PART NO. EM1M7-2-2

HITACHI

Operator's Manual

ZAXIS

27U-2
30U-2
35U-2
40U-2
50U-2

Hydraulic Excavator

Serial No.

ZX27U-2	010192	and up
ZX30U-2	012146	and up
ZX35U-2	010744	and up
ZX40U-2	011234	and up
ZX50U-2	011049	and up

ZX27U-2 • 30U-2 • 35U-2 • 40U-2 • 50U-2 HYDRAULIC EXCAVATOR OPERATOR'S MANUAL

EM1M7-2-2

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

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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^2, 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.

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 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 standards (including safety standards) and requirements of that particular country. Please do not 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.

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.

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.

INDEX

MACHINE NUMBERS
SAFETY
SAFETY SIGNS
COMPONENTS NAME
OPERATOR'S STATION
BREAK-IN
OPERATING THE ENGINE
DRIVING THE MACHINE
OPERATING THE MACHINE
TRANSPORTING
MAINTENANCE
CONSUMABLE PARTS LIST
MAINTENENCE UNDER SPECIAL ENVIRONMENTAL CONDITIONS
STORAGE
TROUBLESHOOTING
SPECIFICATIONS
REFERENCE
INDEX

CONTENTS

MACHINE NUMBERS

SAFETY

Recognize Safety Information S-1
Understand Signal Words S-1
Follow Safety Instructions S-2
Prepare for Emergencies S-2
Wear Protective Clothing S-3
Protect Against Noise S-3
Inspect Machine S-3
Tidy Up Inside Operator's Space S-4
Use Handholds and Steps S-4
Adjust the Operator's Seat S-5
Ensure Safety Before Rising From or Leaving Operator's Seat S-5
Fasten Your Seat Belt S-5
Move and Operate Machine Safely S-6
Operate Only from Operator's Seat S-7
Jump Starting S-7
Keep Riders Off Machine S-7
Precautions for Operations S-8
Investigate Job Site Beforehand S-9
Protect Against Falling Stones and Debris S-10
Provide Signals for Jobs Involving Multiple Numbers of Machines S-10
Confirm Direction of Machine to be Driven S-10
Drive Machine Safely S-11
Avoid Injury from Rollaway Accidents S-13
Avoid Injury from Back-Over and Swing Accidents S-14
Keep Person Clear from Working Area S-15
Never Position Bucket Over Anyone S-15
Avoid Undercutting S-15
Avoid Tipping S-16
Never Undercut a High Bank S-16
Dig with Caution S-17
Operate with Caution S-17
Avoid Power Lines S-17
Precautions for Lightening S-18
Do Not Use for Craning Operations S-18
Protect Against Flying Debris S-18
Park Machine Safely S-19
Handle Fluids Safely – Avoid Fires S-19
Safety Transporting S-20
Practice Safe Maintenance S-21
Warn Others of Service Work S-22
Support Machine Properly S-23
Stay Clear of Moving Parts S-23
Prevent Parts from Flying S-23
Store Attachments Safely S-24
Prevent Burns S-24
Replace Rubber Hoses Periodically S-25
Avoid High-Pressure Fluids S-25
Prevent Fires S-26
Evacuating in Case of Fire S-28
Beware of Exhaust Fumes S-28
Beware of Asbestos Dust S-28
Precautions for Welding and Grinding S-29
Avoid Heating Near Pressurized Fluid Lines S-29
Avoid Applying Heat to Lines Containing Flammable Fluids S-29
Remove Paint before Welding or Heating S-30
Prevent Battery Explosions S-30
Precautions for Handling Refrigerant S-31
Handle Chemical Products Safely S-31
Dispose of Waste Properly S-32

SAFETY SIGNS S-33

COMPONENTS NAME 1-1

OPERATOR'S STATION

Pedals, Levers and Monitor Panel 1-2
Key Switch 1-4
Switch Panel 1-4
Monitor Panel 1-5
Coolant Temperature Gauge 1-5
Fuel Gauge 1-5
System Failure Indicator 1-6
Engine Oil Pressure Indicator 1-6
Overheat Indicator 1-6
Fuel Level Indicator 1-6
Alternator Indicator 1-7
Preheat Indicator 1-7
Fast Travel Mode Indicator 1-7
Liquid Crystal display (LCD), Display Selection Switch, and Set Switch 1-8
How to Operate Trip Meter 1-9
Auto-Idle Switch (Except ZX27U-2) 1-11
Air Conditioner Operation 1-12
Tips for Air Conditioner Usage 1-14
Radio (Cab Equipped Machines) 1-15
AM/FM Radio Operation 1-16
Cab Door Release lever (Cab-equipped machines) 1-18
Opening/Closing Cab Front Window (Cab-equipped machines) 1-19
Adjusting Operator's Seat 1-20
Tool and Operator's manual Boxes 1-20
Emergency Exit (Cab-equipped machines) 1-21
Seat Belt (Optional) 1-22
Cab Light (Cab-equipped machines) 1-22

BREAK-IN

Breaking in New Machine 2-1

OPERATING THE ENGINE

Before Starting Engine 3-1
Starting Engine 3-2
Starting in Ordinary Temperature 3-2
Starting in Cold Weather 3-3
Check Machine After Starting Engine 3-4

CONTENTS

Using Booster Batteries 3-5
Stopping the Engine 3-6

DRIVING THE MACHINE

Travel Levers and Pedals 4-1
Travel Mode Switch 4-3
Traveling on Soft Ground 4-4
Raise One Track Using Boom and Arm 4-4
Towing Machine 4-5
Driving In Water or on Soft Ground 4-6
Precautions for Traveling on Slopes 4-7
Parking and Stopping on Slopes 4-8
Parking on Slopes 4-8

OPERATING THE MACHINE

Control Lever (ISO Excavator Pattern) 5-1
Control Lever
(H-Pattern: HITACHI Excavator Pattern) 5-2
Control Lever (SAE-Backhoe Pattern)
--- If Equipped (2 Way Multi Valve) 5-3
Boom-Swing Pedal 5-4
Auxiliary Pedal (Optional) 5-5
Blade Lever 5-6
Precautions for Blade Operation 5-7
Pilot Control Shut-Off Lever 5-8
Warming Up Operation 5-9
Warming Up in Cold Weather 5-9
Auto-Idle Control (Except ZX27U-2) 5-10
Operating Backhoe 5-11
Grading Operation 5-12
Avoid Driving Bucket Teeth Into Ground 5-12
Avoid Abusive Operation 5-12
Avoid Striking with Bucket 5-13
Avoid Excavation Using Upperstructure
and/or Boom Swing Power 5-13
Use Correct Track Shoe 5-13
Avoid Other than Specified Machine
Operations 5-14
Boom Cylinder May Hit Blade 5-15
Avoid Hitting Blade with Bucket 5-16
Avoid Colliding Blade Against Rocks 5-16
Avoid Colliding Boom Cylinder with Track 5-16
Precautions for Installing Wide Bucket
or Special Type Bucket 5-16
Using Rubber Crawler 5-17
Hydraulic Breaker (Optional) 5-19
Crusher Operation (Optional) 5-22
Precautions for After Operating the Machine 5-23
Auxiliary Flow Rate Control
(Optional) (Except ZX27U-2) 5-24
Emergency Boom Lowering Procedure 5-25

TRANSPORTING

Transporting by Road 6-1
Trailer Loading/Unloading 6-1
Loading 6-2
Securing the Machine to the Trailer
for Transportation 6-3
Unloading 6-4
Lifting Machine with Crane 6-5

MAINTENANCE

Procedures 7-1
Prepare Machine for Inspection/Maintenance 7-2
Opening/Closing Engine Access Covers 7-3
Opening/Closing Tank Covers 7-4
Daily Inspection 7-5
Periodic Replacement of Parts 7-6
Maintenance Guide 7-7
The Brand Names of Recommended
Oils and Lubricants 7-10
A. Greasing 7-11
Front Joint Pins 7-11
Bucket and Link Pins 7-14
Blade Pins 7-14
Precautions for Front Attachment and
Blade Removal 7-14
Swing Bearing 7-15
Swing Internal Gear 7-16
Control Lever Universal Joint 7-16
Tilt Mechanism 7-17
B. Engine 7-18
Engine Oil 7-18
Change Engine Oil 7-18
Replace Engine Oil Filter 7-18
C. Transmission 7-20
Travel Reduction Gear 7-20
D. Hydraulic System 7-22
Inspection and Maintenance of
Hydraulic Equipment 7-22
Check Hydraulic Oil Level 7-23
Drain Hydraulic Oil Tank Sump 7-24
Change Hydraulic Oil 7-25
Clean Suction Filter 7-28
Replace Full Flow Filter Element 7-29
Replace Pilot Filter Element 7-30
Check Hoses and Lines 7-32
E. Fuel System 7-37
Check Water Separator 7-38
Drain Fuel Tank Sump 7-38
Replace Fuel Filter 7-39
Check Fuel Hoses 7-40
F. Air Cleaner 7-41
Clean the Air Cleaner Element 7-41
Replace the Air Cleaner Element 7-41
G. Cooling System 7-42
Check Coolant Level 7-43
Check and Adjust Fan Belt Tension 7-44
Change Coolant 7-45
Clean Radiator Core 7-46
H. Electrical System 7-47
Batteries 7-47

CONTENTS

Replacing Fuses 7-50
I. Miscellaneous 7-51
Check Bucket Teeth for Looseness and/or Wear 7-51
Replace Bucket 7-53
Adjust Track Sag (Rubber Crawler) and Check for Damage 7-54
Replace Rubber Crawler 7-56
Check Track Sag (Steel Crawler) (Optional) 7-58
Check and Replace Seat Belt 7-61
Check Air conditioner (Machine with Cab) 7-62
Clean and Replace Air Conditioner Re-circulation Filter 7-63
Clean Re-circulation Filter 7-63
Replace Re-circulation Filter 7-63
Clean Cab Floor 7-65
Check Injection Nozzle 7-66
Check and Adjust Valve Clearance 7-66
Check Injection Timing 7-66
Measure Engine Compression Pressure 7-66
Check Starter and Alternator 7-67
Check Radiator Cap 7-67
Check Tightening Torque of Bolts and Nuts 7-68
Check Tilt Mechanism Fulcrum Bolts for Looseness 7-71
Preparation for Inspection and Maintenance 7-72
Tilting Floor Down 7-74

CONSUMABLE PARTS LIST 8-1

MAINTENANCE UNDER SPECIAL ENVIRONMENTAL CONDITIONS 9-1

STORAGE
Storing the Machine 10-1
Removing the Machine From Storage 10-2

TROUBLESHOOTING 11-1

SPECIFICATIONS
Specifications 12-1
Working Ranges 12-6
Shoe Types and Applications 12-11
Bucket Types and Applications 12-16

REFERENCE
Additional Counterweight 13-1

INDEX 14-1

CONTENTS

MEMO

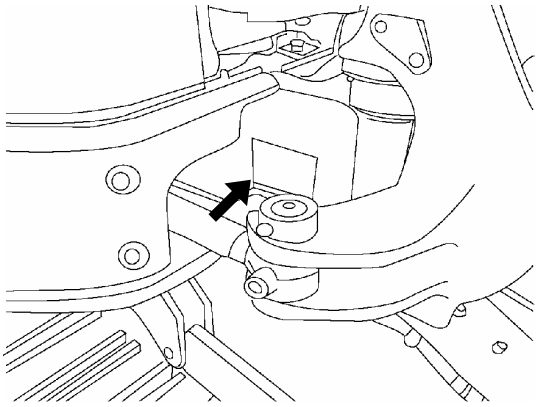
MACHINE NUMBERS

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:_____



M1M7-00-001

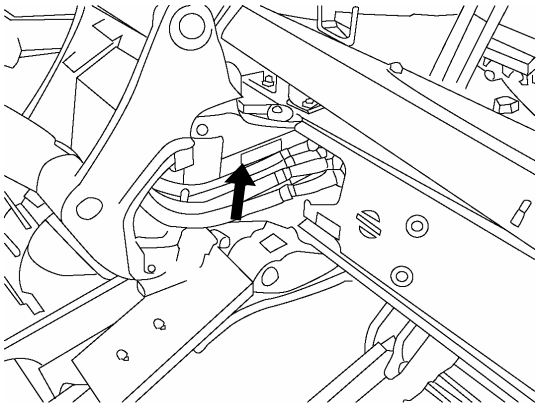
PRODUCT IDENTIFICATION NUMBER

PRODUCT
IDENTIFICATION
NUMBER:_____

NOTE:

HCM1M700X00010001 — Marks to indicate the start and end of the PIN

PRODUCT IDENTIFICATION NUMBER (PIN)

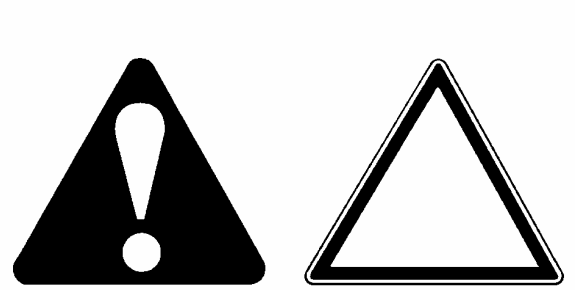


M1M7-00-002

MEMO

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.



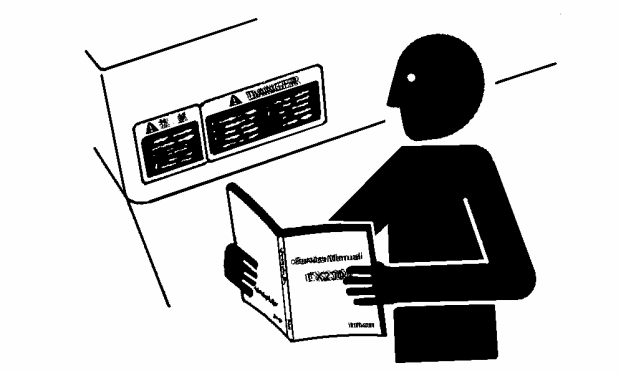
SA-688

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 don't 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

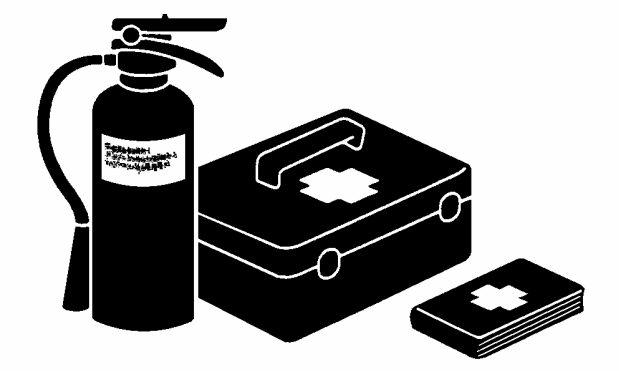
FOLLOW SAFETY INSTRUCTIONS



SA-003

- 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.
- Always operate the machine within the specification.
  - Unauthorized modifications of the machine may impair the functions and/or safety and affect machine life and the warranty will become void.
- 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.

