ZX60USB-5N

MADB-07-014



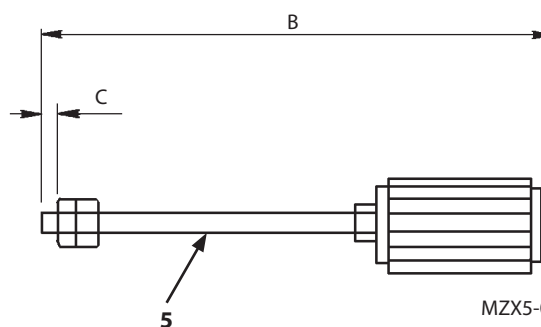
MADC-07-009



MADC-07-010

Model	B	C
ZX60USB-5N	536	20

mm



MZX5-07-001

## MAINTENANCE

### Bleed Air from Hydraulic System

After changing hydraulic oil, bleed air from the hydraulic system by following the procedure described below.


### Bleed Air from Pump

**IMPORTANT:** If the engine is started when the pump is not filled with hydraulic oil, damage to the pump may result.

1. Connect all hydraulic lines to the hydraulic pump. Fill any hydraulic components, that can be filled with hydraulic oil, with as much hydraulic oil as possible at this time.
2. Add hydraulic oil to the hydraulic oil tank to the specified level.
3. Loosen air bleed plug (1) slightly. Purge air from the pump casing and suction line. Do not remove as hydraulic oil may spout out. Tighten air bleed plug (1) after purging air.

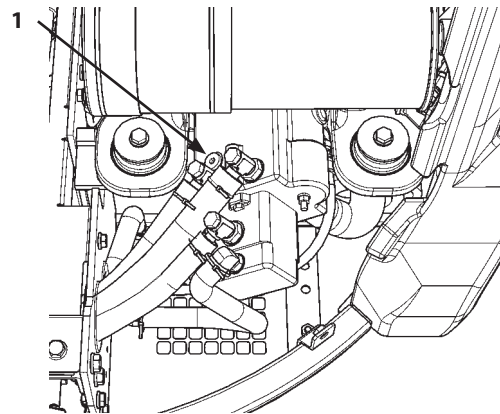
Tightening Torque: 30 to 40 N·m (3.0 to 4.0 kgf·m, 22 to 29 lbf·ft)

4. Check all line connections for any oil leaks. Set the engine control dial or lever in the slow idle position.
5. Start the engine. Wait 5 to 10 seconds. Stop the engine.
6. Check the hydraulic oil level at the level gauge located on the side of the hydraulic oil tank. Add hydraulic oil if necessary.
7. Restart the engine. Confirm that hydraulic oil level in the hydraulic oil tank is sufficient. Run the engine for approximately 1 minute.
8. This is the end of the hydraulic pump air bleeding procedure.

 **NOTE:** If the hydraulic pump is left empty overnight or longer, be sure to fill the pump with clean hydraulic oil before performing the air bleeding procedure above.

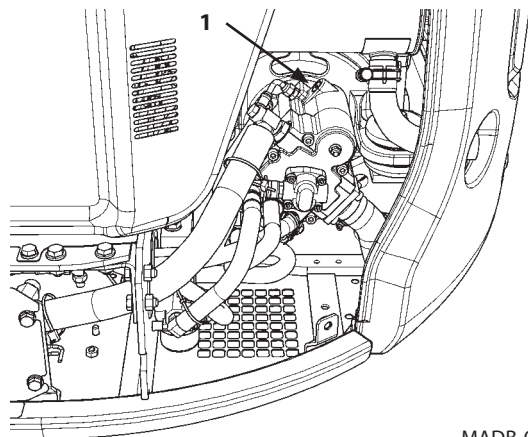
### Bleed Air From Hydraulic Circuits

1. After filling hydraulic oil in the hydraulic oil tank, start the engine. Evenly operate each cylinder and swing motor repeatedly for 10 to 15 minutes to purge air from hydraulic system.
2. Position the machine in the hydraulic oil level checking position.
3. Stop the engine. Check hydraulic oil level. Add oil if necessary.



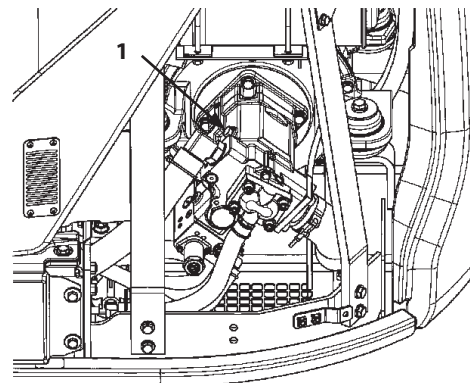
ZX30U-5N, 35U-5N

MADB-07-016



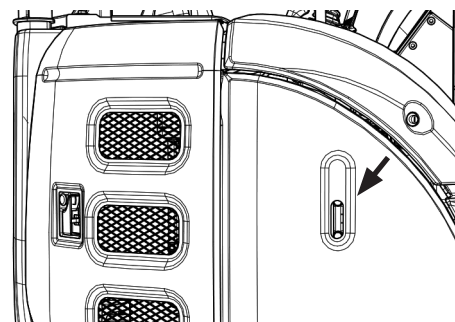
ZX50U-5N

MADB-07-015



ZX60USB-5N

MADC-07-011



MADB-07-004

## MAINTENANCE

### 5 Replace Full-Flow Filter

- every 500 hours (first time after 250 hours)  
(when using the filter-paper element)
- every 1000 hours (first time after 500 hours)  
(when using the high performance element)

**IMPORTANT:** Changing interval differs according to the brand of hydraulic oil, filter element and attachments used, kind of filter element or average attachment operating availability. (Refer to 7-33, 7-34 pages)

**CAUTION:** Hydraulic oil becomes hot and pressurized during operation. Severe burns may result if skin comes in contact with escaping hydraulic oil immediately after operation. Wait for the oil to cool before starting any maintenance work.

#### Procedures:

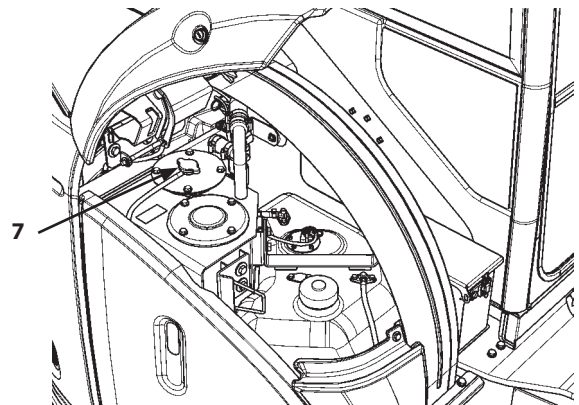
1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Before replacing element (6), be sure to bleed air pressure from the hydraulic oil tank by loosening cap (7).
3. Loosen bolts (1) (4 used) to remove cover (2) and O-ring (3). When removing cover (2), slowly remove cover (2) while pressing cover (2) downward so that spring (4) does not fly off.

**IMPORTANT:** Especially when removing the filter, be aware that the remaining oil in the filter may spill. Use extra care.

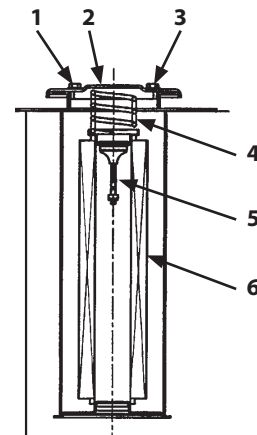
4. Remove spring (4), valve (5) and element (6).
5. Take extra care never to allow water or dust to enter the filter case.



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## MAINTENANCE

6. Replace O-ring (3) and element (6) with new ones. Be careful not to damage element (6) and O-ring (3).

Broken element (6) is unusable.

7. Install element (6), valve (5), spring (4) and O-ring (3).
8. Install cover (2) with bolts (1) (4 used).

Tightening Torque:


ZX30U-5N, 35U-5N, 50U-5N: 10 N·m (1 kgf·m, 7.4 lbf·ft)

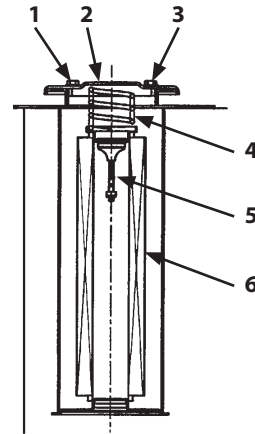
ZX60USB-5N: 50 N·m (5 kgf·m, 37 lbf·ft)

9. Bleed air from the hydraulic system and check the hydraulic oil level after replacing the element.

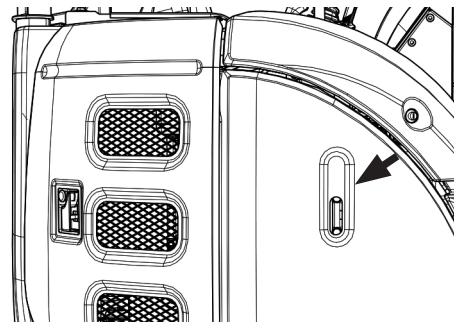
(Refer to the descriptions for "Bleed Air from Hydraulic System")

If the machine is operated with air mixed in the hydraulic circuit, damage to the pump may result.

 **NOTE:** Replace element (6) at the regular interval to keep hydraulic oil clean and to extend the service life of the hydraulic components.



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MADB-07-004



## MAINTENANCE

### 6 Replace Pilot Oil Filter Element --- every 1000 hours

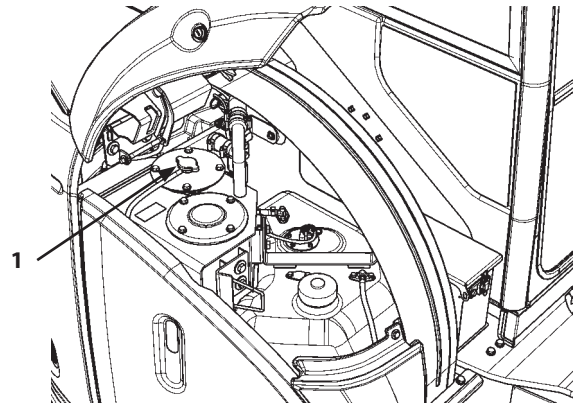
**CAUTION:** Hydraulic oil becomes hot and pressurized during operation. Severe burns may result if skin comes in contact with escaping hydraulic oil immediately after operation. Wait for the oil to cool before starting any maintenance work.

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Before replacing the element, be sure to bleed air pressure from the hydraulic oil tank by loosening cap (1).
3. Remove bolts (3) and under cover (2) of rear left side.

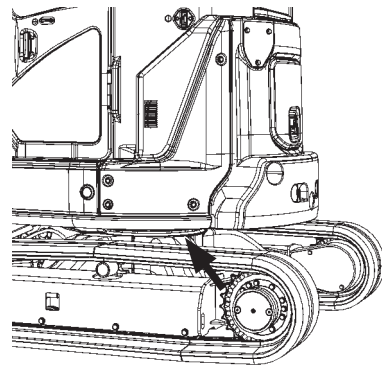
Wrench size: 17 mm



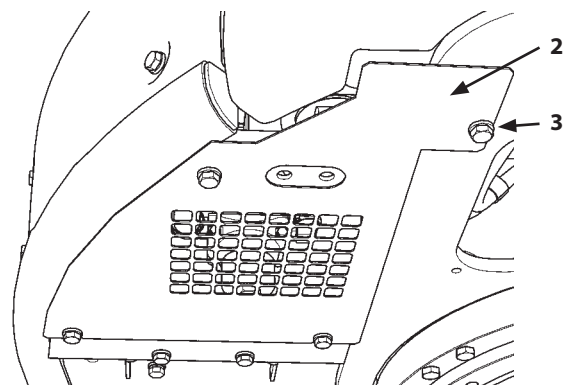
M1M7-05-024



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MADB-07-018

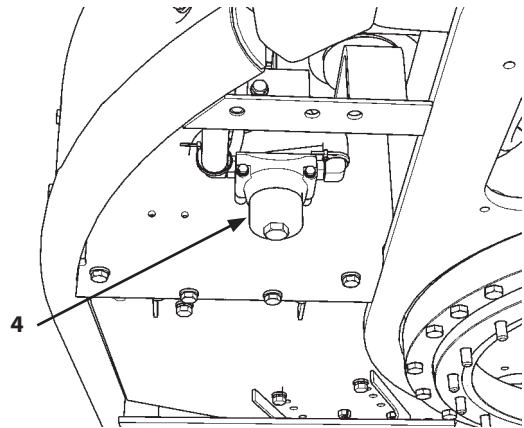


MADB-07-019

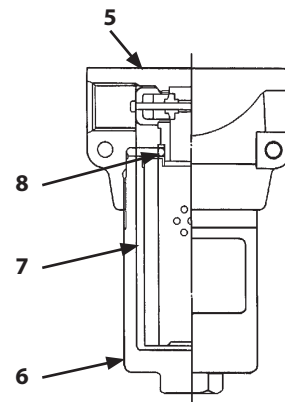
## MAINTENANCE

4. Rotate filter case (6) of pilot filter (4) counterclockwise to remove filter case (6).
5. While rotating filter element (7), pull to remove filter element (7) downward.
6. Replace O-ring (8) with a new one.
7. Clean the filter O-ring (8) contact area on filter head (5).
8. Securely install O-ring (8) in the O-ring groove on head cover (5).
9. Coat the seal on new filter element (7) with clean hydraulic oil. Completely install filter element (7) into head cover (5) while rotating filter element (7) taking care not to damage filter element (7).
10. Take care not to allow dust and/or water enter filter case (6).
11. Install case (6) into head cover (5) while rotating case (6) clockwise.  
Tightening Torque: 25 to 35 N·m  
(2.5 to 3.5 kgf·m, 18.0 to 26 lbf·ft)
12. After replacing filter element (7), bleed any remaining air from the hydraulic circuit.  
Check the oil level in the hydraulic oil tank. Add oil as needed.  
  
(Refer to the descriptions for "Bleed Air from Hydraulic System")  
  
If the machine is operated with air mixed in the hydraulic circuit, damage to the pump may result.
13. Install under cover (2).  
Wrench size: 17 mm
14. Tighten cap (1).

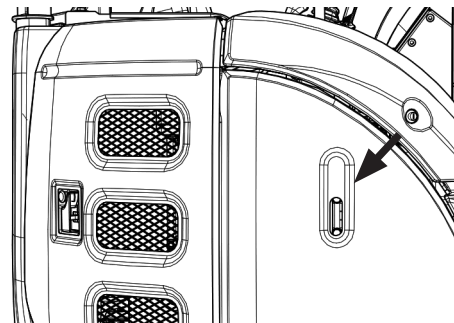
 **NOTE:** Replace element (7) at the regular interval to keep hydraulic oil clean and to extend the service life of the hydraulic components.



MADB-07-020



M503-07-031



MADB-07-004

## MAINTENANCE

### 7 Check Hoses and Lines

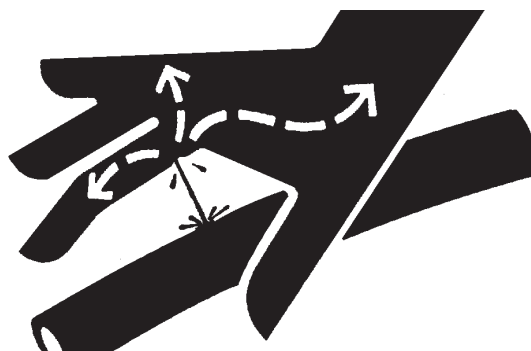
- daily
- every 250 hours

#### **!** WARNING:

- Hydraulic oil and lubricant leaks can lead to fire that may result in serious injury. Check for missing or loose clamps, kinked hoses, lines or hoses that rub against each other, damaged oil cooler, and loose oil cooler flange bolts, for leaks.
- Escaping oil under pressure can penetrate the skin causing serious injury. To avoid this hazard, search for oil leaks with a piece of cardboard. Take care to protect hands and body from high-pressure fluids. If an accident occurs, see a doctor familiar with this type of injury immediately.
- Tighten, repair or replace any missing, loose or damaged clamps, hoses and lines.
- Do not bend or strike high-pressure lines.
- Never install bent or damaged hoses or lines.

According to the check points shown below, check hoses and lines for oil leaks and damage.

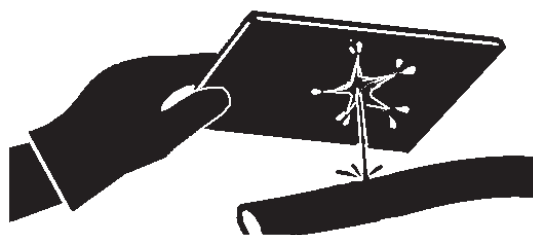
If any abnormality is found, replace or retighten as instructed in the table.



SA-031



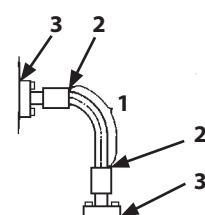
SA-292



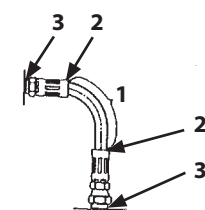
SA-044

#### Hose

Interval (hours)	Check Points	Abnormalities	Remedies
Daily	Hose covers	Leak (1)	Replace
	Hose ends	Leak (2)	Replace
	Fittings	Leak (3)	Retighten or replace hose or O-ring



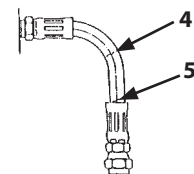
M137-07-008



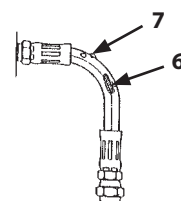
M115-07-145

## MAINTENANCE

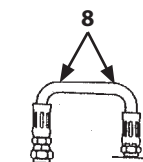
Interval (hours)	Check Points	Abnormalities	Remedies
Every 250 hours	Hose covers	Damage or leak (4)	Replace
	Hose ends	Damage or leak (5)	Replace
	Hose covers	Exposed reinforcement (6)	Replace
	Hose covers	Crack or blister (7)	Replace
	Hose	Bend (8), Collapse (9)	Replace
	Hose ends and Fittings	Deformation or corrosion (10)	Replace



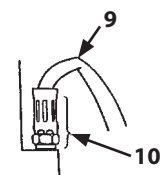
M115-07-146



M115-07-147



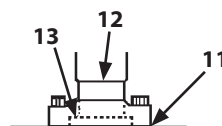
M115-07-148



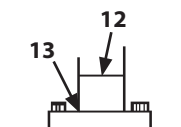
M115-07-149

### Lines

Interval (hours)	Check Points	Abnormalities	Remedies
Daily	Contact surfaces of flange joints	Leak (11)	Replace
	Bolts	Loose or leak (11)	Retighten or replace O-ring
	Welded surfaces on flange joints	Leak (12)	Replace
Every 250 hours	Flange joint neck	Crack (13)	Replace
	Welded surfaces on flange joints	Crack (12)	Replace
	Clamps	Missing or deformation Loose bolts	Replace or retighten



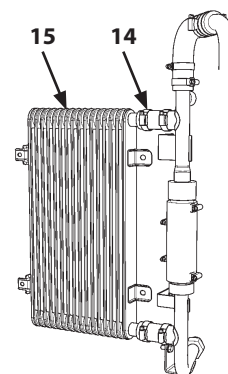
M137-07-001



M137-07-007

### Oil Cooler

Interval (hours)	Check Points	Abnormalities	Remedies
Every 250 hours	Coupling	Leak (14)	Retighten or replace
	Oil Cooler	Leak (15)	Replace



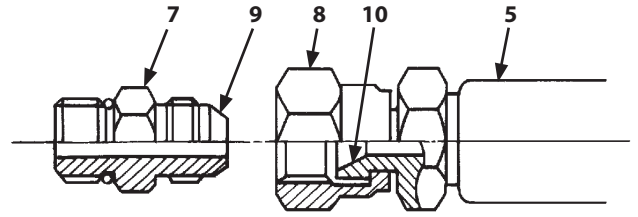
MADB-07-021

## MAINTENANCE

- Metal Face Seal Fittings

Fittings are used on smaller diameter joint and consist of a metal flare (10) and a metal flare seat (9).

1. Inspect flare (10) and flare seat (9). They must be free of dirt or obvious defects.
2. Tighten fitting (7) by hand.
3. Tighten fitting (7) or nut (8) to the torque values shown.  
Do not allow hose (5) to twist when tightening fittings.



M202-07-051

		±10%						
Wrench size (mm)		17	19	22	27	36	41	50
Tightening Torque	N·m	25	30	40	65	180	210	250
	(kgf·m)	(2.5)	(3)	(4)	(6.5)	(18)	(21)	(25)
	(lbf·ft)	(18)	(22)	(29.5)	(47)	(130)	(150)	(184)

## MAINTENANCE

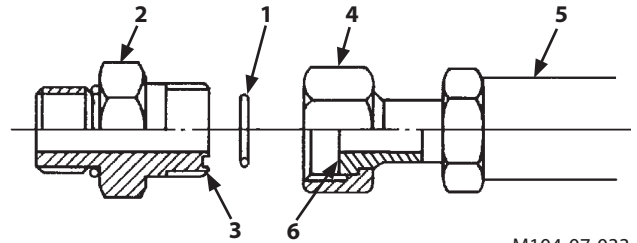
### Service Recommendations for Hydraulic Fittings

Two hydraulic fitting designs are used on this machine.

- Flat Face O-ring Seal Fitting (ORS Fitting)  
O-ring (1) is used on the sealing surfaces of adapter (2) to prevent oil leakage.

#### Precautions for Use

1. Replace O-ring (1) with a new one when assembling fittings.
2. Check that O-ring (1) is properly fitted in O-ring groove (3). Tighten union (4).  
Tightening union (4) with O-ring (1) out of the groove may damage O-ring (1) and cause oil leak.
3. When assembling fittings, take care not to make a dent on O-ring groove (3) of adaptor (2) and sealing surface (6) on hose (5) or valve side. Failure to do so may result in damage to O-ring (1) leading to oil leak.
4. If oil leaks from a loose connection of union (4), do not tighten fitting (2). Open the connection, replace O-ring (1) with a new one and check for correct O-ring position before tightening the connection.



M104-07-033

#### Tightening Torque:

Tighten fittings to the torque values shown below.

±10 %

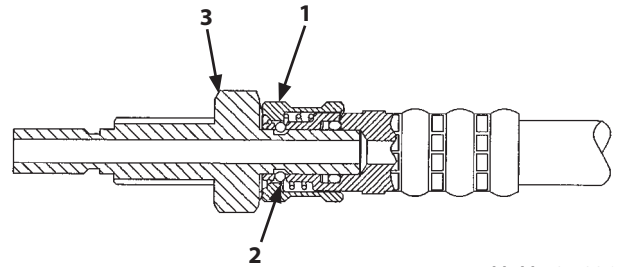
Wrench size (mm)		19	22	24	27	36	41
Tightening Torque:	N·m	30	70	80	95	180	210
	(kgf·m)	(3.0)	(7.0)	(8.0)	(9.5)	(18)	(21)
	(lbf·ft)	(22)	(52)	(59)	(70)	(130)	(152)

## MAINTENANCE

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### Quick Coupler

1. Connection Procedure
  - 1.1 While pulling and fully turning socket ring (1) counterclockwise, insert socket ring (1) onto plug (3) until the end face of socket ring (1) comes in contact with plug (3).
  - 1.2 Release socket ring (1). Check that socket ring (1) is slightly moved backward by the spring force and that the coupler is held in position with balls (2). Be sure to check that socket ring (1) has been moved back fully to the right original position.
2. Disconnection Procedure
  - 2.1 While pulling and fully turning socket ring (1) counterclockwise, disconnect the coupler. As no check valve is provided in the coupler, take care that oil may flow out of the coupler when the coupler is disconnected.
  - 2.2 After the coupler is disconnected, plug the holes with the exclusively prepared plugs.



M1M7-07-006

### IMPORTANT:

- **Take care not to damage the joint surfaces when disconnecting or connecting the coupler.**
- **Before disconnecting or connecting the coupler, clean the coupler and its surroundings with a cleaning solvent and completely wipe off the cleaning solvent. Use extra care not to allow foreign matter such as dirt to enter the coupler.**
- **Disconnect or connect the coupler in the correct procedure. Confirm by inspection that no oil leak is present after connecting the coupler.**
- **After connecting the coupler, check that socket ring (1) has been moved back fully to the right original position.**

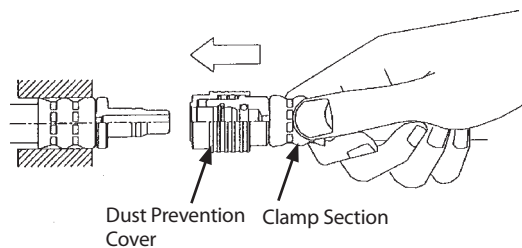
## MAINTENANCE

### Quick Coupler

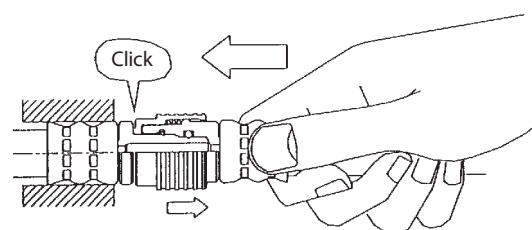
#### 1. Connecting Coupler

Always grasp the coupler by its clamp section. Push the body straight until the dust prevention cover retracts approx. 2 mm. Then, pull the clamp section straight to make sure that the coupler is properly connected and will not be disconnected.

**CAUTION:** If the coupler is grasped and pushed by the dust prevention cover, or not pushed until the dust prevention cover retracts, incomplete connection of the coupler may result, causing the coupler to disconnect when oil pressure increases. Even if the coupler is incompletely connected, if pulling force is diagonally applied, the coupler may be difficult to disconnect. However, the coupler may be easily disconnected in this case when oil pressure increases. Take care not to diagonally push the coupler. Failure to do so damage to the inner parts, cause oil leak, and/or unexpected coupler disconnection may result.



M1LA-07-014

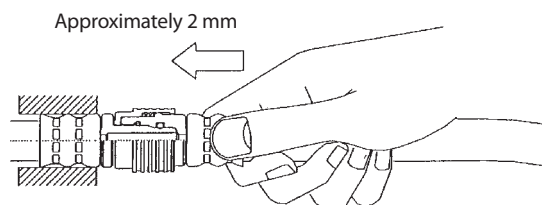


M1LA-07-015

#### 2. Disconnecting Coupler

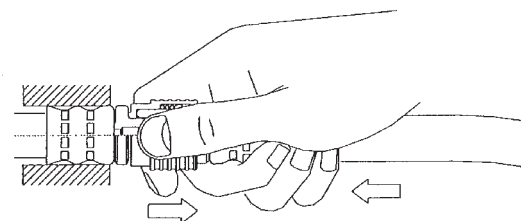
Be sure to disconnect the coupler only after removing any foreign matter adhered such as soil adhered to the joint with cleaning oil.

- While grasping the clamp section, push the body straight approx. 2 mm.



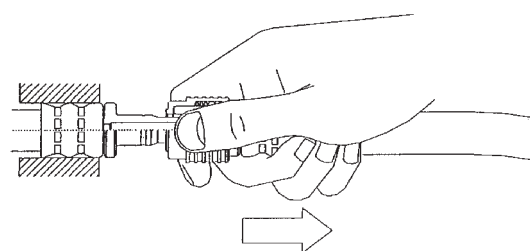
M1LA-07-016

- While pushing the body, pull the dust prevention cover.



M1LA-07-017


- Pull the overall coupler together along with the dust prevention cover to disconnect the coupler.



M1LA-07-018



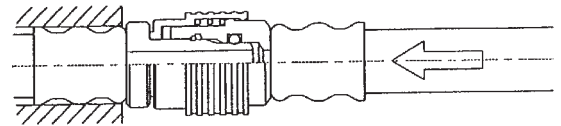
## MAINTENANCE

 **NOTE:** When disconnecting a coupler located in a narrow space that is difficult for your hand to enter, use a screwdriver following the procedures as described below.

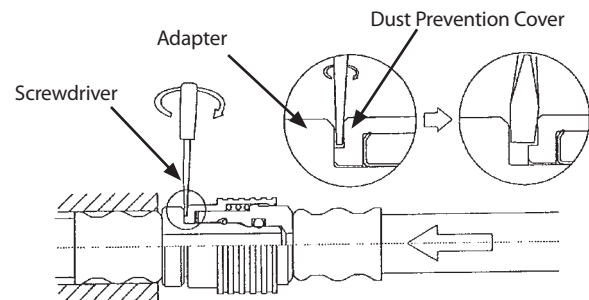
### Using Screwdriver

A screwdriver with a tip thickness of less than 1 mm and a tip width of approx. 5 mm is appropriate to this work.

- Slightly push the hose toward the coupler approx. 2 mm.
- While pushing the hose toward the coupler, insert a screwdriver in the position as illustrated to the right. Twist the screwdriver about 90°. After making the gap between the adapter and the dust prevention cover more than 2 mm, pull the hose to disconnect the coupler.



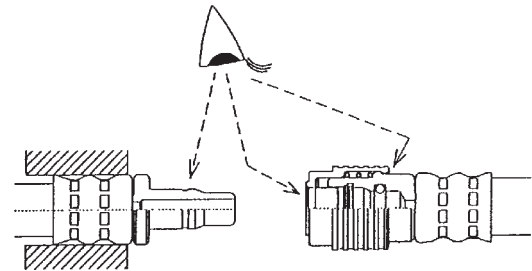
M1LA-07-021



M1LA-07-022

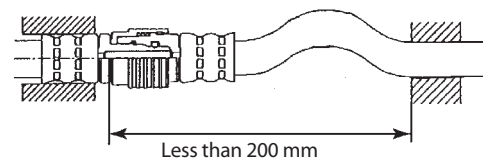
### 3. Precautions for Re-using Coupler

- Before connecting the coupler, be sure to check the coupler surface for any adhered foreign matter. Clean to remove the foreign matter if any. Adhered foreign matter may cause oil leaks and/or disconnection of the coupler.
- When a hose clamping is required, put a clamp 200 mm away from the joint edge. If the hose is clamped as illustrated to the right, the coupler joint may slide as oil pressure changes, causing oil leaks due to the premature inner parts wear.
- Do not use the coupler as a foot step and do not handle the coupler roughly. If the dust prevention cover is broken, the coupler may become difficult to disconnect.
- Do not paint on the joint surface. The body will be seized with the dust prevention cover so that the coupler cannot be disconnected.



M1LA-07-019

**WRONG**



M1LE-07-006

## MAINTENANCE

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### E. Fuel System

 **WARNING: Beware of fire. Fuel is flammable. Keep fuel away from fire hazards.**

**IMPORTANT: Always fill the fuel tank with the specified diesel fuel. Failure to do so may cause engine trouble and also make it difficult for the engine to start.**

#### **Recommended Fuel**

Use only super high quality or high quality DIESEL FUEL (JIS K-2204) (ASTM 2-D). Kerosene must NOT be used.

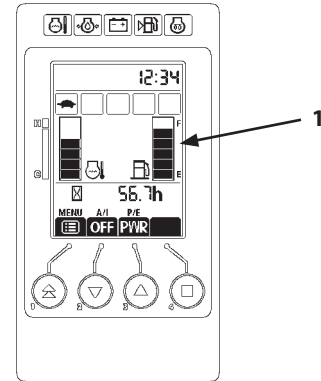
Besides, using bad quality fuel, drainage agent, fuel additives, gasoline, kerosene or alcohol refueled or mixed with specified fuel may deteriorate performance of fuel filters and cause sliding problem at lubricated contacts in the injector. It also affects the engine parts, leading to malfunction. Using fuel other than ultra low-sulfur or low-sulfur diesel fuel has adverse effects on the engine, which may result in malfunction.

## MAINTENANCE

### 1 Check Fuel Level --- every 8 hours (daily)

**CAUTION:** Handle fuel carefully. Shut the engine off before fueling. Do not smoke while you fill the fuel tank or work on fuel system.

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Check fuel level gauge (3) and fuel gauge (1) of the monitor panel. When necessary to add fuel, remove cap (2) and refill fuel.



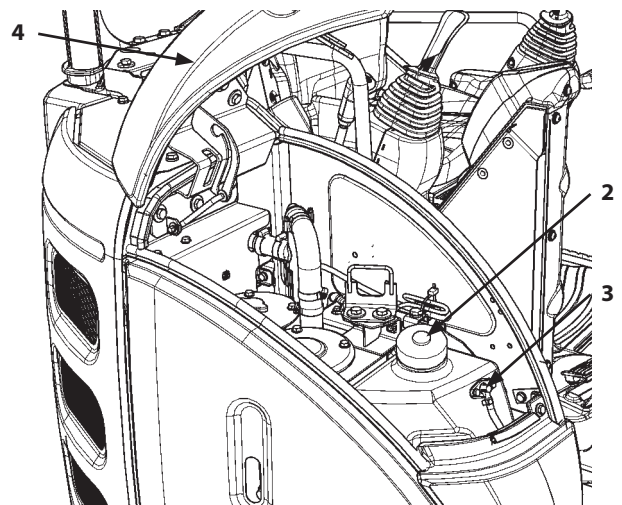
MADH-01-009

**IMPORTANT:** Keep all dirt, dust, water and other foreign materials out of the fuel system when refilling fuel.

3. To avoid condensation, fill the tank at the end of each day's operation. Take care not to spill fuel on the machine or ground.

Model	Tank Capacity
ZX30U-5N, 35U-5N	42 L (11.1 US gal)
ZX50U-5N	70 L (18.5 US gal)
ZX60USB-5N	120 L (31.7 US gal)

4. After refilling fuel, install cap (2). Close tank cover (4) and be sure to lock cover (4) to prevent vandalism.



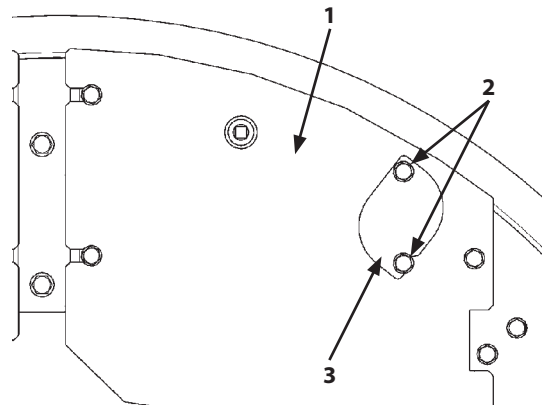
MADB-07-041

## MAINTENANCE

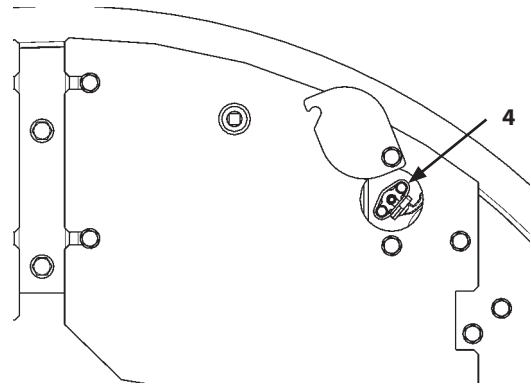
### 2 Drain Fuel Tank Sump

--- As required

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Loosen bolts (2) to remove drain valve cover (3) from right-front under cover (1). Rotate drain valve cover (3) to open the checking port.
3. Place a 0.5 liters or larger capacity container under drain valve (4) to collect the drained water.
4. Open drain valve (4) to drain water and/or sediment.
5. After draining water, securely tighten drain valve (4).
6. Return drain valve cover (3) to original position and tighten bolts (2).



MADB-07-024



MADB-07-025

## MAINTENANCE

### 3 Check Water Separator (ZX30U-5N, 35U-5N) Drain water --- every 8 hours (before starting operation)

Water separator (1) is a device designed to separate water from the fuel. There is a float inside the case which buoys when water accumulates.