PREPARE FOR EMERGENCIES



SA-437

- 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.

WEAR PROTECTIVE CLOTHING

- Wear close fitting clothing and safety equipment appropriate to the job.

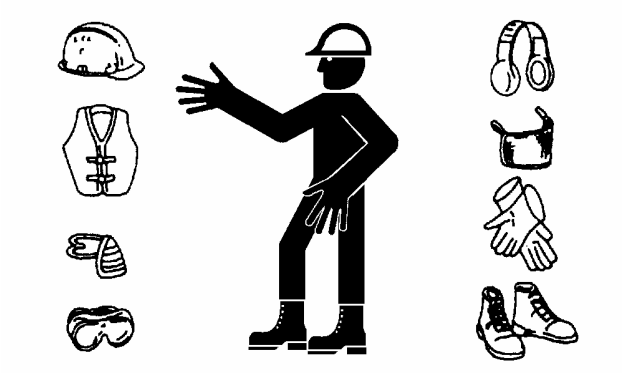
  You may need:
  A hard hat
  Safety belt
  Safety shoes
  Safety glasses, goggles, or face shield
  Heavy gloves
  Hearing protection
  Reflective clothing
  Wet weather gear
  Respirator or filter mask.

  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.

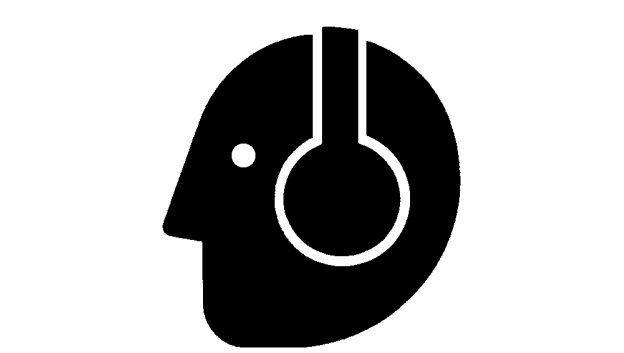


SA-438

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

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 “PRE-START INSPECTION” chapter in the operator’s manual.

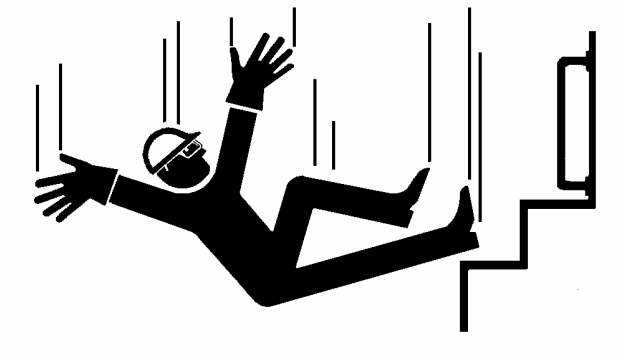
SA-435

TIDY UP INSIDE OPERATOR'S SPACE

- Always keep inside the cab clean by observing instructions below, to prevent any personal accidents from occurring.
- Remove mud and/or oily material from the shoe soles before entering the operator's space. If pedals are operated without removing mud or oily matter, the foot may slip off the pedal, possibly creating a hazardous situation.
- Do not leave parts and/or tools around the operator's seat.
- Do not keep a transparent water bottle in the cab. The transparent water bottle may concentrate the sun light like a lens, possibly causing a fire.
- Do not wear radio or music headphones and do not use a cell phone while traveling or operating the machine.
- Never allow hazardous materials such as combustible and/or explosive material in the operator's space.
- Do not leave cigarette lighters in the cab. If the temperature in the cab increases, the lighter may explode.

USE HANDHOLDS AND STEPS

- Falling is one of the major causes of personal injury.
  - 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.



SA-439

ADJUST THE OPERATOR'S SEAT

- A poorly adjusted seat for either the operator or for the work at hand may quickly fatigue the operator leading to mis-operation 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.

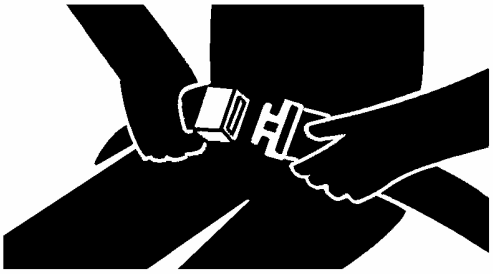
SA-378

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.

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

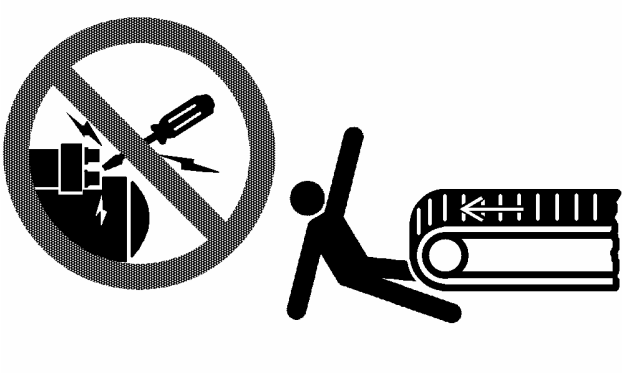
MOVE AND OPERATE MACHINE SAFELY

- 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 illuminations.

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

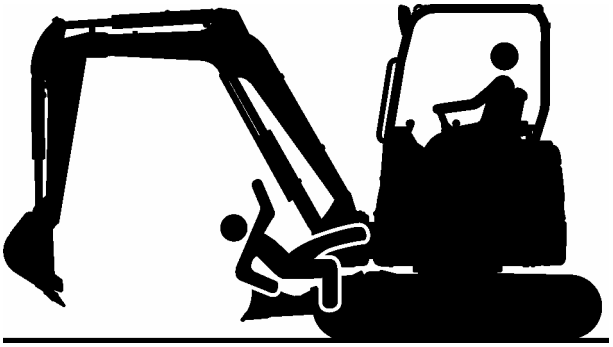
JUMP STARTING

- 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 THE 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.
  - Failure to follow correct jump starting procedures could result in a battery explosion or a runaway machine.

SA-032

KEEP RIDERS OFF MACHINE

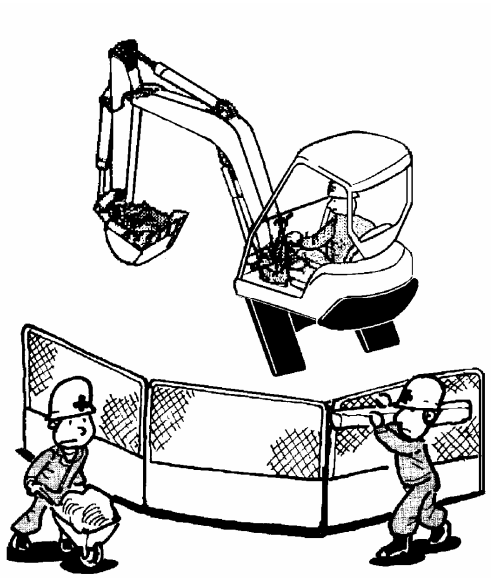
- Riders on machine are subject to injury such as being struck by foreign objects and being thrown off the machine.
  - Riders also obstruct the operator’s view, resulting in the machine being operated in an unsafe manner.
  - Only allow the operator is allowed on the machine. Keep riders off.



SA-1292

PRECAUTIONS FOR OPERATIONS

- Thoroughly make certain safety at the work site before starting operations. Especially always observe the following points.
  - Be sure to wear close fitting clothing and required safety items, such as a hard hat, when operating the machine.
  - Keep all bystanders and unnecessary objects out of and away from the machine working areas. Always beware of the surroundings while operating the machine. Take care not to allow the rear part of the upperstructure to come in contact with objects when swinging the machine in a small area.
  - When loading a dump truck, bring the bucket from the rear side of the dump truck to avoid moving the bucket over the dump truck cab or over any co-workers.



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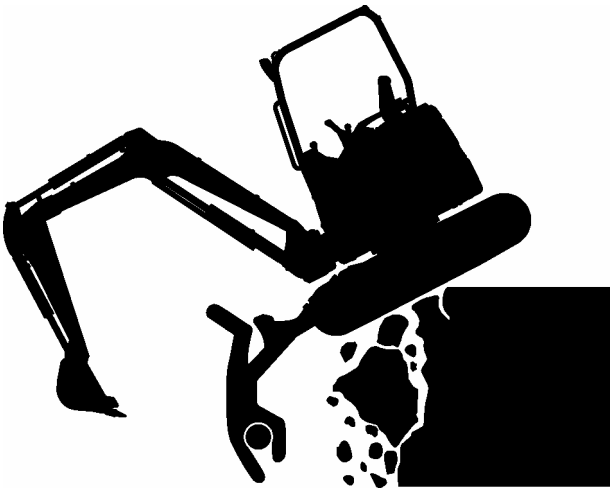
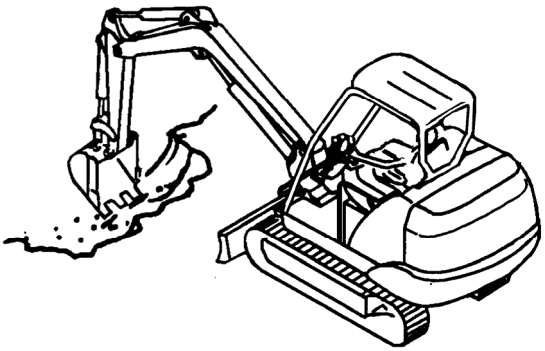
INVESTIGATE JOB SITE BEFOREHAND



SA-1293

- 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.



M586-05-021

PROTECT AGAINST FALLING STONES AND DEBRIS

- Confirm that your machine is FOPS cab equipped before working in areas where the possibility of falling stones or debris exist.

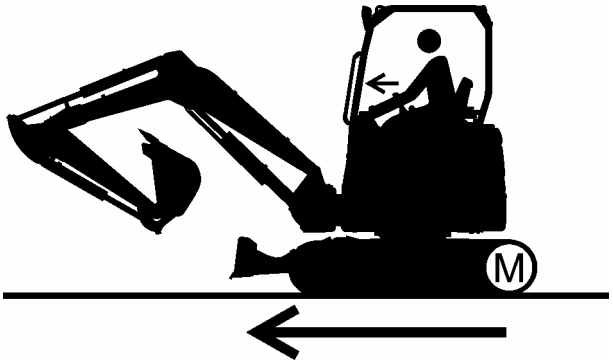
PROVIDE SIGNALS FOR JOBS INVOLVING MULTIPLE NUMBERS OF MACHINES

- 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 numbers of 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

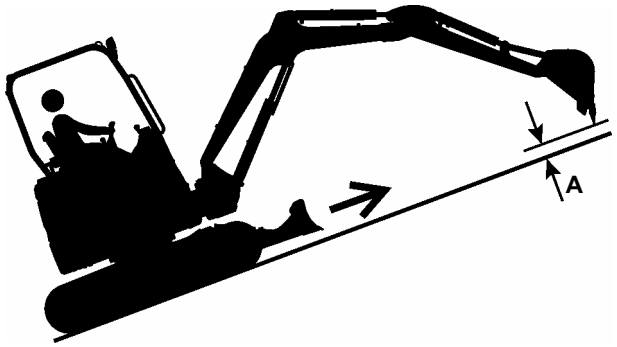
- Incorrect travel pedal/lever operation may result in serious injury or death.
  - Before driving the machine, confirm the position of the undercarriage in relation to the operator's position.
  - If the travel motors are located towards the front of the cab, the machine will move in the reverse direction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



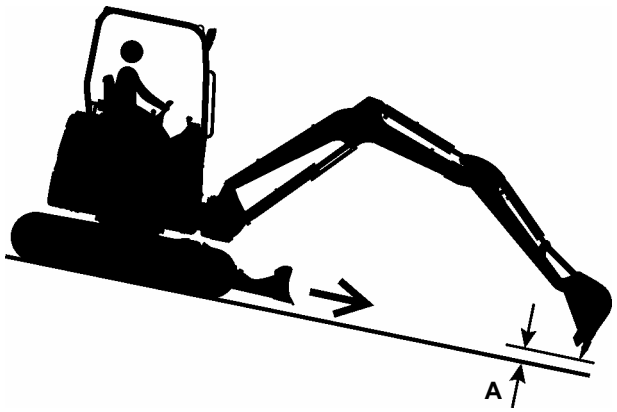
SA-1294

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



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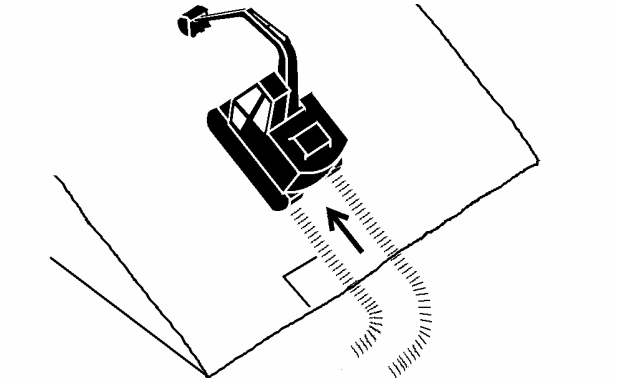
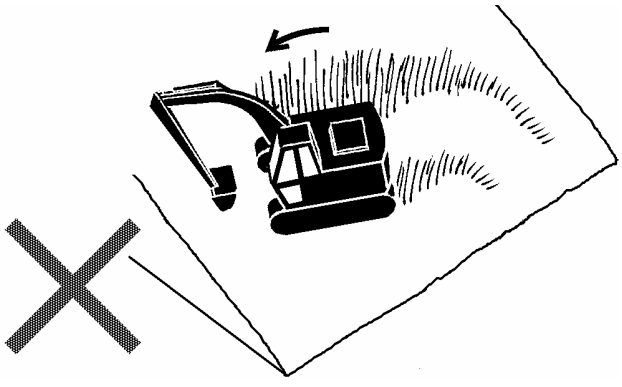
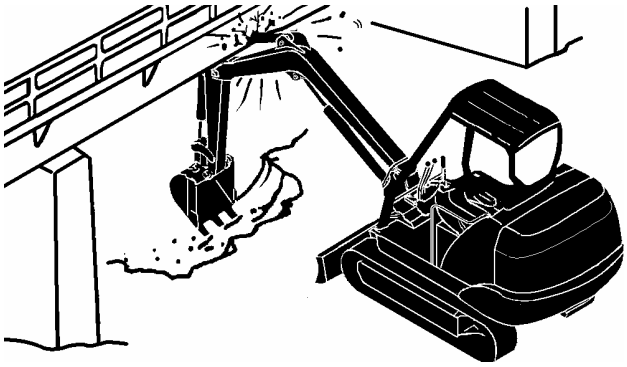


SA-441



SA-442

- 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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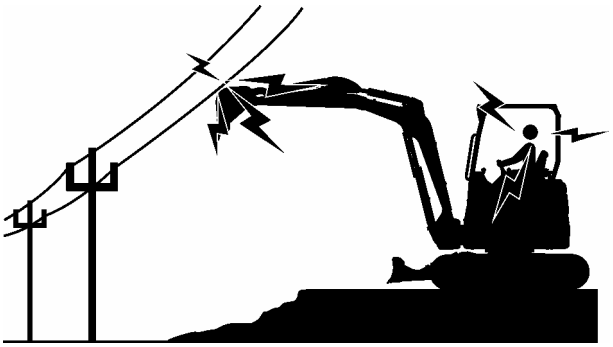
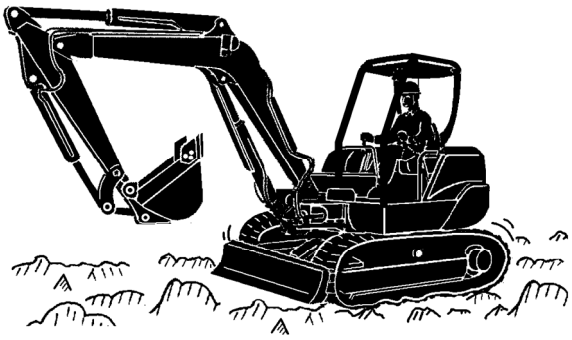


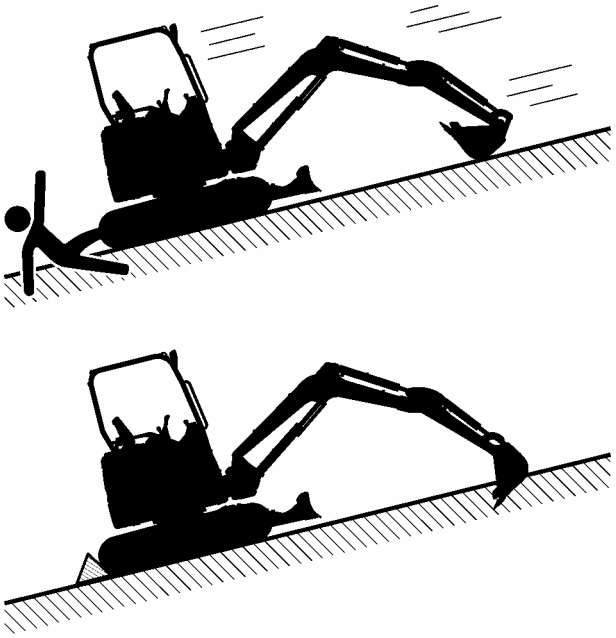
SA-1305



M586-05-002

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-19 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 a reasonable distance from other machines.

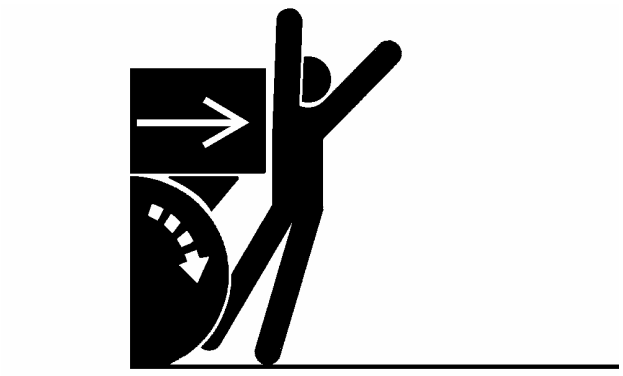


SA-1297

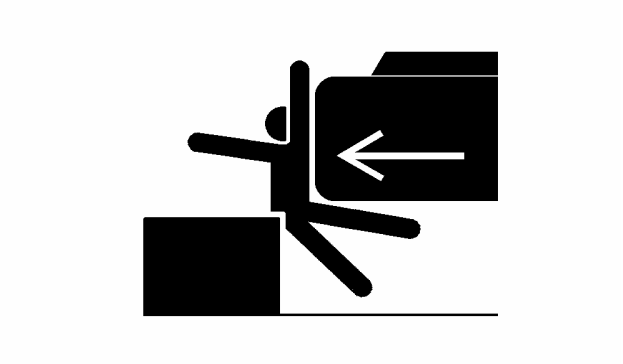
AVOID INJURY FROM BACK-OVER AND SWING ACCIDENTS

- 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 signalman 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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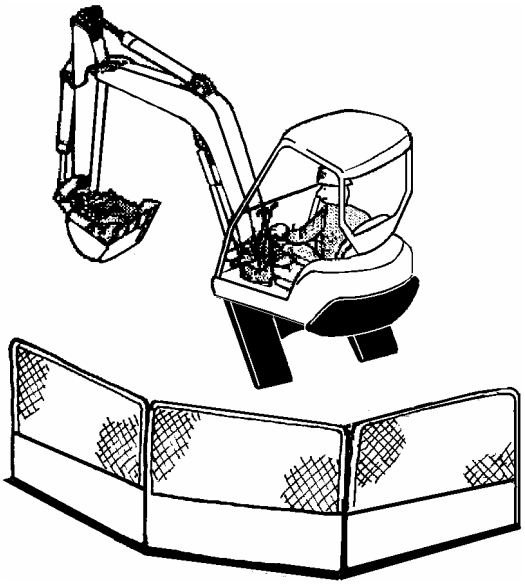
KEEP PERSON CLEAR FROM WORKING AREA

- If a person is present near the operating machine, the person may come in contact with the swinging front attachment or counterweight and/or may be crushed against an other object, resulting in serious injury or death.
  - Before operating the machine, set up barriers to the sides and rear area of the bucket swing radius to prevent anyone from entering the work area.
  - Make sure that no personnel other than the signal person or no obstacles are present in the working area before operating the machine.



SA-667

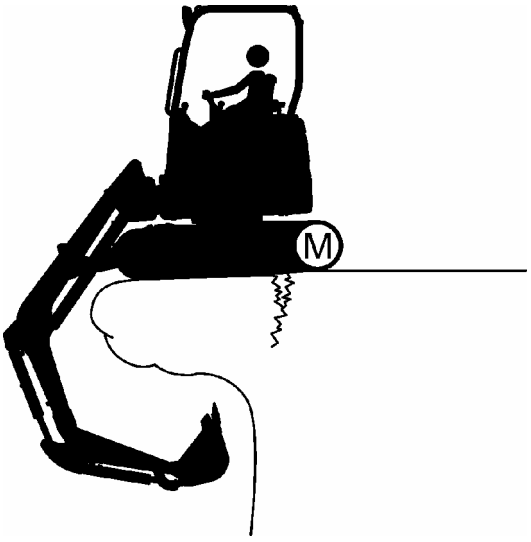
NEVER POSITION BUCKET OVER ANYONE

- 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 panic raise the front attachment with a panic. Lowering the front attachment may be safer in most cases.

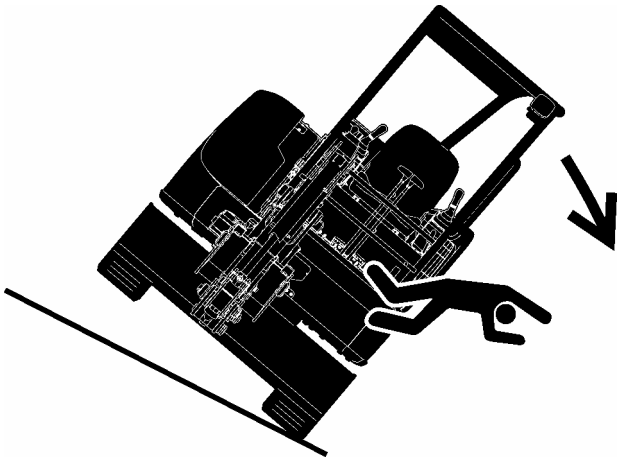


SA-1300

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.



SA-1301

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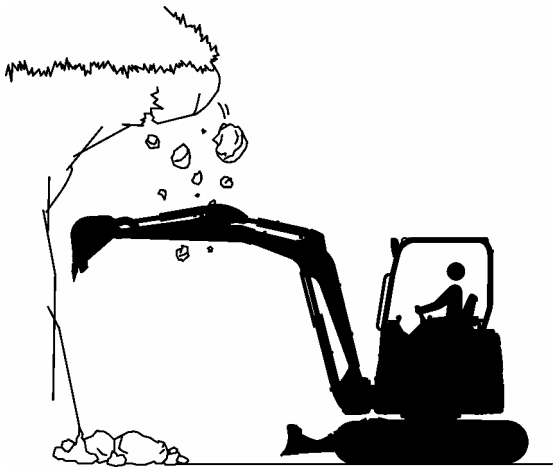
NEVER UNDERCUT A HIGH BANK

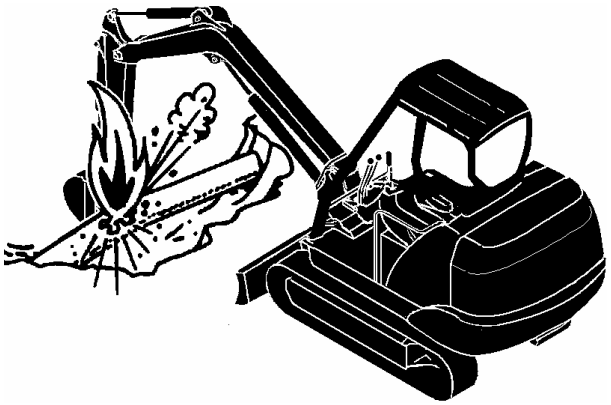
- The edges could collapse or a land slide could occur causing serious injury or death.



SA-1302

DIG WITH CAUTION

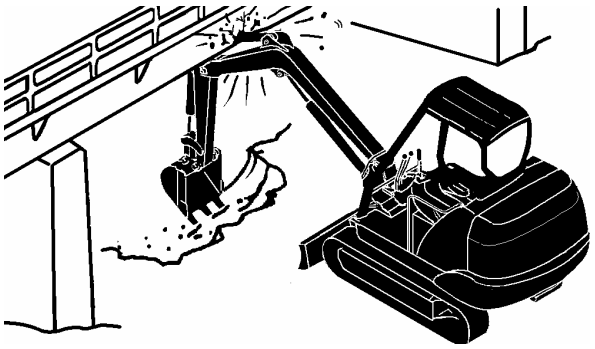
- Accidental severing of underground cables or gas lines may cause an explosion and/or fire, possibly resulting in serious injury or death.
  - Before digging check the location of cables, gas lines, and water lines.
  - Keep the minimum distance required, by law, from cables, gas lines, and water lines.
  - 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

OPERATE WITH CAUTION

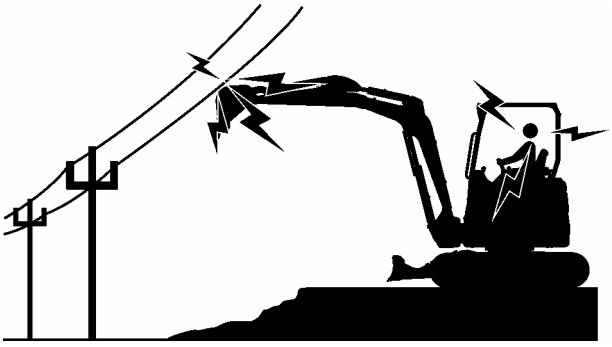
- If the front attachment or any other part of the machine hits against an overhead obstacle, such as a bridge, both the machine and the overhead obstacle will be damaged, and personal injury may result as well.
  - Take care to avoid hitting overhead obstacles with the boom or arm.



SA-673

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

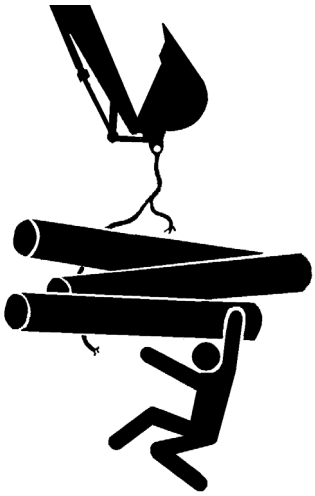
PRECAUTIONS FOR LIGHTENING

- The machine is vulnerable to lighting strikes.
  - In the event of an electrical storm, immediately stop operation, and lower the bucket to the ground. Evacuate to a safe place far away from the machine.
  - After the electrical storm has passed, check all of the machine safety devices for any failure. If any failed safety devices are found, operate the machine only after repairing them.

SA-1805

DO NOT USE FOR CRANING OPERATIONS

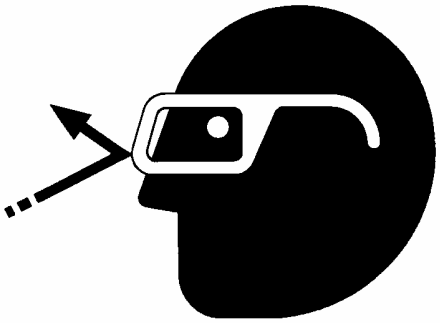
- NEVER use the machine for craning operations. If the machine is used for craning operations, the machine may tip over and/or lifted load may fall, possibly resulting in serious injury or death.
- This machine has been exclusively designed to engage in excavation and loading works.
- This machine is not equipped with any of the necessary safety devices that could allow the machine to be used for craning operation.