When the float rises to the water draining level, drain water.

#### Drain Procedures

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Place 0.5 liters or larger capacity container under drain plug (3) to collect the drained water.
3. Close cock (2) at upper part of water separator (1). Loosen drain plug (3) at lower part of water separator (1) to drain water. If water is difficult to drain, loosen air bleed plug (4) counterclockwise 2 to 3 turns.
4. After draining water, securely tighten drain plug (3) and plug (4).
5. Open cock (2).

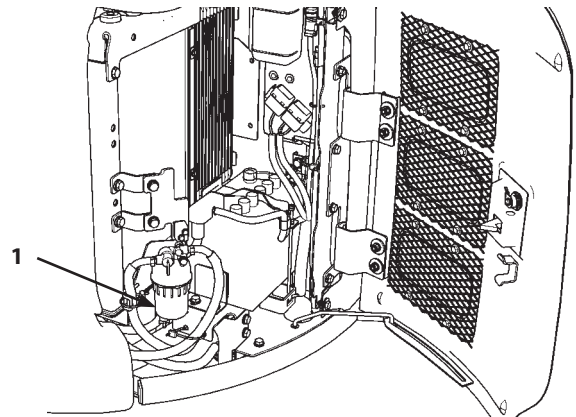
**IMPORTANT:** After draining water from the water separator, bleed air from the fuel supply system.

#### Bleed Air from Fuel System (ZX30U-5N, 35U-5N)

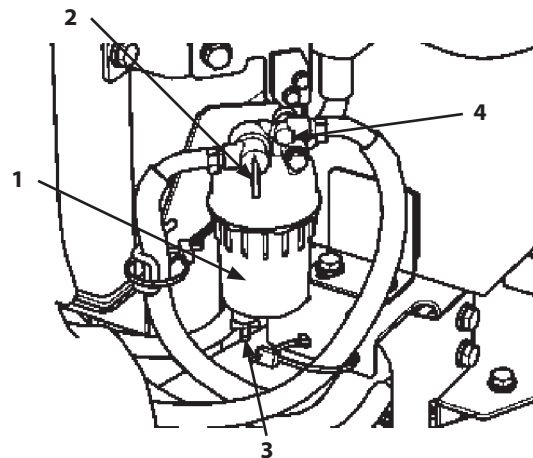
Air in the fuel system will cause the engine to start hard and/or run roughly. Be sure to bleed air from the system after replacing the fuel filter or running the fuel tank dry.

Automatic bleeding device is provided on this machine.

1. Confirm that the fuel level is more than one-half of the tank capacity. If the fuel level is lower, automatic bleeding device will not operate. Add fuel.
2. Turn the key switch ON and hold for 10 to 15 seconds.
3. Start the engine and check the fuel system for fuel leaks.



MADB-07-022



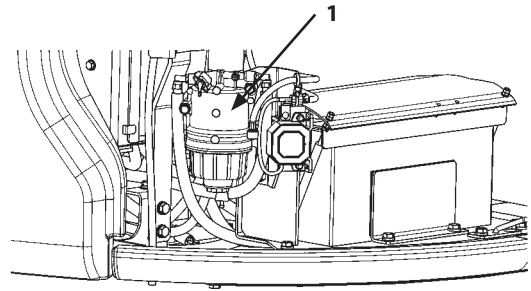
MADB-07-023

## MAINTENANCE

### 4 Drain Fuel Pre-Filter (ZX50U-5N, 60USB-5N) --- every 8 hours (before starting operation)

**IMPORTANT:** Drain fuel filter daily before starting operation. The engine may be damaged if you do not drain fuel filter daily.

Pre-filter has water separator function, these allow float (4) to rise as water accumulates. Be sure to drain daily the water accumulated in the filter until float (4) goes the bottom of case.

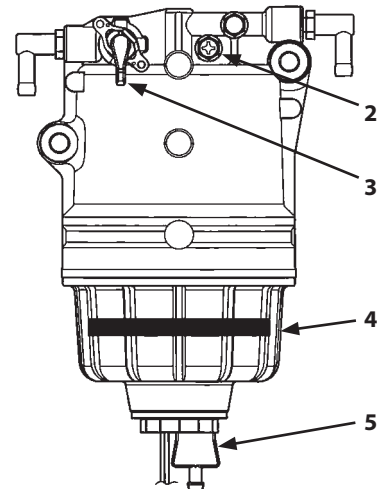


MADG-07-001

#### Drain Procedures

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Place 0.5 liters or larger capacity container under drain valve (5) to collect the drained water.
3. Close cock (3) at upper part of fuel pre-filter (1). Loosen drain valve (5) at lower part of fuel pre-filter (1) to drain water. If water is difficult to drain, loosen air bleed plug (2).
4. After draining water, securely tighten drain valve (5) and plug (2).
5. Open cock (3).

**IMPORTANT:** After draining water from the water separator, bleed air from the fuel supply system.



MADG-07-002

## MAINTENANCE

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### Bleed Air from the Fuel System (ZX50U-5N, 60USB-5N)

This machine is equipped with a electrical fuel pump.

**⚠ CAUTION: Fuel leaks may lead to fires.**

1. Confirm that the fuel level is more than one-half of the tank capacity. If the fuel level is lower, automatic bleeding device will not operate. Add fuel.
2. Turn the key switch ON and hold it in that position for approx. 3 minutes. Thereby, the electrical fuel pump operates, starting to bleed air.
3. After the main filter is filled with fuel, hold the key switch in the ON position for 30 seconds.
4. Start the engine. Check the fuel supply system for fuel leaks.

**IMPORTANT: Even if air is not thoroughly bled, do not hold the key switch in the ON position for more than 5 minutes. In case air is not thoroughly bled, first return the key switch to the OFF position. Then, after waiting for more than 30 seconds, turn the key switch ON again. Failure to do so may cause damage to the electrical pump and/or discharging the batteries.**

### If Air Mixed After Common Rail

In case air mixed in the fuel system due to lack of fuel and the engine is difficult to start, release air by following the procedure given below.

1. Bleed air until the engine supply pump entrance enough according to the above-mentioned procedures.
2. Operate starter motor for long cranking within 20 seconds. If engine falls to start, return key switch to OFF. Wait more than about 60 seconds, and then try again.

## MAINTENANCE

### 5 Replace Fuel Main Filter Element --- every 500 hours

#### IMPORTANT:

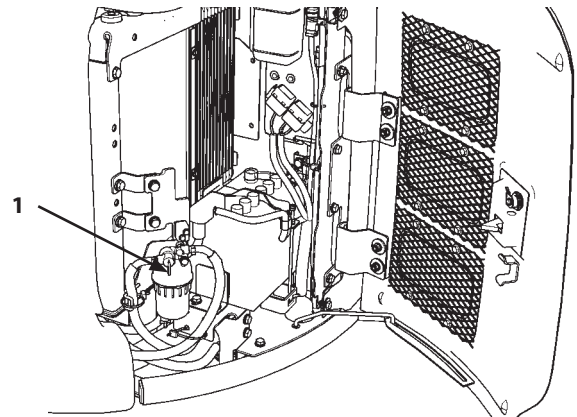
- Be sure to use only genuine Hitachi elements for the fuel main filter element. Failure to do so may deteriorate the engine performance and/or shorten the engine service life. Please be noted that all engine failures caused by using other manufacturers' elements are excluded from Hitachi Warranty Policy.
- Take care not to allow dirt and/or water to enter the fuel tank.

#### Procedures:

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Close cock (1).
3. Place a 1 liter or larger capacity container under fuel main filter (2).
4. Remove fuel filter (2) using the filter wrench.
5. Clean the fuel filter (2) contact area.
6. Apply a thin layer of clean fuel to the gasket of new fuel filter (2).
7. Turn fuel filter (2) clockwise by hand until fuel filter (2) touches the contact area.
8. Tighten fuel filter (2) 1/2 turn more using the filter wrench. Be careful not to overtighten.
9. Open cock (1).
10. Bleed Air from the Fuel System

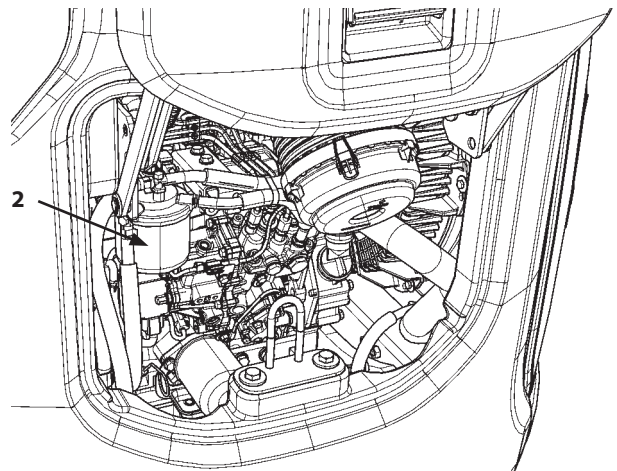
After replacing the fuel filter element, bleed air from the fuel supply system.

(Refer to "2 Bleed Air from the Fuel System")



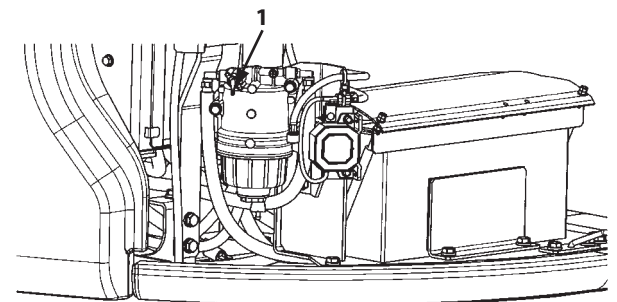
ZX30U-5N, 35U-5N

MADB-07-022



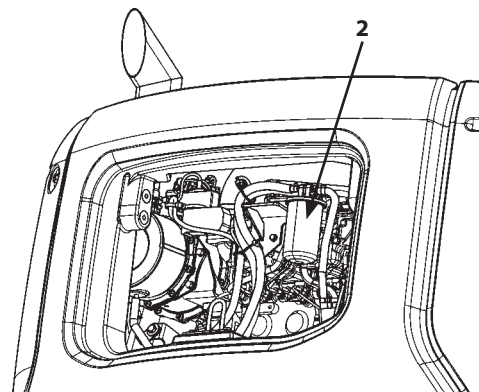
ZX30U-5N, 35U-5N

MADB-07-011



ZX50U-5N, 60USB-5N

MADG-07-010



ZX50U-5N, 60USB-5N

MADG-07-009



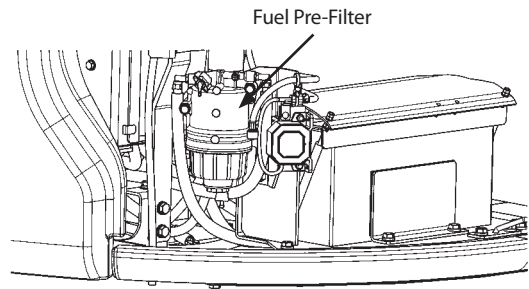
## MAINTENANCE

### 6 Replace Fuel Pre-Filter Element (ZX50U-5N, 60USB-5N)

--- every 500 hours or when fuel filter clogging lamp is lit

#### IMPORTANT:

- Be sure to use only genuine Hitachi elements for the fuel pre-filter element. Failure to do so may deteriorate the engine performance and/or shorten the engine service life. Please be noted that all engine failures caused by using other manufacturers' elements are excluded from Hitachi Warranty Policy.

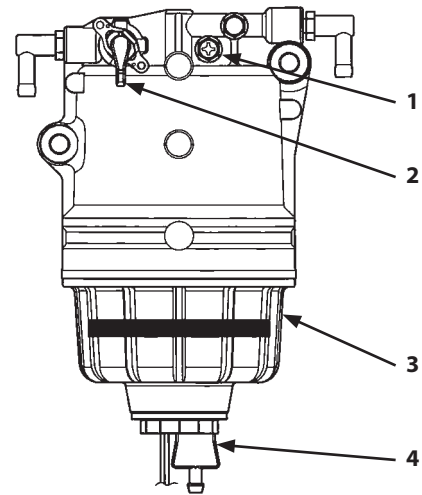


MADG-07-001

#### Procedures:

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Close cock (2).
3. Place a 1 liter or larger capacity container under drain plug (4).
4. Loosen air bleed plug (1) and drain plug (4). Drain fuel until fuel does not flow out of the filter.
5. Remove filter case (3) by using a special tool.
6. Remove the filter element.
7. Replace the O-ring with new ones.
8. Install a new element and O-ring. Tighten filter case (3) by using a special tool.

Tightening Torque :  $30 \pm 3$  N·m (2.8 to 3.4 kgf·m, 21 to 25 lbf·ft).



MADG-07-002

9. Tighten air bleed plug (1) and drain plug (4).
10. Open cock (2).
11. Bleed Air from the Fuel System

After replacing the fuel filter element, bleed air from the fuel supply system.

(Refer to "Bleed Air from the Fuel System".)

## MAINTENANCE

- 7** Check Fuel Hoses  
 --- every 8 hours (before starting operation)  
 --- every 250 hours

**⚠ CAUTION:** Fuel leaks can lead to fires that may result in serious injury.

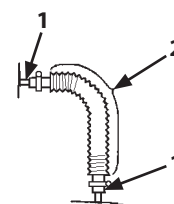
- Escaping combustible fluid can cause fires. Check for kinked hoses, hoses that rub against each other and any fuel leaks.
- Repair or replace any loose or damaged hoses.
- Never reinstall bent or damaged hoses.

According to the check points shown below, check hoses for oil leaks and damage.

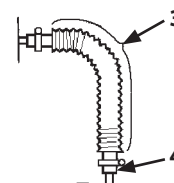
If any abnormality is found, replace or retighten as the hose instructed in the table.

Hose

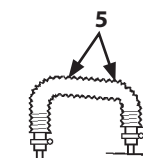
Interval (hours)	Check Points	Abnormalities	Remedies
Daily	Hose ends	Leak (1)	Retighten or replace
	Hose covers	Wear, crack (2)	Replace
Every 250 hours	Hose covers	Crack (3)	Replace
	Hose ends	Crack (4)	Replace
	Hose	Bend (5), Collapse (6)	Replace
	Hose fittings	Corrosion (7)	Replace



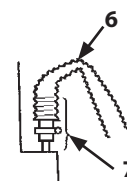
M137-07-003



M137-07-004



M137-07-005



M137-07-006

## MAINTENANCE

### F. Air Cleaner

- 1** Clean Air Cleaner Outer Element  
 --- every 250 hours or when the air filter restriction alarm (5) comes ON  
 Replace Air Cleaner Outer and Inner Elements  
 --- after cleaning six times or after one year

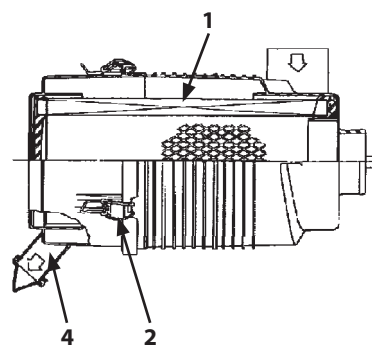
- 2** Replace Air Cleaner Inner Element (Optional)  
 --- when outer element is replaced

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Loosen clamps (2) (2 used) (ZX60USB-5N : 3 used) to remove cover (3).
3. Remove outer element (1).
4. Tap outer element (1) with the palm of your hand, NOT ON A HARD SURFACE.

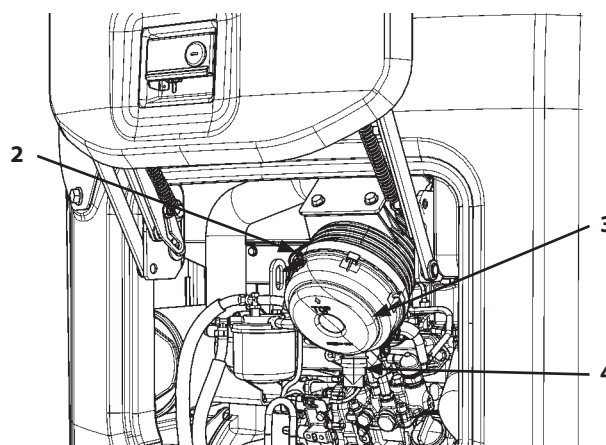
**⚠ CAUTION:** Use reduced compressed air pressure. (Less than 0.69 MPa, 7 kgf/cm<sup>2</sup>). Clear area of bystanders, guard against flying chips, and wear personal protection equipment including goggles or safety glasses.

**IMPORTANT:** To clean element (1), avoid giving shocks or striking element (1) with other objects.

5. Clean outer element (1) by blowing compressed air [less than 0.69 MPa (7 kgf/cm<sup>2</sup>)] outward from the inside of the filter element. After cleaning, be sure to check element (1) for any damage. If any damage is found, replace the element with a new one.
6. In case air filter restriction alarm (5) lights soon after cleaning outer element (1) even if the cleaning times are less than 6 times, replace both outer and inner elements with new ones.

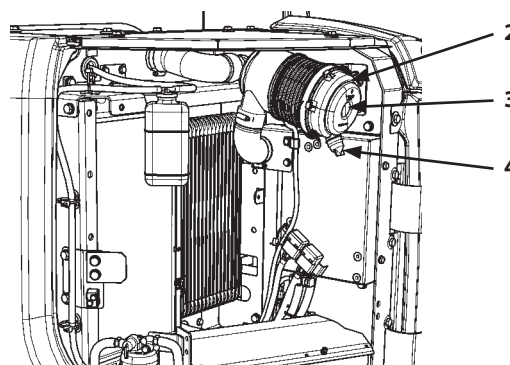


M555-07-023



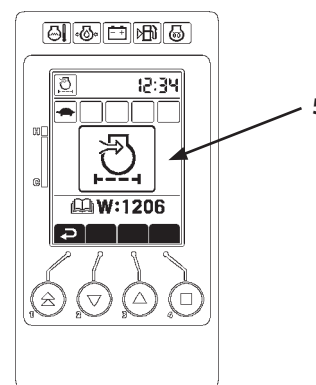
ZX30U-5N, 35U-5N

MADB-07-003



ZX50U-5N, 60USB-5N

MADB-07-026



MADH-07-012

## MAINTENANCE

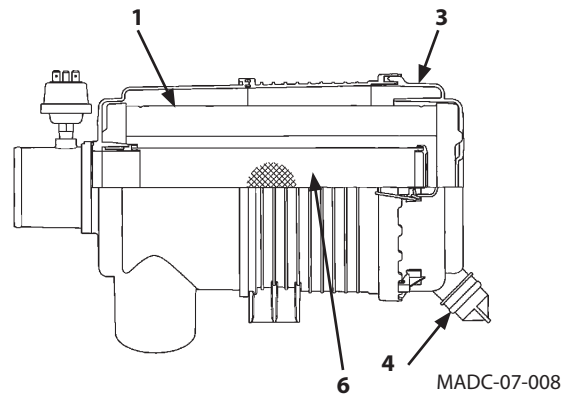
---

7. Clean the filter interior before installing outer element (1).
8. Install outer element (1).

**IMPORTANT: Do not install the element and/or the cover forcibly when installing the clamps. Failure to do so may result in deformation of the clamps, element, and/or cover.**

9. When installing cover (3), position cover (3) so that valve (4) faces downward. Tighten clamps (2).
10. Start the engine and run at slow idle.
11. Check the air filter restriction indicator on the monitor panel. If the air filter restriction indicator comes ON, stop the engine and replace outer element (1).
12. When replacing the air cleaner filter element, replace both outer (1) and inner (6) elements together. Remove outer element (1). Clean the filter interior before removing inner element (6). Remove inner element (6). First install inner element (6) and then install outer element (1).

**IMPORTANT: Do not reuse inner element (3). Always replace the new one.**



## MAINTENANCE

### G. Cooling System

#### Coolant

**IMPORTANT:** Use soft water as a coolant. Do not use strong acid or alkaline water. Use the coolant with genuine Hitachi Long-Life Coolant (LLC) mixed by 30 to 50 %.

If a coolant mixed with less than 30 % of genuine Hitachi Long-Life Coolant (LLC) is used, service life of the cooling parts may be shortened due to damage by freezing or corrosion of coolant system parts.

If it is above 60 %, the engine may overheat.

#### Antifreeze Mixing Ratio

Air Temperature [°C]	Mixing Ratio [%]	ZX30U-5N, 35U-5N		ZX50U-5N		ZX60USB-5N	
		Antifreeze L (US qt)	Soft water L (US qt)	Antifreeze L (US qt)	Soft water L (US qt)	Antifreeze L (US qt)	Soft water L (US qt)
-1	30	1.5 (1.6)	3.5 (3.7)	2.0 (2.1)	4.5 (4.8)	2.3 (2.4)	5.4 (5.7)
-15	35	1.8 (1.9)	3.2 (3.4)	2.3 (2.4)	4.2 (4.5)	2.7 (2.9)	5.0 (5.2)
-20	40	2.0 (2.1)	3.0 (3.2)	2.6 (2.7)	3.9 (4.2)	3.1 (3.3)	4.6 (4.8)
-25	45	2.3 (2.4)	2.7 (2.9)	2.9 (3.1)	3.6 (3.8)	3.5 (3.7)	4.2 (4.4)
-30	50	2.5 (2.6)	2.5 (2.7)	3.2 (3.4)	3.3 (3.5)	3.9 (4.1)	3.8 (4.0)

#### CAUTION: Precautions for handling antifreeze

- Antifreeze is poisonous.
- Antifreeze is poisonous; if ingested, it can cause serious injury or death. Induce vomiting and get emergency medical attention immediately.
- If antifreeze is accidentally splashed into eyes, flush with water for 10 to 15 minutes and get emergency medical attention.
- When storing antifreeze, be sure to keep it in a clearly marked container with a tight lid. Always keep antifreeze out of the reach of children.
- Use attention to fire hazards. LLC is specified as a dangerous substance in the fire protection law.
- When disposing of LLC, be sure to comply with all local regulations. When storing or disposing of antifreeze, be sure to comply with all local regulations.

## MAINTENANCE

### 1 Check Coolant Level

--- daily

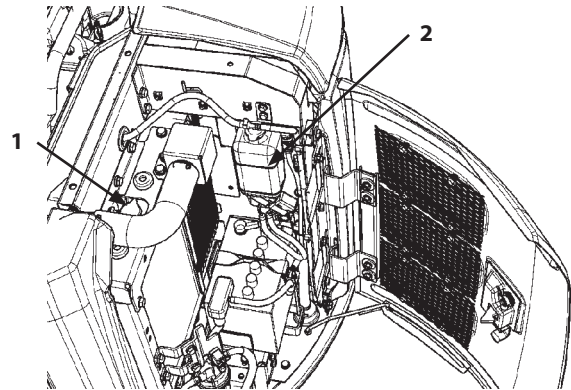
With the engine cold, the coolant level must be between the FULL and LOW marks on coolant reservoir (2).

If the coolant level is below the low mark, remove the cap of coolant reservoir (2) and add coolant to coolant reservoir (2).

**⚠ CAUTION:** Do not loosen cap (1) until the coolant temperature in the radiator becomes cool. Hot steam may spout out, possibly causing severe burns. After the coolant temperature has lowered, slowly loosen cap (1) to release the inside air pressure before removing cap (1).

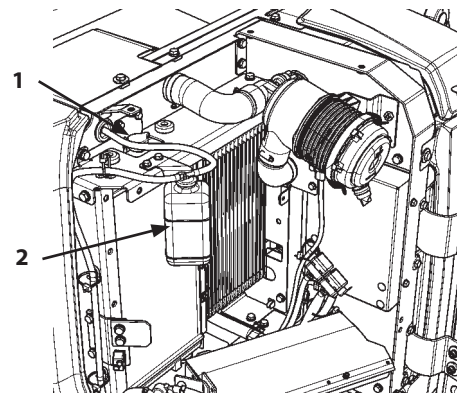
If coolant reservoir (2) is empty, add coolant through cap (1) of the radiator.

- When refilling a Long-Life Coolant (LLC), use the same brand product and the same mixture ratio as already used in the machine.
- If only water is refilled, the mixture ratio in the Long-Life Coolant (LLC) is diluted so that anti-rust and antifreeze effect in the coolant will become deteriorated.



ZX30U-5N, 35U-5N

MADB-07-028



ZX50U-5N, 60USB-5N

MADB-07-029

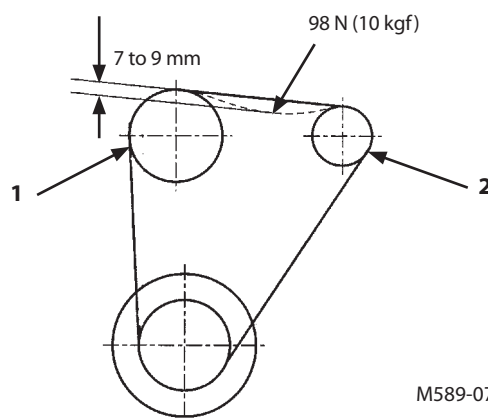
## MAINTENANCE

### 2 Check and Adjust Fan Belt Tension --- every 100 hours (first time after 50 hours)

**IMPORTANT:** Loose fan belt may result in insufficient battery charging, engine overheating, as well as premature belt wear. Belts that are too tight, however, can damage both bearings and belts.

#### Inspect

Check fan belt tension by depressing the midpoint between fan pulley (1) and alternator pulley (2) by your thumb with a depressing force of approximately 98 N (10 kgf, 22 lbf). Deflection : 7 to 9 mm  
Visually check the belt for wear. Replace if necessary.

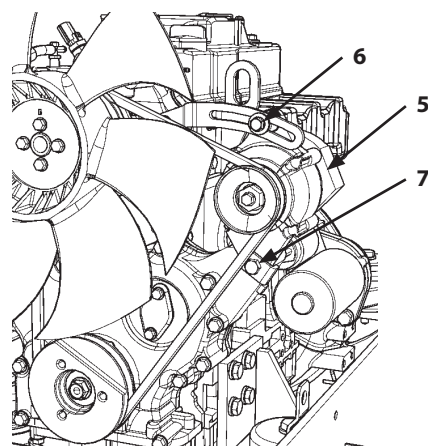
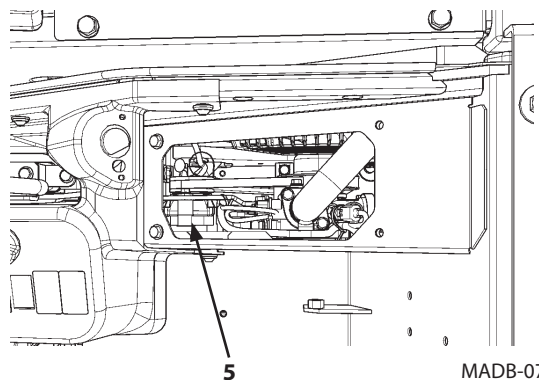
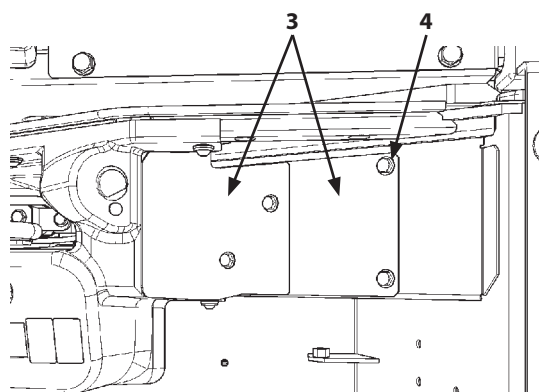


#### Adjust Fan Belt Tension

ZX30U-5N, 35U-5N

1. Remove bolts (4) from the right side of the seat. Remove covers (3) to open the checking port.
2. Loosen adjusting bolt (6) and mounting bolt (7) of alternator (5).
3. Adjust belt tension by moving alternator (5) forward or backward.
4. Securely tighten bolts (6) and (7).

**IMPORTANT:** When a new belt is installed, be sure to re-adjust the tension after operating the engine for 3 to 5 minutes at slow idle speed to be sure that the new belt is seated correctly.

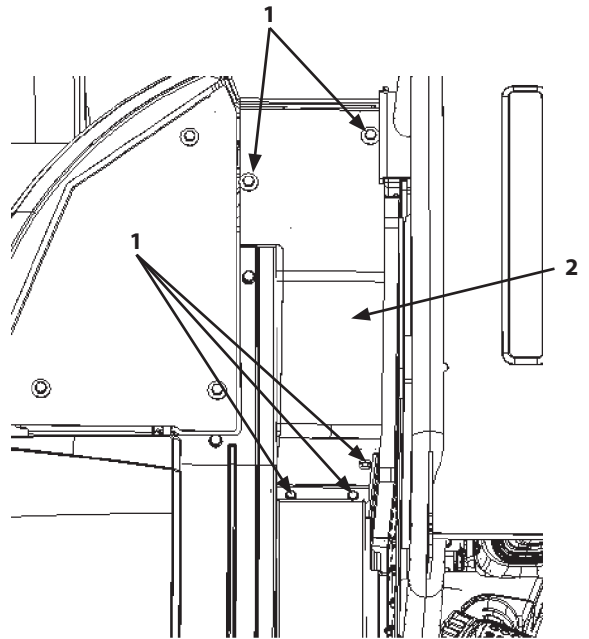


## MAINTENANCE

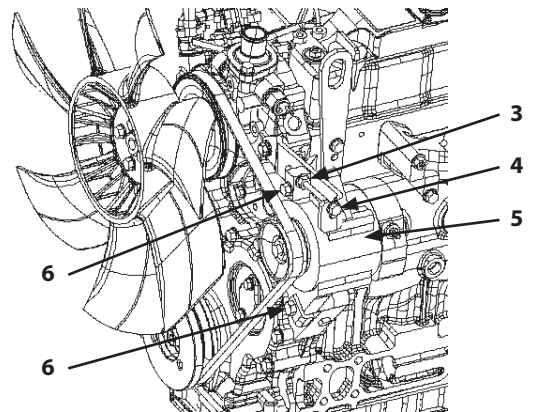
ZX50U-5N

1. Remove bolts (1) (5 used). Remove cover (2) to open checking port.
2. Loosen mounting bolts (6) and nut (3) of alternator (5).
3. Adjust belt tension by moving alternator (5) forward or backward by using adjusting screw (4).
4. Securely tighten bolts (6) and nut (3).

**IMPORTANT:** When a new belt is installed, be sure to re-adjust the tension after operating the engine for 3 to 5 minutes at slow idle speed to be sure that the new belt is seated correctly.



MADB-07-050



MADB-07-049

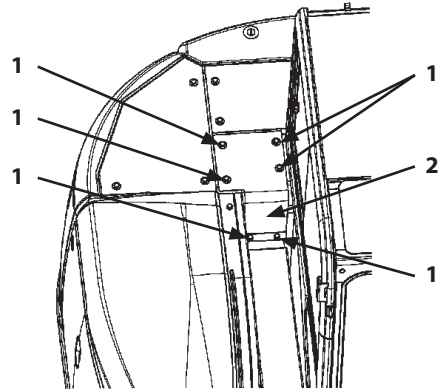


## MAINTENANCE

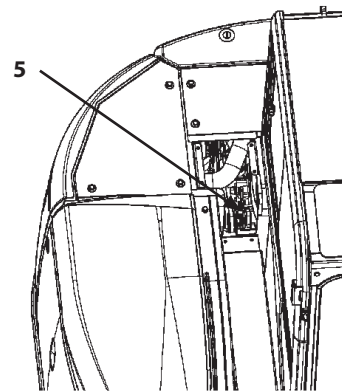
### ZX60USB-5N

1. Remove bolts (1) (6 used). Remove cover (2) to open checking port.
2. Loosen mounting bolts (6) and nut (3) of alternator (5).
3. Adjust belt tension by moving alternator (5) forward or backward by using adjusting screw (4).
4. Securely tighten bolts (6) and nut (3).

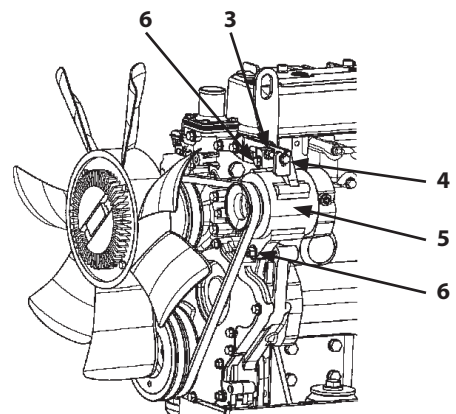
**IMPORTANT:** When a new belt is installed, be sure to re-adjust the tension after operating the engine for 3 to 5 minutes at slow idle speed to be sure that the new belt is seated correctly.



MADC-07-002



MADC-07-003




MADC-07-004

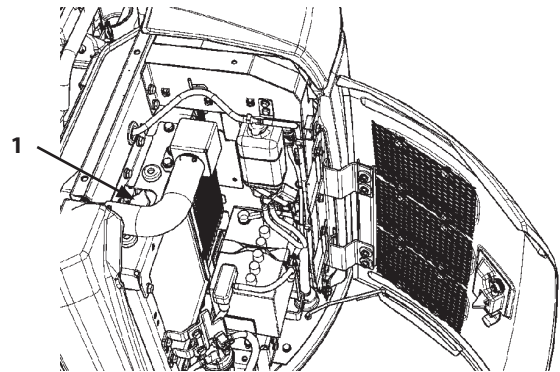
## MAINTENANCE

### 3 Change Coolant --- twice a year (in spring and autumn)

 **NOTE:** When genuine Hitachi Long-Life Coolant (LLC) is used, change interval is once every two years (in autumn every other year) or every 2000 hours, whichever comes first.

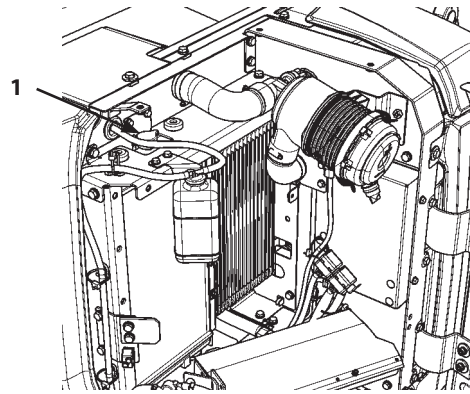
 **CAUTION:** Do not loosen radiator cap (1) until the system has cooled. Hot steam may spout out, possibly causing severe burns. Loosen the cap slowly to the stop. Release all pressure before removing the cap.

**IMPORTANT:** Use fresh water or normal tap water as a coolant. Do not use strong acid or alkaline water. Use the coolant with genuine Hitachi Long-Life Coolant (LLC) mixed by 30 to 50 %.



ZX30U-5N, 35U-5N

MADB-07-028



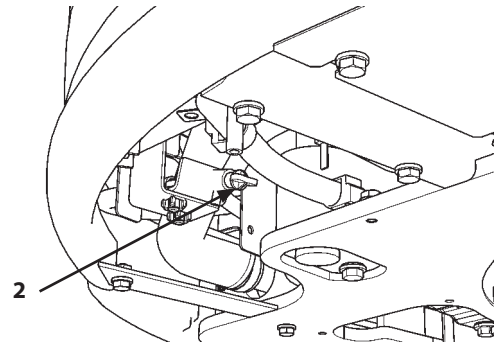
ZX50U-5N, 60USB-5N

MADB-07-029

## MAINTENANCE

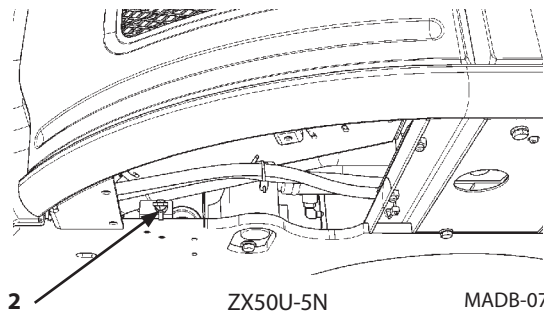
### Procedure:

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Remove the under cover. Remove radiator cap (1). Open drain cock (2) on the radiator and the drain cock on the water jacket to allow the coolant to drain completely. Remove impurities such as scale at the same time.
3. Close drain cock (2) and the drain cock on the water jacket. Fill the radiator with soft water containing fewer impurities or tap water and a radiator cleaner agent. Run the engine at a speed slightly higher than slow idle to raise the coolant temperature until the first two segments come on. Then, run the engine further for about 10 minutes.
4. Stop the engine and open radiator drain cock (2). Flush out the cooling system with tap water, until draining water is clear. This helps remove rust and sediment.
5. Close drain cock (2). Fill the radiator with tap water and LLC at the specified mixing ratio. When adding coolant, do so slowly to avoid mixing air bubbles in the system. Run the engine to sufficiently bleed air from the cooling system.
6. After adding coolant, operate the engine for several minutes. Check the coolant level again, and add coolant if necessary.