SA-014

PROTECT AGAINST FLYING DEBRIS

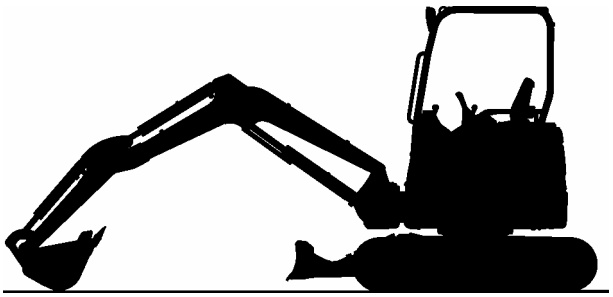
- If flying debris such as soil, rock fragments or metal pieces hit eyes or any other part of the body, serious injury may result.
  - Guard against such injuries when working in a job site where possibility of flying pieces of metal or debris exist, or when removing or installing pins using a hammer;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



SA-432

PARK MACHINE SAFELY

- Unless the machine is not 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 re-started. 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 lock lever to the LOCK position.
  - Turn the auto-idle switch OFF. Failure to do so may create a hazarduos condition as the engine speed may unexpectedly increase. (Except ZX27U-2)
  - Run 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

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 cap.

SA-018

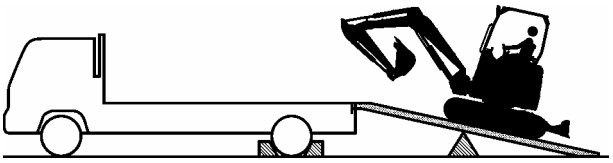
SA-019

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.

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. Be sure to turn the auto-idle switch (13) OFF. (Except ZX27U-2)
6. Slowly drive 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 tracks. Securely fasten the machine to the trailer bed with chain 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



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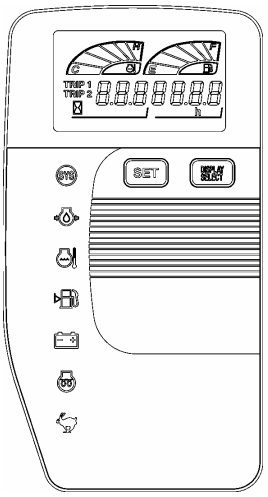

ZX27U-2

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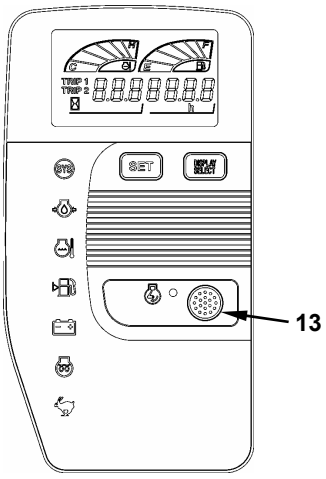
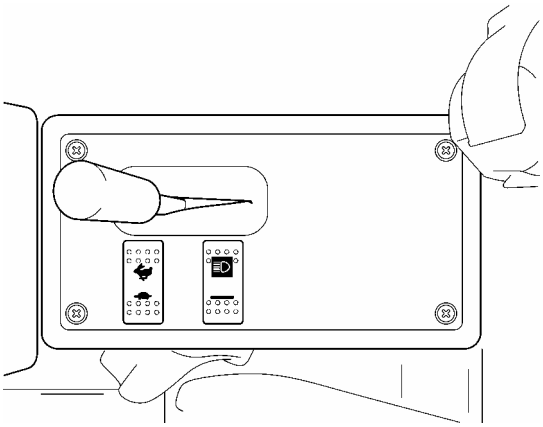


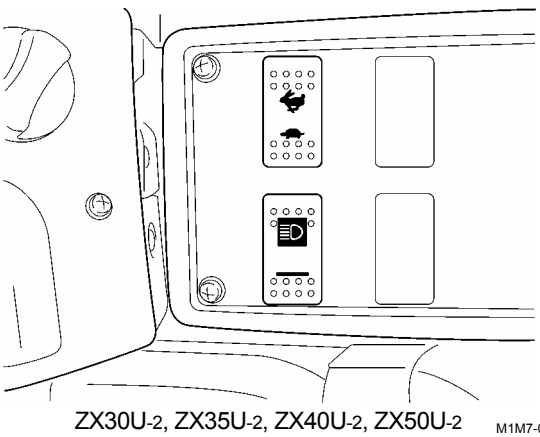
ZX30U-2, ZX35U-2
ZX40U-2, ZX50U-2

M1M7-01-028



ZX27U-2 (Canopy)

M1M7-01-033



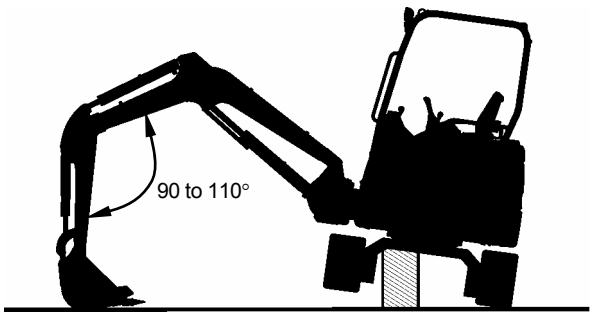
ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2
(Canopy)

M1M7-01-032

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 attachiment .
  - 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 runnning, 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 dieasel fuel, or gasoline.

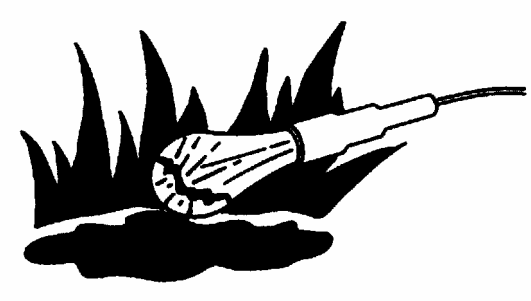
SA-028



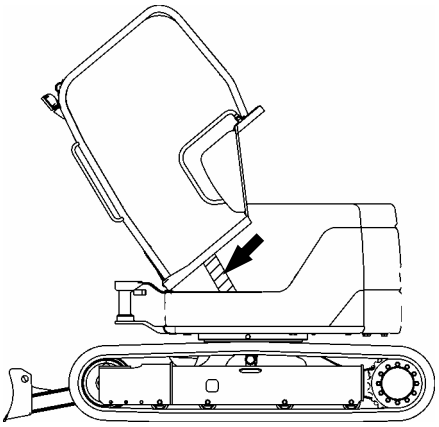
M1M7-04-006

SA-527

- 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 7-72 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.

SA-287

SS2045102

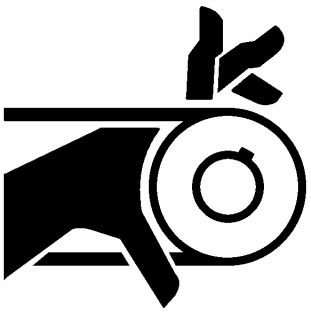
SUPPORT MACHINE PROPERLY

- 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

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

PREVENT PARTS FROM FLYING

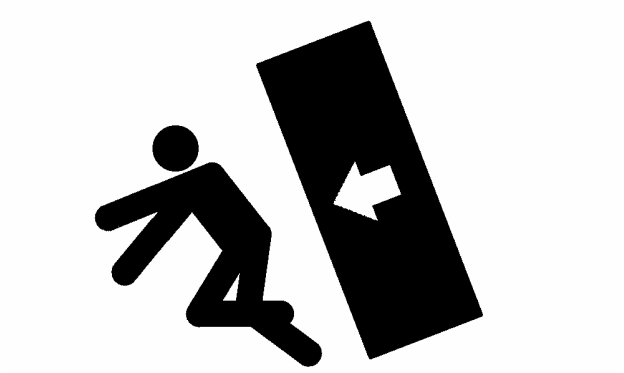
- Grease in the track adjuster is under high pressure. Failure to follow the precautions below may result in serious injury, blindness, or death.
  - Do not attempt to remove GREASE FITTINGS or VALVE ASSEMBLIES.
  - As pieces of parts may fly off, be sure to keep body and face away from the valve.

SA-344

- 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.

STORE ATTACHMENTS SAFELY

- Stored attachments such as buckets, hydraulic hammers, and blades can fall and cause serious injury or death.
  - Securely store attachments and implements to prevent falling accidents.
  - Keep children and bystanders away from storage areas.

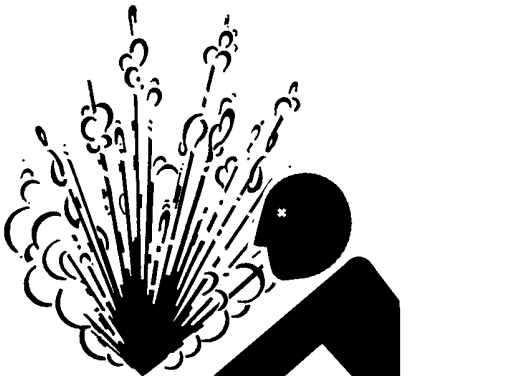


SA-034

PREVENT BURNS

Hot spraying fluids:

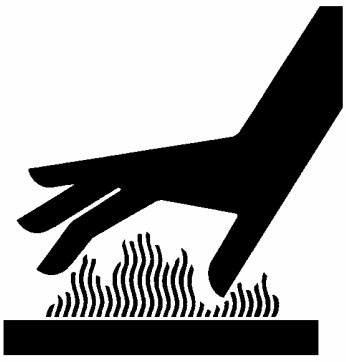
- After operation, engine coolant is hot and under pressure. Hot water or steam is contained in the engine, radiator and heater lines.
  Skin contact with escaping hot water or steam can cause severe burns.
  - To prevent possible injury from hot spraying water, stop the engine. Begine to work after 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 release 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

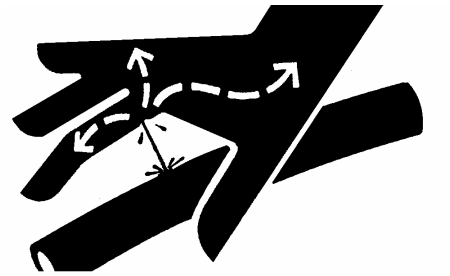
REPLACE RUBBER HOSES PERIODICALLY

- 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.

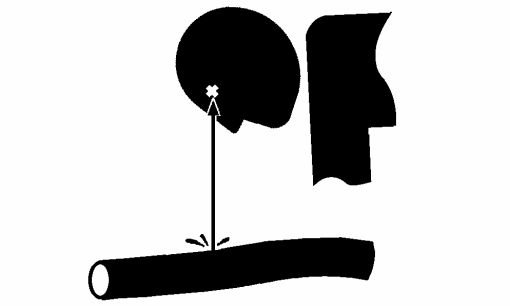
SA-019

AVOID HIGH-PRESSURE FLUIDS

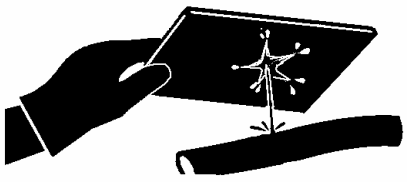
- Fluids such as diesel fuel or hydraulic oil under pressure can penetrate the skin or eyes causing serious injury, blindness or death.
  - Avoid this hazard by relieving pressure before disconnecting hydraulic or other lines. Make sure that all connectors are completely connected before applying pressure.
  - 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

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.

SA-019

Check for Shorts:

- 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 Flammables

- Spilled fuel and oil, and trash, grease, debris, accumulated coal dust, and other flammables may cause fires.

  - Prevent fires by inspecting and cleaning the machine daily, and by removing spilled or accumulated flammables immediately.
  - Don't store flammable fluid near open flames.
  - Don't burn or crush a pressurerized container.
  - Don't store oily cloths. They are liable to catch fire.
  - Don't wind easy-to-absorb-oil asbestos or glass wool around high-temperature parts such as a muffler or exhaust pipe.

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.

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 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 Evacuation Method.

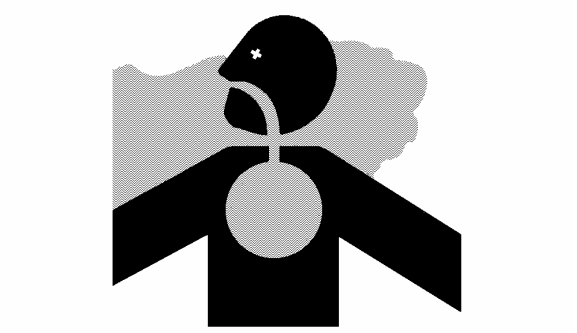
SA-393

(Cab-Equipped Machines)

SS4642980

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.



SA-016

BEWARE OF ASBESTOS DUST

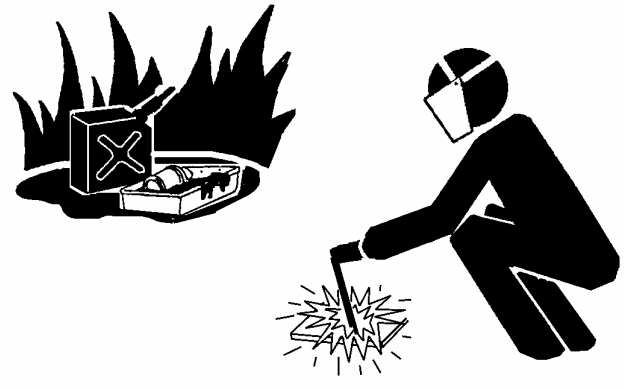
- Take care not to inhale dust produced in the work site. Inhalation of asbestos fibers may be the cause of lung cancer.
  - Depending on the wok site conditions, the risk of inhaling asbestos fiber may exist. Spray water to prevent asbestos from becoming airborne. Do not use compressed air.
  - When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

Asbestos might be present in imitation parts. Use only genuine Hitachi Parts.

SA-029

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 objects 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 objects 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

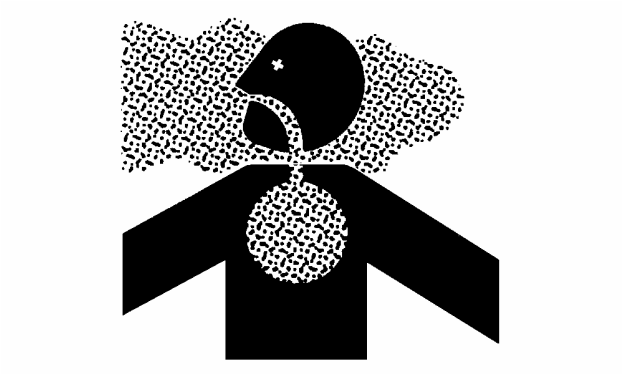
- Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders.
  - Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials.
  - Pressurized lines can be accidentally cut when heat 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.