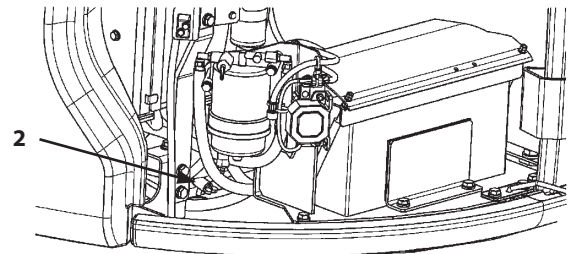
ZX30U-5N, 35U-5N

MADB-07-033



ZX50U-5N

MADB-07-034



ZX60USB-5N

MADC-07-005

## MAINTENANCE

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- 4** Clean Radiator/Oil Cooler Core  
Outside --- every 500 hours  
Inside --- when coolant is changed

**⚠ CAUTION:** Use reduced compressed air pressure (Less than 0.2 MPa, 2 kgf/cm<sup>2</sup>) for cleaning purposes. Wear personal protection equipment including eye protection.

**⚠ WARNING:**

- Entanglement in moving parts can cause serious injury.
- Before servicing, stop the engine and the fan to prevent any accident.
- Never attempt to start the engine when the cover is open.
- In case tools or parts are dropped into the radiator/oil cooler/inter cooler core, remove them before starting the engine.

**IMPORTANT:**

- Cover the air cleaner inlet opening to prevent the entry of dust and water while cleaning the radiator.
- If air with pressure of higher than 0.2 MPa (2 kgf/cm<sup>2</sup>) or tap water with high delivery pressure is used for cleaning, damage to the radiator/oil cooler fins may result.
- Check the core periodically and replace it if necessary when the machine is operated in dusty areas.

The radiator and the oil cooler are arranged in parallel. If dirt or dust is accumulated on them, cooling system performance decreases. Clean the radiator/oil cooler cores with compressed air pressure (lower than 0.2 MPa (2 kgf/cm<sup>2</sup>)) or tap water. It will prevent a reduction in cooling system performance.

## MAINTENANCE

---

- 5** Clean Air Conditioner Condenser  
--- every 500 hours

**IMPORTANT:** When operating the machine in a dusty environment, check the air conditioner condenser every day for dirt and clogging. If clogged, remove, clean and reinstall the air conditioner condenser.

- 6** Clean Air Conditioner Condenser Front Screen  
--- every 500 hours (Optional : ZX30U-5N, 35U-5N, 50U-5N)

**IMPORTANT:** When operating the machine in a dusty environment, check the air conditioner condenser front screen every day for dirt and clogging. If clogged, remove, clean and reinstall the air conditioner condenser front screen.

- 7** Clean Fuel Cooler (ZX50U-5N, 60USB-5N)  
--- every 500 hours

**IMPORTANT:** When operating the machine in a dusty environment, check the screen every day for dirt and clogging. If clogged, remove, clean and reinstall the screen.

## MAINTENANCE

### H. Electrical System

#### IMPORTANT:

Improper radio communication equipment and associated parts, and/or improper installation of radio communication equipment effects the machine's electronic parts, causing involuntary movement of the machine.

Also, improper installation of electrical equipments may cause machine failure and/or a fire on the machine.

Be sure to consult your authorized dealer when installing a radio communication equipment or additional electrical parts, or when replacing electrical parts.

Never attempt to disassemble or modify the electrical/electronic components. If replacement or modification of such components is required, contact your authorized dealer.

#### 1 Batteries



#### WARNING:

Battery gas can explode. Keep sparks and flames away from batteries.

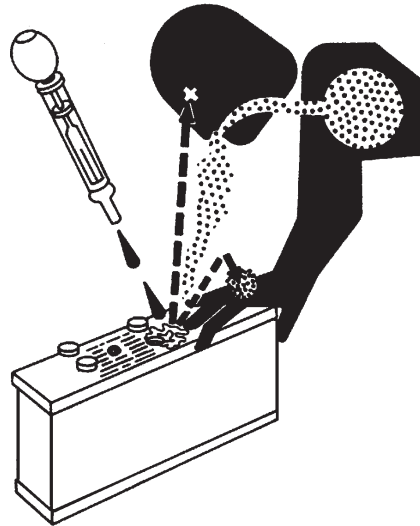
Use a flashlight to check the battery electrolyte level.

Do not continue to use or charge the battery when electrolyte level is lower than specified. Explosion of the battery may result.

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into the eyes.

Avoid hazard by:

1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Using proper booster battery starting procedures.



SA-036

## MAINTENANCE

---

**If you spill acid on yourself:**

- 1. Flush your skin with water.**
- 2. Apply baking soda or lime to help neutralize the acid.**
- 3. If splashed in eyes, flush with water for 15 to 30 minutes. Get medical attention immediately.**

**If acid is swallowed:**

- 1. Do not induce vomiting.**
- 2. Drink large amounts of water or milk.**
- 3. Get medical attention immediately.**

### **IMPORTANT:**

- **Add water to batteries in freezing weather before you begin operating your machine for the day, or before charge the batteries.**
- **If the battery is used with the electrolyte level lower than the specified lower level, the battery may deteriorate quickly.**
- **Do not refill electrolyte more than the specified upper level. Electrolyte may spill, damaging the painted surfaces and/or corroding other machine parts.**



*NOTE: In case electrolyte is refilled more than the specified upper level line or beyond the bottom end of the sleeve, remove the excess electrolyte until the electrolyte level is down to the bottom end of the sleeve using a pipette. After neutralizing the removed electrolyte with sodium bicarbonate, flush it with plenty of water. Otherwise, consult the battery manufacturer.*

# MAINTENANCE

## Electrolyte Level Check

--- every month

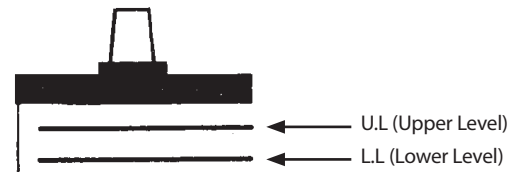
1. Check the electrolyte level at least once a month.
2. Park the machine on level ground and stop the engine.
3. Check the electrolyte level.
- 3.1 When checking the level from the battery side:

Clean around the level check lines with a wet towel. Do not use a dry towel. Static electricity may be developed, causing the battery gas to explode. Check if the electrolyte level is between U.L (Upper Level) and L.L (Lower Level). In case the electrolyte level is lower than the middle level between the U.L and L.L, immediately refill distilled water or commercial battery fluid. Be sure to refill with distilled water before recharging (operating the machine). After refilling, securely tighten the filler plug.

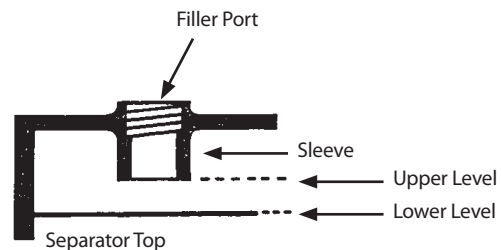
- 3.2 When impossible to check the level from the battery side or no level check mark is indicated on the side:

After removing the filler plug from the top of the battery. Check the electrolyte level by viewing through the filler port. It is difficult to judge the accurate electrolyte level in this case. Therefore, when the electrolyte level is flush with the U.L, the level is judged to be proper. Then, referring to the right illustrations, check the level. When the electrolyte level is lower than the bottom end of the sleeve, refill with distilled water or commercial battery fluid up to the bottom end of the sleeve. Be sure to refill with distilled water before recharging (operating the machine). After refilling, securely tighten the filler plug.


- 3.3 When an indicator is available to check the level, follow its check result.
4. Always keep around the battery terminals clean to prevent battery discharge. Check terminals for loose and/or rust. Coat terminals with grease or petroleum jelly to prevent corrosion build up.




M146-07-109



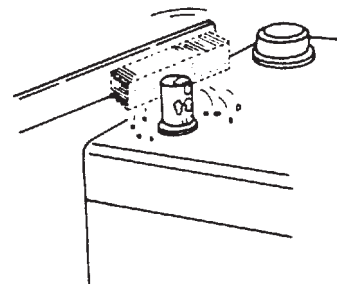
M146-07-110

**Proper**  
 Since the electrolyte surface touches the bottom end of the sleeve, the electrolyte surface is raised due to surface tension so that the electrode ends are seen curved.

M146-07-111

**Lower**  
 When the electrolyte surface is lower than the bottom end of the sleeve, the electrode ends are seen straight.

M146-07-112



M409-07-072



## MAINTENANCE

### Check Electrolyte Specific Gravity

--- every month

**WARNING:** Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check the battery electrolyte level.

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into the eyes.

Never check the battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove the grounded (-) battery clamp first and replace it last.

Avoid hazard by:

1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Using proper booster battery starting procedures.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. If splashed in eyes, flush with water for 10 to 15 minutes. Get medical attention immediately.

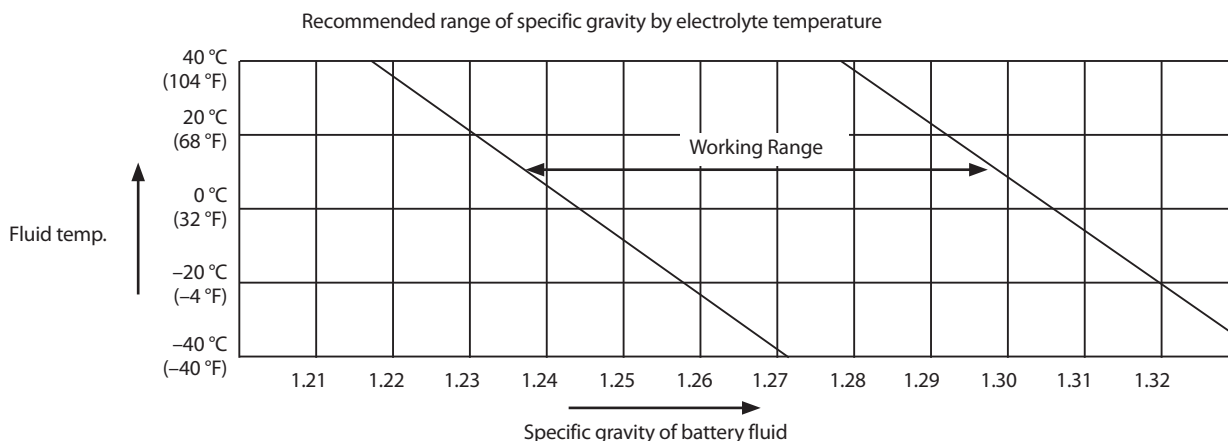
If acid is swallowed:

1. Do not induce vomiting.
2. Drink large amounts of water or milk.
3. Get medical attention immediately.

**IMPORTANT:** Check the specific gravity of the electrolyte after it is cooled, not immediately after operation.

Check the electrolyte specific gravity in each battery cell.

The lowest limit of the specific gravity for the electrolyte varies depending on electrolyte temperature. The specific gravity should be kept within the range shown below. Charge the battery if the specific gravity is below the limit.



## MAINTENANCE

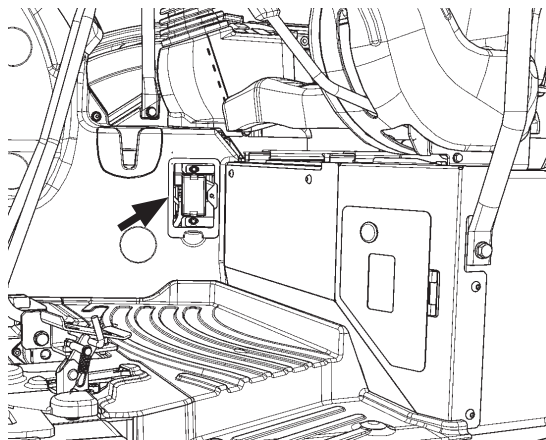
### 2 Replacing Fuses --- as required

If any electrical equipment fails to operate, first check the fuses.

**IMPORTANT:** Install fuse with correct amperage rating to prevent electrical system damage from overload.

 NOTE:

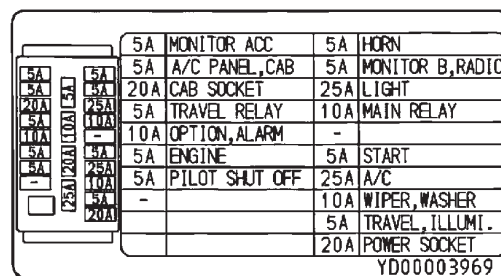
- One each spare fuse for respective fuse capacities is provided in the fuse box.



MADB-07-036

#### ZX30U-5N, 35U-5N

5 A	MONITOR ACC	5 A	HORN
5 A	A/C PANEL, CAB	5 A	MONITOR B, RADIO
20 A	CAB SOCKET	25 A	LIGHT
5 A	TRAVEL RELAY	10 A	MAIN RELAY
10 A	OPTION, ALARM	-	
5 A	ENGINE	5 A	START
5 A	PILOT SHUT OFF	25 A	A/C
-		10 A	WIPER, WASHER
		5 A	TRAVEL, ILLUMI.
		20 A	POWER SOCKET

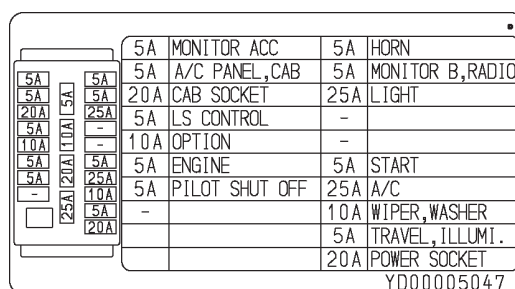


ZX30U-5N, 35U-5N

MADG-07-012

#### ZX50U-5N, 60USB-5N

5 A	MONITOR ACC	5 A	HORN
5 A	A/C PANEL, CAB	5 A	MONITOR B, RADIO
20 A	CAB SOCKET	25 A	LIGHT
5 A	LS CONTROL	-	
10 A	OPTION	-	
5 A	ENGINE	5 A	START
5 A	PILOT SHUT OFF	25 A	A/C
-		10 A	WIPER, WASHER
		5 A	TRAVEL, ILLUMI.
		20 A	POWER SOCKET



ZX50U-5N, 60USB-5N

MADG-07-003

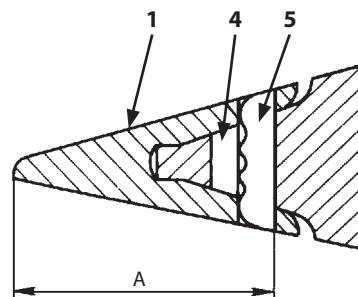
# MAINTENANCE

## I. Miscellaneous

### 1 Check and Replace Bucket Teeth --- daily

Check bucket teeth (1) for wear and looseness. Replace teeth (1) if tooth wear exceeds the designated service limit shown below.

mm (in)		
	New	Limit of Use
A	128 (5.0)	65 (2.6)



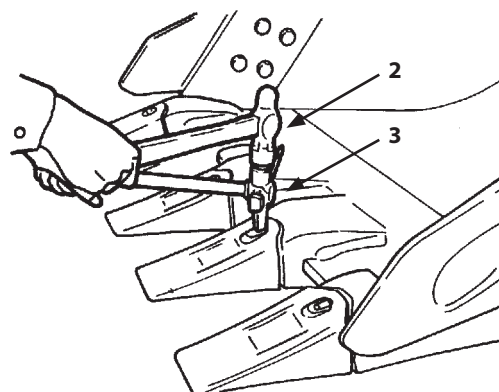
M104-07-056

### Replace

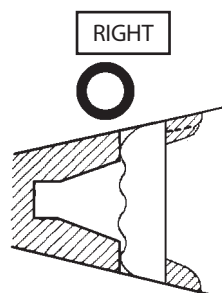
#### ⚠ CAUTION:

- Guard against injury from flying pieces of metal.
- Wear hard hat or safety glasses, and safety equipment appropriate to the job.

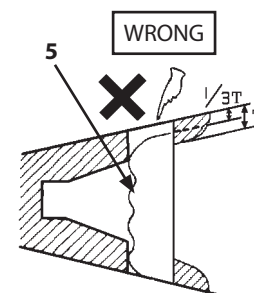
1. Use hammer (2) and drift (3) to drive out locking pin (5). Take care not to damage rubber pin lock (4).
2. Check lock pin (5) and rubber pin lock (4). Short locking pins and damaged rubber pin locks must be replaced with new ones.



M104-07-116

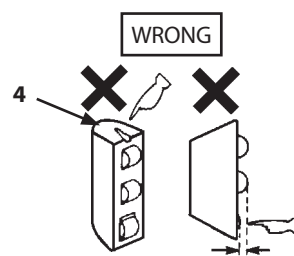


M104-07-118



Flush one end of the locking pin to evaluate. In this instance, the locking pin is too short.

M104-07-058



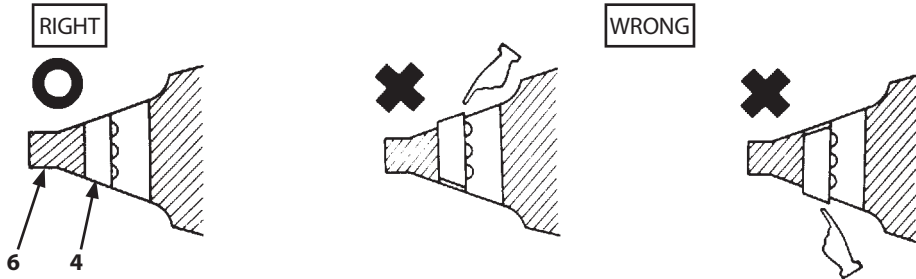
Crack on the rubber. The steel ball may come out.

The steel ball dents when pushing the ball.

M104-07-059

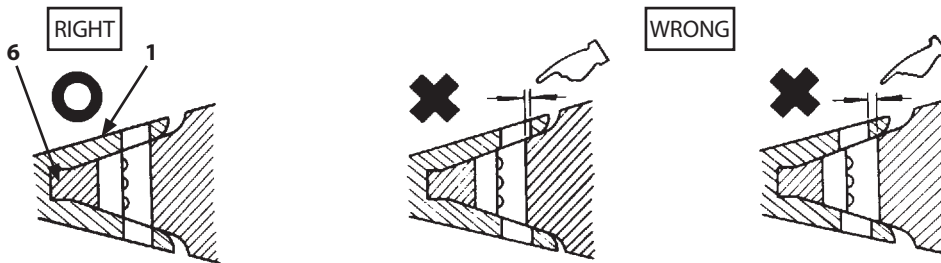
## MAINTENANCE

- Clean shank (6) surface.
- Install rubber pin lock (4) into shank (6) hole as shown.



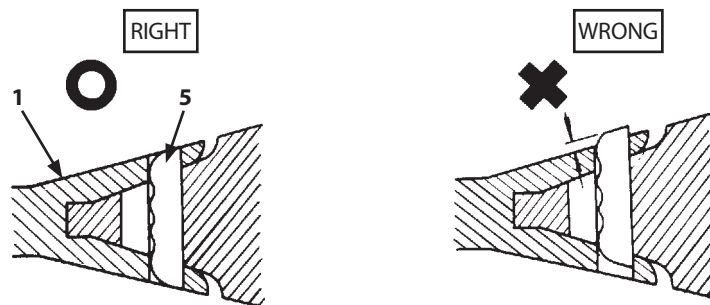
M104-07-060

- Position new tooth (1) over shank (6).



M104-07-061

- Drive locking pin (5) fully into the hole as shown.



M104-07-062

## MAINTENANCE

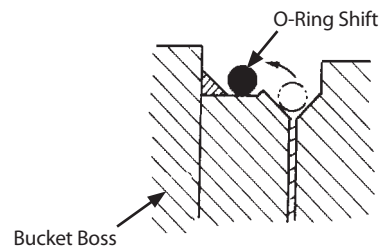
### 2 Change Bucket --- as required

**CAUTION:** When driving the connecting pins in or out, guard against injury from flying pieces of metal or debris. Wear hard hat or safety glasses, and safety equipment appropriate to the job.

Before starting converting work, keep bystanders clear of the machine. Slowly move the front attachment. When using a signal person, coordinate hand signals before starting.

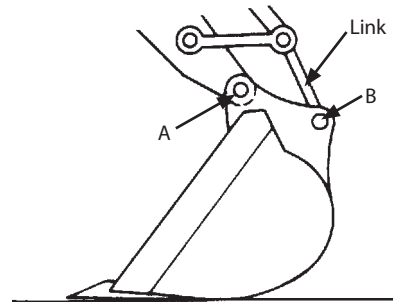
#### Removal

1. Park the machine on a level surface. Lower the bucket to the ground and position it with the flat surface resting on the ground. Be sure the bucket will not roll when the pins are removed.
2. Slide the O-rings out of the way, as shown.
3. Remove bucket pins A and B to separate the arm and bucket.



#### Installation

1. Clean the pins and pin bores. Apply sufficient grease to the pins and pin bores.
2. Place the new bucket in stable position as shown in the figure.
3. Fit the arm and alternate bucket. Be sure the bucket will not roll. Install bucket pins A and B.
4. Install the locking pins and snap rings on pins A and B.
5. Install O-rings to the specified positions.
6. Apply grease to each pin.
7. Start the engine and run at slow idle. Slowly operate the bucket in both directions to check for any interference in bucket movement.



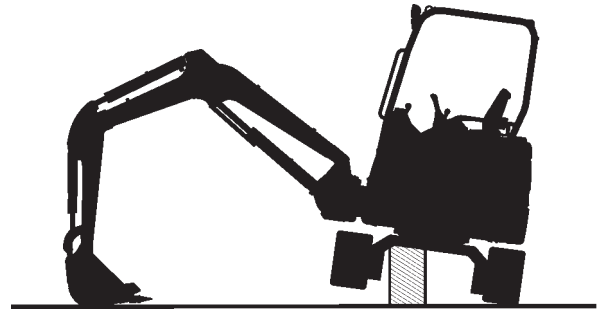
M104-07-063

## MAINTENANCE

### 3 Adjust Track Sag (Rubber Crawler) and Check for Damage

--- daily

Swing the upperstructure 90 ° and lower the bucket to raise the track off the ground as shown. Rotate the rubber track so that the track joint is positioned at the upper center of the track. Measure distance (A) from the bottom of the lower roller tread to the inner ridge of the rubber track. Each time, be sure to place blocks under the track frame to support the machine.



M1M7-04-006

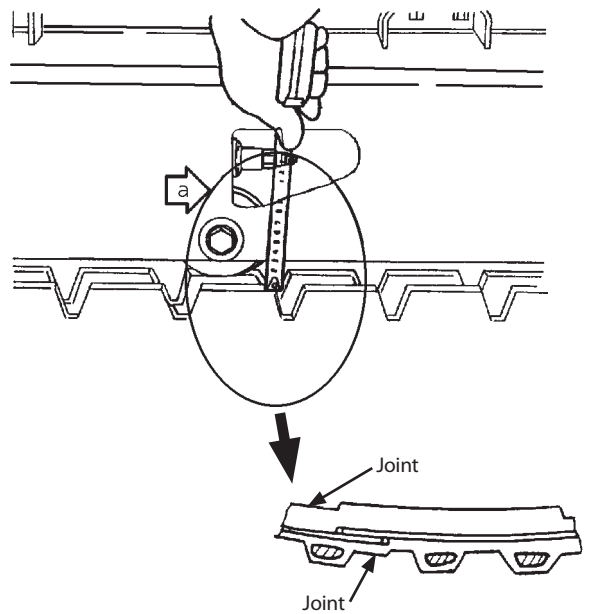
**CAUTION:** To prevent accidents, care should be taken to ensure that hands, feet, and any body parts do not become entangled when working around the tracks.

Appropriate sag A	10 to 15 mm (0.4 to 0.6 in)
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**NOTE:** Check track sag after thoroughly removing soil stuck on the track area by washing.

#### Adjust Track Sag

1. If track sag is not within specifications, loosen or tighten the track following the procedures shown on the next page.
2. When adjusting track sag, lower the bucket to the ground to raise one track off the ground. Repeat this procedure to raise the other track. Each time, be sure to place blocks under the machine frame to support the machine. To prevent accidents, care should be taken to ensure that hands, feet, and any body parts do not become entangled when working around the tracks.
3. After adjusting both side track sags, rotate the tracks backward and forward to equalize both side track sags.
4. Recheck the track sag once more. Readjust as necessary.

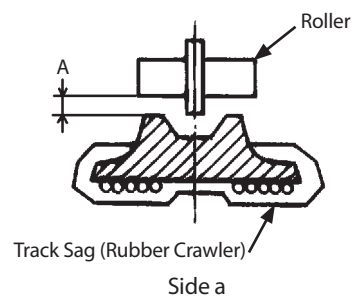


M588-07-055

M102-07-075

#### Check Rubber Track for Damage

Check the rubber track for damage. If any, consult your authorized dealer for repair.



M503-05-050

## MAINTENANCE

### Loosen the Track (Rubber Crawler)

**CAUTION:** The pressure inside the cylinder of the track adjuster is high. Do not loosen valve (1) quickly or loosen it too much as valve (1) may fly out or high-pressure grease in the adjusting cylinder may spout out. Slowly loosen valve (1) while keeping body parts and face away from valve (1). Never loosen grease fitting (2).

**IMPORTANT:** When gravel or mud is packed between sprockets and rubber crawlers, remove it before loosening.

1. To loosen the track, slowly turn valve (1) counterclockwise using long socket 19; grease will escape from the grease outlet.
2. Between 1 to 1.5 turns of valve (1) is sufficient to loosen the track. Do not loosen valve (1) further.
3. If grease does not drain smoothly, slowly rotate the raised track.

**CAUTION:** To prevent accidents, care should be taken to ensure that hands, feet, and any body parts do not become entangled when working around the tracks.

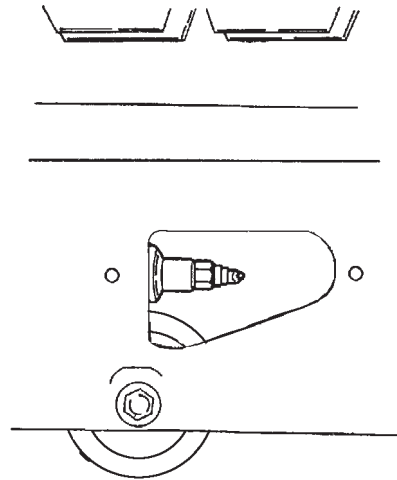
4. When proper track sag is obtained, turn valve (1) clockwise to the original condition.  
Tightening Torque: 90 N·m (9 kgf·m)

**CAUTION:** Consult your authorized dealer if grease is not sufficiently drained.

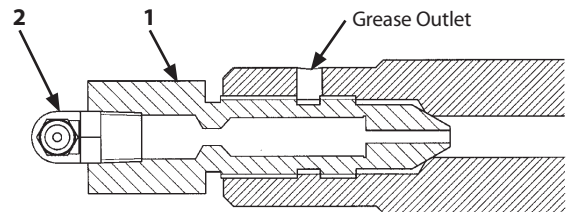
### Tighten the Track (Rubber Crawler)

**CAUTION:** It is abnormal if the track can not be adjusted. The strong force acts on the spring in track adjuster. Therefore, the grease in cylinder is highly pressurized. In such cases, NEVER ATTEMPT TO DISASSEMBLE the track or track adjuster, because of dangerous high-pressure grease inside the track adjuster. See your authorized dealer immediately.

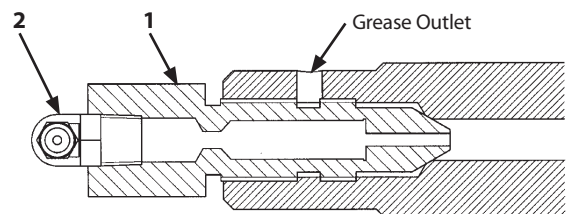
To tighten the track, connect a grease gun to grease fitting (2) and add grease until the sag is within specifications.



M1LA-07-012



M1LA-07-036



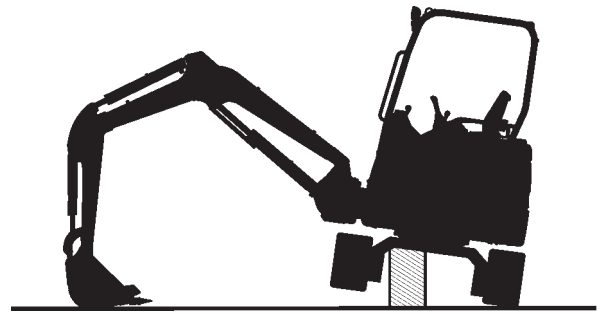
M1LA-07-036

## MAINTENANCE

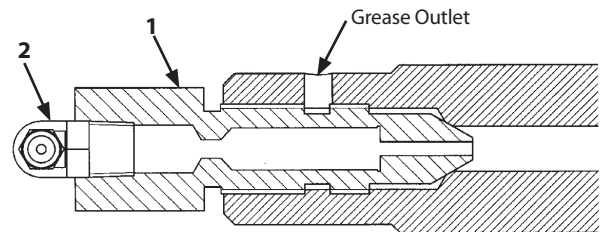
### 4 Replace Rubber Crawler --- as required

#### **⚠ WARNING:**

- Do not loosen valve (1) too quickly or too much as high-pressure grease in the adjusting cylinder may spout out. Loosen carefully, keeping body parts and face away from valve (1). Never loosen grease fitting (2).
- When removing the rubber track, do not allow anyone to stand in front of the front idler. During this procedure, the high power track adjuster may suddenly release the front idler with extreme force, potentially resulting in personal injury or death.
- After the rubber track is removed, the front idler will become free to remove. If the front idler comes off unexpectedly, personal injury and/or death may result. Be sure to remove the rubber track only after taking appropriate measures to prevent the front idler from coming off.



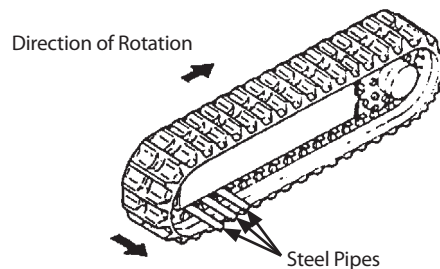
M1M7-04-006



M1LA-07-036

#### Removing Rubber Crawler

1. Lower the bucket and blade to raise one track off ground, as shown. Place blocks under machine frame to support the machine.
2. Slowly turn valve (1) counterclockwise to allow grease to escape from the grease outlet.
3. Insert two or three steel pipes into the gaps among lower rollers, track frame and rubber track and slowly rotate the track in reverse to lift the rubber track off the idler. Apply horizontal force to pry the rubber track off the idler. Before completely removing the rubber track from the front idler, take an appropriate measure to prevent the front idler from coming off. Then, remove the rubber track.



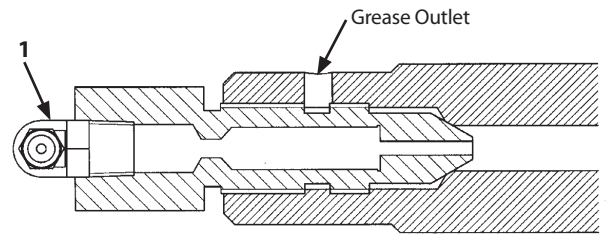
M503-07-062



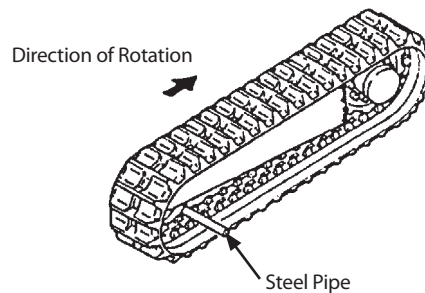
## MAINTENANCE

### Installing Rubber Crawler

1. Lower the bucket and blade to raise one track off ground. Place blocks under machine frame to support the machine.
2. Slowly turn valve (1) counterclockwise to allow grease to escape from the grease outlet.
3. Engage the rubber track with the sprocket and position the other end of the rubber track on the front idler.
4. While rotating the sprocket in reverse, apply horizontal force to the rubber track to seat it on the idler.
5. Insert a steel pipe into gaps among lower rollers, track frame and rubber track and rotate the rubber track slowly to correctly seat the rubber track on the idler.
6. Confirm that the rubber track is correctly engaged with the sprocket and idler.
7. Adjust track sag. (Refer to "Adjust Track Sag".)
8. After checking that the rubber track is correctly engaged with the sprocket and idler and the track sag is correctly adjusted, lower the machine to the ground.



M1LA-07-036



M503-07-063

## MAINTENANCE

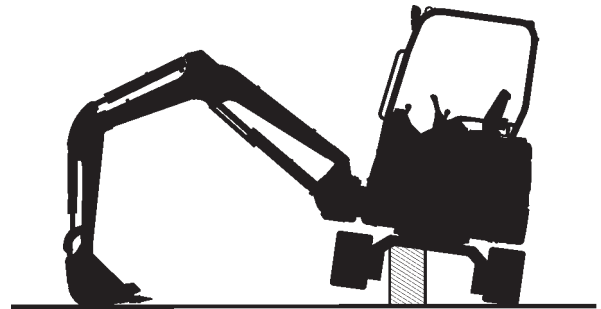
### 5 Check Track Sag (Steel Crawler) (Optional)

--- every 50 hours

Swing the upperstructure 90 ° and lower the bucket to raise the track off the ground as shown. Measure distance (A) at the middle of the track frame from the bottom of the track frame to the back face of the track shoe.

Each time, be sure to place blocks under the machine frame to support the machine.

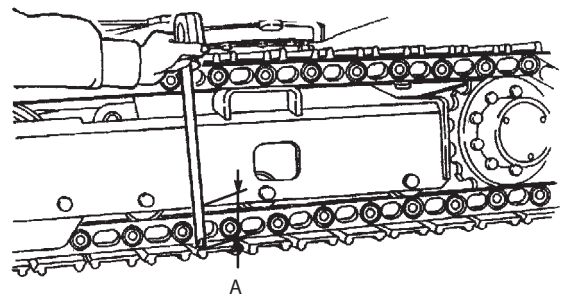
**CAUTION:** To prevent accidents, care should be taken to ensure that hands, feet, and any body parts do not become entangled when working around the tracks.



M1M7-04-006

Model	Appropriate sag A (mm)
ZX30U-5N, 35U-5N	120 to 140 mm (4.7 to 5.5 in)
ZX50U-5N, 60USB-5N	140 to 160 mm (5.5 to 6.3 in)

**NOTE:** Check track sag after thoroughly removing soil stuck on the track area by washing.



M588-07-062

#### Adjust Track Sag

1. If track sag is not within specifications, loosen or tighten the track following the procedures shown on the next page.
2. When adjusting track sag, lower the bucket to the ground to raise one track off the ground. Repeat this procedure to raise the other track. Each time, be sure to place blocks under the machine frame to support the machine. To prevent accidents, care should be taken to ensure that hands, feet, and any body parts do not become entangled when working around the tracks.
3. After adjusting both side track sags, rotate the tracks backward and forward to equalize both side track sags.
4. Recheck the track sag once more. Readjust as necessary.