REMOVE PAINT BEFORE WELDING OR HEATING



SA-029

- 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 material from area.

PREVENT BATTERY EXPLOSIONS

SA-032

- 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 become loose, it may induce sparks. Securely tighten all terminals.

- 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 continuosly with water for about 15 minutes. Seek medical attention immediately.
  - Be sure to wear eye protection when checking electrolyte specific gravity.

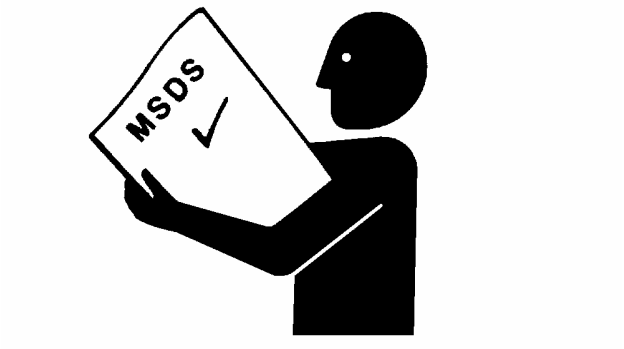
PRECAUTIONS FOR HANDLING REFRIGERANT

- 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

HANDLE CHEMICAL PRODUCTS SAFELY

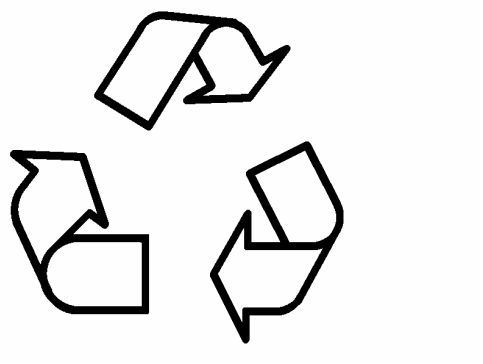
- Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with your machine include such items as lubricants, electrolyte, coolants, paints, and adhesives.
  - A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and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



SA-309

DISPOSE OF WASTE PROPERLY

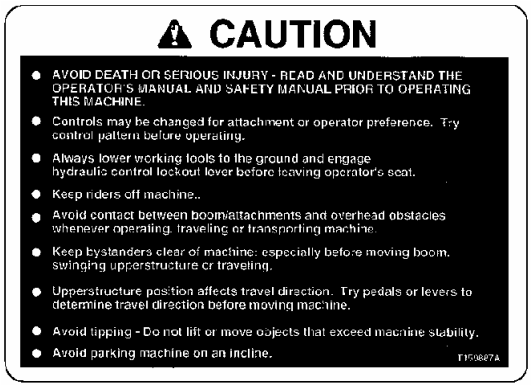
- Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with HITACHI equipment includes such items as oil, fuel, coolant, brake fluid, filters, and batteries.
  - When draining fluid, use a leakproof container with a capacity larger than the drained fluid 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 batteries from your local environmental or recycling center.



SA-226

SAFETY SIGNS

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 placing an order of it to your authorized dealer.



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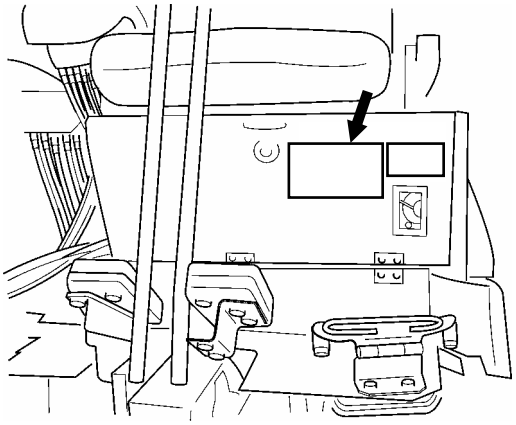

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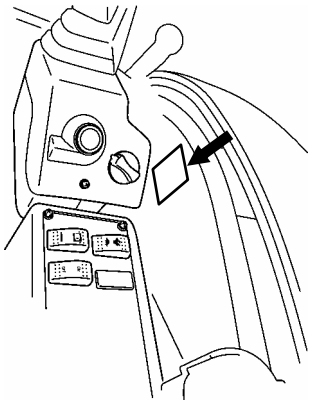

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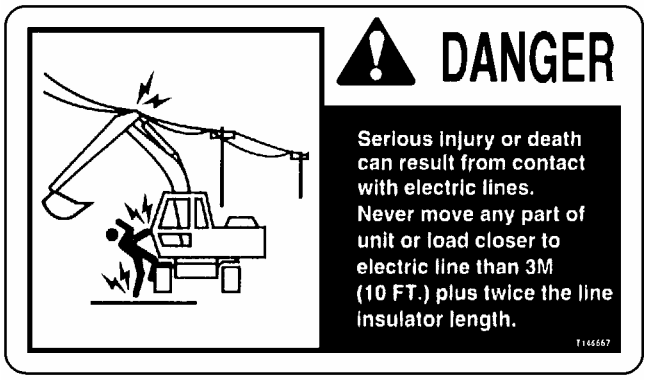
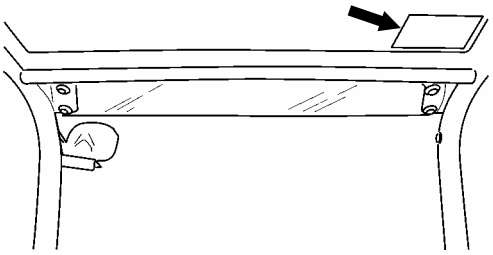
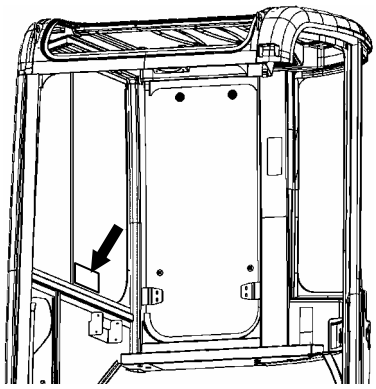


SS-259



CANOPY

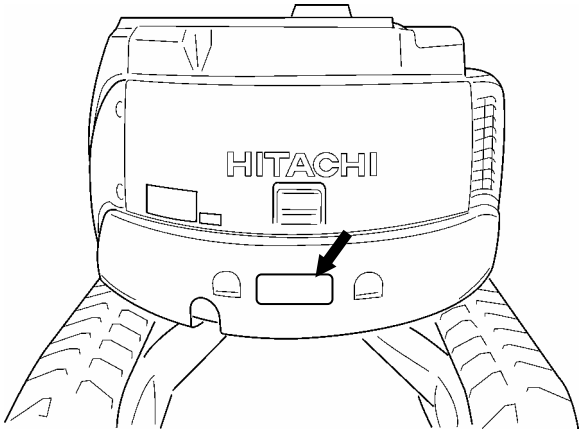
SS-2684



CAB

SS-2652

SS-024



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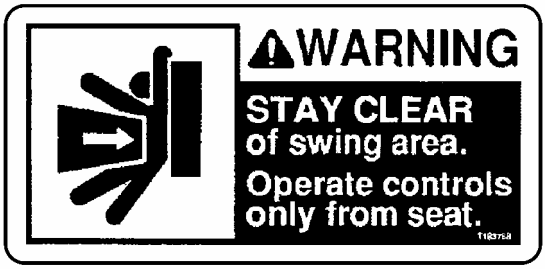

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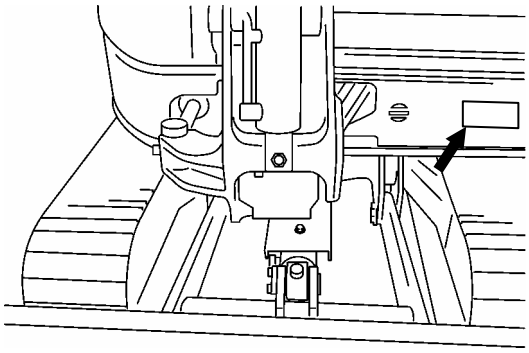

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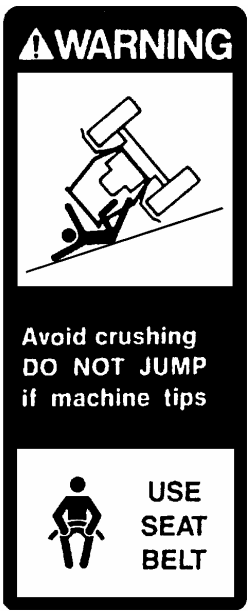

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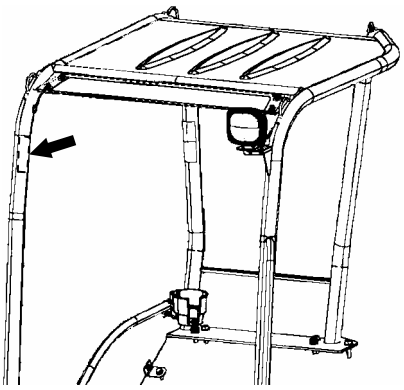

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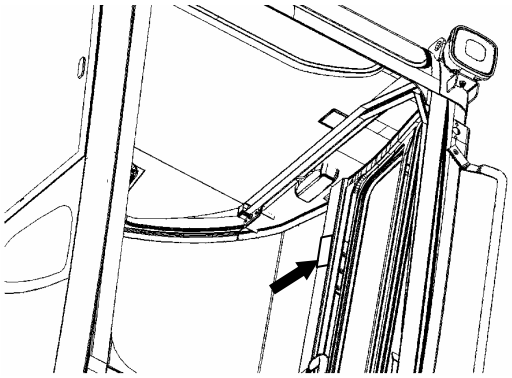

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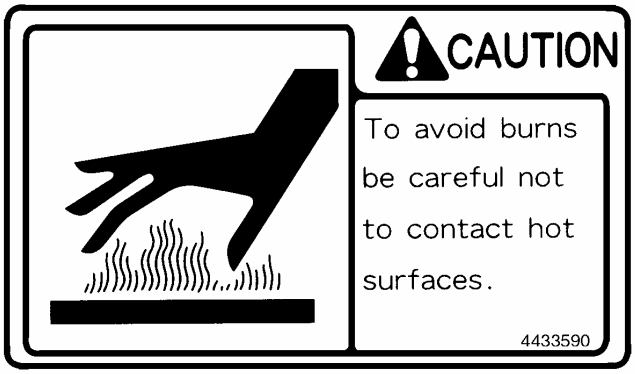

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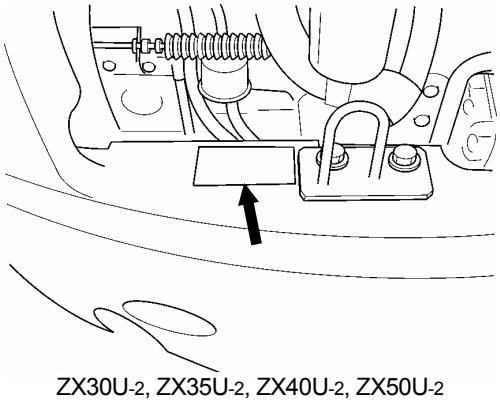
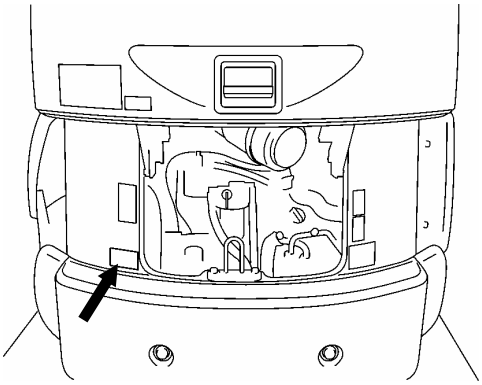


ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2 SS-2636



ZX27U-2 SS-2753

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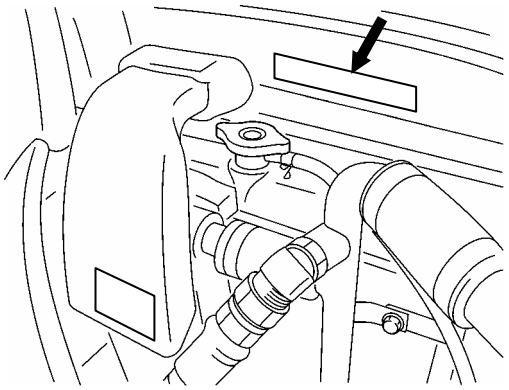

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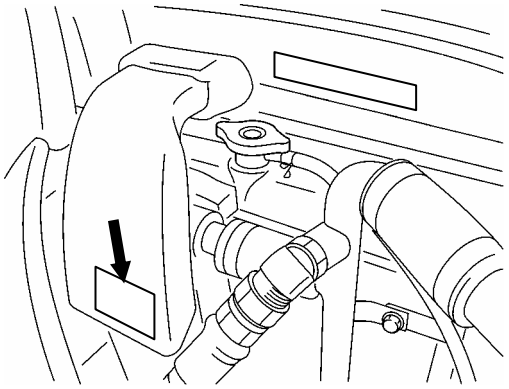

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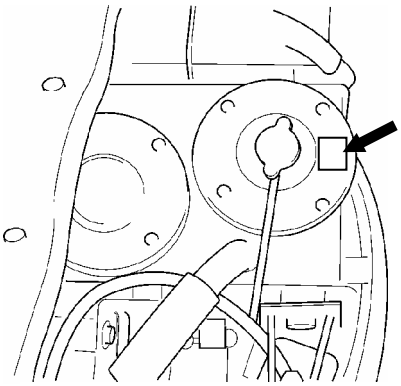
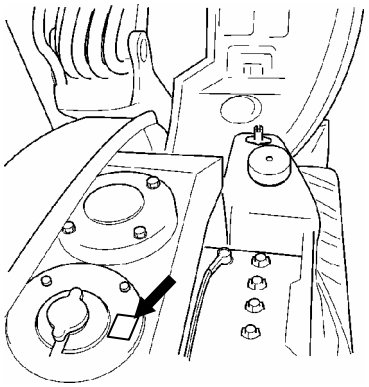


ZX27U-2, ZX30U-2, ZX35U-2

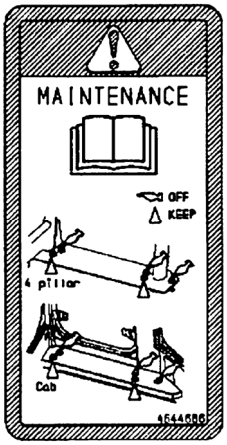
SS-2686



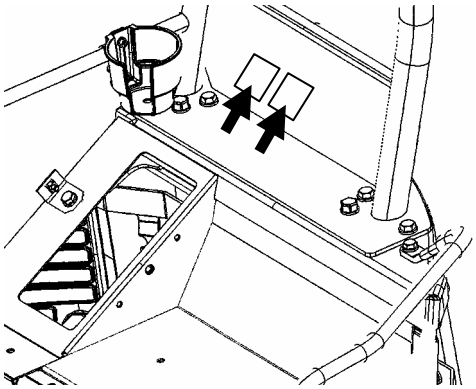
ZX40U-2, ZX50U-2

SS-2687

- When using the floor tilt mechanism, consult your authorized dealer. If bolts ⇦ are removed or installed by unauthorized personnel, mismatch to ROPS may occur.
  Remove bolts ⇦ (not covered with resin caps) in the rear section of the operator's seat.
  Be careful. When bolts ⇦ are removed, the canopy or the cab may come off the floor.