## MAINTENANCE

### Loosen the Track (Steel Crawler)

**CAUTION:** The pressure inside the cylinder of the track adjuster is high. Do not loosen valve (1) quickly or loosen it too much as valve (1) may fly out or high-pressure grease in the adjusting cylinder may spout out. Slowly loosen valve (1) while keeping body parts and face away from valve (1). Never loosen grease fitting (2).

**IMPORTANT:** When gravel or mud is packed between sprockets and track links, remove it before loosening.

1. To loosen the track, slowly turn valve (1) counterclockwise using long socket 19; grease will escape from the grease outlet.
2. Between 1 to 1.5 turns of valve (1) is sufficient to loosen the track. Do not loosen valve (1) further.
3. If grease does not drain smoothly, slowly rotate the raised track.

**CAUTION:** To prevent accidents, care should be taken to ensure that hands, feet, and any body parts do not become entangled when working around the tracks.

4. When proper track sag is obtained, turn valve (1) clockwise to the original condition.

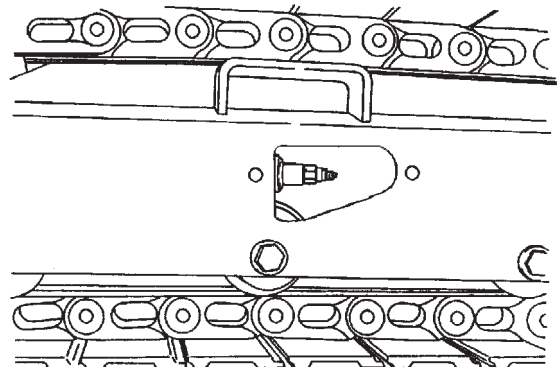
Tightening Torque: 90 N·m (9 kgf·m)

**CAUTION:** Consult your authorized dealer if grease is not sufficiently drained.

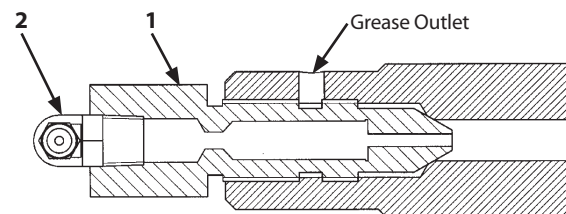
### Tighten the Track (Steel Crawler)

**CAUTION:** It is abnormal if the track can not be adjusted. The strong force acts on the spring in track adjuster. Therefore, the grease in cylinder is highly pressurized. In such cases, NEVER ATTEMPT TO DISASSEMBLE the track or track adjuster, because of dangerous high-pressure grease inside the track adjuster. See your authorized dealer immediately.

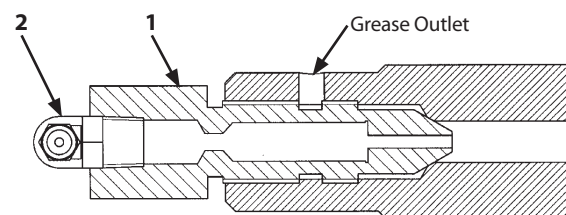
To tighten the track, connect a grease gun to grease fitting (2) and add grease until the sag is within specifications.



M1LA-07-013



M1LA-07-036



M1LA-07-036

## MAINTENANCE

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### Converting the Track

 **WARNING:**

- **Consult your authorized dealer for converting the track. Extremely strong force is being applied. Do not allow anyone to stand in front of the front idler.**
- **After the rubber track is removed, the front idle will become free to remove. If the front idle comes off unexpectedly, personal injury and/or death may result. Be sure to remove the rubber track only after taking an appropriate measure to prevent the front idler from coming off.**

Consult your authorized dealer for converting the track.  
Change the track adjuster whenever converting the steel or rubber track.

## MAINTENANCE

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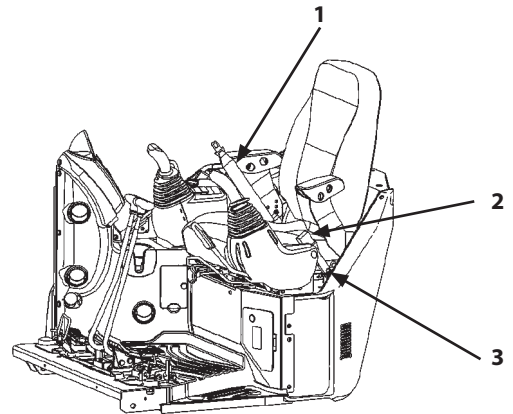
### **6** Check and Replace Seat Belt

**Check --- daily**

**Replace --- every 3 years**

Prior to operating the machine, thoroughly examine belt (1), buckle (2) and attaching hardware (3). If any item is damaged or materially worn, replace the seat belt or component before operating the machine.

We recommend that the seat belt be replaced every three years regardless of its apparent condition.



MADB-01-003

## MAINTENANCE

### 7 Check Air Conditioner (Cab Equipped Machine)

--- daily

**ZX35U-5N Serial No. 270001-270727**

**ZX50U-5N Serial No. 280001-280687**

**ZX60USB-5N Serial No. 285001 and up**

#### Check pipe connections for refrigerant gas leakage

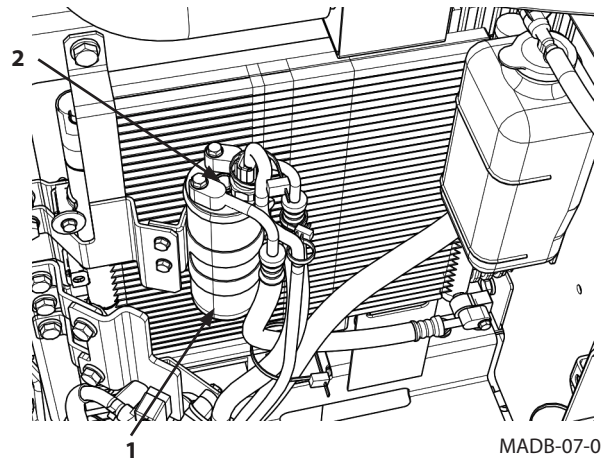
If oil seepage is found around pipe connections, it indicates possible gas leakage.

#### Check Refrigerant

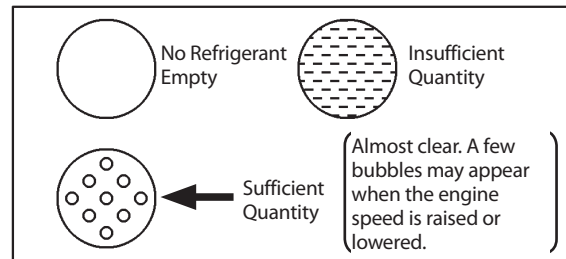
Start the engine and run at approximately 1500 min<sup>-1</sup> (rpm). Turn the air conditioner switch to ON. Set the blower switch to HI and set the temperature control switch to the coolest position (18 °C on the monitor screen). Operate the air conditioner for 2 to 3 minutes. Check if cool air comes out from the vent in the cab.

#### Kind of refrigerant and amount when shipping the machine

Model	Type	Amount
ZX35U-5N, 50U-5N	HFC134a	0.65±0.05 kg
ZX60USB-5N		0.85±0.05 kg



MADB-07-038



**IMPORTANT: Do not dispose FREON gas into the atmosphere to prevent depletion of the ozone layer and global warming.**

M107-01-050

#### Check the condenser

If the condenser fins become clogged with dirt or insects, the cooling effect will be decreased.

Be sure to keep them clean at all times. (Refer to "Clean Radiator/Oil Cooler Core" in Maintenance Section.)

#### Check compressor

After operating the air conditioner for 5 to 10 minutes, touch both the high pressure pipe and the low pressure pipe.

If normal, the high-pressure side pipe will be hot, and the low-pressure side cold.

## MAINTENANCE

**ZX30U-5N Serial No. 265001 and up**

**ZX35U-5N Serial No. 270728 and up**

**ZX50U-5N Serial No. 280688 and up**

### Check pipe connections for refrigerant gas leakage

If oil seepage is found around pipe connections, it indicates possible gas leakage.

### Check Refrigerant

Start the engine and run at approximately 1500 min<sup>-1</sup> (rpm). Turn the air conditioner switch to ON. Set the blower switch to HI and set the temperature control switch to the coolest position (18 °C on the monitor screen). Operate the air conditioner for 2 to 3 minutes. Check if cool air comes out from the vent in the cab.

### Kind of refrigerant and amount when shipping the machine

Model	Type	Amount
ZX30U-5N, 35U-5N, 50U-5N	HFC134a	0.65±0.05 kg

**IMPORTANT: Do not dispose FREON gas into the atmosphere to prevent depletion of the ozone layer and global warming.**

### Check the condenser

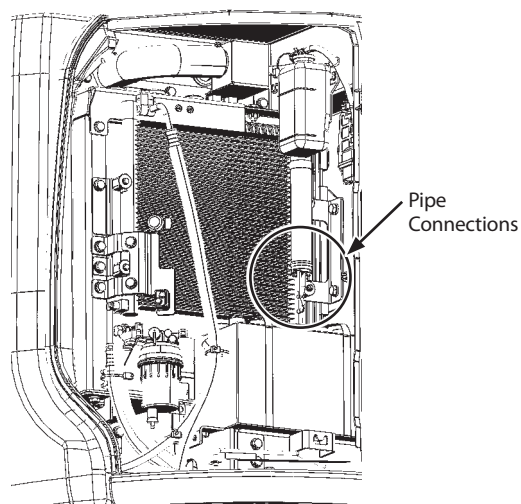
If the condenser fins become clogged with dirt or insects, the cooling effect will be decreased.

Be sure to keep them clean at all times. (Refer to "Clean Radiator/Oil Cooler Core" in Maintenance Section.)

### Check compressor

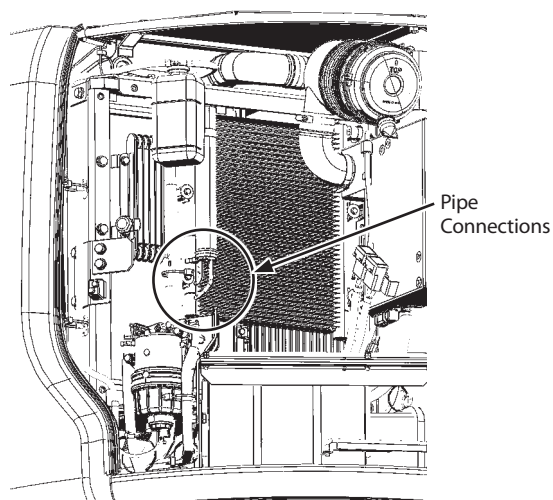
After operating the air conditioner for 5 to 10 minutes, touch both the high pressure pipe and the low pressure pipe.

If normal, the high-pressure side pipe will be hot, and the low-pressure side cold.



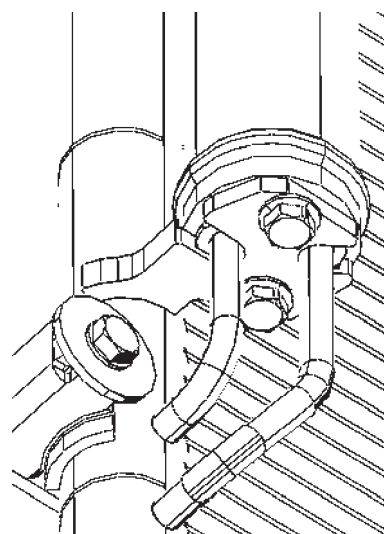
ZX30U-5N, 35U-5N

MADB-07-051



ZX50U-5N

MADB-07-052



Pipe Connections

MADB-07-053

## MAINTENANCE

### Check mounting bolts for looseness

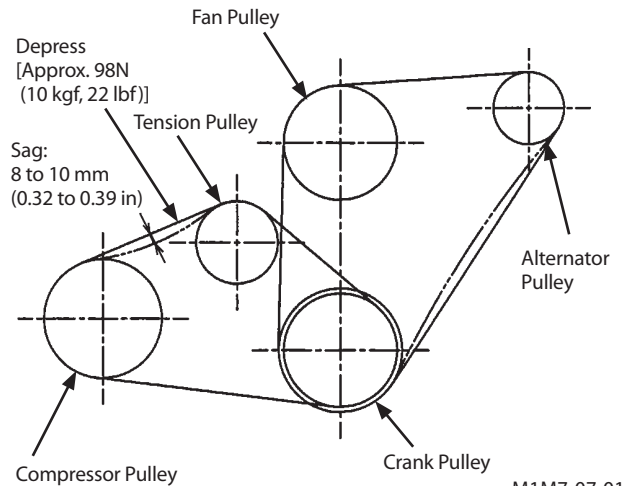
Confirm that the compressor mounting bolts and other mounting/fastening bolts are securely tightened.

### Check compressor and fan belt

Visually check the compressor and fan belts for looseness and wear.

Check fan belt tension by depressing the midpoint of the belt with the thumb. Deflection must be shown in the right figure with a depressing force of approximately 98 N (10 kgf).

If any abnormalities are found in air conditioner system, see your authorized dealer for inspection.

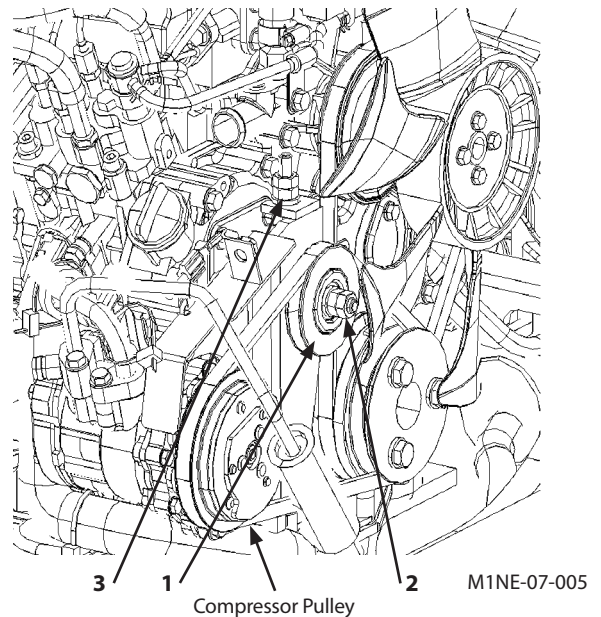


### Adjust Compressor Belt Tension

1. Loosen lock nut (2) of tension pulley (1).
2. Move tension pulley (1) by adjusting bolt (3) until tension is correct.
3. Securely tighten lock nut (2) of tension pulley (1).

Tightening Torque : 41 to 50 N·m (4.1 to 5.0 kgf·m, 30 to 37 lbf·ft)

**IMPORTANT:** When a new belt is installed, be sure to re-adjust the tension after operating the engine for 3 to 5 minutes at slow idle speed to be sure that the new belt is seated correctly.





## MAINTENANCE


### 8 Clean and Replace Heater / Air Conditioner Filter

#### Clean Circulating Air Filter

--- every 500 hours

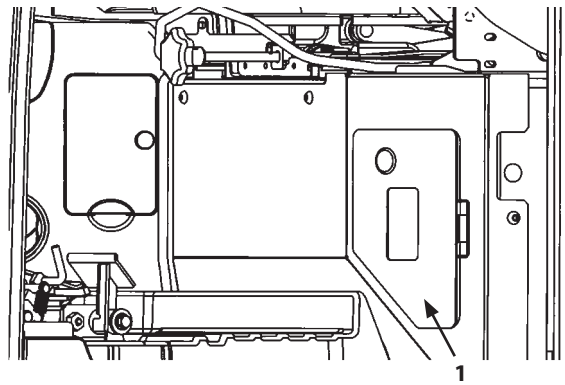
#### Replace Circulating Air Filter

--- After cleaning 6 times or so

 **NOTE:** The recommended maintenance hour is a reference value. Shorten the maintenance interval when the machine is operated in dusty areas.

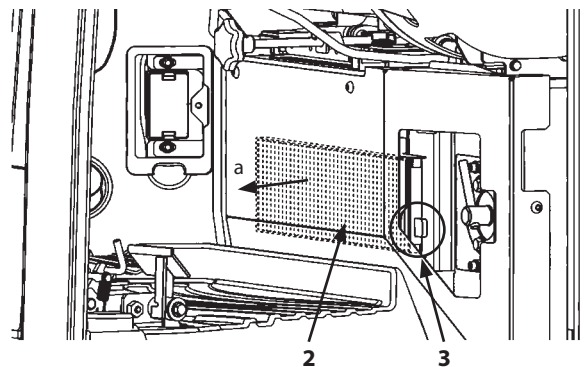
#### Removing Recirculating Air Filter

1. Open left-side panel (1) located under the seat.
2. Grasp and pull tab (3) of circulation filter (2) to remove filter (2). Filter (2) can be folded at the middle part. Pull the filter while folding it. Take care so that it does not interfere with pedals.



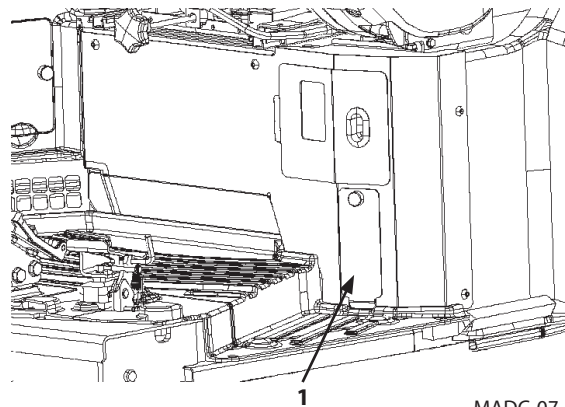
MADC-07-013

ZX30U-5N, 35U-5N, 50U-5N



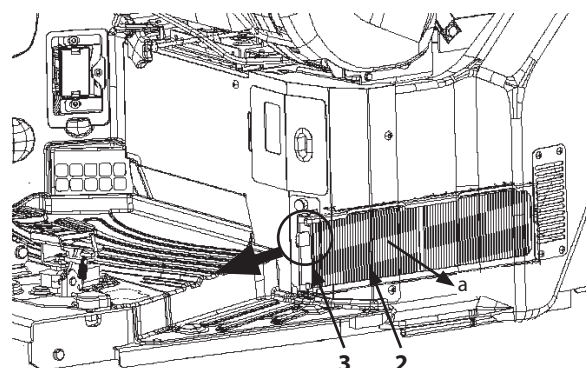
MADC-07-014

ZX30U-5N, 35U-5N, 50U-5N



MADC-07-006

ZX60USB-5N



MADC-07-007

ZX60USB-5N

## MAINTENANCE

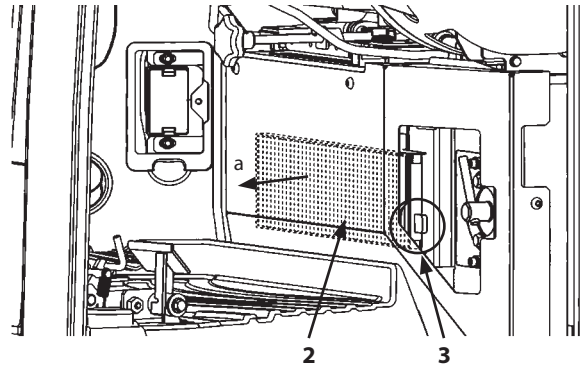
### Cleaning

**IMPORTANT:** Clean filter (2) by using a vacuum cleaner.  
Do not clean it by blowing compressed air or washing with water.

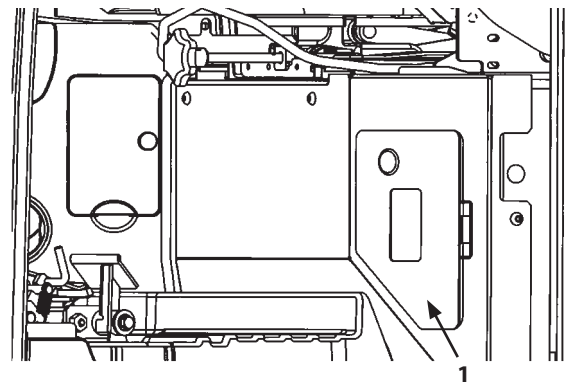
1. With side "a" of filter (2) facing downward, lightly tap the filter (2) frame to let large dirt drop.
2. Clean side "a" of filter (2) by using a vacuum cleaner.

### Installation

1. Install filter (2) with side "a" facing as illustrated. Install tab (3) as illustrated.
2. Close panel (1).

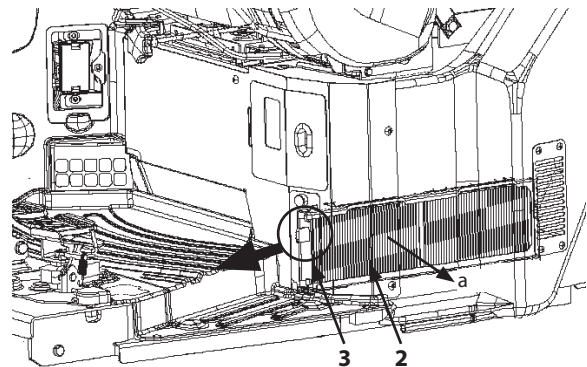


ZX30U-5N, 35U-5N, 50U-5N MADC-07-014



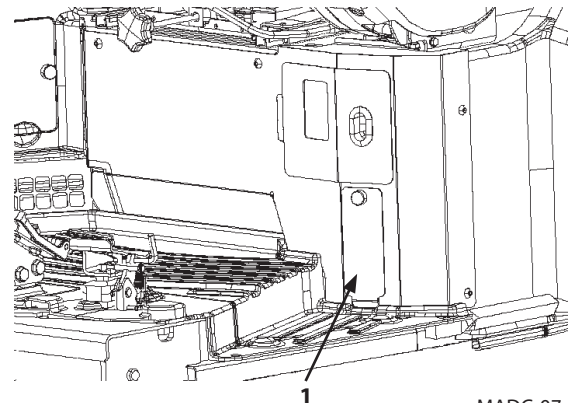
MADC-07-013

ZX30U-5N, 35U-5N, 50U-5N



MADC-07-007

ZX60USB-5N



MADC-07-006

ZX60USB-5N

## MAINTENANCE

### Clean Fresh Air Filter

--- every 500 hours

### Replace Fresh Air Filter

--- After cleaning 6 times or so

ZX30U-5N, 35U-5N, 50U-5N

ZX30U-5N Serial No. 265001 - 267823

ZX35U-5N Serial No. 270001 - 289828

ZX50U-5N Serial No. 280001 - 292567

### Removing Fresh Air Filter

1. Pull out fresh air filter (1) upward, which is located at bottom left of the seat.

### Cleaning

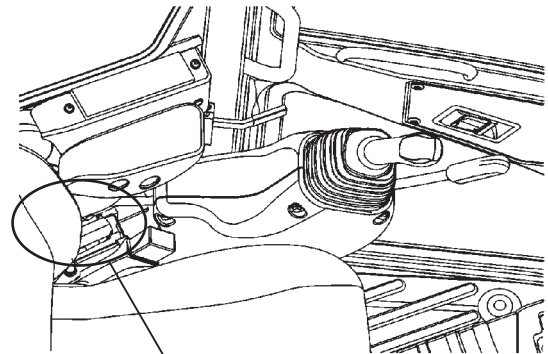
**IMPORTANT:** Clean filter (3) by using a vacuum cleaner. Do not clean it by blowing compressed air or washing with water.

1. With side "a" of filter (1) facing downward, lightly tap the filter (1) frame to let large dirt drop.
2. Clean side "a" of filter (1) by using a vacuum cleaner.

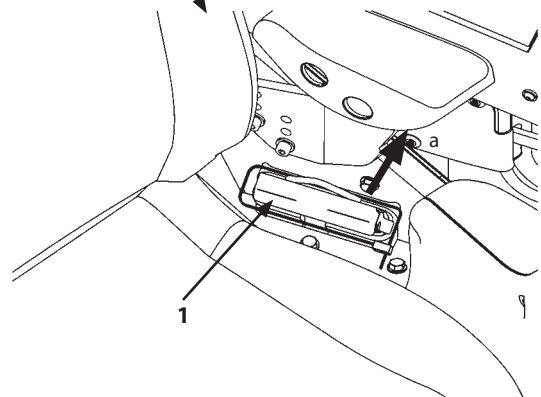
### Installation

**IMPORTANT:** Inappropriate installation of the filter may cause dust to enter into the heater unit and air conditioner, causing malfunction or breakdown of them. Before installing the filter element, clean off dust around the mounting area; install the filter element with extra care.

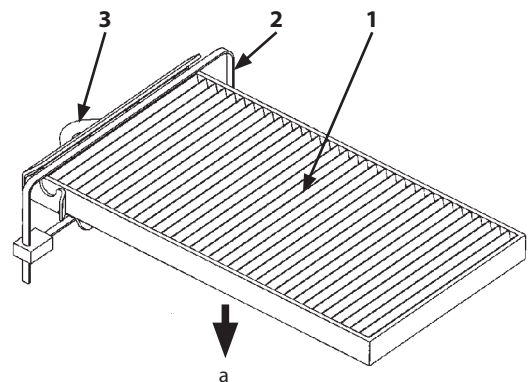
1. Fresh air filter (1) can be replaced by removing clip band (2).
2. Install fresh air filter (1) assembly while holding tab (3) of cover.



MADB-07-045



MADB-07-042



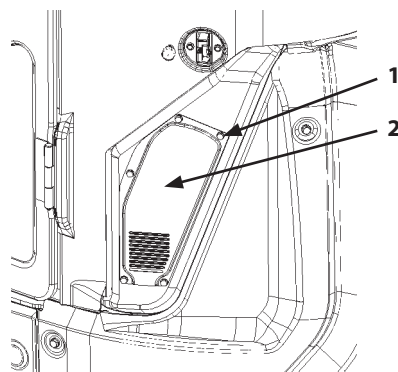
MADB-07-043

## MAINTENANCE

ZX30U-5N Serial No. 267825 and up  
ZX35U-5N Serial No. 289829 and up  
ZX50U-5N Serial No. 292568 and up

### Removing Fresh Air Filter

1. Remove bolts (1) and cover (2).
2. Remove filter (3).

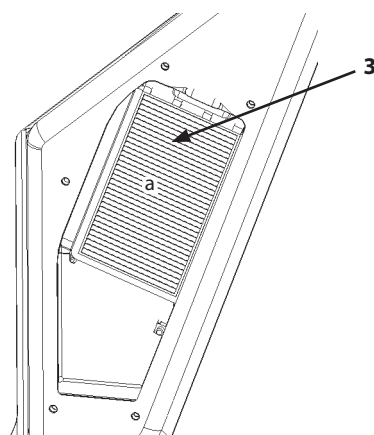


MADG-07-015

### Cleaning

**IMPORTANT:** Clean filter (3) with a vacuum cleaner. Do not clean it with compressed air or wash it with water.

1. With side "a" of filter (3) facing downward, lightly tap the filter (3) frame to let large dirt drop off.
2. Clean side "a" of filter (3) with a vacuum cleaner.



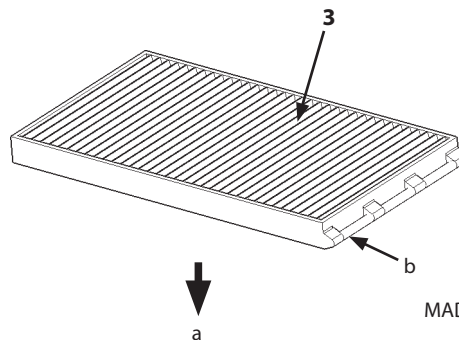
MADG-07-016

### Installation

**IMPORTANT:** Inappropriate installation of the filter may cause dust to enter into the heater unit and air conditioner, causing malfunction or breakdown. Before installing the filter, clean off dust around the mounting area; install the filter element with extra care.

Attach the filter with the protruding side "b" facing the outside of the machine.

1. Fit filter (3) into the groove.
2. Secure cover (2) with bolts (1).



MADG-07-017

## MAINTENANCE

### Clean Fresh Air Filter

--- every 500 hours

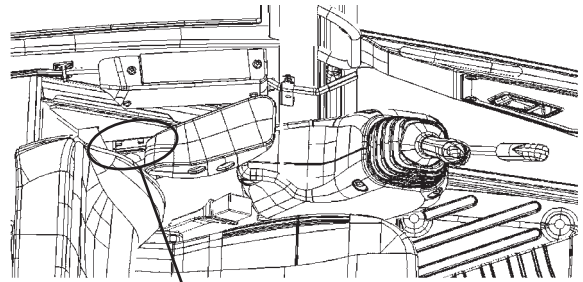
### Replace Fresh Air Filter

--- After cleaning 6 times or so

#### ZX60USB-5N

#### Removing Fresh Air Filter

1. Pull out fresh air filter (1) upward, which is located at bottom left of the seat.

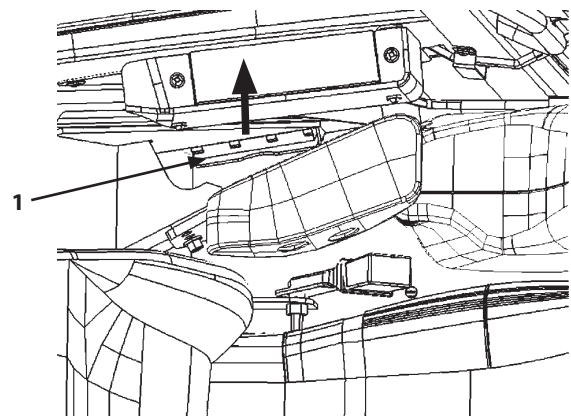


MADC-07-023

#### Cleaning

**IMPORTANT: Clean filter (3) by using a vacuum cleaner. Do not clean it by blowing compressed air or washing with water.**

1. With side "a" of filter (1) facing downward, lightly tap the filter (1) frame to let large dirt drop.
2. Clean side "a" of filter (1) by using a vacuum cleaner.

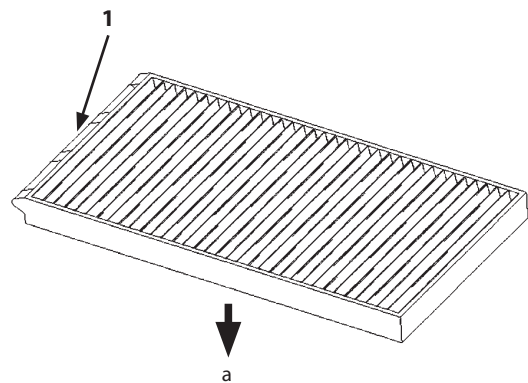


MADC-07-024

#### Installation

**IMPORTANT: Inappropriate installation of the filter may cause dust to enter into the heater unit or air conditioner, causing malfunction or breakdown of them. Before installing the filter element, clean off dust around the mounting area; install the filter element with extra care.**

Install the fresh air filter straightly into the fresh air filter mounting case.



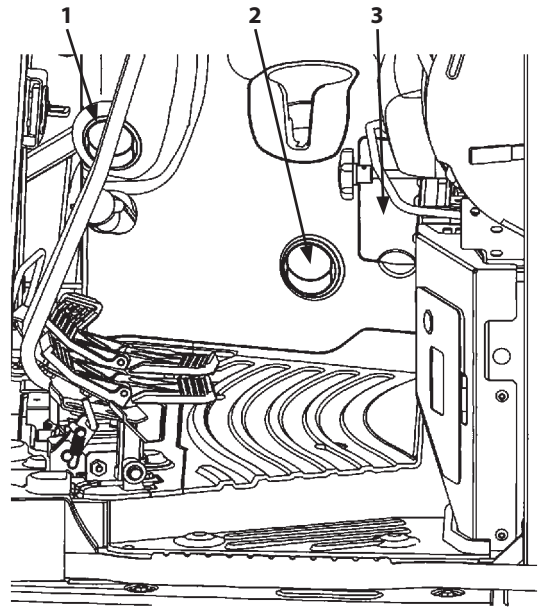
MADC-07-025

## MAINTENANCE

### 9 Clean Cab Floor --- as required

**IMPORTANT:** Only the cab floor can be washed with water. Take care not to splash other parts of the cab with water. Do not increase the water pressure speed by squeezing the hose end. Never use steam to clean the cab floor. Always clean the cab floor only after closing ducts (1, 2, and 3) to prevent water from entering the ducts (1, 2, and 3).

1. Park the machine following the same procedures as described on page 7-6 for preparation for inspection and maintenance.
2. Sweep the cab floor clean using a brush, and brush dust from the cab floor while spraying water. (Sweep out the mud and dust with a brush as much as possible before applying water.)
3. When cleaning the floor mat, sweep dust (water) along the grooves on the floor mat.
4. When cleaning the cab floor with the floor mat removed, remove only rear mat. Then sweep the dust and/or water through one cleaning hole.



MADB-07-044

## MAINTENANCE

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**10** **Check, Clean and Function Check of Injection Nozzle**  
(ZX30U-5N, 35U-5N)

--- every 1500 hours

Consult your authorized dealer for inspection and repair.

**11** **Check, Clean and Function Check Injector (ZX50U-5N, 60USB-5N)**

--- every 3000 hours

Consult your authorized dealer for inspection and repair.

**12** **Inspect and Adjust Valve Clearance**

--- every 1000 hours

Consult your authorized dealer for inspection and repair.

**13** **Check and Adjust Injection Timing (ZX30U-5N, 35U-5N)**

--- every 1500 hours

Consult your authorized dealer for inspection and repair.

**14** **Measure Engine Compression Pressure**

--- as required

Consult your authorized dealer for inspection and repair.

**15** **Check Starter and Alternator**

--- every 1000 hours

Consult your authorized dealer for inspection and repair.

**16** **Check Crankcase Breather**

--- every 1500 hours

Consult your authorized dealer for inspection and repair.

## MAINTENANCE

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- 17** **Check Radiator Cap**  
--- every 2000 hours

Consult your authorized dealer for inspection and repair.

- 18** **Clean EGR Cooler (ZX50U-5N/60USB-5N)**  
--- every 1500 hours

Consult your authorized dealer for inspection and repair.

- 19** **Function Check Intake Throttle Valve (ZX50U-5N/60USB-5N)**  
--- every 3000 hours

Consult your authorized dealer for inspection and repair.

- 20** **Check, Clean and Function Check EGR Valve (ZX50U-5N/60USB-5N)**  
---every 3000 hours

Consult your authorized dealer for inspection and repair.



## MAINTENANCE

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### **21** Tightening and Retighten Torque of Bolts and Nuts --- every 250 hours (first time after 50 hours)

Check tightness after the first 50 hours then every 250 hours. Tighten to torque shown if any are loose. Bolts and nuts should be replaced with those of the same or higher grade. For tightening nuts and bolts other than specified in the table below, refer to the Tightening Torque Chart at the end of this section.

**IMPORTANT: Check and tighten bolts and nuts using a torque wrench.**

## MAINTENANCE

### ZX30U-5N, 35U-5N

No.	Descriptions		Bolt Dia. mm	Q'ty	Wrench Size mm	Torque		
						N·m	(kgf·m)	(lbf·ft)
1.	Engine cushion rubber mounting bolt		12	4	19	90	(9)	(65)
2.	Engine bracket mounting bolt (Front)		10	8	17	50	(5)	(36)
3.	Hydraulic oil tank mounting bolt		12	4	19	90	(9)	(65)
4.	Fuel tank mounting nut		10	4	17	50	(5)	(36)
5.	Union joints for hydraulic hoses and pipes	Metal face seal fitting for hydraulic hoses and piping	7/16-20UNF		17	25	(2.5)	(18)
			9/16-18UNF		19	30	(3)	(22)
					22	40	(4)	(29)
			3/4-16UNF		27	65	(6.5)	(47)
			1-1/16-12UNF		36	180	(18)	(129)
		1-5/16-12UNF		41	210	(21)	(151)	
		ORS		9/16 UNF		19	30	(3)
		11/16 UNF		22	70	(7)	(52)	
		13/16 UNF		27	95	(9.5)	(69)	
6.	Pump mounting bolt		12	2	10	90	(9)	(65)
7.	Pump cover mounting bolt		10	8	17	50	(5)	(36)
8.	Control valve mounting bolt		10	4	17	50	(5)	(36)
	Control valve base mounting bolt		10	4	17	50	(5)	(36)
9.	Swing device mounting bolt		14	6	22	140	(14)	(101)
10.	Battery mounting nut		6	3	10	5	(0.5)	(3.5)
11.	Canopy mounting bolt		12	11	19	110	(11)	(80)
12.	Cab mounting bolt		12	11	19	90	(9)	(65)
13.	Swing bearing mounting bolt	Upperstructure	12	22	19	110	(11)	(80)
		Undercarriage	12	20	19	110	(11)	(80)
14.	Travel device mounting bolt		12	24	19	110	(11)	(83)
15.	Sprocket mounting bolt		12	24	19	110	(11)	(83)
16.	Upper roller mounting bolt		16	2	24	210	(21)	(151)
17.	Lower roller mounting bolt		14	16	22	220	(22)	(130)
18.	Cover mounting bolt		6		10	5	(0.5)	(3.5)
			8		13	10	(1)	(7)
			10		17	50	(5)	(36)
19.	Counterweight mounting bolt		22	3	32	750	(75)	(553)
20.	Front pin lock bolts		10		17	50	(5)	(36)
			12		19	90	(9)	(65)
			14		22	140	(14)	(101)
			16		24	210	(21)	(152)
			18		27	400	(40)	(290)
21.	Side-cutter mounting bolt		14	6	22	180	(18)	(130)
22.	Track roller guard mounting bolt		14	12	22	180	(18)	(130)

#### IMPORTANT:

- Before installing, clean the bolt and nut threads to remove soil, rust, and/or dust.
- When installing new bolts and/or nuts, apply lubricant (e.g. white zinc B dissolved into spindle oil) to the screw threads.
- Tighten bolts and nuts to the specifications. If tightened with excessively high or inadequate torque, missing or breakage of bolts and/or nut may result.
- In case the counterweight mounting bolts became loose, consult your authorized dealer for retightening.

## MAINTENANCE

### ZX50U-5N

No.	Descriptions		Bolt Dia. mm	Q'ty	Wrench Size mm	Torque		
						N·m	(kgf·m)	(lbf·ft)
1.	Engine cushion rubber mounting bolt		14	4	22	140	(14)	(101)
2.	Engine bracket mounting bolt (Front)		10	8	17	50	(5)	(36)
3.	Hydraulic oil tank mounting bolt		12	4	19	110	(11)	(80)
4.	Fuel tank mounting nut		10	4	17	20	(2)	(15)
5.	Union joints for hydraulic hoses and pipes	Metal face seal fitting for hydraulic hoses and piping	7/16-20UNF		17	25	(2.5)	(18)
			9/16-18UNF		19	30	(3)	(22)
					22	40	(4)	(29)
			3/4-16UNF		27	65	(6.5)	(47)
			1-1/16-12UNF		36	18	(18)	(129)
		1-5/16-12UNF		41	210	(21)	(151)	
		ORS	9/16 UNF		19	30	(3)	(22)
11/16 UNF			22	70	(7)	(52)		
13/16 UNF			27	95	(9.5)	(69)		
6.	Pump mounting bolt		12	2	10 (Socket)	90	(9)	(65)
7.	Pump cover mounting bolt		10	8	17	50	(5)	(36)
8.	Control valve mounting bolt		10	4	17	50	(5)	(36)
	Control valve base mounting bolt		10	4	17	50	(5)	(36)
9.	Swing device mounting bolt		16	8	24	270	(27)	(195)
10.	Battery mounting nut		6	4	10	5	(0.5)	(3.5)
11.	Canopy mounting bolt		12	11	19	110	(11)	(80)
12.	Cab mounting bolt		12	11	19	110	(11)	(80)
13.	Swing bearing mounting bolt	Upperstructure	12	27	19	110	(11)	(80)
		Undercarriage	12	24	19	110	(11)	(80)
14.	Travel device mounting bolt		14	24	22	180	(18)	(130)
15.	Sprocket mounting bolt		14	24	22	180	(18)	(130)
16.	Upper roller mounting bolt		16	2	24	270	(27)	(199)
17.	Lower roller mounting bolt		16	16	24	270	(27)	(195)
18.	Cover mounting bolt		6		10	5	(0.5)	(3.5)
			8		13	10	(1)	(7)
			10		17	50	(5)	(36)
19.	Counterweight mounting bolt		24	3	36	930	(93)	(690)
20.	Front pin lock bolts		10		17	50	(5)	(36)
			12		19	90	(9)	(65)
			14		22	140	(14)	(101)
			16		24	210	(21)	(152)
			18		27	400	(40)	(290)
21.	Side-cutter mounting bolt		14	6	22	180	(18)	(130)
22.	Track roller guard mounting bolt		16	12	24	270	(27)	(196)

#### IMPORTANT:

- Before installing, clean the bolt and nut threads to remove soil, rust, and/or dust.
- When installing new bolts and/or nuts, apply lubricant (e.g. white zinc B dissolved into spindle oil) to the screw threads.
- Tighten bolts and nuts to the specifications. If tightened with excessively high or low torque, missing or breakage of bolts and/or nut may result.
- In case the counterweight mounting bolts became loose, consult your authorized dealer for retightening.

## MAINTENANCE

### ZX60USB-5N

No.	Descriptions	Bolt Dia. mm	Q'ty	Wrench Size mm	Torque			
					N·m	(kgf·m)	(lbf·ft)	
1.	Engine cushion rubber mounting bolt	14	4	22	140	(14)	(101)	
2.	Engine bracket mounting bolt (Front)	10	8	17	65	(6.5)	(47)	
3.	Muffler mounting U-bolt fixing nut (single nut)	10	4	17	10	(1)	(7)	
4.	Muffler mounting U-bolt fixing nuts (double nuts)	10	4	17	35	(3.5)	(26)	
5.	Hydraulic oil tank mounting bolt	16	4	24	270	(27)	(195)	
6.	Fuel tank mounting nut	10	4	17	20	(2)	(14)	
7.	Union joints for hydraulic hoses and pipes	Joint	PF1/8		19	30	(3)	(22)
			PF3/8		22	40	(4)	(29)
			PF1/2		27	65	(6.5)	(47)
			PF3/4		36	180	(18)	(130)
			PF1	2	41	210	(21)	(151)
			PF1-1/4	1	50	250	(25)	(184)
		Metal face seal fitting for hydraulic hoses and piping	7/16-20UNF		17	25	(2.5)	(18)
			9/16-18UNF		19	30	(3)	(22)
					22	40	(4)	(29)
			3/4-16UNF		27	65	(6.5)	(47)
			1-1/16-12UNF		36	180	(18)	(130)
			1-5/16-12UNF		41	210	(21)	(151)
		ORS	1-5/8-12UNF	2	50	250	(25)	(184)
			9/16-18UNF		19	30	(3)	(22)
			11/16-16UNF		22	70	(7)	(52)
13/16-16UNF			27	95	(9.5)	(69)		
1-3/16-12UNF			36	180	(18)	(130)		
	1-7/16-12UNF	2	41	210	(21)	(151)		
8.	T-bolt clamp of low pressure piping	1/4-28UNF	4	11	10	(1)	(7)	
9.	Pump mounting bolt	12	4	19	90	(9)	(65)	
10.	Pump cover mounting bolt	10	12	17	50	(5)	(36)	
11.	Control valve mounting bolt	10	4	17	50	(5)	(36)	
12.	Control valve base mounting bolt	10	5	17	50	(5)	(36)	
13.	Swing device mounting bolt	16	8	24	270	(27)	(196)	
14.	Battery mounting nut	6	2	10	5	(0.5)	(3.5)	
15.	Canopy mounting bolt	12	12	19	110	(11)	(80)	
16.	Cab mounting bolt	12	12	19	110	(11)	(80)	
17.	Cab cushion rubber (rear) mounting bolt	14	2	22	180	(18)	(130)	
18.	Swing bearing mounting bolt	Upperstructure	14	36	22	180	(18)	(130)
		Undercarriage	14	24	22	180	(18)	(130)
19.	Travel device mounting bolt	14	24	22	220	(22)	(162)	
20.	Sprocket mounting bolt	14	24	22	220	(22)	(162)	







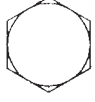


## MAINTENANCE

### ZX60USB-5N

No.	Descriptions	Bolt Dia. mm	Q'ty	Wrench Size mm	Torque		
					N·m	(kgf·m)	(lbf·ft)
21.	Upper roller mounting bolt	16	2	24	210	(21)	(151)
22.	Lower roller mounting bolt	20	16	30	620	(62)	(455)
23.	Shoe bolt (optional)	12	312	19	165	(16.5)	(121)
24.	Cover mounting bolt	6		10	5	(0.5)	(3.5)
		8		13	10	(1)	(7)
		10		17	50	(5)	(36)
25.	Counterweight mounting bolt	24	3	36	930	(95)	(685)
26.	Additional counterweight mounting bolt (optional)	20	2	30	540	(55)	(398)
27.	Front pin lock bolts	10		17	50	(5)	(36)
		12		19	90	(9)	(65)
		14		22	140	(14)	(103)
		16		24	210	(21)	(151)
		18		27	400	(40)	(236)
28.	Track roller guard mounting bolt (optional)	16	12	24	270	(27)	(196)

## MAINTENANCE

### Tightening Torque Chart

Bolt Dia.	Wrench Size	Hexagon Wrench Size	   M552-07-091			   M552-07-090 Socket Bolt			   M157-07-225		
			N·m	(kgf·m)	(lbf·ft)	N·m	(kgf·m)	(lbf·ft)	N·m	(kgf·m)	(lbf·ft)
			M8	13	6	30	(3.0)	(22)	20	(2.0)	(15)
M10	17	8	65	(6.5)	(48)	50	(5.0)	(37)	20	(2.0)	(15)
M12	19	10	110	(11)	(81)	90	(9)	(66)	35	(3.5)	(26)
M14	22	12	180	(18)	(135)	140	(14)	(103)	55	(5.5)	(41)
M16	24	14	270	(27)	(200)	210	(21)	(155)	80	(8.0)	(59)
M18	27	14	400	(40)	(295)	300	(30)	(220)	120	(12)	(89)
M20	30	17	550	(55)	(410)	400	(40)	(295)	170	(17)	(125)
M22	32	17	750	(75)	(550)	550	(55)	(410)	220	(22)	(160)
M24	36	19	950	(95)	(700)	700	(70)	(520)	280	(28)	(205)
M27	41	19	1400	(140)	(1030)	1050	(105)	(770)	400	(40)	(295)
M30	46	22	1950	(195)	(1440)	1450	(145)	(1070)	550	(55)	(410)
M33	50	24	2600	(260)	(1920)	1950	(195)	(1440)	750	(75)	(550)
M36	55	27	3200	(320)	(2360)	2450	(245)	(1810)	950	(95)	(700)

**⚠ CAUTION:** If fixing bolts for counterweight are loosened, consult your nearest authorized dealer.

#### IMPORTANT:

- Apply lubricant (e. g. white zinc B solved into spindle oil) to bolts and nuts to stabilize their friction coefficient.
- Remove soil, dust, and/or dirt from the nut and bolt thread surfaces before tightening.
- Tighten nuts and bolts to specifications. If tightened with excessively low or high torque, missing or breakage of nuts and/or bolts may result.

## MAINTENANCE

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### J. Muffler Filter (ZX50U-5N, 60USB-5N)

- 1** Check and Clean Filter Element of Muffler Filter  
--- every 3000 hours

See your authorized dealer.

- 2** Check and Clean Muffler Filter  
--- as required

**IMPORTANT: Check and clean flammable materials on the area around the muffler filter.**

Do not disassemble the base machine support parts, sensors, differential pressure hoses and pipes.

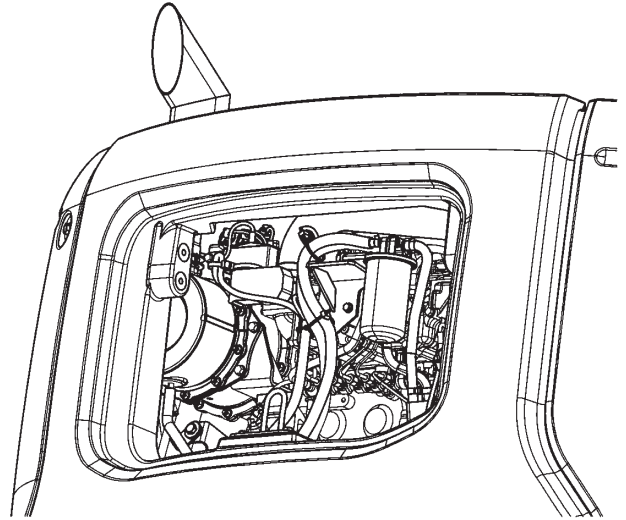
When the machine is operated in dusty areas, refer to "9-1 Maintenance Under Special Environmental Conditions".

Open the engine cover.

Check differential hoses and pipes for disconnection or cracks.

Check the differential sensors and harnesses of exhaust temperature sensors for abnormality.

Securely close the engine cover.



MADG-07-013





## MAINTENANCE UNDER SPECIAL ENVIRONMENTAL CONDITIONS

### Maintenance Under Special Environmental Conditions

Operating Conditions	Precautions for Maintenance	
Muddy Soil, Rainy or Snowy Weather	After Operation	Clean the machine and check for cracks, damaged, loose or missing bolts and nuts. Lubricate all necessary parts without delay.
Near the Ocean	After Operation	The following salt pollution measures must be taken when the machine is operated at sea or at coastline. (1) After completing the work, extend/retract the hydraulic cylinders several times to form oil film on the rod surface. Store the machine with cylinders retracted as much as possible. (2) Thoroughly clean the machine with fresh water to wash off salt. (3) Perform touch up painting periodically on hose fittings, lubrication piping and inserting position of cover, where sea water is easily collected, in order to prevent corrosion. (4) During storage of the machine, cover the machine by tarps to prevent sea water from entering into the cab vent. Apply rust prevention oil (example: ANTIRUST P-1300NP-3 JX Nippon Oil & Energy Corporation) onto plated part of the cylinder rods.
Dusty Atmosphere	Air Cleaner	Clean the filter element and strainer regularly at shorter service intervals.
	Radiator	Clean the oil cooler screen to prevent clogging of the radiator core.
	Fuel System	Clean the filter element and strainer regularly at shorter service intervals.
	Electrical Parts	Clean the commutator especially for the starter and alternator.
	Engine, Muffler	Clean earlier than the normal interval to prevent dust from sticking and accumulating. Inhibit regeneration according to the machine operating condition.
Rocky Ground	Track	Carefully operate while checking for cracks, damage and loose bolts and nuts. Do not use rubber crawlers.
	Front Attachment	Standard attachment may be damaged when digging rocky ground. Reinforce the bucket before using it, or use a heavy duty bucket.
Falling Stones	Cab Head Guard	Provide a cab guard to protect the machine from falling stones. Consult your nearest Hitachi dealer.
Freezing Weather	Fuel/Lubricant	Use high quality and low viscosity fuel and oil.
	Engine Coolant	Be sure to use antifreeze.
	Battery	Fully charge the batteries at shorter intervals. If not fully charged, electrolyte may freeze.
	Track	Keep the track clean. Park the machine on a hard surface to prevent the tracks from freezing to the ground.
High Altitude (Altitude: 1500 m or higher)*	Engine Oil	Change at 1/2 of normal service interval.
	Engine Oil Filter	Change at 1/2 of normal service interval.

\*When the machine is operated at the altitude 1500 m or higher, the ignition of the engine may deteriorate, possibly resulting in significant decrease in durability or function. If the machine is unavoidably operated under these conditions, consult your authorized Hitachi dealer.



## STORAGE

### Storing the Machine

In case the machine is to be stored for longer than one month, pay attention to the following points to prepare next operation.

Item	Remedy
Machine Cleaning	Wash the machine. Remove soil or other debris adhered to the machine.
Lubrication/Greasing	Check lubricant's level and contamination. Fill up or change if necessary. Lubricate all grease points. Coat grease to exposed metal surfaces which are subject to rust (i.e. cylinder rods etc.).
Battery	Remove the batteries and store them in a dry protected place after charging fully. If not removed, disconnect the negative battery cable from the (⊖) terminal.
Coolant	Add anti-rusting agent. If storing in extremely cold areas, either add extra anti-freeze or drain coolant completely to avoid freezing. In this case, place a sign reading "NO COOLANT".
Protection Against Dust and Moisture	Store the machine in a dry storage area using a protective cover.
Tools	Inspect and repair, then store.
Lubrication Operation	If oil film on the metal surfaces is lost, rust may begin, possibly causing abnormal wear of the machine when the machine operation is restarted. If the machine is stored for a long time, operate hydraulic functions for travel, swing and digging two to three times for lubrication, at least once a month. Be sure to check the coolant level and lubrication conditions before operating. Charge the batteries at this time.

 NOTE:

- *Lubricating operation is a series of warm-up, travel, swing and digging operation carried out repeatedly for a few cycles at slow speed.*
- *Lubricants will deteriorate during long term storage of the machine. Be sure to carefully check the lubricants before restarting operation of the machine.*
- *Refer to "Using Rubber Crawler" in the OPERATING THE MACHINE section for the machines equipped with rubber crawlers.*



# TROUBLESHOOTING

## Troubleshooting

If any machine trouble has occurred, immediately repair it. Make certain the cause of the trouble and take necessary measures to prevent the reoccurrence of the same trouble.

In case troubleshooting is difficult, or measures marked with \* must be taken, consult the nearest Hitachi dealer. Never attempt to adjust, disassemble, or repair the hydraulic and/or electrical/electronic parts/components.

**IMPORTANT: Never attempt to disassemble or modify the electrical/electronic components.**

### Engine

Consult the nearest Hitachi dealer for the engine troubleshooting.

### Engine Auxiliaries

Problem	Cause	Solution
Batteries will not be charged.	Broken battery separator	Replace
	Faulty regulator	* Adjust and replace
	Faulty ground line	* Repair
	Faulty alternator	* Repair or replace
Batteries discharge quickly after being charged.	Shorted cable	* Repair or replace
	Shorted battery separator	* Repair or replace
	Increased sediment in battery	* Replace
Coolant temperature is too high.	Low coolant level	Refill
	Insufficient fan belt tension	Adjust
	Damaged rubber hose	* Replace
	Faulty thermostat	* Replace
	Faulty coolant temperature gauge	* Replace

\* Mark: Consult your authorized Hitachi dealer.

## TROUBLESHOOTING

### Impossible to Start the Engine

Problem	Cause	Solution	
Engine will not start.	Starter does not rotate or is not powerful.	Discharged battery	Charge or replace battery.
		Disconnected, loose, or corroded battery terminals	After repairing the corroded area, securely tighten the connectors.
		Lowered pilot control shut-off lever	Pull pilot control shut-off lever up.
		Disconnected, loose, or corroded starter ground line terminals	After repairing the corroded area, securely tighten the connectors.
		Faulty pilot control shut-off lever electrical system	Repair
		Too high engine oil viscosity	Change engine oil with appropriate viscosity.
		Faulty starter and/or electrical system	* Repair and adjust
	Starter rotates.	No fuel	After checking that no fuel is leaking, refill fuel.
		Faulty injection pump	* Repair and adjust
		Air in the fuel system	Bleed air.
		Clogged fuel filter	After draining water, replace the element.
		Frozen fuel	Warm the fuel pump with hot water or wait until the atmospheric temperature rises.
		Faulty preheat system	* Repair and adjust
Even though the engine is started, the engine stalls soon.	Too low idle speed	* Repair and adjust	
	Clogged fuel filter	After draining water, replace the element.	
	Clogged pre-fuel filter (ZX50U-5N, ZX60USB-5N)	Clean or replace the element.	
	Faulty engine control system	* Repair and adjust	
	Clogged air cleaner	Clean or replace the element.	
	Faulty injection pump	* Repair and adjust	
Engine runs irregularly.	Faulty fuel system	* Repair and adjust	
	Water or air in the fuel system	Drain water or bleed air.	
	Faulty engine control system	* Repair and adjust	

\* Mark: Consult your authorized Hitachi dealer.

## TROUBLESHOOTING

<b>Control Lever</b>		
Problem	Cause	Solution
Lever is heavy to operate.	Rusted joint	* Lubricate or repair
	Worn pusher	* Replace
Does not move smoothly	Worn pusher	* Repair or replace
	Faulty pilot valve	* Replace
Does not return to neutral.	Faulty pilot valve	* Replace
The lever is tilted in the neutral position due to increase in play.	Worn joint	* Repair or replace
	Faulty pilot valve	* Replace

\* Mark: Consult your authorized Hitachi dealer.

## TROUBLESHOOTING

### Hydraulic System

When the machine is stored without operation, air mixed in hydraulic oil will become separated and will accumulate in the cylinder upper sections, causing a delay in the response time of the machine movement or weak power development.

In case these symptoms appear, repeatedly operate all actuators several times.

Problem	Cause	Solution
No hydraulic Functions (Noise from pumps)	Faulty hydraulic pump	* Repair or replace
	Lack of hydraulic oil	Refill
	Broken suction pipe and/or hose	* Repair or replace
No hydraulic Functions (Hydraulic pump noise remains unchanged.)	Faulty pilot pump	* Replace
	Faulty pilot shut-off solenoid valve	* Replace
	Faulty wire harness (pilot shut-off solenoid valve) pilot shut-off switch	* Repair or replace
	The pilot control shut-off lever is in the LOCK position.	Turn the pilot shut-off lever to the UNLOCK position.
All actuators have no power.	Malfunction due to worn hydraulic pump	* Replace
	Decreased main relief valve set pressure in the control valve	* Adjust
	Lack of hydraulic oil	Refill
	Clogged suction strainer in the hydraulic oil tank	Clean
	Absorption of air from the oil suction side	Retighten
Only one side lever is inoperable or has no power.	Faulty relief valve in the valve	* Repair or replace
	Broken pipe and/or hose	* Repair or replace
	Loose pipe line joint	Retighten
	Broken O-ring at pipe line joint	* Replace
	Faulty hydraulic pump	* Repair or replace
	Faulty pilot valve	* Replace
	Faulty pilot circuit line	* Repair or replace
Faulty pilot solenoid valve	* Repair or replace	

\* Mark: Consult your authorized Hitachi dealer.



## TROUBLESHOOTING

Problem	Cause	Solution
Only one actuator is inoperable.	Broken control valve spool	* Replace
	Embedded foreign matter in valve spool	* Repair or replace
	Broken pipe and/or hose	* Repair or replace
	Loose pipe line joint	Retighten
	Broken O-ring at pipe line joint	* Replace
	Broken actuator	* Repair or replace
	Faulty pilot valve	* Replace
	Faulty pilot circuit line	* Repair or replace
Only one cylinder is inoperable or has no power.	Broken oil seal in cylinder	* Repair or replace
	Oil leak due to damage to cylinder rod	* Repair or replace
	Faulty pilot valve	* Replace
	Faulty pilot circuit line	* Repair or replace
	Low set pressure of main or port relief valve (boom, arm and bucket)	* Adjust and replace
Hydraulic oil temperature increases.	Stained oil cooler	Clean
	Insufficient engine fan belt tension	Adjust
Oil leak from low pressure hose	Loose clamps	Retighten

\* Mark: Consult your authorized Hitachi dealer.

## TROUBLESHOOTING

<b>Drive Function</b>		
Problem	Cause	Solution
One or both side tracks are inoperable.	Damaged center joint	* Repair or replace
	Incompletely released parking brake	* Repair or replace
	Broken travel motor	* Repair or replace
	Faulty pilot valve	* Replace
	Faulty pilot circuit line	* Repair or replace
	Faulty counter balance valve	* Replace
Does not travel smoothly.	Overly tensioned or slackened crawler sag	Adjust
	Deformed track frame	* Repair or replace
	Embedded foreign matter such as rock fragments	Remove
	Dragged parking brake	* Repair
	Faulty counter balance valve	* Replace
Travel speed does not change.	Faulty travel speed switch.	* Replace
	Poor contact in connector	* Repair or replace
	Damaged wire harness	* Repair
	Faulty solenoid valve	* Repair or replace
	Faulty motor	* Repair or replace

\* Mark: Consult your authorized Hitachi dealer.

## TROUBLESHOOTING

<b>Swing Function</b>		
Problem	Cause	Solution
Upperstructure does not swing.	Faulty swing parking brake	* Repair or replace
	Broken swing motor	* Repair or replace
	Faulty pilot valve	* Replace
	Faulty pilot circuit line	* Repair or replace
	Low set pressure of swing relief valve	* Adjust and replace
Swing is not smooth.	Worn swing gear	* Repair or replace
	Damaged swing bearing and bearing balls	* Repair or replace
	Lack of grease	Refill
	Low set pressure of swing relief valve	* Adjust and replace

\* Mark: Consult your authorized Hitachi dealer.

Immediately after the control valve, swing motor relief valve and/or the swing motor is replaced, a noise may be emitted and/or operation may not be performed smoothly due to air trapped in the hydraulic line.

Slowly continue to operate the machine for approx. 10 minutes to bleed air.

After repair work is complete, be sure to check the oil level in the hydraulic oil tank. Refill hydraulic oil as needed.

## TROUBLESHOOTING

<b>Engine Speed</b>		
Problem	Cause	Solution
Even if operating the engine control dial, the engine speed does not change.	Blown fuse	Replace
	Faulty engine control dial	* Replace
	Poor contact in connector	* Repair or replace
	Damaged wire harness (between EC dial and monitor)	* Repair
	Faulty controller (ECU)	* Replace
Work mode does not change.	Faulty mode switch	* Replace
	Poor contact in connector	* Repair or replace
	Damaged wire harness (between ECU and monitor)	* Repair
	Faulty controller (ECU)	* Replace
	Faulty solenoid valve	* Repair or replace
Auto-idle is inoperable or not released.	Faulty pressure sensor	* Replace
	Poor contact in connector	* Repair or replace
	Damaged wire harness	* Repair
	Faulty controller	* Replace

\* Mark: Consult your authorized Hitachi dealer.

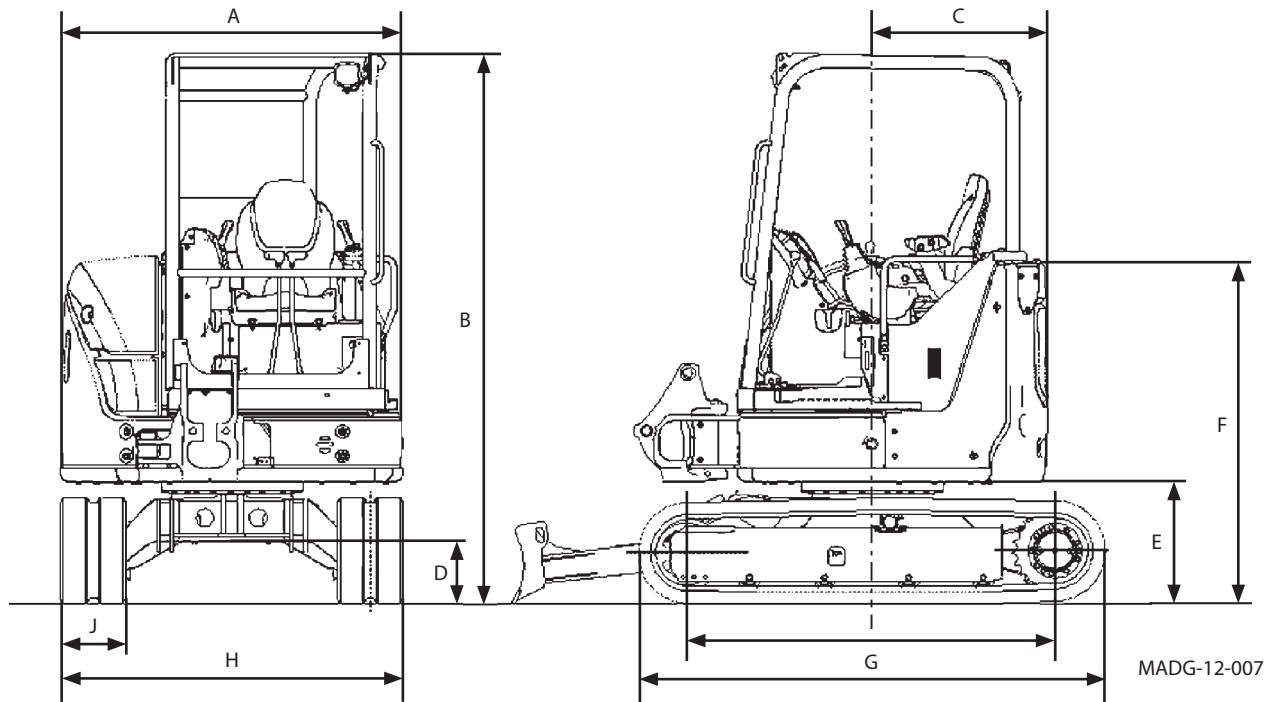
### Others

The machine may have a noise, excessive vibration, and abnormal smell when any trouble occurs. Always beware of the machine conditions during operation.

## SPECIFICATIONS

### Std. Specification

#### ZX30U-5N



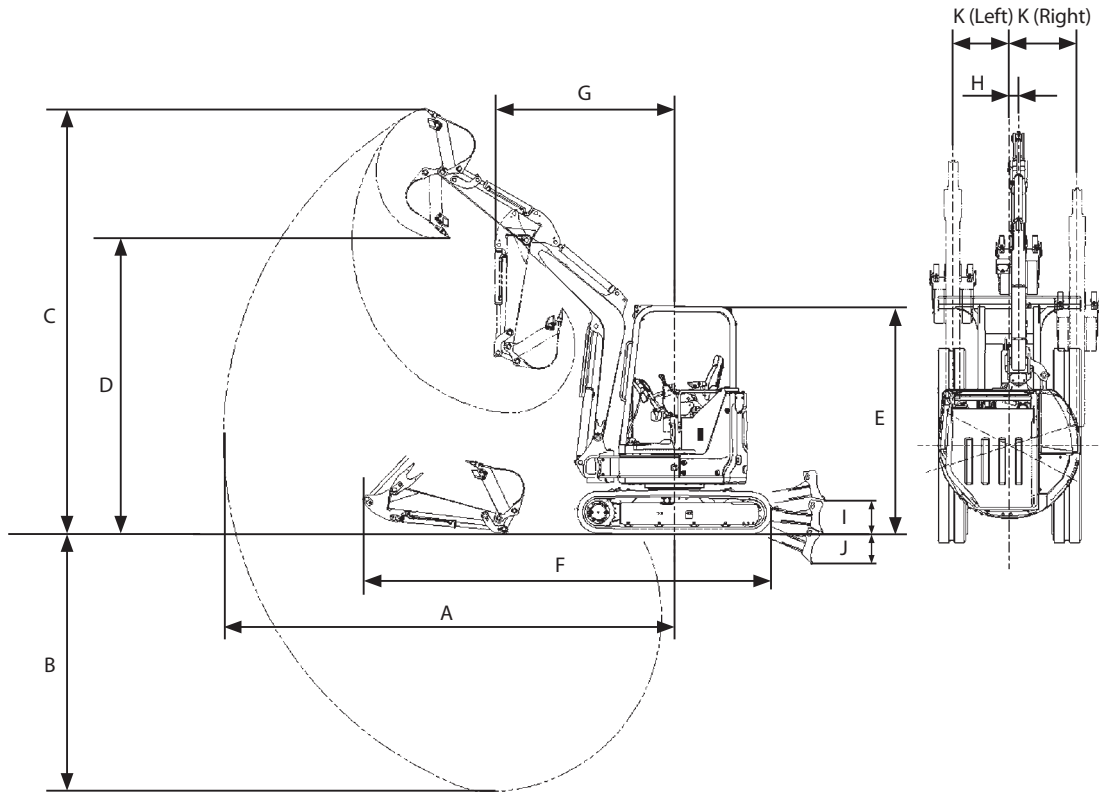
Model		ZX30U-5N	
Specification		Canopy	Cab
Type of Front-End Attachment	-	Boom Swing Type, 1.17 m (3 ft 10 in) Arm	
Bucket Capacity (Heaped)	m <sup>3</sup> (yd <sup>3</sup> )	0.09 (0.12)	
Operating Weight	kg (lb)	3030 (6680)	3200 (7050)
Base Machine Weight	kg (lb)	2330 (5140)	2500 (5510)
Engine	kW/min <sup>-1</sup> (PS/rpm)	YANMAR 3TNV88F 17.4/2400 (23.7/2400)	
A: Overall Width	mm (ft-in)	1550 (5' 1")	
B: Overall Height	mm (ft-in)	2480 (8' 2")	
C: Rear End Swing Radius	mm (ft-in)	775 (2' 7")	
D: Minimum Ground Clearance	mm (ft-in)	280 (11")	
E: Counterweight Clearance	mm (ft-in)	550 (1' 10")	
F: Engine Cover Height	mm (ft-in)	1530 (5')	
G: Undercarriage Length	mm (ft-in)	2110 (6' 11")	
H: Undercarriage Width	mm (ft-in)	1550 (5' 1")	
I: Sprocket Center to Idler Center	mm (ft-in)	1660 (5' 5")	
J: Track Shoe Width	mm (ft-in)	300 (1')	
Ground Pressure	kPa (kgf/cm <sup>2</sup> , psi)	28 (0.28, 4.1)	30 (0.30, 4.4)
Swing Speed	min <sup>-1</sup> (rpm)	9.1 (9.1)	
Travel Speed (fast/slow)	km/h (mph)	4.3/2.8 (2.7/1.7)	
Gradeability		30° (tan θ = 0.58)	

**NOTE:** The dimensions do not include the height of the shoe lug. The dimensions of the machine equipped with rubber crawlers are shown.

# SPECIFICATIONS

## Working Ranges

### ZX30U-5N



Category		ZX30U-5N	
		Canopy	Cab
		1.17 m Arm	
A: Maximum Digging Reach	mm (ft-in)	4890 (16' 1")	
B: Maximum Digging Depth	mm (ft-in)	2790 (9' 2")	
C: Maximum Cutting Height	mm (ft-in)	4620 (15' 2")	4420 (14' 6")
D: Maximum Dumping Height	mm (ft-in)	3200 (10' 6")	3030 (10')
E: Overall Height	mm (ft-in)	2480 (8' 2")	
F: Overall Length	mm (ft-in)	4450 (14' 8")	
G: Minimum Swing Radius	mm (ft-in)	1970 (6' 5")	2150 (7' 1")
H: Boom Swing Pivot Offset Distance	mm (ft-in)	100 (4")	
I: Blade Bottom Highest Position	mm (ft-in)	360 (1' 2")	
J: Blade Bottom Lowest Position	mm (ft-in)	320 (1' 1")	
K: Offset Distance	mm (ft-in)	L610 (2') R735 (2' 5")	L610 (2') R700 (2' 4")
Maximum Boom-Swing Angle		L72° R62° [52°]	L62° R62° [52°]

**NOTE:**

- The dimensions do not include the height of the shoe lug. The dimensions of the machine equipped with rubber crawlers are shown.
- L: Left R: Right
- Values in the brackets [ ] are dimension of the machine equipped with the House rupture valve.