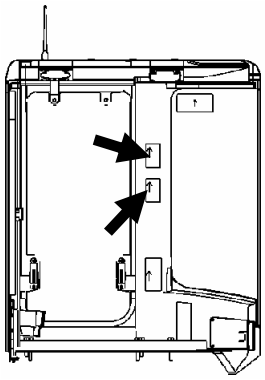


SS4644686



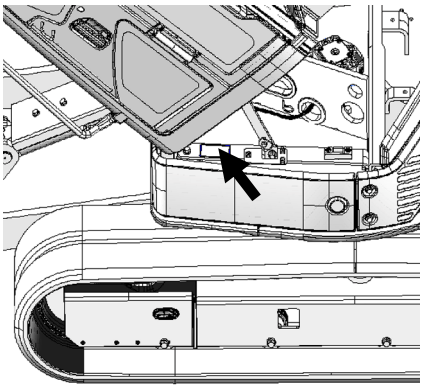
CANOPY M1M7-07-063

SS4664139



CAB SS-2798

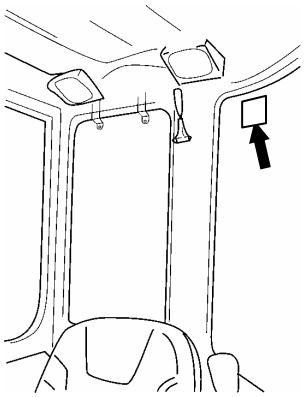
SS4664709



SS-2927

(Cab-Equipped Machines)

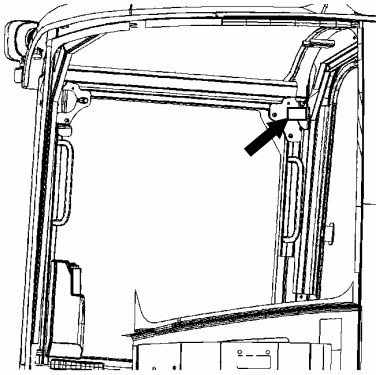
SS4642980



M1M7-01-020

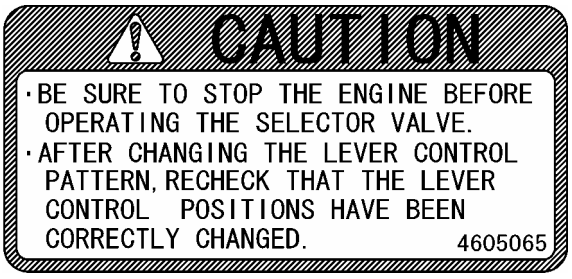
(Cab-Equipped Machines)

SS-1832

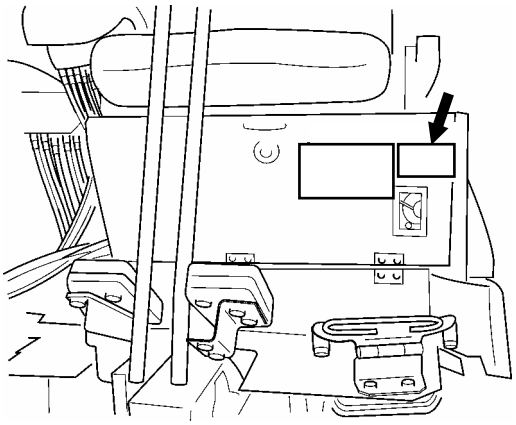


M1M7-01-013

(2Way Multi Lever Equipped Machines)



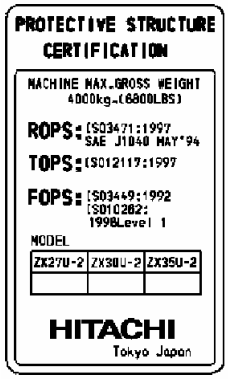
SS4605065



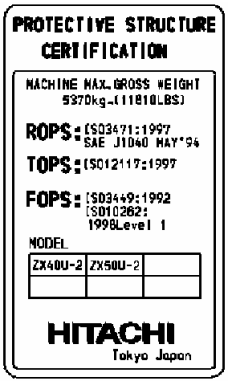
SS-2640

ROPS/TOPS/FOPS Canopy and Cab

- To maintain unimpaired operator protection and manufacture's protective structure
  - Damaged Roll Over Protective Structure (ROPS), Tip Over Protective Structure (TOPS), Falling Object Protective Structure (FOPS) must be replaced, not repaired or revised.
  - Any alternation to the ROPS or TOPS or FOPS must be approved by the manufacturer.

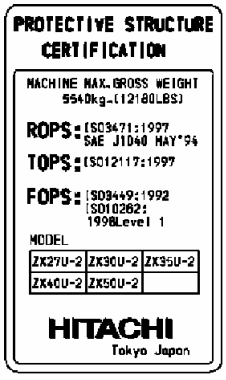


ROPS/FOPS



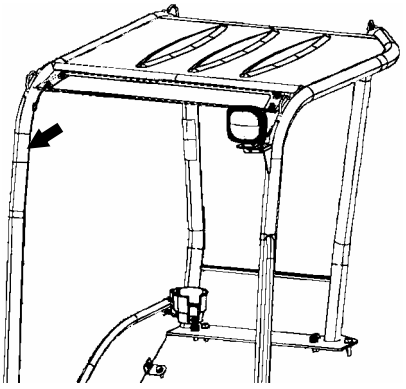
ROPS/FOPS

SS3107469
SS3107610

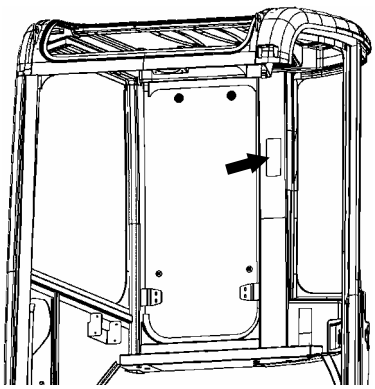


ROPS/FOPS

SS3107593



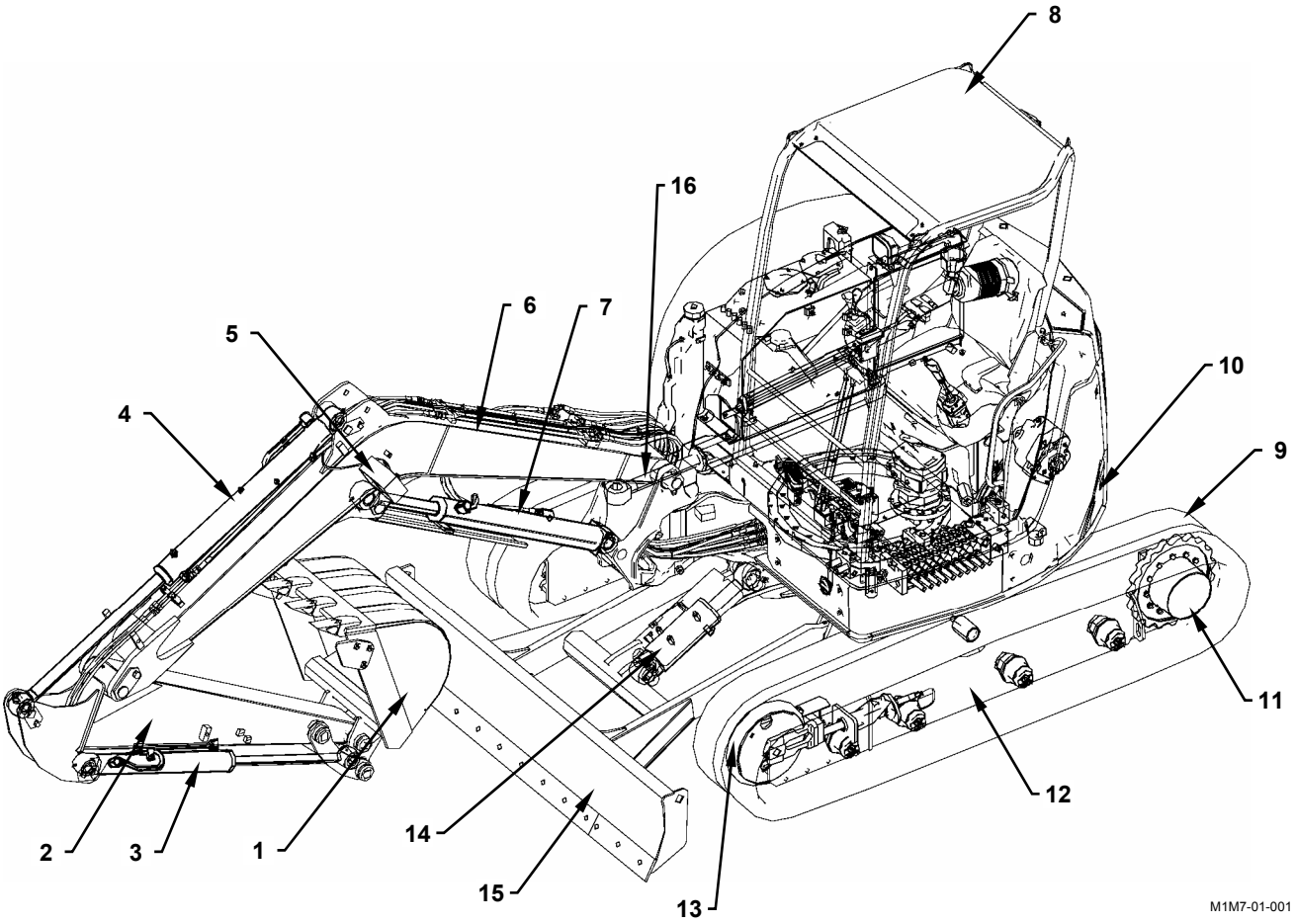
CANOPY SS-2651



CAB SS-2652

MEMO

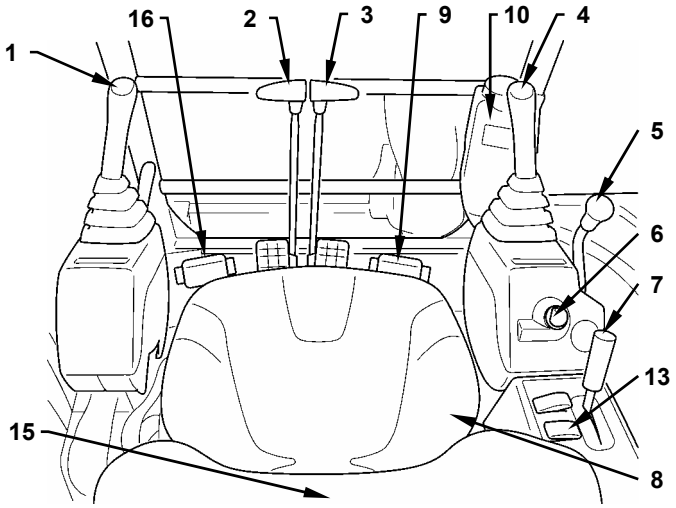
COMPONENTS NAME



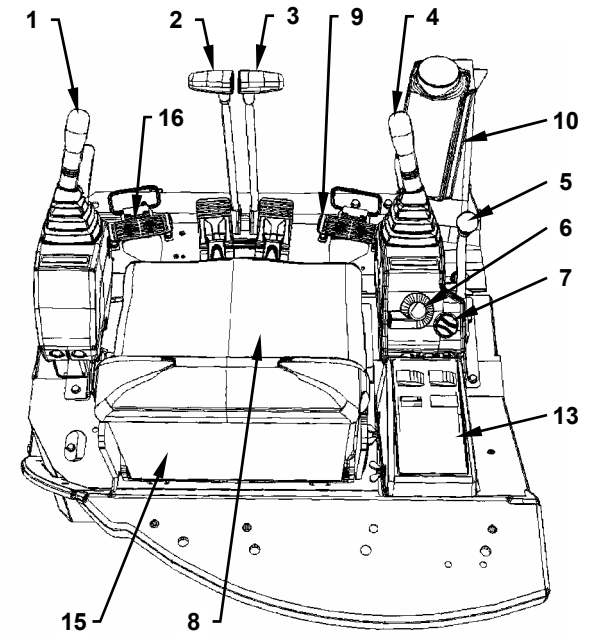
1- Bucket
2- Arm
3- Bucket Cylinder
4- Arm Cylinder
5- Work Light
6- Boom
7- Boom Cylinder
8- Canopy
9- Track Shoe
10- Counterweight
11- Travel Device
12- Track Frame
13- Front Idler
14- Blade Cylinder
15- Blade
16- Boom-Swing Cylinder