## SPECIFICATIONS

### Shoe Types and Applications

#### ZX30U-5N (Canopy)

Shoe Width	Rubber Shoe	Grouser Shoe	Rubber Pad Shoe	Pad Crawler Shoe
	300 mm	300 mm	300 mm	300 mm
Application	For Paved Road (Standard)	For Ordinary Ground (Optional)	For Paved Road (Optional)	For Paved Road (Optional)
Operating Weight (kg)	3030	3170	3270	3240
Minimum Ground Clearance (mm)	280	270	310	320
Undercarriage Length (mm)	2110	2130	2170	2180
Undercarriage Width (mm)	1550	1550	1550	1550
Ground Pressure (kPa)	28	29	30	30
	(kgf/cm <sup>2</sup> ) 0.29	0.30	0.31	0.31

#### ZX30U-5N (Cab)

Shoe Width	Rubber Shoe	Grouser Shoe	Rubber Pad Shoe	Pad Crawler Shoe
	300 mm	300 mm	300 mm	300 mm
Application	For Paved Road (Standard)	For Ordinary Ground (Optional)	For Paved Road (Optional)	For Paved Road (Optional)
Operating Weight (kg)	3200	3340	3440	3410
Minimum Ground Clearance (mm)	280	270	310	320
Undercarriage Length (mm)	2110	2130	2170	2180
Undercarriage Width (mm)	1550	1550	1550	1550
Ground Pressure (kPa)	30	31	32	31
	(kgf/cm <sup>2</sup> ) 0.31	0.32	0.33	0.32

 **NOTE:**

- The specifications for the front-end attachment are for 1.17 m arm with ISO 0.09 m<sup>3</sup> bucket.
- Rubber shoe, rubber pad shoe and pad crawler shoe should be used on paved road. Use of rubber crawlers on other than paved road may shorten the service life of the rubber crawlers to a great extent.
- Other than 300 mm grouser shoe should not be used on gravel or rocky ground. Operating or digging on gravel ground may cause serious damage to shoe, shoe bolts and other parts such as rollers.
- The dimensions do not include the height of the shoe lug.

## SPECIFICATIONS

### Bucket Types and Applications

#### ZX30U-5N

Bucket	Bucket Capacity m <sup>3</sup> (yd <sup>3</sup> ) ISO (Heaped)	Bucket Width mm		Front-End Attachment
		(With side cutter) mm (in)	(Without side cutter) mm (in)	1.17 m (3'10") Arm
Hoe Bucket	0.04 (0.052)	300 (12")	250 (10")	⊙
	0.055 (0.072)	350 (14")	300 (12")	⊙
	0.065 (0.085)	400 (16")	350 (14")	⊙
	0.08 (0.11)	450 (18")	400 (16")	⊙
	0.09 (0.12)	500 (20")	450 (18")	⊙
	0.10 (0.13)	550 (22")	500 (20")	○
	0.11 (0.14)	600 (24")	550 (22")	□
	0.13 (0.17)	650 (26")	600 (24")	□

 NOTE:

- Symbols in the above table have the following meanings.

- ⊙: General excavating
- : Light duty excavating
- : Loading work

- Hoe bucket is applicable to the following types of work.

*General excavating:*

*For digging and loading operation of sand, gravel, clay, ordinary earth and so on.*

*Light duty excavating:*

*For digging and loading operation of dried, loosened earth, sand, mud and so on.*

*Their bulk density shall be less than 1600 kg/m<sup>3</sup> as a standard.*

*Loading work:*

*For loading operation of dried, loosened earth and sand.*

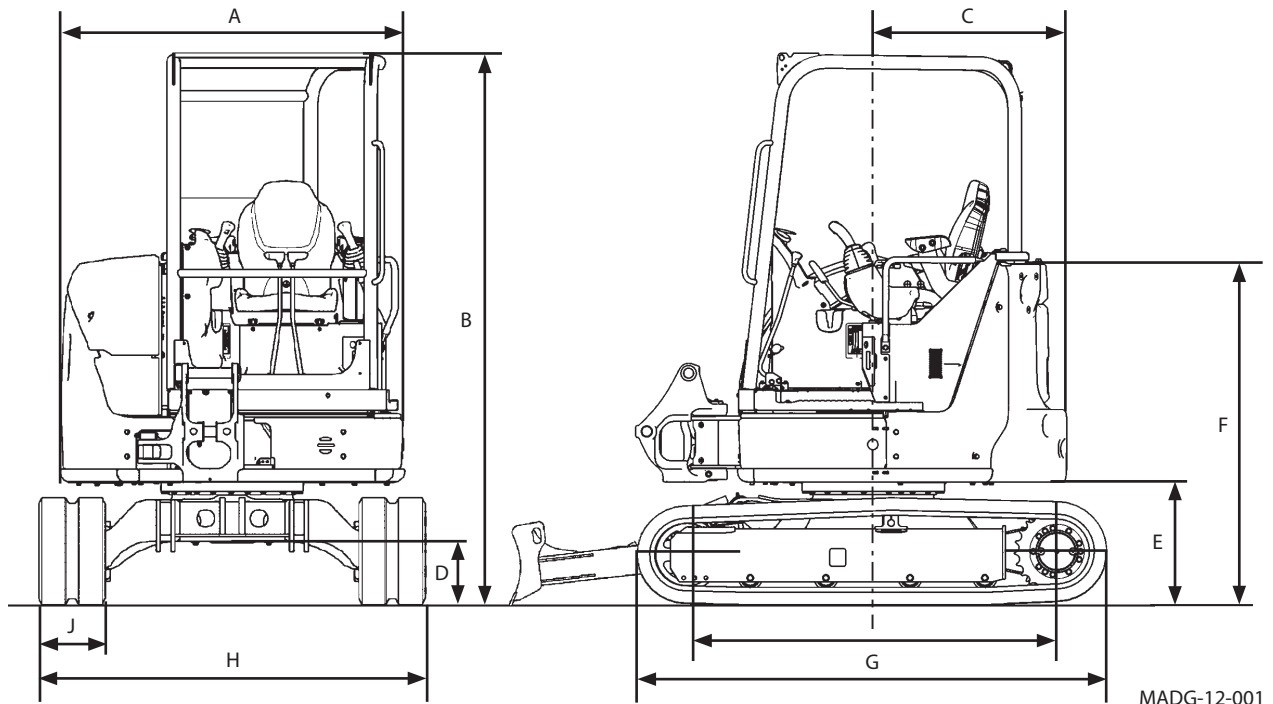
*Their bulk density shall be less than 1100 kg/m<sup>3</sup> as a standard.*



## SPECIFICATIONS

### Std. Specification

#### ZX35U-5N



MADG-12-001

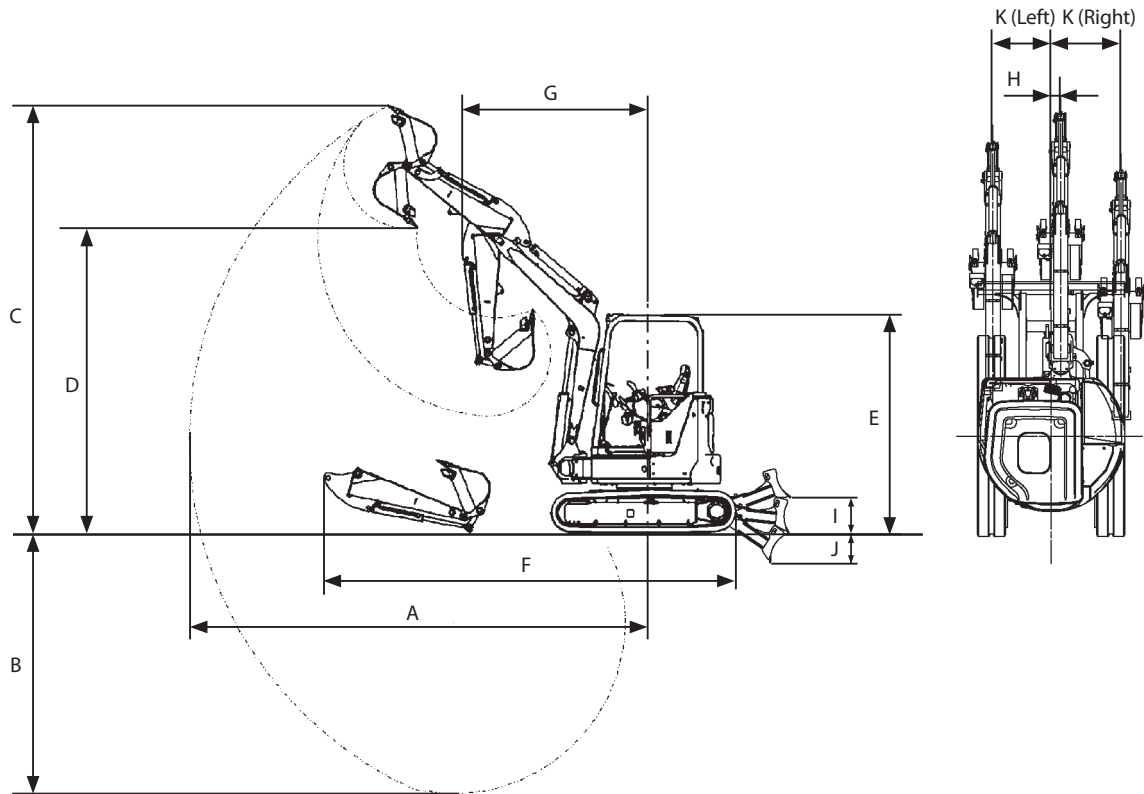
Model		ZX35U-5N	
Specification		Canopy	Cab
Type of Front-End Attachment	-	Boom Swing Type, 1.32 m (4 ft 4 in) Arm	
Bucket Capacity (Heaped)	m <sup>3</sup> (yd <sup>3</sup> )	0.11 (0.14)	
Operating Weight	kg (lb)	3440 (7580)	3610 (7960)
Base Machine Weight	kg (lb)	2650 (5840)	2820 (6220)
Engine	kW/min <sup>-1</sup> (PS/rpm)	YANMAR 3TNV88F 17.4/2400 (23.7/2400)	
A: Overall Width	mm (ft-in)	1550 (5' 1")	
B: Overall Height	mm (ft-in)	2480 (8' 2")	
C: Rear End Swing Radius	mm (ft-in)	870 (2' 10")	
D: Minimum Ground Clearance	mm (ft-in)	280 (11")	
E: Counterweight Clearance	mm (ft-in)	550 (1' 10")	
F: Engine Cover Height	mm (ft-in)	1530 (5')	
G: Undercarriage Length	mm (ft-in)	2110 (6' 11")	
H: Undercarriage Width	mm (ft-in)	1740 (5' 9")	
I: Sprocket Center to Idler Center	mm (ft-in)	1660 (5' 5")	
J: Track Shoe Width	mm (ft-in)	300 (1')	
Ground Pressure	kPa (kgf/cm <sup>2</sup> , psi)	32 (0.32, 4.6)	33 (0.34, 4.8)
Swing Speed	min <sup>-1</sup> (rpm)	9.1 (9.1)	
Travel Speed (fast/slow)	km/h (mph)	4.3/2.8 (2.7/1.7)	
Gradeability		30° (tan θ = 0.58)	

**NOTE:** The dimensions do not include the height of the shoe lug. The dimensions of the machine equipped with rubber crawlers are shown.

# SPECIFICATIONS

## Working Ranges

### ZX35U-5N



MADC-12-004

Item		Category	ZX35U-5N			
			Canopy		Cab	
			1.32 m Arm	1.72 m Arm	1.32 m Arm	1.72 m Arm
A:	Maximum Digging Reach	mm (ft-in)	5210 (17' 1")	5520 (18' 1")	5210 (17' 1")	5520 (18' 1")
B:	Maximum Digging Depth	mm (ft-in)	3060 (10')	3460 (11' 4")	3060 (10')	3460 (11' 4")
C:	Maximum Cutting Height	mm (ft-in)	4870 (16')	4950 (16' 3")	4700 (15' 5")	4740 (15' 7")
D:	Maximum Dumping Height	mm (ft-in)	3460 (11' 4")	3570 (11' 9")	3310 (10' 10")	3390 (11' 1")
E:	Overall Height	mm (ft-in)	2480 (8' 2")			
F:	Overall Length	mm (ft-in)	4640 (15' 3")	4760 (15' 7")	4640 (15' 3")	4760 (15' 7")
G:	Minimum Swing Radius	mm (ft-in)	2080 (6' 10")	2190 (7' 2")	2240 (7' 4")	2300 (7' 7")
H:	Boom Swing Pivot Offset Distance	mm (ft-in)	100 (4")			
I:	Blade Bottom Highest Position	mm (ft-in)	360 (1' 2")			
J:	Blade Bottom Lowest Position	mm (ft-in)	400 (1' 4")			
K:	Offset Distance	mm (ft-in)	L610 (2') R735 (2' 5")		L610 (2') R700 (2' 4")	
Maximum Boom-Swing Angle			L72° R62° [52°]		L62° R62° [52°]	

**NOTE:**

- The dimensions do not include the height of the shoe lug. The dimensions of the machine equipped with rubber crawlers are shown.
- L: Left R: Right
- Values in the brackets [ ] are dimension of the machine equipped with the House rupture valve.

## SPECIFICATIONS

### Shoe Types and Applications

#### ZX35U-5N (Canopy)

Shoe Width	Rubber Shoe	Grouser Shoe	Rubber Pad Shoe	Pad Crawler Shoe
	300 mm	300 mm	300 mm	300 mm
Application	For Paved Road (Standard)	For Ordinary Ground (Optional)	For Paved Road (Optional)	For Paved Road (Optional)
Operating Weight (kg)	3440	3580	3680	3650
Minimum Ground Clearance (mm)	280	270	310	320
Undercarriage Length (mm)	2110	2130	2170	2180
Undercarriage Width (mm)	1740	1740	1740	1740
Ground Pressure (kPa)	32	33	34	34
	(kgf/cm <sup>2</sup> ) 0.33	0.34	0.35	0.35

#### ZX35U-5N (Cab)

Shoe Width	Rubber Shoe	Grouser Shoe	Rubber Pad Shoe	Pad Crawler Shoe
	300 mm	300 mm	300 mm	300 mm
Application	For Paved Road (Standard)	For Ordinary Ground (Optional)	For Paved Road (Optional)	For Paved Road (Optional)
Operating Weight (kg)	3610	3750	3850	3820
Minimum Ground Clearance (mm)	280	270	310	320
Undercarriage Length (mm)	2110	2130	2170	2180
Undercarriage Width (mm)	1740	1740	1740	1740
Ground Pressure (kPa)	33	34	35	35
	(kgf/cm <sup>2</sup> ) 0.34	0.35	0.36	0.36

 **NOTE:**

- The specifications for the front-end attachment are for 1.32 m arm with ISO 0.11 m<sup>3</sup> bucket.
- Rubber shoe, rubber pad shoe and pad crawler shoe should be used on paved road. Use of rubber crawlers on other than paved road may shorten the service life of the rubber crawlers to a great extent.
- Other than 300 mm grouser shoe should not be used on gravel or rocky ground. Operating or digging on gravel ground may cause serious damage to shoe, shoe bolts and other parts such as rollers.
- The dimensions do not include the height of the shoe lug.

## SPECIFICATIONS

### Bucket Types and Applications

#### ZX35U-5N

Bucket	Bucket Capacity m <sup>3</sup> (yd <sup>3</sup> ) ISO (Heaped)	Bucket Width mm		Front-End Attachment	
		(With side cutter) mm (in)	(Without side cutter) mm (in)	1.32 m (4'4") Arm	1.72 m (5'8") Arm
Hoe Bucket	0.04 (0.052)	300 (12")	250 (10")	⊙	⊙
	0.055 (0.072)	350 (14")	300 (12")	⊙	⊙
	0.065 (0.085)	400 (16")	350 (14")	⊙	⊙
	0.08 (0.11)	450 (18")	400 (16")	⊙	⊙
	0.09 (0.12)	500 (20")	450 (18")	⊙	⊙
	0.10 (0.13)	550 (22")	500 (20")	⊙	⊙
	0.11 (0.14)	600 (24")	550 (22")	⊙	○
	0.13 (0.17)	650 (26")	600 (24")	○	□
	0.14 (0.18)	700 (28")	650 (26")	□	—
	0.15 (0.20)	750 (30")	700 (28")	□	—

 **NOTE:**

- Symbols in the above table have the following meanings.

- ⊙: General excavating
- : Light duty excavating
- : Loading work

- Hoe bucket is applicable to the following types of work.

*General excavating:*

*For digging and loading operation of sand, gravel, clay, ordinary earth and so on.*

*Light duty excavating:*

*For digging and loading operation of dried, loosened earth, sand, mud and so on.*

*Their bulk density shall be less than 1600 kg/m<sup>3</sup> as a standard.*

*Loading work:*

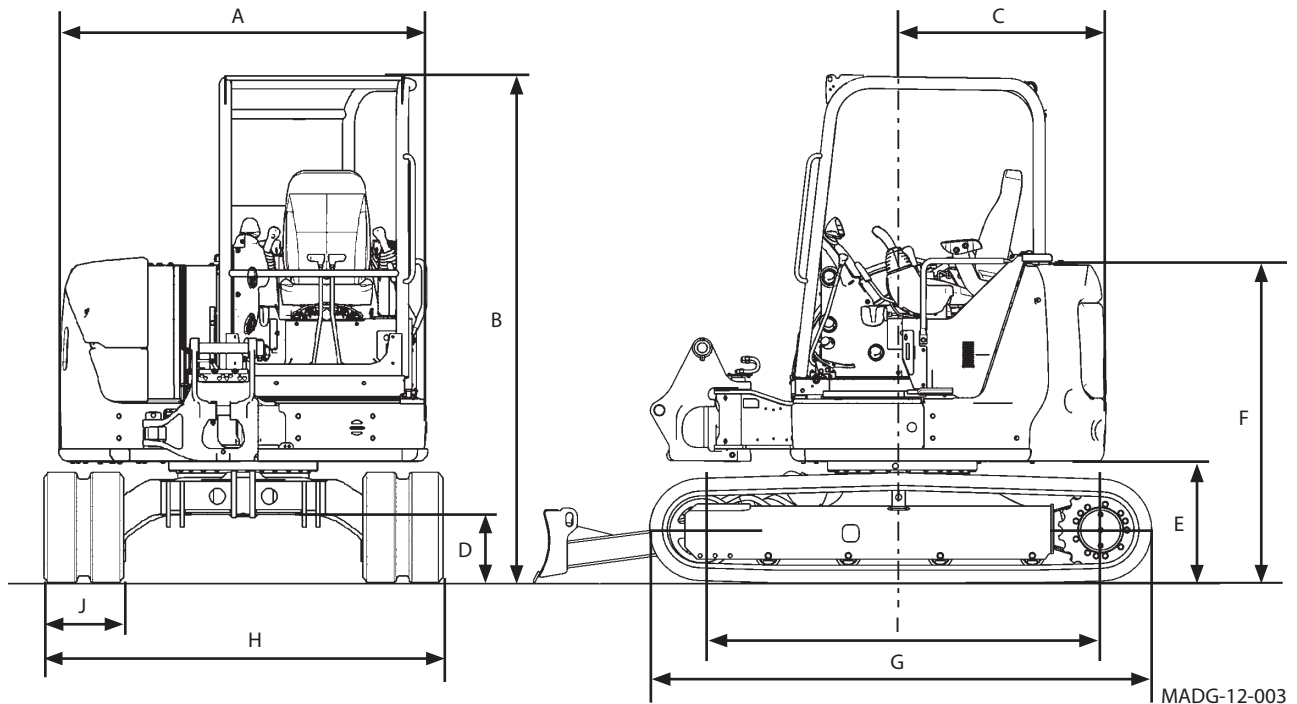
*For loading operation of dried, loosened earth and sand.*

*Their bulk density shall be less than 1100 kg/m<sup>3</sup> as a standard.*

## SPECIFICATIONS

### Std. Specification

#### ZX50U-5N



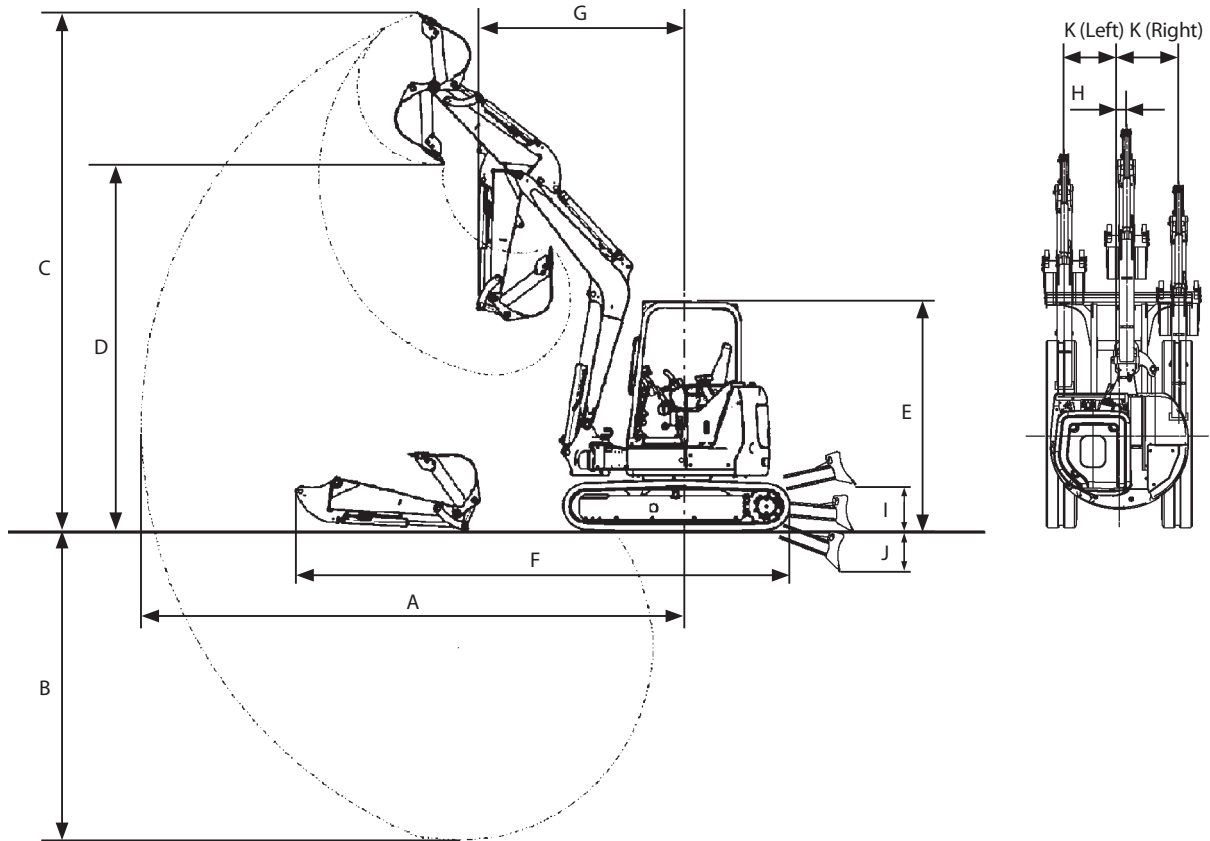
Model		ZX50U-5N	
Specification		Canopy	Cab
Type of Front-End Attachment	-	Boom Swing Type, 1.38 m (4 ft 6 in) Arm	
Bucket Capacity (Heaped)	m <sup>3</sup> (yd <sup>3</sup> )	0.16 (0.21)	
Operating Weight	kg (lb)	4790 (10560)	4920 (10850)
Base Machine Weight	kg (lb)	3680 (8110)	3810 (8400)
Engine	kW/min <sup>-1</sup> (PS/rpm)	YANMAR 4TNV88C 27.1/2400 (36.8/2400)	
A: Overall Width	mm (ft-in)	1850 (6' 1")	
B: Overall Height	mm (ft-in)	2530 (8' 4")	
C: Rear End Swing Radius	mm (ft-in)	1000 (3' 3")	
D: Minimum Ground Clearance	mm (ft-in)	340 (1' 1")	
E: Counterweight Clearance	mm (ft-in)	610 (2')	
F: Engine Cover Height	mm (ft-in)	1590 (5' 3")	
G: Undercarriage Length	mm (ft-in)	2500 (8' 2")	
H: Undercarriage Width	mm (ft-in)	2000 (6' 7")	
I: Sprocket Center to Idler Center	mm (ft-in)	2000 (6' 7")	
J: Track Shoe Width	mm (ft-in)	400 (1' 4")	
Ground Pressure	kPa (kgf/cm <sup>2</sup> , psi)	27 (0.28, 4.0)	28 (0.29, 4.1)
Swing Speed	min <sup>-1</sup> (rpm)	9.0 (9.0)	
Travel Speed (fast/slow)	km/h (mph)	4.2/2.5 (2.6/1.6)	
Gradeability		30° (tan θ = 0.58)	

**NOTE:** The dimensions do not include the height of the shoe lug. The dimensions of the machine equipped with rubber crawlers are shown.

# SPECIFICATIONS

## Working Ranges

### ZX50U-5N



MADC-12-005

Item		Category	ZX50U-5N			
			Canopy		Cab	
			1.38 m Arm	1.69 m Arm	1.38 m Arm	1.69 m Arm
A:	Maximum Digging Reach	mm (ft-in)	5960 (19' 7")	6260 (20' 7")	5960 (19' 7")	6260 (20' 7")
B:	Maximum Digging Depth	mm (ft-in)	3530 (11' 7")	3830 (12' 7")	3530 (11' 7")	3830 (12' 7")
C:	Maximum Cutting Height	mm (ft-in)	5750 (18' 10")	6000 (19' 8")	5750 (18' 10")	6000 (19' 8")
D:	Maximum Dumping Height	mm (ft-in)	4070 (13' 4")	4310 (14' 2")	4070 (13' 4")	4310 (14' 2")
E:	Overall Height	mm (ft-in)	2530 (8' 2")			
F:	Overall Length	mm (ft-in)	5470 (17' 11")	5520 (18' 1")	5470 (17' 11")	5520 (18' 1")
G:	Minimum Swing Radius	mm (ft-in)	2210 (7' 3")	2300 (7' 7")	2210 (7' 3")	2300 (7' 7")
H:	Boom Swing Pivot Offset Distance	mm (ft-in)	100 (4")			
I:	Blade Bottom Highest Position	mm (ft-in)	460 (1' 6")			
J:	Blade Bottom Lowest Position	mm (ft-in)	370 (1' 2")			
K:	Offset Distance	mm (ft-in)	L690 (2' 3") R850 (2' 10")			
Maximum Boom-Swing Angle			L80° R60°			

**NOTE:**

- The dimensions do not include the height of the shoe lug. The dimensions of the machine equipped with rubber crawlers are shown.
- L: Left R: Right

## SPECIFICATIONS

### Shoe Types and Applications

#### ZX50U-5N (Canopy)

Shoe Width	Rubber Shoe	Grouser Shoe	Rubber Pad Shoe	Pad Crawler Shoe
	400 mm	400 mm	400 mm	400 mm
Application	For Paved Road (Standard)	For Ordinary Ground (Optional)	For Paved Road (Optional)	For Paved Road (Optional)
Operating Weight (kg)	4790	4900	5090	4960
Minimum Ground Clearance (mm)	340	320	360	360
Undercarriage Length (mm)	2500	2490	2540	2540
Undercarriage Width (mm)	2000	2000	2000	2000
Ground Pressure (kPa)	27	28	29	28
	(kgf/cm <sup>2</sup> ) 0.28	0.29	0.30	0.29

#### ZX50U-5N (Cab)

Shoe Width	Rubber Shoe	Grouser Shoe	Rubber Pad Shoe	Pad Crawler Shoe
	400 mm	400 mm	400 mm	400 mm
Application	For Paved Road (Standard)	For Ordinary Ground (Optional)	For Paved Road (Optional)	For Paved Road (Optional)
Operating Weight (kg)	4920	5030	5220	5090
Minimum Ground Clearance (mm)	340	320	360	360
Undercarriage Length (mm)	2500	2490	2540	2540
Undercarriage Width (mm)	2000	2000	2000	2000
Ground Pressure (kPa)	28	29	30	29
	(kgf/cm <sup>2</sup> ) 0.29	0.29	0.31	0.30

 **NOTE:**

- The specifications for the front-end attachment are for 1.38 m arm with ISO 0.16 m<sup>3</sup> bucket.
- Rubber shoe, rubber pad shoe and pad crawler shoe should be used on paved road. Use of rubber crawlers on other than paved road may shorten the service life of the rubber crawlers to a great extent.
- Other than 400 mm grouser shoe should not be used on gravel or rocky ground. Operating or digging on gravel ground may cause serious damage to shoe, shoe bolts and other parts such as rollers.
- The dimensions do not include the height of the shoe lug.

## SPECIFICATIONS

### Bucket Types and Applications

#### ZX50U-5N

Bucket	Bucket Capacity m <sup>3</sup> (yd <sup>3</sup> ) ISO (Heaped)	Bucket Width mm		Front-End Attachment	
		(With side cutter) mm (in)	(Without side cutter) mm (in)	1.38 m (4'6") Arm	1.69 m (5'7") Arm
Hoe Bucket	0.10 (0.13)	450 (18")	400 (16")	⊙	⊙
	0.11 (0.14)	500 (20")	450 (18")	⊙	⊙
	0.13 (0.17)	550 (22")	500 (20")	⊙	⊙
	0.14 (0.18)	600 (24")	550 (22")	⊙	⊙
	0.16 (0.21)	650 (26")	600 (24")	⊙	○
	0.17 (0.22)	700 (28")	650 (26")	○	□

 NOTE:

- Symbols in the above table have the following meanings.

- ⊙: General excavating
- : Light duty excavating
- : Loading work

- Hoe bucket is applicable to the following types of work.

*General excavating:*

*For digging and loading operation of sand, gravel, clay, ordinary earth and so on.*

*Light duty excavating:*

*For digging and loading operation of dried, loosened earth, sand, mud and so on.*

*Their bulk density shall be less than 1600 kg/m<sup>3</sup> as a standard.*

*Loading work:*

*For loading operation of dried, loosened earth and sand.*

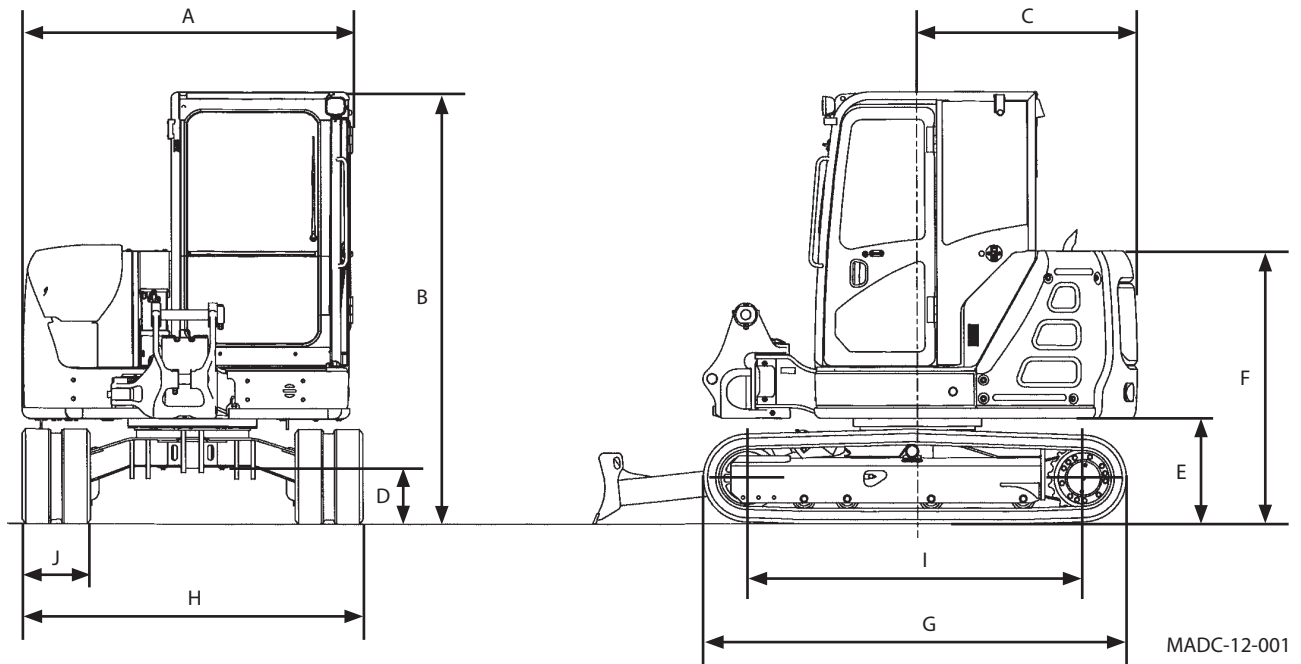
*Their bulk density shall be less than 1100 kg/m<sup>3</sup> as a standard.*



## SPECIFICATIONS

### Std. Specification

#### ZX60USB-5N



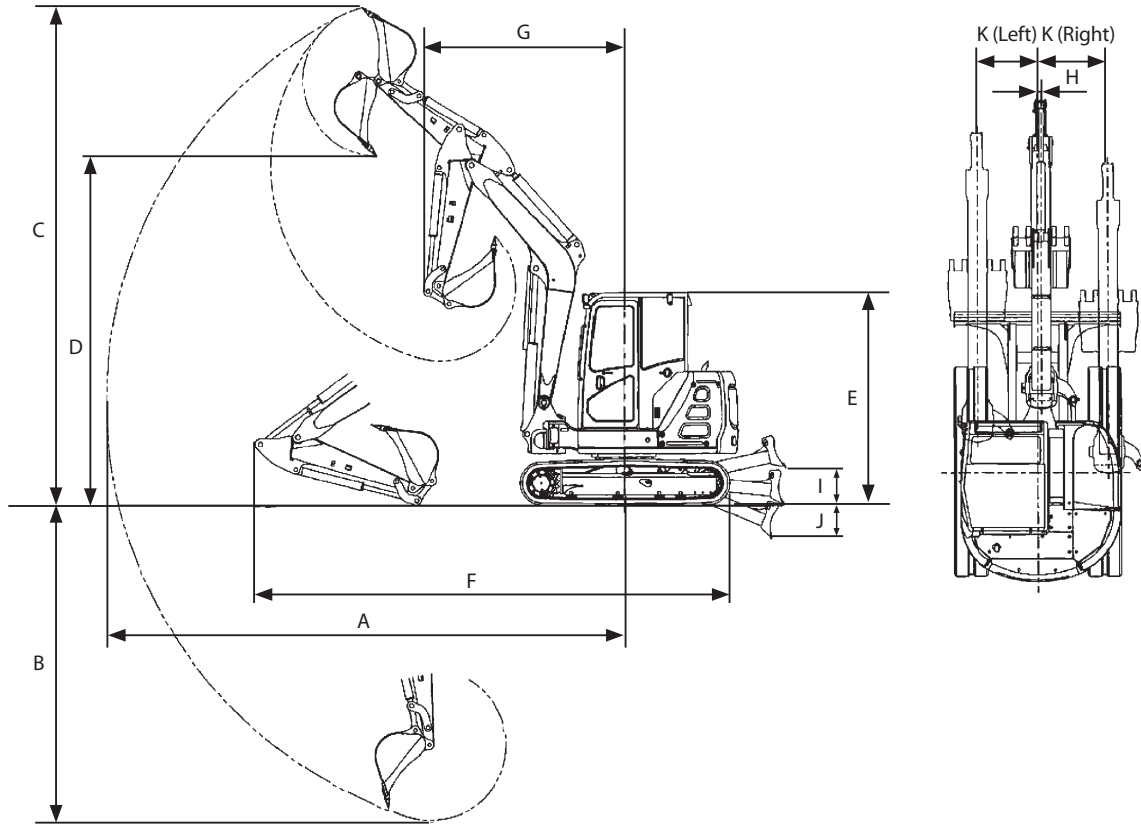
Model		ZX60USB-5N	
Specification		Canopy	Cab
Type of Front-End Attachment	-	Boom Swing Type, 1.50 m (4 ft 11 in) Arm	
Bucket Capacity (Heaped)	m <sup>3</sup> (yd <sup>3</sup> )	0.24 (0.31)	
Operating Weight	kg (lb)	5900 (13010)	6070 (13380)
Base Machine Weight	kg (lb)	4290 (9460)	4460 (9830)
Engine	kW/min <sup>-1</sup> (PS/rpm)	YANMAR 4TNV98C 39.6/2000 (53.8/2000)	
A: Overall Width	mm (ft-in)	1930 (6' 4")	
B: Overall Height	mm (ft-in)	2540 (8' 4")	
C: Rear End Swing Radius	mm (ft-in)	1300 (4' 3")	
D: Minimum Ground Clearance	mm (ft-in)	335 (1' 1")	
E: Counterweight Clearance	mm (ft-in)	620 (2')	
F: Engine Cover Height	mm (ft-in)	1600 (5' 3")	
G: Undercarriage Length	mm (ft-in)	2500 (8' 2")	
H: Undercarriage Width	mm (ft-in)	2000 (6' 7")	
I: Sprocket Center to Idler Center	mm (ft-in)	1990 (6' 6")	
J: Track Shoe Width	mm (ft-in)	400 (1' 4")	
Ground Pressure	kPa (kgf/cm <sup>2</sup> , psi)	34 (0.34, 4.9)	35 (0.35, 5.0)
Swing Speed	min <sup>-1</sup> (rpm)	9.5 (9.5)	
Travel Speed (fast/slow)	km/h (mph)	4.8/2.9 (3.0/1.8)	
Gradeability		30° (tan θ = 0.58)	

**NOTE:** The dimensions do not include the height of the shoe lug. The dimensions of the machine equipped with rubber crawlers are shown.