PEDALS, LEVERS AND MONITOR PANEL

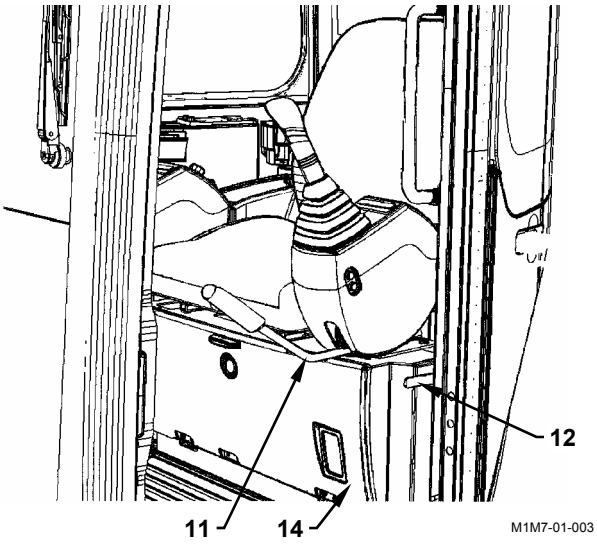
1- Left Control Lever
2- Left Travel Lever
3- Right Travel Lever
4- Right Control Lever / Horn Switch
5- Blade Lever
6- Key Switch
7- Engine Control Dial
(ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2)
Engine Control Lever
(ZX27U-2)
8- Operator's Seat
9- Boom Swing Pedal
10- Monitor Panel
11- Pilot Control Shut-Off Lever
12- Door Lock Release Lever
(Cab equipped machine)
13- Switch Panel
14- Tool Box
15- Operator's Manual Box
16- Attachment Pedal (Optional)



ZX27U-2 M1M7-01-034



ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2 M1M7-01-002



M1M7-01-003

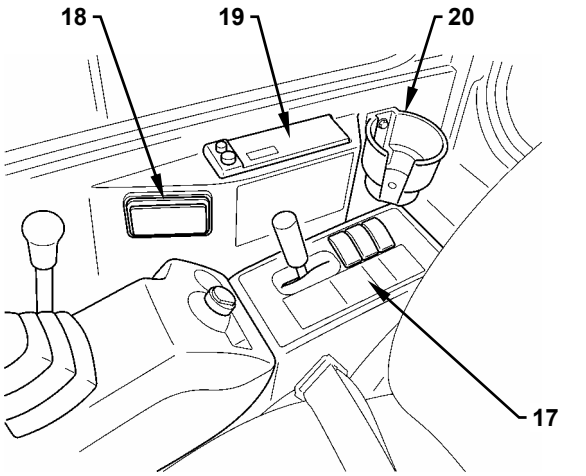
17- Air Conditioner Control Panel (Cab equipped machine)

18- Ash Tray (Cab equipped machine)

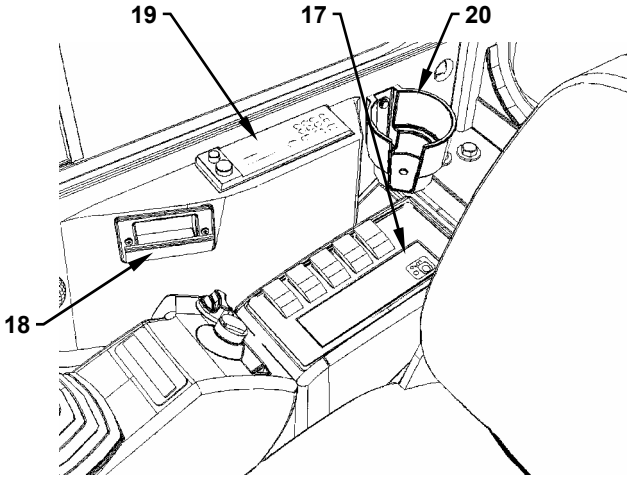
19- Radio (AM/FM, Cab equipped machine)

20- Cup Holder

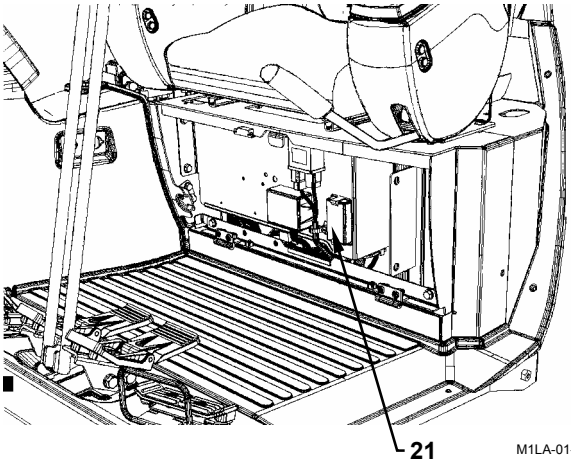
21- Fuse Box



ZX27U-2 M1M7-01-035



ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2 M1M7-01-004



M1LA-01-005

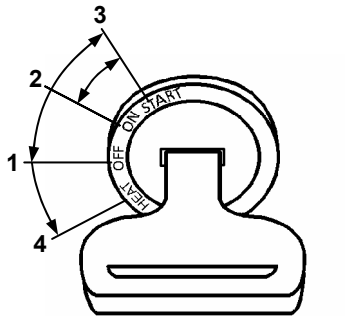
KEY SWITCH

1- OFF (Engine OFF)

2- ON (Engine ON)

3- START (Engine Start)

4- HEAT (Engine Preheat)



M1M7-01-007

SWITCH PANEL

5- Work Light Switch
Press the top side of switch (5) to turn work lights (9) located on the boom and cab roof front ON. Press the bottom side of switch (5) to turn work lights (9) OFF.

6- Travel Mode Switch
Press the rabbit-mark side of switch (6) to select the fast travel mode. However, when the travel load becomes heavy, the slow travel mode will automatically be selected. Press the turtle-mark side of switch (6) to select the slow travel mode.

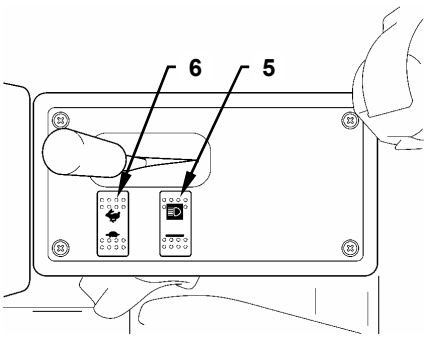
7- Wiper Switch (Cab equipped machine)
Three-operation positions are provided on this switch.

OFF: Both the wiper and washer do not operate.

Center: The wiper operates.

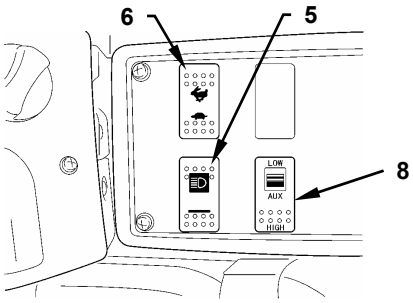
WASHER: The washer operates together with the wiper.

8- Auxiliary Flow Control Switch
(Optional: Except ZX27U-2)
The hydraulic oil flow in the auxiliary pipe line can be controlled.



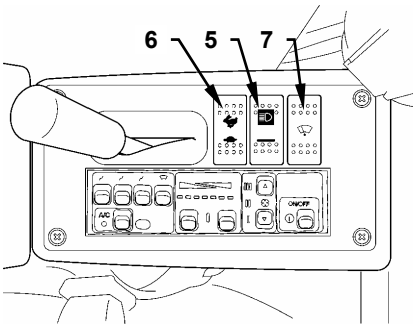
ZX27U-2 (Canopy)

M1M7-01-033



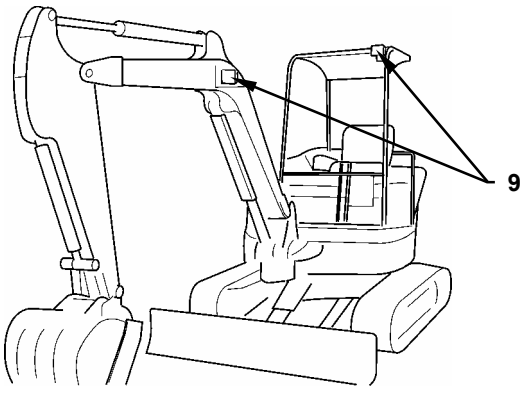
ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2 (Canopy)

M1M7-05-026

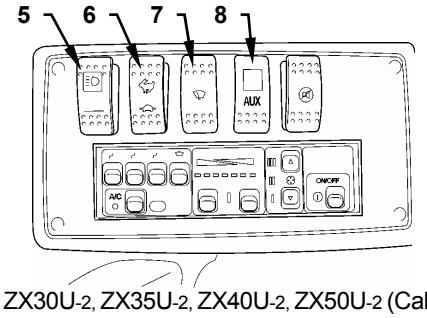


ZX27U-2 (Cab)

M1M7-01-036



M1M7-01-025

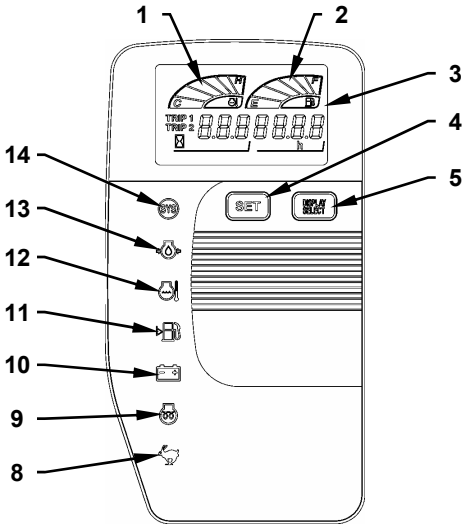


ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2 (Cab)

M1M7-01-024

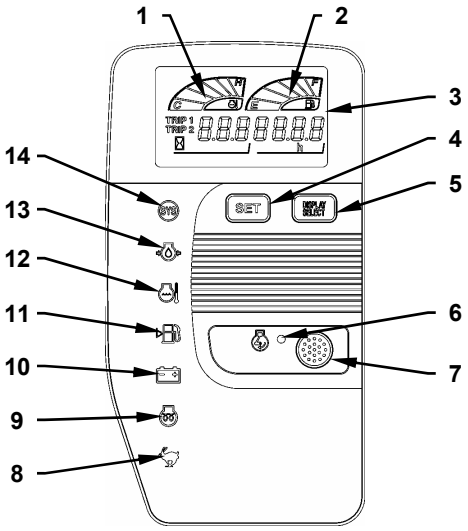
MONITOR PANEL

1- Coolant Temperature Gauge
2- Fuel Gauge
3- Liquid Crystal Display (Hour Meter, etc)
4- Set Switch
5- Display Control Switch
6- Auto-Idle Indicator (Except ZX27U-2)
7- Auto-Idle Switch (Except ZX27U-2)
8- Fast Travel Mode Indicator
9- Preheat Indicator
10- Alternator Indicator
11- Fuel Level Indicator
12- Overheat Indicator
13- Engine Oil Pressure Indicator
14- System Failure Indicator



ZX27U-2

M1M7-01-031



ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2

M1M7-01-028

Coolant Temperature Gauge

The gauge segment position indicates the engine coolant temperature. When the first three segments come ON, the coolant temperature is normal.

NOTE: When the coolant temperature is lower than 20°C (68°F), the first segment will flash.

Fuel Gauge

The gauge segment position indicates the fuel level. Refill the fuel before only the E-marked segment comes ON.

NOTE: Even though the key switch is OFF, when the display control switch is continuously pressed for more than 0.5 seconds, the fuel level is displayed. As long as the display control switch is kept pressed, the gauge indicates the fuel level. When the switch is released, the gauge stops indication the fuel level.

IMPORTANT: In case all segments flash, the machine is abnormal. Immediately, contact your authorized dealer.

M1SM-05-008

M1SM-01-003

System Failure Indicator

The system failure indicator comes ON or flashes an abnormality may be present in the engine control system (optional: Except ZX27U-2). If the system failure indicator comes ON or flashes, immediately contact your authorized dealer for repair.

M1M7-01-008

Engine Oil Pressure Indicator

The red indicator will light when the engine oil pressure is low. If the red indicator comes ON, the engine oil pressure warning buzzer will sound at the same time. Immediately stop the engine. Check the engine oil pressure system and the oil level for any abnormality.

M178-01-037

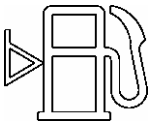
Overheat Indicator

If the coolant temperature rises extremely high, this indicator operates. If the red light comes ON, the buzzer sounds at the same time.
Immediately stop machine operation and reduce engine speed to the slow idle speed to lower the coolant temperature.

M178-01-036

Fuel Level Indicator

When the fuel level indicator comes ON while the machine is operating on level ground, the remaining fuel amount in the fuel tank is as shown in the table below. Refill the fuel as soon as possible.

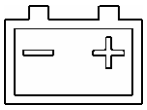


M178-01-034

Model	Remaining Fuel Amount
ZX27U-2, ZX30U-2, ZX35U-2	6.5 litters (1.7 US gal)
ZX40U-2, ZX50U-2	11 litters(2.9 US gal)

Alternator Indicator

The red indicator will light when low alternator output is present.
Check the electrical system such as the alternator and/or battery system.



M178-01-038

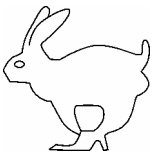
Preheat Indicator

When the key switch is turned to the HEAT position, orange indicator will light. Light will turn off after approx. 15 seconds has passed.

M178-01-041

Fast Travel Mode Indicator

When the rabbit-mark (fast mode) side of the travel mode switch on the switch panel is pressed, the indicator comes ON.



M1M7-01-022

LIQUID CRYSTAL DISPLAY (LCD), DISPLAY SELECTION SWITCH, AND SET SWITCH

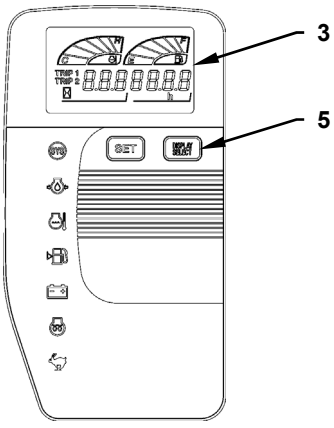
LCD (3) indicates 3 types of meters, Hour Meter, Trip Meter 1 or Trip Meter 2.

NOTE: After the key switch is turned ON, LCD always indicates the hour meter.

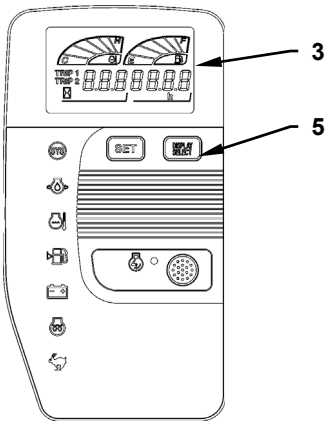
- How to Select Display
  Each time display control switch (5) is pressed, LCD alternately displays Hour Meter, Trip Meter 1, and Trip meter 2 in this order.