# SPECIFICATIONS

## Working Ranges

### ZX60USB-5N



MADC-12-002

Item		Category	ZX60USB-5N			
			Canopy		Cab	
			1.50 m Arm	1.85 m Arm	1.50 m Arm	1.85 m Arm
A:	Maximum Digging Reach	mm (ft-in)	6230 (20' 5")	6560 (21' 6")	6230 (20' 5")	6560 (21' 6")
B:	Maximum Digging Depth	mm (ft-in)	3770 (12' 4")	4120 (13' 6")	3770 (12' 4")	4120 (13' 6")
C:	Maximum Cutting Height	mm (ft-in)	5960 (19' 7")	6190 (20' 4")	5960 (19' 7")	6190 (20' 4")
D:	Maximum Dumping Height	mm (ft-in)	4170 (13' 8")	4410 (14' 6")	4170 (13' 8")	4410 (14' 6")
E:	Overall Height	mm (ft-in)	2540 (8' 4")			
F:	Overall Length	mm (ft-in)	5760 (18' 11")	5790 (19')	5760 (18' 11")	5790 (19')
G:	Minimum Swing Radius	mm (ft-in)	2450 (8')	2540 (8' 4")	2450 (8')	2540 (8' 4")
H:	Boom Swing Pivot Offset Distance	mm (ft-in)	45 (2")			
I:	Blade Bottom Highest Position	mm (ft-in)	450 (1' 6")			
J:	Blade Bottom Lowest Position	mm (ft-in)	390 (1' 3")			
K:	Offset Distance	mm (ft-in)	L720 (2' 4") R850 (2' 9")			
Maximum Boom-Swing Angle			L80° R60°			

**NOTE:**

- The dimensions do not include the height of the shoe lug. The dimensions of the machine equipped with rubber crawlers are shown.
- L: Left R: Right

## SPECIFICATIONS

### Shoe Types and Applications

#### ZX60USB-5N (Canopy)

Shoe Width	Rubber Shoe	Grouser Shoe	Pad Crawler Shoe
	400 mm	400 mm	400 mm
Application	For Paved Road (Standard)	For Ordinary Ground (Optional)	For Paved Road (Optional)
Operating Weight (kg)	5900	5990	6020
Minimum Ground Clearance (mm)	335	330	350
Undercarriage Length (mm)	2500	2480	2530
Undercarriage Width (mm)	2000	2000	2000
Ground Pressure (kPa)	34	35	35
	(kgf/cm <sup>2</sup> ) 0.34	0.35	0.35

#### ZX60USB-5N (Cab)

Shoe Width	Rubber Shoe	Grouser Shoe	Pad Crawler Shoe
	400 mm	400 mm	400 mm
Application	For Paved Road (Standard)	For Ordinary Ground (Optional)	For Paved Road (Optional)
Operating Weight (kg)	6070	6160	6190
Minimum Ground Clearance (mm)	335	330	350
Undercarriage Length (mm)	2500	2480	2530
Undercarriage Width (mm)	2000	2000	2000
Ground Pressure (kPa)	35	36	36
	(kgf/cm <sup>2</sup> ) 0.35	0.36	0.36

 **NOTE:**

- The specifications for the front-end attachment are for 1.5 m arm with ISO 0.24 m<sup>3</sup> bucket.
- Rubber shoe, rubber pad shoe and pad crawler shoe should be used on paved road. Use of rubber crawlers on other than paved road may shorten the service life of the rubber crawlers to a great extent.
- Other than 400 mm grouser shoe should not be used on gravel or rocky ground. Operating or digging on gravel ground may cause serious damage to shoe, shoe bolts and other parts such as rollers.
- The dimensions do not include the height of the shoe lug.

## SPECIFICATIONS

### Bucket Types and Applications

#### ZX60USB-5N

Bucket	Bucket Capacity m <sup>3</sup> (yd <sup>3</sup> ) ISO (Heaped)	Bucket Width mm		Front-End Attachment	
		(With side cutter) mm (in)	(Without side cutter) mm (in)	ZX52U-3	
				1.38 m (4'6") Arm	1.69 m (5'7") Arm
Hoe Bucket	0.22 (0.29)	735 (29")	650 (26")	⊙	⊙
	0.24 (0.31)	785 (31")	700 (28")	⊙	○

 **NOTE:**

- Symbols in the above table have the following meanings.

- ⊙: General excavating
- : Light duty excavating
- : Loading work

- Hoe bucket is applicable to the following types of work.

*General excavating:*

*For digging and loading operation of sand, gravel, clay, ordinary earth and so on.*

*Light duty excavating:*

*For digging and loading operation of dried, loosened earth, sand, mud and so on.*

*Their bulk density shall be less than 1600 kg/m<sup>3</sup> as a standard.*

*Loading work:*

*For loading operation of dried, loosened earth and sand.*

*Their bulk density shall be less than 1100 kg/m<sup>3</sup> as a standard.*

## **OPTIONAL ATTACHMENT**

### **HYDRAULIC BREAKER, HYDRAULIC CRUSHER AND QUICK COUPLER**

---

#### **Hydraulic Breaker, Hydraulic Crusher and Quick Coupler**

##### **Selecting a breaker or crusher**

Select a breaker, crusher or quick coupler with the correct size and weight for your machine, considering the stability of the machine, hydraulic oil pressure and flow rate of the breaker, crusher or quick coupler. Consult your authorized Hitachi dealer for correct breaker information.

##### **Precautions for Operation**

Carefully study the operation manuals of the breaker, crusher and quick coupler.

To avoid damaging the machine, hydraulic breaker, crusher or quick coupler, follow the precautions given below.

##### **Precautions for connecting breaker, crusher or quick coupler piping**

Do not allow impurities to enter into the system when disconnecting/connecting hoses of the breaker, crusher or the quick coupler with the arm end piping.

When the breaker, crusher or quick coupler is not installed, always install caps or plugs to open ends of the pipes on the arm top and hoses of the breaker, crusher or the quick coupler to prevent impurities from entering the system.

Be sure to provide spare caps and plugs in the tool box so that they will be available when needed.

After connecting, check the connecting seal fitting for oil leakage, and pipe clamp bolts for looseness.

## OPTIONAL ATTACHMENT

### HYDRAULIC BREAKER, HYDRAULIC CRUSHER AND QUICK COUPLER

#### Attachment

##### Allowable Weight Limits of Installed Attachment

**⚠ WARNING:**

- **When an attachment other than the standard bucket is installed on the machine, the machine stability will be different.  
If a heavy attachment is used, not only will controllability be affected but also machine stability will be reduced, possibly causing safety hazard.**
- **Before installing attachments such as hydraulic breaker, crusher (concrete crusher), or pulverizer, take machine controllability into account when selecting the weight of the attachment by referring to the table below.**
- **According to the specifications of installed attachment and the base machine, the machine weight may exceed the allowable maximum operating weight of the ROPS, making the ROPS unable to assure the protective function for operator. Refer to the ROPS certification affixed in the cab for the allowable maximum operating weight.**

(Unit: kg)

Specification	Base Machine		Breaker		Crusher/Pulverizer	
	Model	Arm	Std.Weight	Max.Weight	Std.Weight	Max.Weight
Zero Tail Swing Model	ZX30U-5N	Std.	200	220	240	280
	ZX35U-5N	Std.	250	280	300	350
		Long	220	240	260	300
	ZX50U-5N	Std.	370	400	440	510
		Long	330	360	400	460
	ZX60USB-5N	Std.	460	500	550	640
Long		410	450	490	580	

(without additional counterweight)

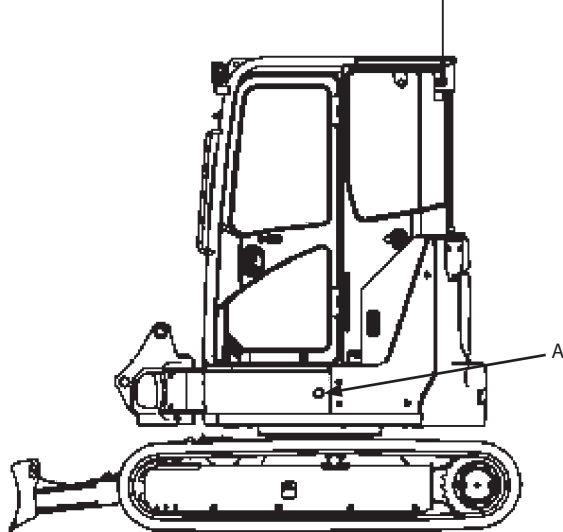
- Breaker operation speed is faster than crusher operation so that the recommended breaker max. weights are reduced more than those of the crushers.
- Avoid installing an attachment with a long overall length. Damage to the front attachment may result.
- When an attachment of the max. weight is installed, always operate the attachment over the front or rear side of the machine. In addition, avoid operating the attachment at the maximum reach.
- Crushers are heavier than breakers. Slowly move the control lever when operating a crusher.

# OPTIONAL ATTACHMENT

## PIPING FOR BREAKER AND CRUSHER

### Piping for Breaker and Crusher (Optional)

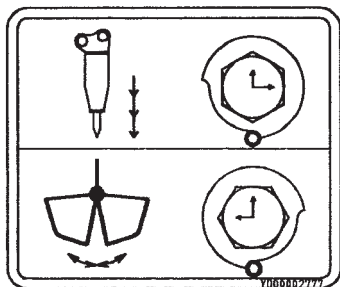
Operational procedures for selection valve and Plug,  
Flat Face Coupling



MADG-13-007

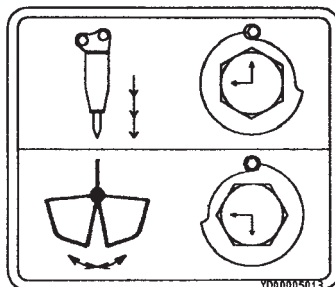
#### A: Selection Valve

Remove a rubber cap and change the attachment.



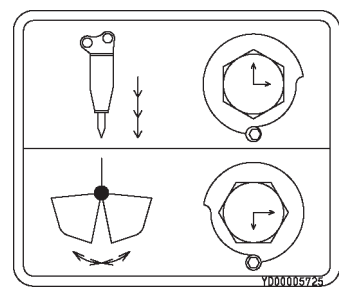
ZX30U-5N, 35U-5N

MADB-13-003



ZX50U-5N

MADB-13-004



ZX60USB-5N

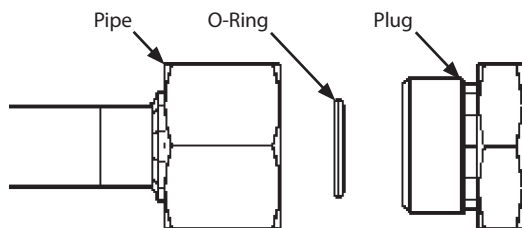
MADC-12-003

#### B: Plug

ZX30U-5N Year of Manufacturing: To Nov. 2018

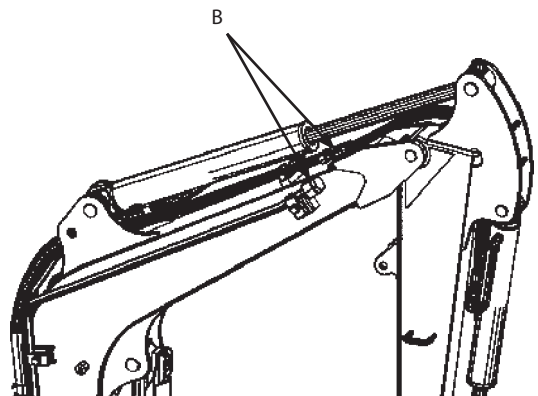
#### Part No. List

Pipe Nominal Size	O-Ring	Plug
1-3/16-12UN	4187308	4209823



MABC-13-003

When the attachment is disconnected

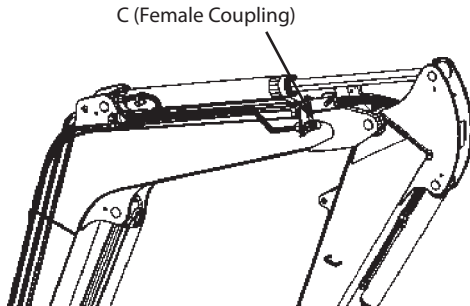


MADG-13-008

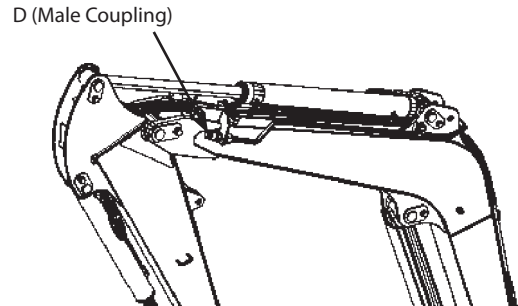
## OPTIONAL ATTACHMENT PIPING FOR BREAKER AND CRUSHER

### C,D: Flat Face Coupling

ZX35U-5N    Year of Manufacturing: To Feb. 2019  
 ZX50U-5N    Year of Manufacturing: To Apr. 2019  
 ZX60USB-5N    Year of Manufacturing: To Apr. 2019



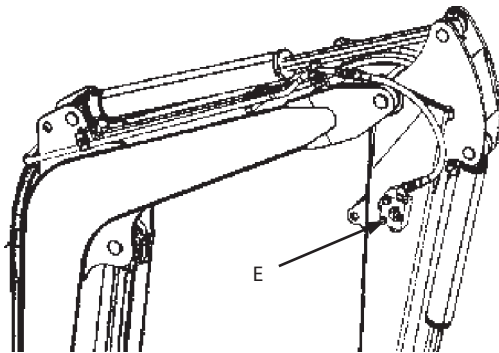
MADG-13-009



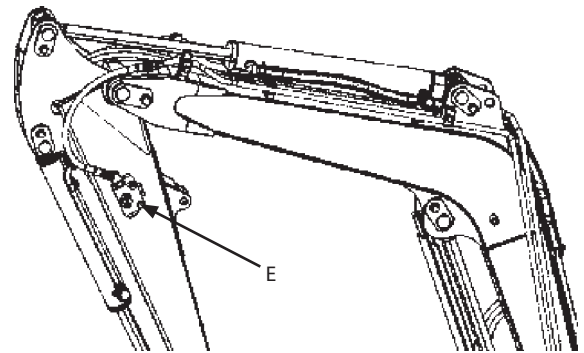
MADG-13-010

### E: Selection Valve

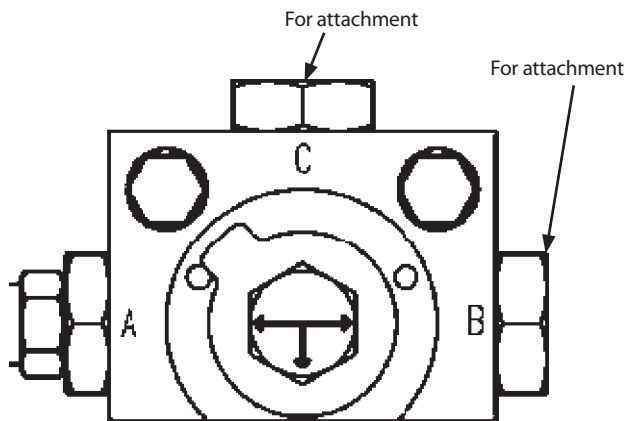
ZX30U-5N    Year of Manufacturing: From Dec. 2018  
 ZX35U-5N    Year of Manufacturing: From Mar. 2019  
 ZX50U-5N    Year of Manufacturing: From May. 2019  
 ZX60USB-5N    Year of Manufacturing: From May. 2019



MABC-13-006

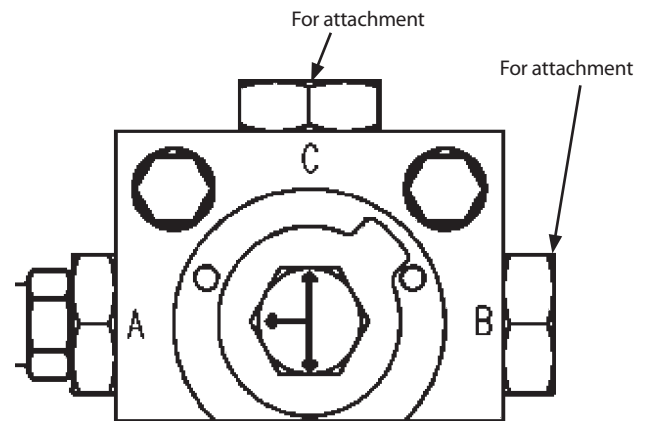


MABC-13-007



When using attachment of port "B" side.

MABC-13-008



When using attachment of port "C" side.

MABC-13-009



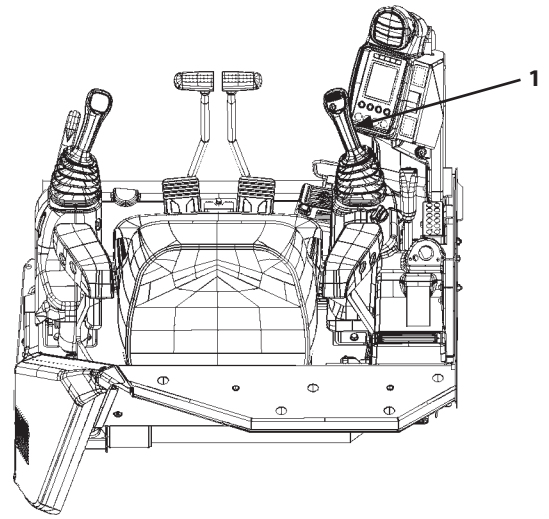
## OPTIONAL ATTACHMENT

### AUX FUNCTION LEVER FOR EXTRA PIPING

#### AUX Function Lever for Extra Piping (Optional)

**WARNING:**

- Switches on the AUX function lever are provided for operating attachments of this machine. Never use these switches for unauthorized application or modify them, which may cause serious injury or death.
- Before using these switches, thoroughly read the operation manual of the corresponding attachment and check the operation of each function in a safe area.
- Before operating an attachment with this switch, confirm the requirements on safe, proper mounting and operation of the attachment with its manufacturer or distributor and observe them.



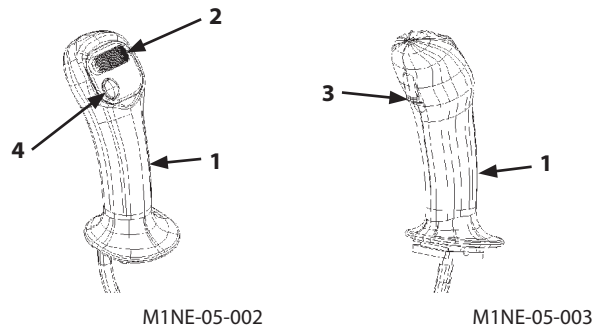
MADC-13-004

The Extra Piping can be operated by using switches provided on right control lever (1), as illustrated.

#### AUX Function Lever (Right) --- for Extra Piping

1. Attachment such as a breaker can be operated by moving slide switch (2) on right control lever (1) left and right.
2. Pushing switch (3) on right control lever (1) performs same function as moving slide switch (2) to the left end. (It is useful when operating a breaker.)

When slide switch (2) and switch (3) are operated simultaneously, operation of switch (3) has a priority.



M1NE-05-002

M1NE-05-003

Right Control Lever

2. Auxiliary
3. Breaker Switch
4. Horn Switch

## OPTIONAL ATTACHMENT ATTACHMENT (HYDRAULIC BREAKER)

### Precautions for Breaker Operation

**⚠ WARNING:** Machine stability is reduced as the breaker is much heavier than the bucket. When using a breaker, the machine is more apt to tip over. Also, flying objects may hit the cab or other part of the machine. Observe the following precautions and take any other precautions necessary to prevent accidents and machine damage from occurring.

#### Avoid hitting objects with breaker.

The breaker is heavier than the bucket, causing the breaker to lower faster.

Take care not to hit any objects with breaker. Doing so will result in damage to the breaker, the front attachment, and/or the upperstructure.

Always move (lower) the breaker slowly to position the tip of the chisel on the object to be broken before starting breaker operation.

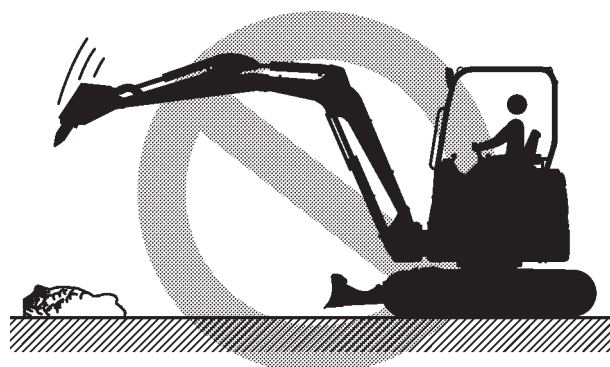
#### Avoid moving objects with breaker.

Do not use the breaker and/or the bracket to move objects. Especially, do not use the swing function to move objects. Failure to do so may damage the boom, arm, and/or breaker.

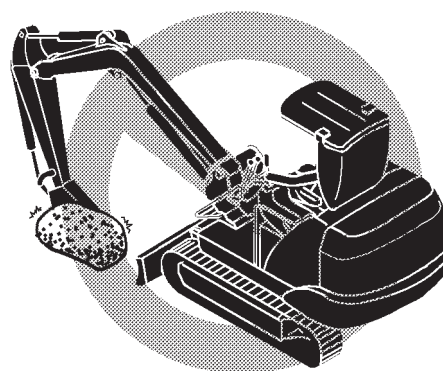
#### Avoid operating breaker at cylinder stroke end

Always operate the breaker by positioning the cylinder rods 50 mm or longer before the stroke end position.

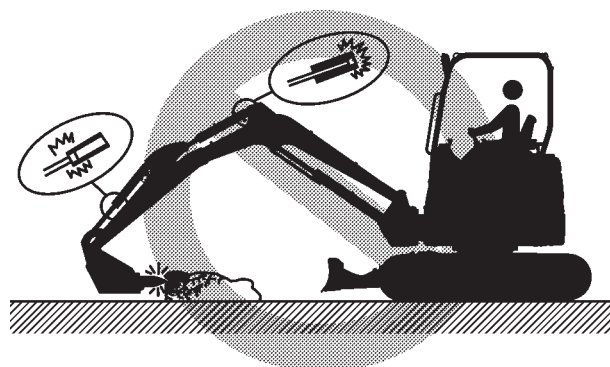
When operating the breaker with cylinders fully retracted or extended, hydraulic cylinders, arm or boom may be damaged.



MZX5-13-001



MZX5-13-002



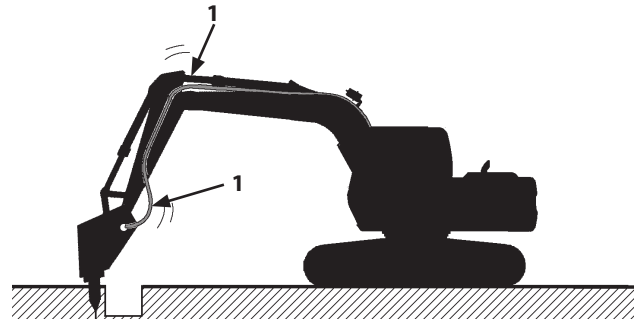
MZX5-13-003

## OPTIONAL ATTACHMENT ATTACHMENT (HYDRAULIC BREAKER)

### Stop operation if breaker hydraulic hoses jump abnormally.

When a hydraulic hose (1) shakes abnormally, continuing to use it as-is results in massive shock, damage to the pump and a negative impact on the machine.

Immediately consult the nearest Hitachi representative.

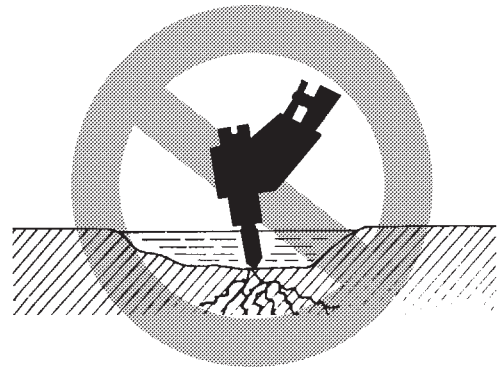


M104-05-058

### Do not operate the breaker in water.

Doing so will cause rust and seal damage, resulting in damage to the hydraulic system components.

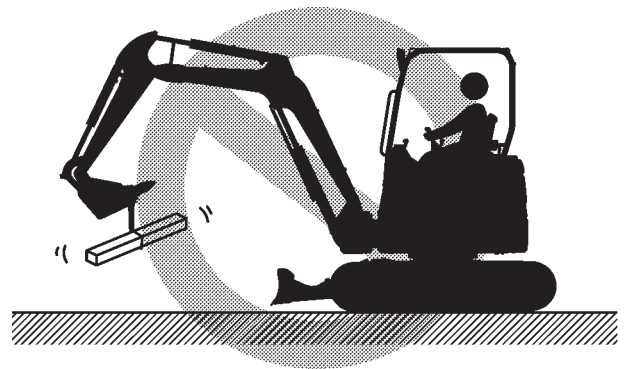
Rust, dust and water may enter into the hydraulic oil through the broken seal, causing damage to the hydraulic system.



MZX5-13-017

### Do not use breaker for lifting operation.

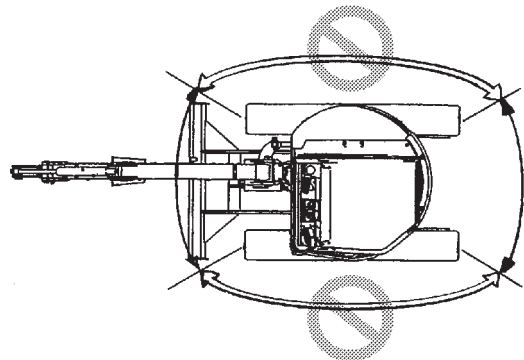
The machine tipping over and/or breaker damage may result.



MZX5-13-004

### Do not operate the breaker to the side of the machine.

The machine may become unstable and undercarriage component life may shorten as a result from operating the breaker to the side of the machine.



MZX5-13-005

## OPTIONAL ATTACHMENT ATTACHMENT (HYDRAULIC BREAKER)

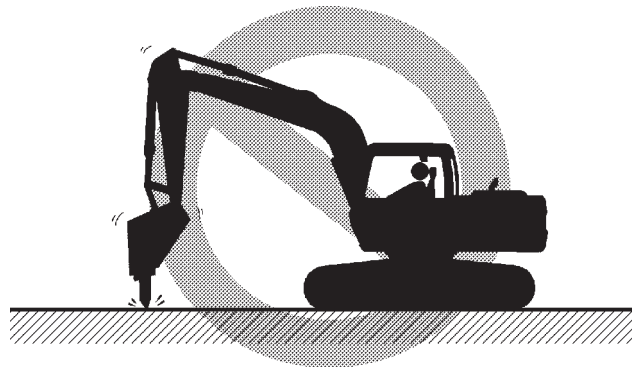
### Operate the chisel carefully to avoid hitting the machine.

When the arm rolled in with the breaker equipped, the chisel may come in contact with the boom.



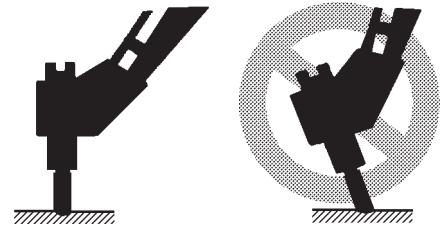
### Do not operate breaker with the arm positioned vertically.

Excessive vibration to the arm cylinder will occur, causing oil leakage.



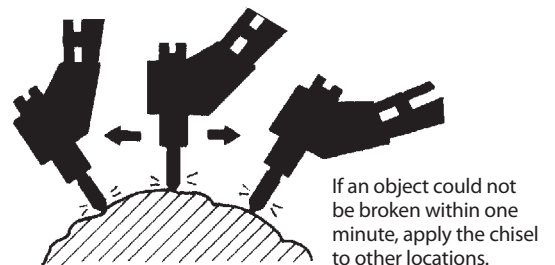
### Press the breaker so that the chisel (the axis) is positioned and thrust perpendicular to the object.

Failure to do so may damage the chisel or may cause seized piston.



### Do not operate the breaker continuously longer than one minute.

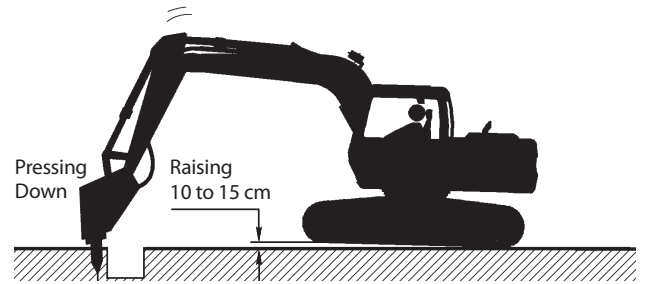
Failure to do so may result in premature wear of the chisel. If an object could not be broken within one minute, apply the chisel to other locations, less than one minute for each location.



## OPTIONAL ATTACHMENT ATTACHMENT (HYDRAULIC BREAKER)

**Raising the front part of the undercarriage by pressing down the breaker may cause damage to the front attachment.**

Do not raise the front part of the undercarriage 150 mm or more by pressing down the breaker.

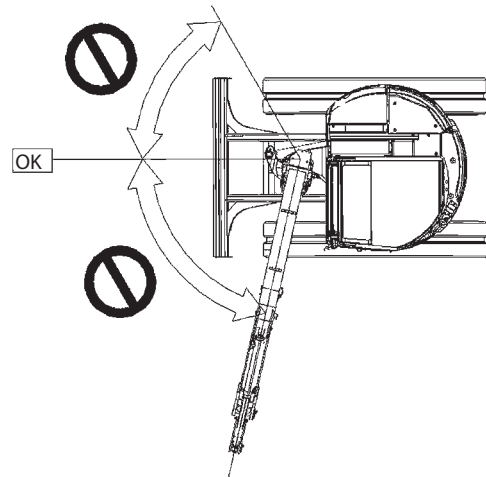


M147-05-016

**Do not operate breaker with the boom swing operation**

Do not operate the breaker for long period of time while swinging the boom.

Failure to do so may shorten the service life of the main frame.



MADB-13-044

## OPTIONAL ATTACHMENT ATTACHMENT (HYDRAULIC BREAKER)

### Precautions for Crusher Operation

Prevent machine tipping over and damage to the front attachment. Observe the following precautions for crusher operation.

**⚠ WARNING: Machine stability is reduced as crusher is much heavier than the bucket. When operating with a crusher, the machine is more apt to tip over. Falling or flying objects may hit the cab or other part of the machine. Observe the following precautions and take any other precautions necessary to prevent accidents and machine damage from occurring.**

- Do not allow the machine's weight to be supported by the crusher or bucket cylinder with the bucket cylinder fully extended or retracted. Failure to do so may result in damage to the front attachment. In particular, avoid doing so with the bucket cylinder fully extended, as the front attachment will be easily damaged. Take care to prevent this from happening when dismantling foundation structures using the crusher.
- Using the front attachment, do not raise the base machine off the ground with the arm cylinder fully extended. Failure to do so may result in damage to the arm cylinder.
- When a heavyweight attachment such as a crusher is installed, avoid quickly starting or stopping the front attachment. Failure to do so may result in damage to the front attachment.
- Do not attempt to perform crushing on either side of the machine. Always perform crushing operations to the fore or rear, parallel with the tracks. Otherwise, tipping over may occur.



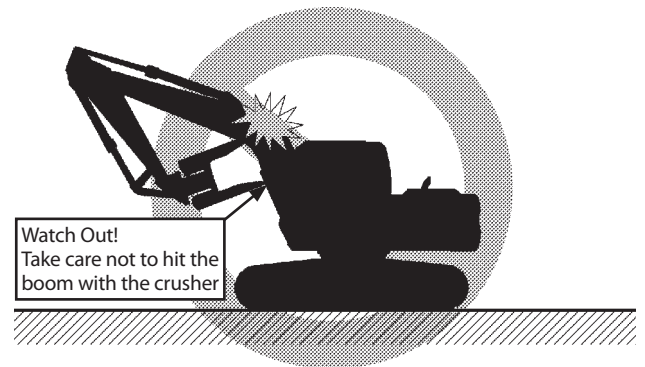
MZX5-13-008



MZX5-13-009

## OPTIONAL ATTACHMENT ATTACHMENT (HYDRAULIC BREAKER)

- When the arm rolled in with the crusher equipped, the crusher may come in contact with the boom.



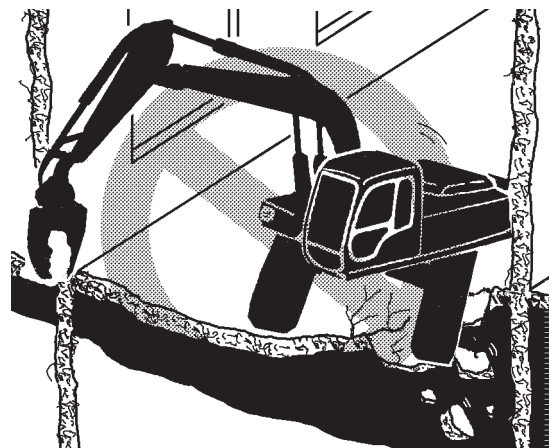
MZX5-13-010

- When operating the crusher up high with the boom fully raised, be careful of falling objects.



MZX5-13-011

- When operating the crusher on a floor in a building, first confirm that the floor has sufficient strength to support the load caused by crushing, in addition to the machine weight.  
The load equivalent or higher than the machine weight may be applied on floor depending on the operation method.



MZX5-13-012

## **OPTIONAL ATTACHMENT ATTACHMENT (HYDRAULIC BREAKER)**

---

- Always operate the crusher on a stable, level surface, not on a slope or on crushed scraps.
- Do not use the crusher to haul or load crushed scraps.
- To prevent the attachment from falling accident, use a platform when replacing or detaching the attachment.
- If a multiple number of attachments such as crusher and bucket, or crusher and breaker are used and replaced with each other at intervals, impurities are more apt to enter the hydraulic system, the hydraulic oil deteriorates quickly. For this reason, replace the hydraulic oil tank filter and change the hydraulic oil at the intervals specified in the breaker time sharing diagram in the previous section.
- Always remove the crusher from the excavator before transporting the machine. Do not fully extend the bucket cylinder when transporting, as this may damage the front attachment by vibrations during transportation.



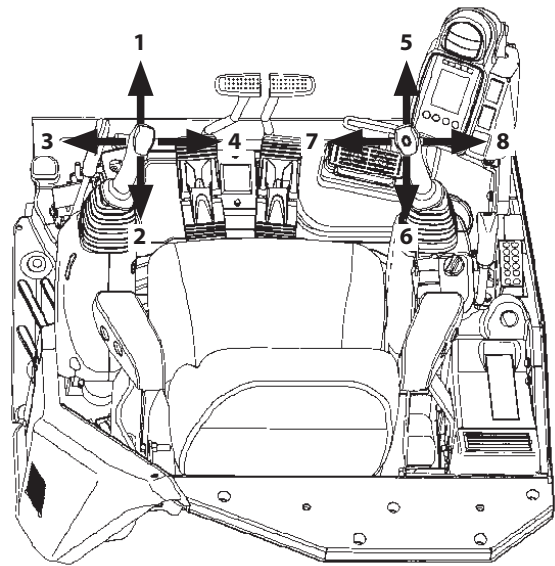
# OPTIONAL ATTACHMENT

## CONTROL LEVER SAE-BACKHOE PATTERN

### Control Lever (SAE-backhoe Pattern)

**⚠ WARNING:**

- Make sure you know the location and function of each control lever before operating. The upperstructure and/or front attachment may unexpectedly move in an attempt to look back because a part of operator's body may come into contact with the control lever(s). Take care not to come into contact with the control levers when looking back.
- Whenever changing the pattern, stop the engine, rotate the selector valve, and set to the pattern position.

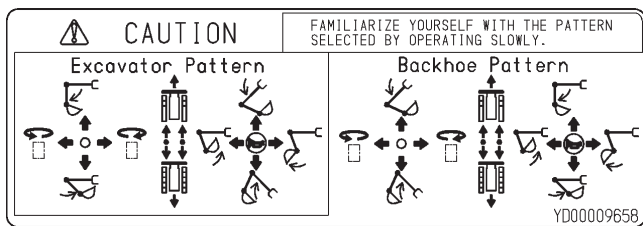


Labels showing the lever control pattern are provided around the operator's seat. As illustrated below, the labels indicate the control patterns. (Refer to the illustration)

Lever Control Pattern Label Location

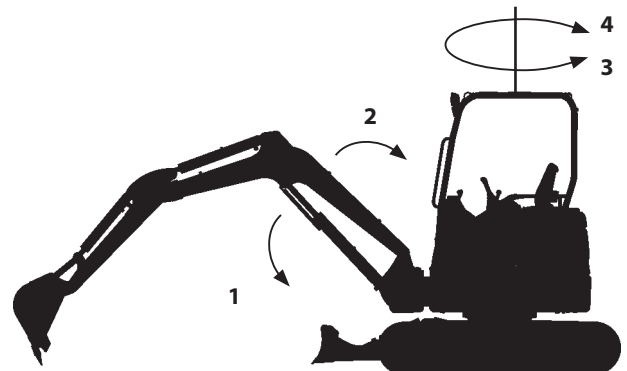
Canopy	Roof
Cab	Right side in the cab

MADB-01-062

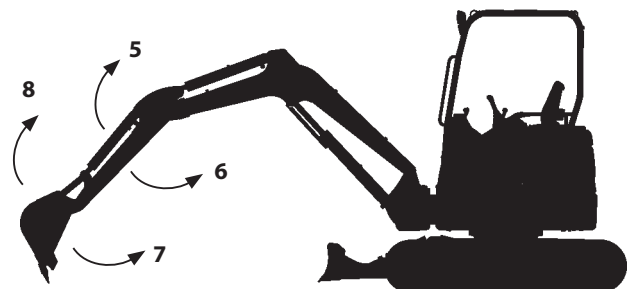


MADG-05-006

- 1- Boom Lower
- 2- Boom Raise
- 3- Swing Left
- 4- Swing Right
- 5- Arm Roll-Out
- 6- Arm Roll-In
- 7- Bucket Roll-In
- 8- Bucket Roll-Out



MADG-05-002



MADG-05-002

## OPTIONAL ATTACHMENT

### FUEL FEED DEVICE

#### Fuel Feed Device (Optional) (ZX50U-5N, 60USB-5N)

This device feeds fuel by electrical pump (3).

**CAUTION:** This device is not incorporated with an auto-stop function when fuel is filled up. Be sure to manually stop filling while monitoring fuel level with level gauge (5).

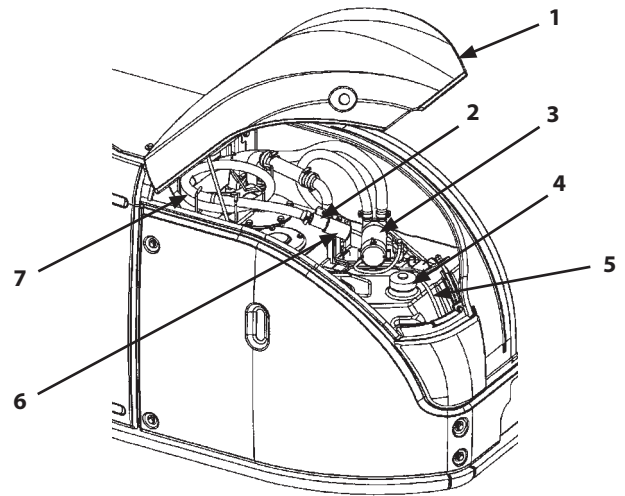
#### Fuel Feeding Operation

1. Park the machine following the same procedures as described on page 7-7 Preparation for Inspection and Maintenance.
2. Open the tank cover following procedures as described on page 7-9 Opening/Closing Tank Cover (1).
3. Pull out hose (7) stored in this device. Set the hose end strainer (2) into the fuel tank.
4. Remove fuel tank cap (4) of the device.

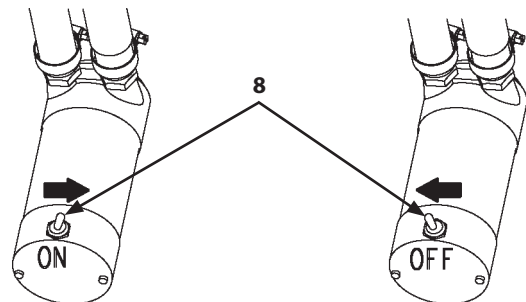
**IMPORTANT:** If cap (4) is not removed, pressure in the tank will increase and the pump performance will be degraded. It will also shorten the service life of the pump.

5. Turn power switch (8) of electrical pump (3) to ON position and start fueling.
6. Refill fuel while checking the level gauge (5) float. Stop fueling by turning switch (8) of electrical pump (3) OFF before fuel is filled up.
7. Close fuel tank cap (4). Put hose (7) in the device. Be sure to insert strainer (2) at the end of hose into holder (6).

**IMPORTANT:** Take care not to allow dirt and/or water to enter the fuel tank when fueling. Wipe off any spilled fuel.



MADC-13-001



MADC-13-003

## OPTIONAL ATTACHMENT ADDITIONAL CONTERWEIGHT

### Additional Counterweight

The mass values of additional counterweights (1) are shown in the table below.

Model	Weight	Overhang from the end of the base machine
ZX30U-5N	190 kg	100 mm
ZX35U-5N	230 kg	110 mm
ZX50U-5N	200 kg	100 mm
ZX60USB-5N	270 kg	110 mm

### Removal

Remove additional counterweight (1) by following the procedure below.

1. Suspend additional counterweight (1) by using the lifting tools described below so that counterweight (1) does not fall.

Wire Rope (2) × 2	Breaking load: more than 7 kN
Pin Shackle (3) × 2	JIS Nominal size: 8 or more
Eye bolt (4) × 2	M16

2. Remove mounting bolts (5).

**⚠ WARNING: Take care if additional counterweight (1) is eccentrically lifted, lifted counterweight (1) may widely sway. Place removed additional counterweight (1) on a level surface.**

### Installation

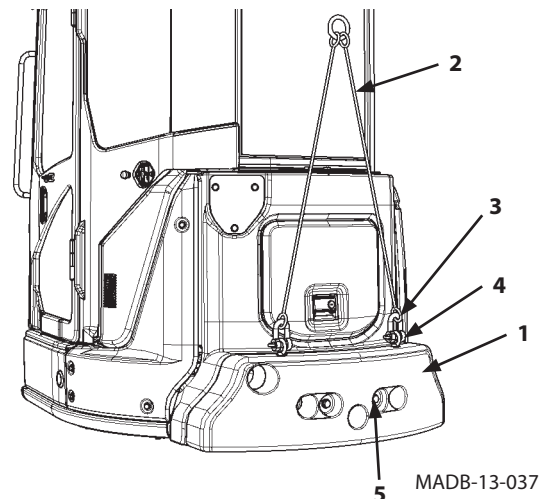
1. Lift additional counterweight (1) by using the lifting tools described above. Install additional counterweight (1) on the standard counterweight. Tighten mounting bolts (5).

ZX30U-5N, 35U-5N

Wrench size:	24 mm
Tightening	270 N·m (27 kgf·m)
Torque:	

ZX50U-5N, 60USB-5N

Wrench size:	30 mm
Tightening	550 N·m (55 kgf·m)
Torque:	



# OPTIONAL ATTACHMENT

## CAB TILTING MECHANISM

### Cab Tilting Mechanism

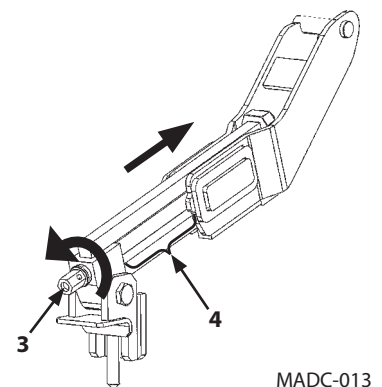
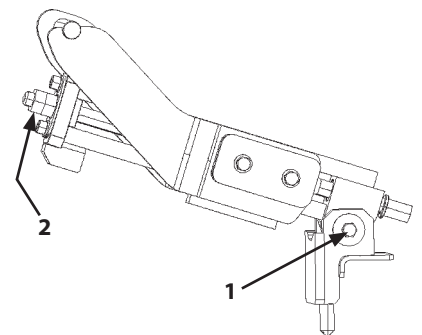
#### CAUTION:

- Wear safety equipments appropriate to the job such as a hard hat, gloves and protective shoes.
- Sufficiently illuminate the work site and work under well-lighted area. Work under low light condition can lead misoperation.
- Take care not to allow grease to contact with skin. If grease contacts with skin, wash away with a lot of water and soap.
- Severe burns may result if skin comes in contact with hot parts immediately after operation. Before starting to work, stop the engine and make sure all parts have sufficiently cooled down.
- When checking or servicing the machine by using the cab tilting function, tilt up the cab with the cab tilting device. Thoroughly read this manual before operating the cab tilting device. Incorrect operation may cause cab falling, possibly resulting in serious accident.
- Do not use the cab tilting device other than cab tilt up/down operation. Do not use the cab tilting device other than the applicable machines.
- Be sure to check that no personnel are present around the machine and in the cab before using the cab tilting device.
- Never attempt to operate the cab tilting device for daily check. The daily inspection can be performed through the maintenance cover ports.

**IMPORTANT:** Never attempt to modify the machine other than the authorized personnel. If a bolt is removed/installed by unauthorized personnel, mismatch to ROPS may occur.

#### Inspection and Maintenance before using Cab Tilting Device

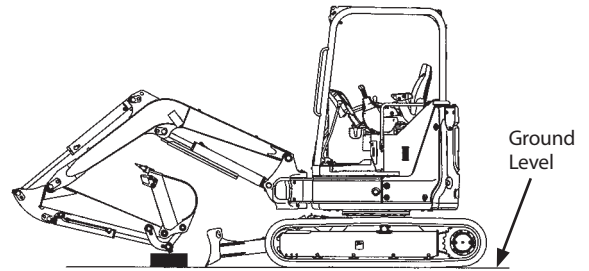
1. Inspect whole cab tilting device for damage. If any damage is found, do not use the cab tilting device.
  2. Check fulcrum bolts (1) of the cab tilting device for looseness. Tighten bolt (1) to 10 N·m (1.0 kgf·m) if necessary.
  3. Check lock nut (2) of the acting screw for looseness. Tighten lock nut (2) to 140 N·m (14 kgf·m) if necessary.
  4. Lubricate all grease points.
    - 4.1 Rotate adjuster (3) counterclockwise to fully extend the tilt device.
    - 4.2 Apply grease all over the thread part of screw (4) of adjuster (3).
- Recommended grease: Dow Corning Toray Co., Ltd. MOLYKOTE® EM-30L



## OPTIONAL ATTACHMENT CAB TILTING MECHANISM

### Floor Tilt Up Procedure

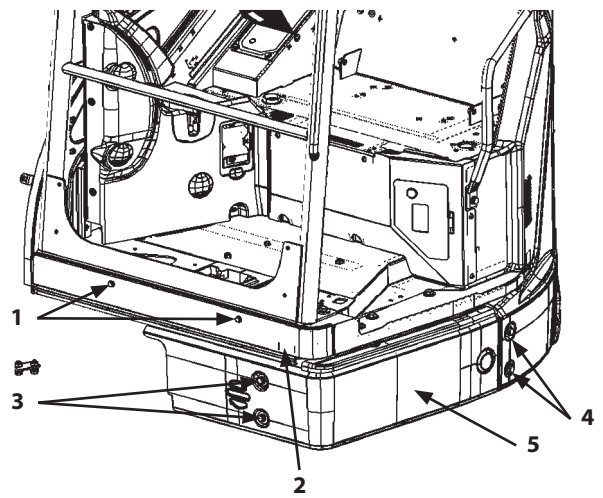
1. After operating the machine, wait for the machine to sufficiently cool.
2. Park the machine on a level surface.
3. Lower the blade.
4. After rolling the arm and the bucket in, lower the bucket on a wooden block down to the ground.
5. Face the front attachment straightforward toward the machine without swinging the front attachment at this time.
6. Stop the engine. Remove the key from the key switch.
7. Close the cab (optional) door.



MADB-13-045

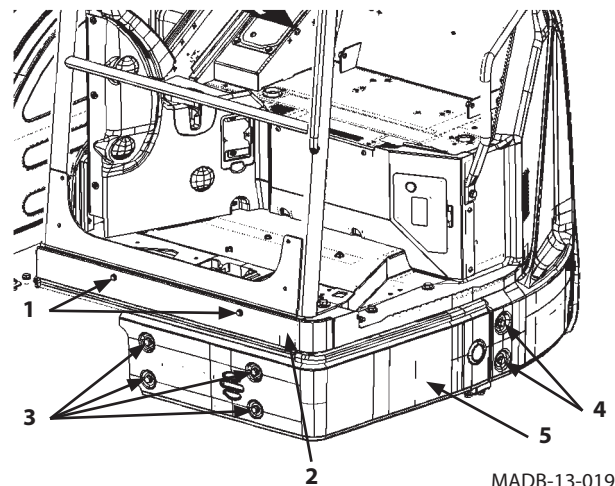
**IMPORTANT: Remove bolt (1) and cover (2). If the floor is tilted up with cover (2), damage to cover (2), floor and the cab tilting device may result.**

8. Remove bolt (1) and cover (2).
9. Remove bolt (3). Loosen bolt (4) and remove cover (5).



ZX30U-5N, 35U-5N

MADB-13-018



ZX50U-5N, 60USB-5N

MADB-13-019

## OPTIONAL ATTACHMENT CAB TILTING MECHANISM

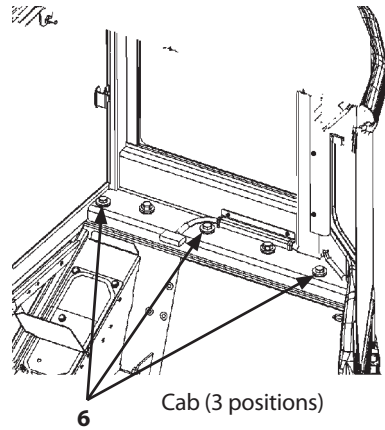
10. Remove bolts (6) (not covered with resin caps) in the rear section of the operator's seat.

**CAUTION:**

- If bolts other than bolt (6) are removed, the canopy or the cab (optional) may come off the floor, resulting in unexpected accident.
- Care should be taken that if the floor is tilted upward while raising the front attachment, the canopy or cab (optional) may come in contact with the boom.

Wrench size:   • 13 mm  
                  • 17 mm  
                  • 19 mm

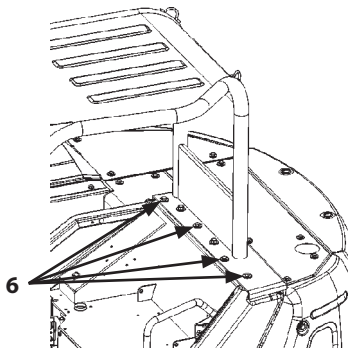
ZX30U-5N, 35U-5N, 50U-5N



Cab (3 positions)

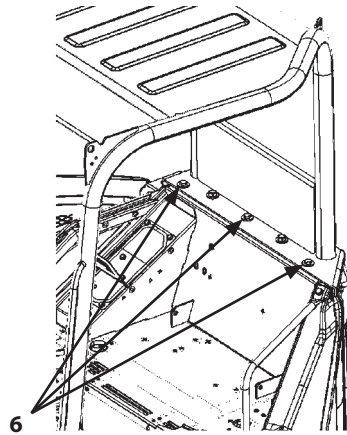
MADG-13-004

ZX60USB-5N



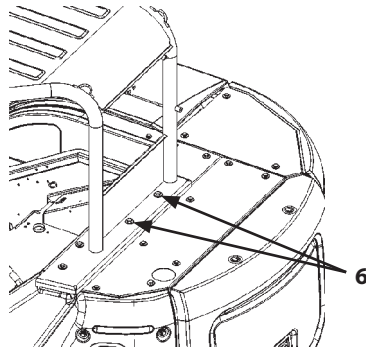
Canopy (4 positions at the front)

MADG-13-001



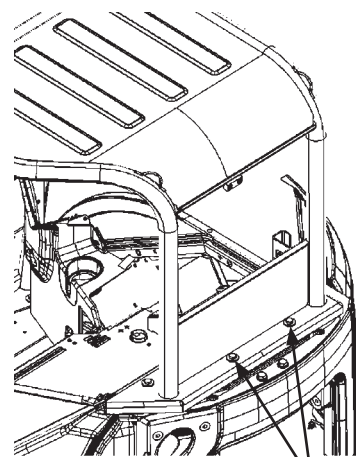
Canopy (3 positions at the front)

MADG-13-005



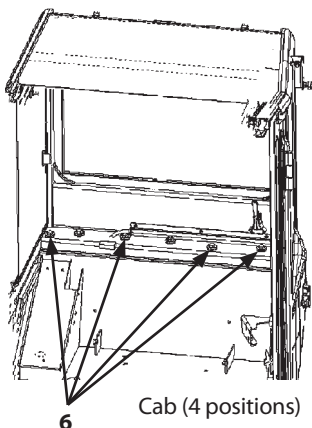
Canopy (2 positions at the front)

MADG-13-002



Canopy (2 positions at the rear)

MADG-13-006



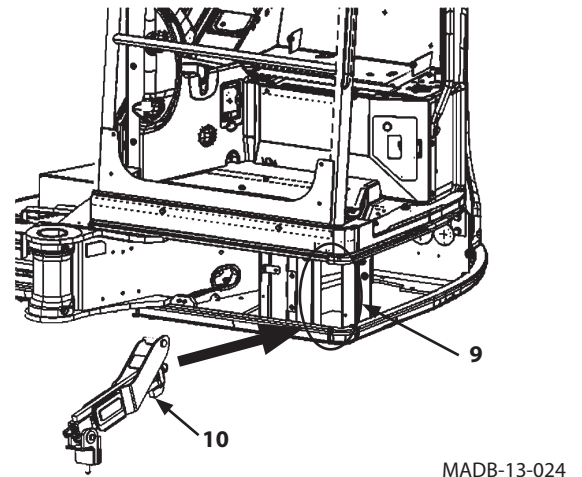
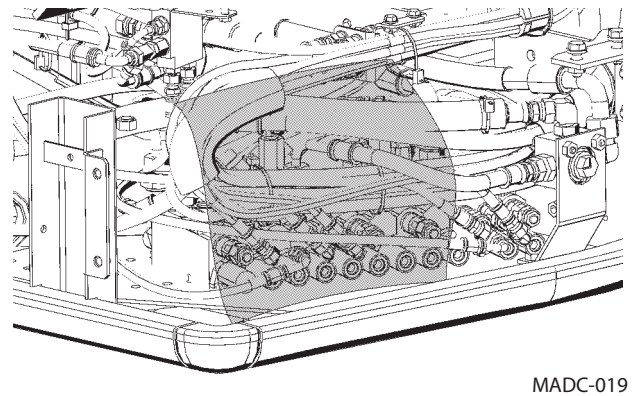
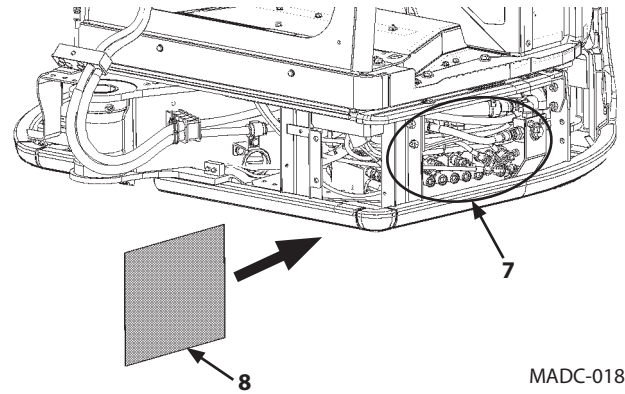
Cab (4 positions)

MADG-13-003

## OPTIONAL ATTACHMENT CAB TILTING MECHANISM

**IMPORTANT:** Do not tilt the canopy or cab by using other than the cab tilting device (such as a crane). Failure to do so may result in breakage of the cab tilting mechanism and/or floor.

11. Install hose protection rubber (8) while taking care not to damage hose (7) at the cab tilting device mounting area.
12. Install cab tilting device (10) through openings (9) on the machine.



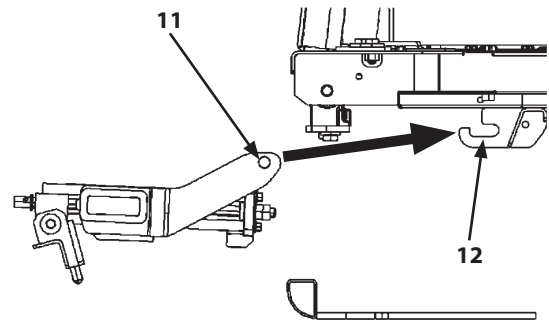
## OPTIONAL ATTACHMENT CAB TILTING MECHANISM

13. Install pin (11) to holder (12).

14. Install align locating pin (13) to hole (14).

### IMPORTANT:

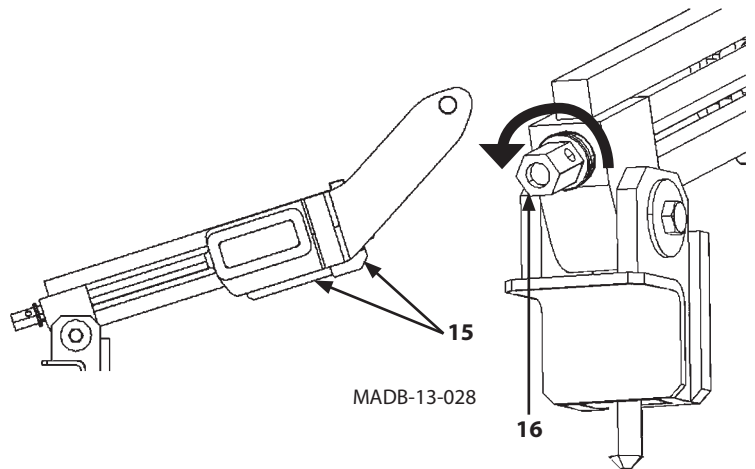
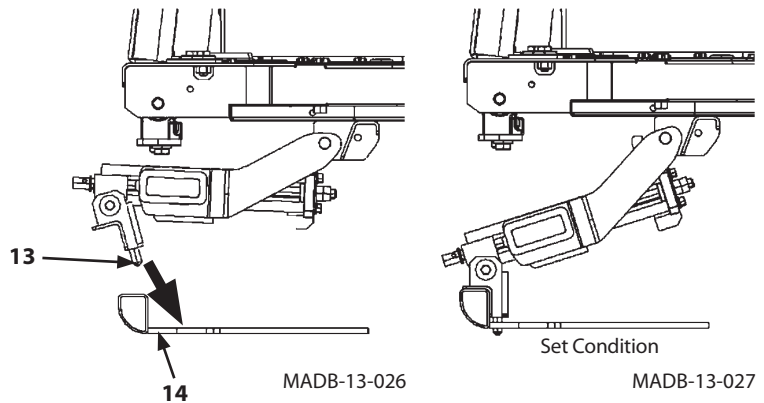
- Do not attempt to tilt up the cab after the stoppers (15) contact each other. Failure to do so may result in breakage of the cab tilting device and/or floor.
- Take care not to entangle hoses or harnesses when installing the cab tilting device.



MADB-13-025

15. Turn adjuster (16) counterclockwise to tilt up the cab until the stoppers (15) contact each other.

Wrench size: 17 mm



MADB-13-028

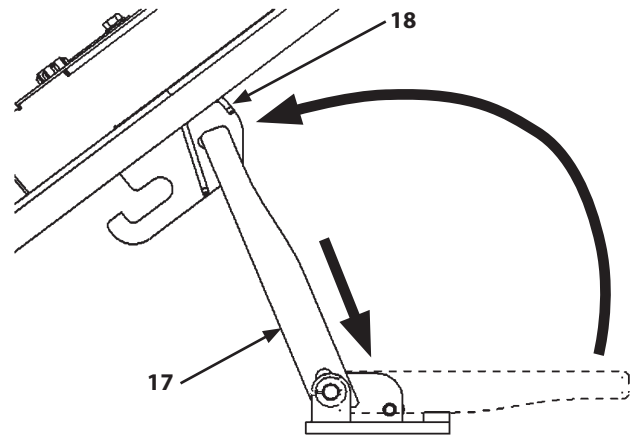
MADB-13-029



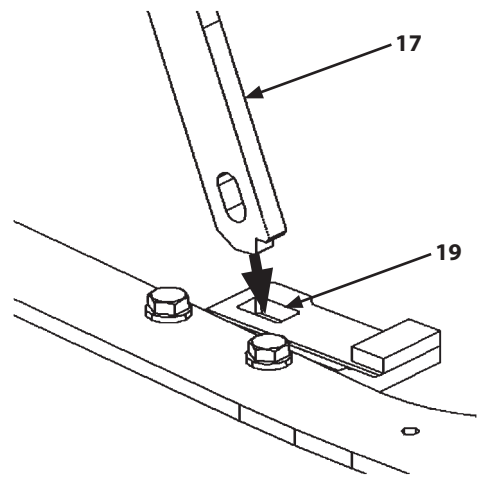
## OPTIONAL ATTACHMENT CAB TILTING MECHANISM

16. Raise fall prevention bar (17) in the arrowed direction until it comes in contact with bracket (18) mounted on the cab floor reverse surface. Insert fall prevention bar (17) into the hole of base (19).
17. Before starting to work under the tilted cab floor, make sure if fall prevention bar (17) does not come off by jolting fall prevention bar (17) by hand.

**⚠ WARNING:** Fall prevention bar (17) is a redundant safety device to be functioned in case the floor tilt mechanism fails. Never attempt to work under the tilted cab floor supported with only fall prevention bar (17). Failure to do so may result in a serious personal accident.



MADB-13-030



MADB-13-031

## OPTIONAL ATTACHMENT CAB TILTING MECHANISM

### Floor Tilt Down Procedure

**⚠ WARNING:**

- Be sure to tilt down the cab after checking or servicing. At this time, be sure to store the fall prevention bar first, and then slowly tilt down the cab. If the fall prevention bar is not stored before tilting down the cab, the cab tilting device may be broken.
- Perform cab tilt down operation manually. Do not use compressed air or electrical tools. If adjusting screw (1) is quickly turned by using compressed air or electrical tool, the floor will rapidly lowered and it may severely vibrate, potentially creating hazardous conditions.

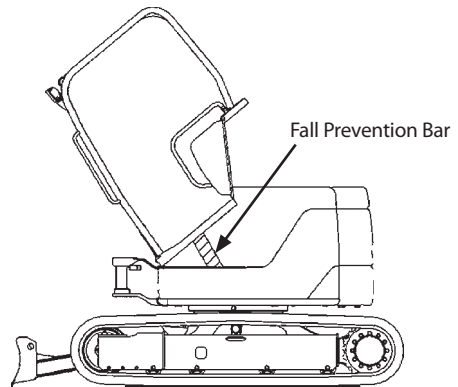
1. Before tilting the cab floor down, check if any tools or workshop towels are not left behind on the base machine or in the operator's cab, and fall prevention bar (2) has been stowed in position. When stowing fall prevention bar (2), raise fall prevention bar (2) in the arrowed direction, and then slide it backward.

**IMPORTANT:** Do not attempt to tilt down the cab after the stoppers (3) contact each other. Failure to do so may result in breakage of the cab tilting device.

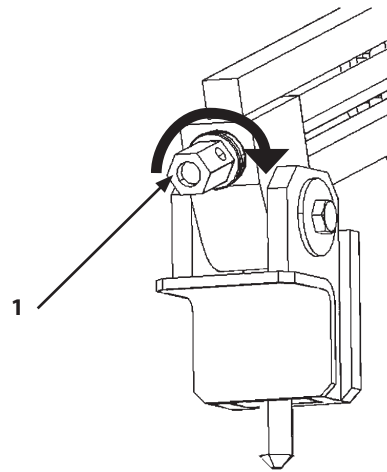
2. Slowly turn adjuster (1) clockwise until the body contacts with stopper (3).

Wrench size: 17 mm

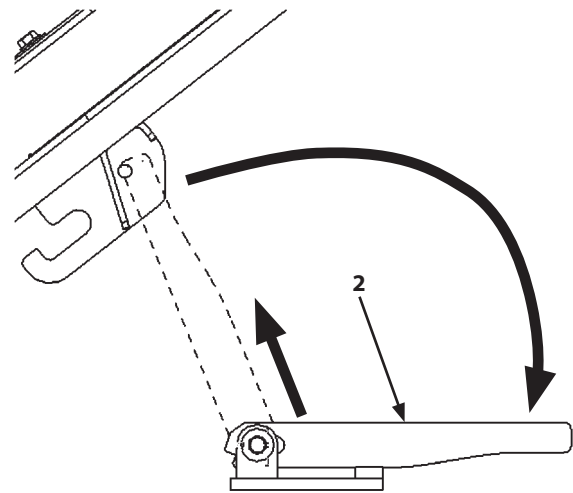
3. Ensure that no load is applied to the cab tilting device. Draw the cab tilting device forward.



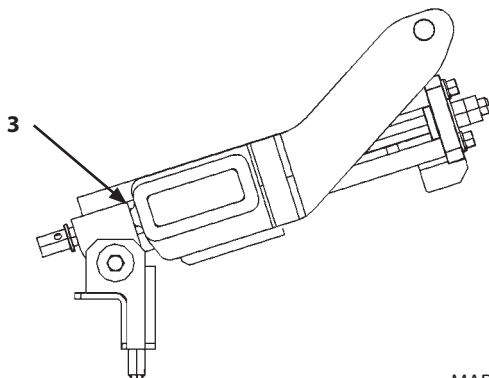
MADC-016



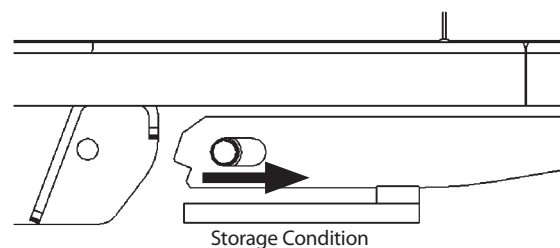
MADB-13-029



MADB-13-032



MADB-13-034



MADB-13-033

## OPTIONAL ATTACHMENT CAB TILTING MECHANISM

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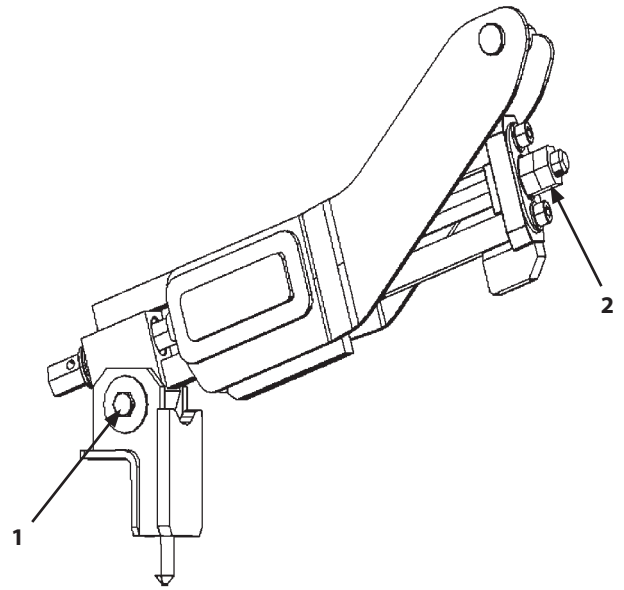
### 1 Maintenance

#### Check Tilt Mechanism Fulcrum Bolts and Working Screw Lock Nut

##### --- Before Use

1. Check tilt mechanism fulcrum bolts (1) for looseness. If bolt (1) is loose, retighten bolt (1) to 10 N·m (1.0 kgf·m).
2. Check working screw lock nut (2) for looseness.

If lock nut (2) is loose, retighten nut (2) to 140 N·m (14kgf·m).

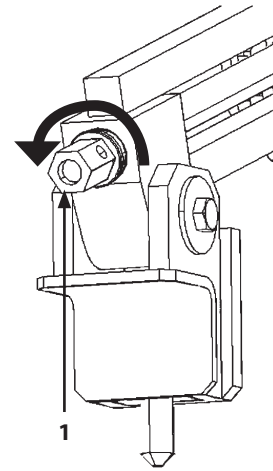


MADB-13-035

## OPTIONAL ATTACHMENT CAB TILTING MECHANISM

### 2 Greasing --- Before Use

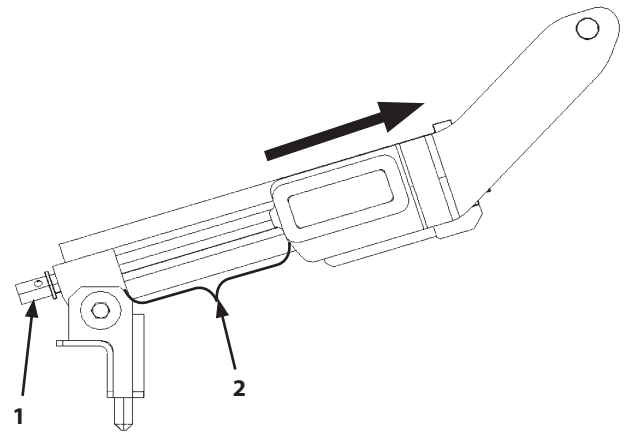
1. Rotate adjuster (1) counterclockwise to fully extend the tilt device.



MADB-13-029

2. Apply grease all over the thread part of screw (2) of adjuster (1).

※ Recommended Dow Corning Toray Co., Ltd.  
grease: MOLYKOTE® EM-30L



MADB-13-036

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