- Hour Meter Display
  The hour meter displays the total accumulated machine operation hours in hour (h) units since the machine started operation. One digit beyond the decimal point indicates tenths of an hour (six minutes). When the hour meter is displayed, the hour meter mark is lit. While the machine is operating, the decimal point flashes.

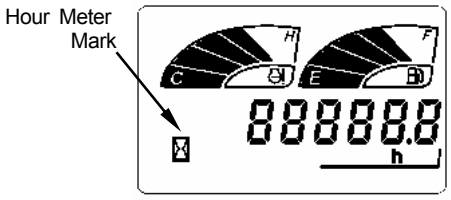
NOTE: Even though the key switch is OFF, the hour meter reading can be checked by depressing and holding display selection switch (5) for more than 0.5 seconds. The hour meter reading can be displayed as long as display selection switch (5) is held and disappears as soon as the switch is released.



ZX27U-2 M1M7-01-031

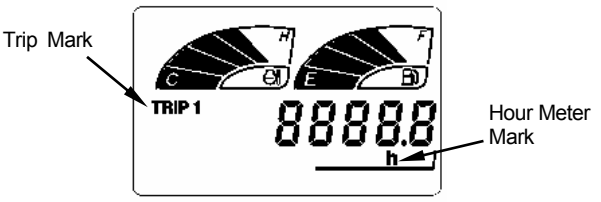


ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2 M1M7-01-028

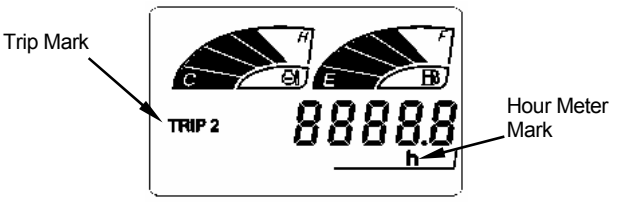


When the hour meter is displayed M1SM-01-005

- Trip Meter Display (Trip Meter 1 and Trip Meter 2)
  The remaining hours until the trip mark flashes from the set-hours are indicated in hour (h) unit. (See page 1-9.) As long as the trip meter is displayed, trip mark (TRIP 1 or TRIP 2) lights on the screen.



When Trip meter 1 is displayed M1SM-01-006



When Trip meter 2 is displayed M1SM-01-007

HOW TO OPERATE TRIP METER

- Trip Meter Function
  The trip meter flashes the trip mark (TRIP 1 or TRIP 2) to inform the operator that the machine operation hours have reached the preset hour. The trip mark continues to flash for 30 seconds when the machine operation hours reach the preset hours. Unless the trip meter is reset, each time when the key switch is turned ON, the trip mark repeatedly flashes for 30 seconds.

IMPORTANT: The trip meter indicates the machine operation hours which are counted from the time when the trip meter is set. Therefore, the machine operation hours indicated by the trip meter are different from the accumulated operation hours indicated by the hour meter.

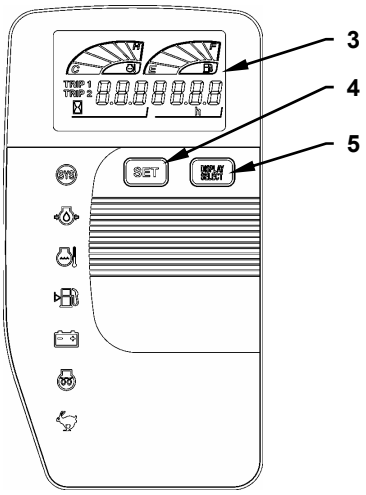
NOTE: Once the trip meter has been set, its function is kept activated even though other types of information is displayed on the LCD afterward. Therefore, when the operation hours reach the preset hours in the trip meter, the trip mark will start flashing regardless of the current LCD operation status. If the trip mark starts flashing when the trip meter is being indicated, the trip mark will stay ON after trip mark stops flashing. In case information other than the trip meter is being indicated on the LCD, the trip mark will be extinguished after the flashing ceases.

- Trip Meter Setting
  1. Turn the key switch ON. Display either trip meter 1 or trip meter 2 by operating display selection switch (5).

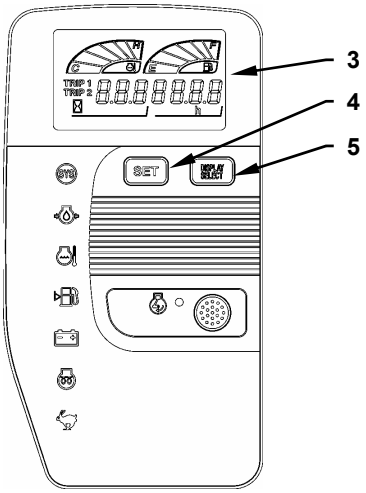
NOTE: Trip meter 1 and trip meter 2 can be independently set by different operation hours.

  2. Each time set switch (4) is pressed, the set-hour is shifted in the following order:
     50>100>150>200>250>300>400>500>750>1000>1250>1500>2000>2500>3000
     Select the desired time to set by operating set switch (4). When the set switch is pressed for more than 2 seconds, the set-hour will be quickly shifted.
  3. While displaying the desired time to be set, press display selection switch (5) to set the trip meter.

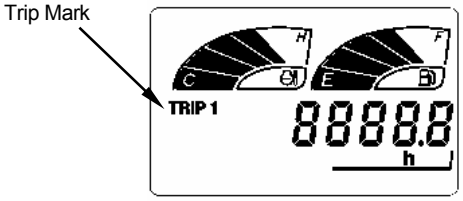
NOTE: When either trip meter 1 or 2 is set and is kept displayed on the LCD, the remaining operation hours of the machine are displayed on the LCD until the operation hours reach the set-hour. Accordingly, when the trip mark starts flashing, the trip meter displays 0 hour. Then the trip meter will continue to display the operation overtime from the set-hour with minus (-) mark until the trip meter is reset.



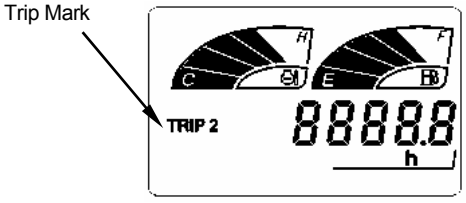
ZX27U-2 M1M7-01-031



ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2 M1M7-01-028



When Trip meter 1 is displayed M1SM-01-006



When Trip meter 2 is displayed M1SM-01-007

- Set Time Change
  1. Turn the key switch ON. Display the trip meter you wish to change the set time by operating display selection switch (5). The trip meter will display the remaining time until the trip mark starts flashing at this time.
  2. Press set switch (4) once. The remaining time display can be changed as follows:

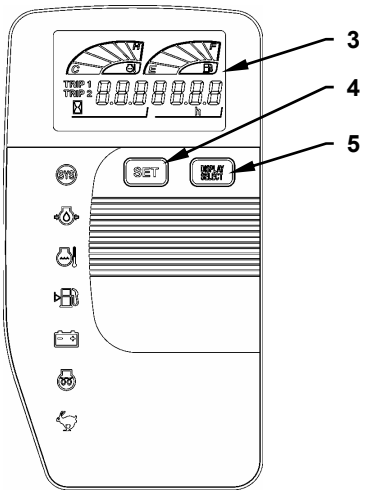
Present Display Time		Time to be Displayed After being Changed
35.2	→	50.0
184.7	→	200.0

  3. When set switch (4) is pressed further, the set time will be changed as follows each time the switch is pressed.
     50>100>150>200>250>300>400>500>750>1000>1250>1500>2000>2500>3000
     When the set switch is pressed for more than 2 seconds, the set-hour will be quickly shifted.
  4. After the time you wish to change to, is displayed, press display selection switch (5) to reset the trip meter.

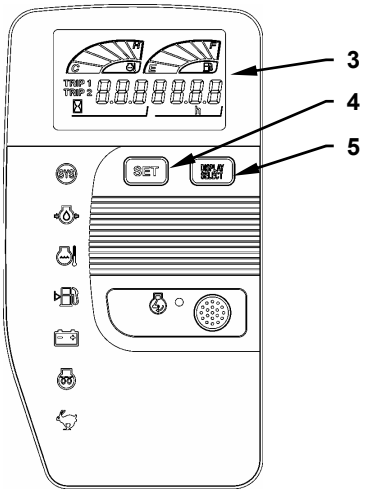
IMPORTANT: Once the set time is changed, the trip meter restarts counting down the time. Accordingly, note that the displayed time is different from the operation hours counted from the first-set time.

- When no trip meter is used:
  When no trip meter is used, set the trip meter for a sufficiently long time (example: 3000 hrs) by following the procedures described above.

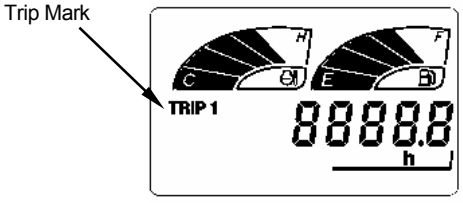
NOTE: The trip meters are set at 10000 hours when the machine is shipped from the factory.



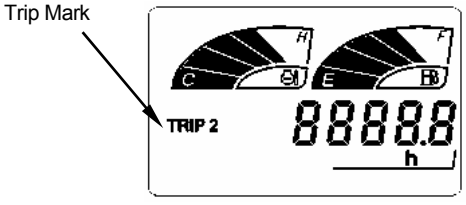
ZX27U-2 M1M7-01-031



ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2 M1M7-01-028



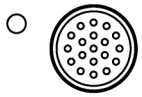
When Trip meter 1 is displayed M1SM-01-006



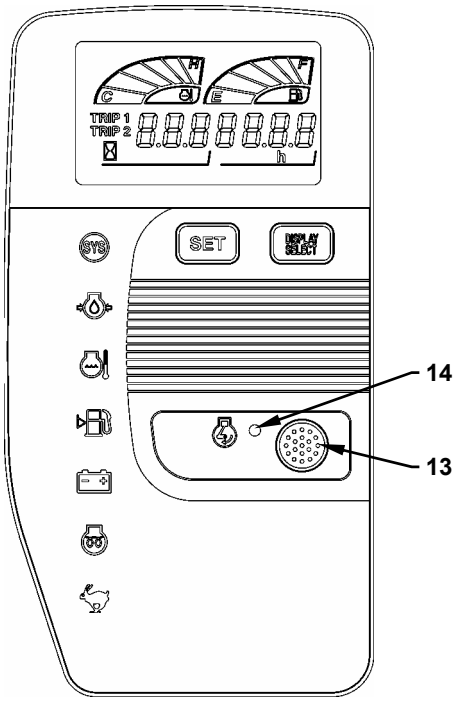
When Trip meter 2 is displayed M1SM-01-007

AUTO-IDLE SWITCH (Except ZX27U-2)

- Auto-Idle Operation
  When pressing auto-idle switch (13), the engine speed is reduced to the slow idle speed approx. 4 seconds after returning all control levers to neutral. Thereby, the fuel consumption is reduced. When the auto-idle mode is selected, auto-idle indicator (14) on the monitor panel lights.



M1CF-01-002



M1M7-01-028

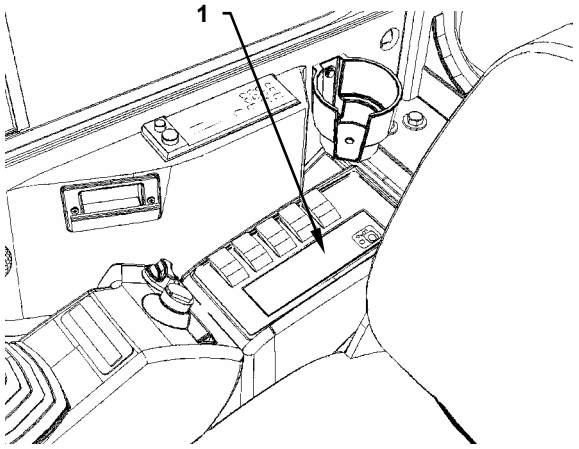
AIR CONDITIONER OPERATION

1- Control Panel

2- Right Front Air Vent 1

3- Right Front Air Vent 2

4- Foot Air Vent



M1M7-01-004

NOTE: Control air-flow from right front air vents (1 and 2) by rotating the louver in the horizontal direction so that the air vents can be used as a defroster.

5- Air Conditioner Power Switch
Press air conditioner power switch (5) to turn the power ON.

Controller Part Names and Functions

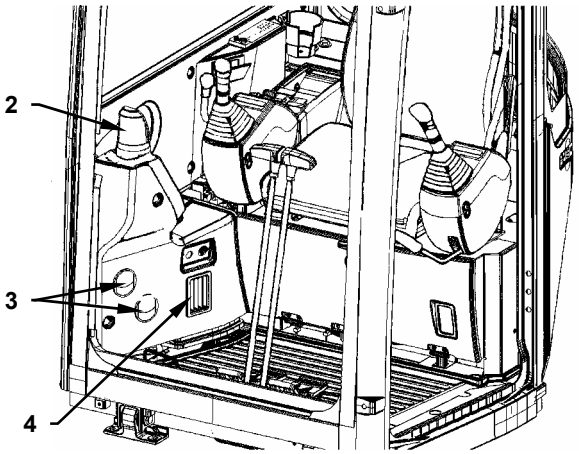
6- Air Conditioner Switch
Press air conditioner switch (6) to turn the air conditioner and indicator (11) ON.

7- Mode Switch
The air vent location is selected. Each time mode switch (7) is pressed, the mode indicator (10) changes in the order shown below.

Air will blow out from right front vents 1(2) and 2 (3)

Air will blow out from right front vents 1(2) and 2(3), and the foot vent (4).

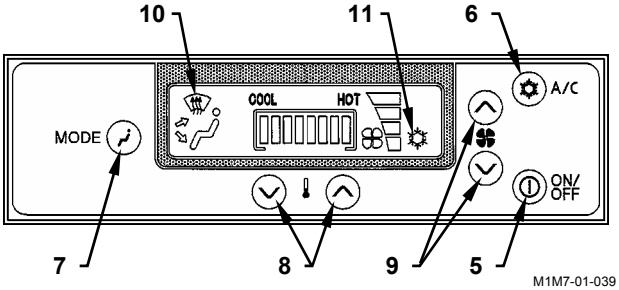
Air will blow out from the foot vent (4).



M1M7-01-009

8- Temperature Control Switch
The set temperature decreases each time the switch with ⌄ mark is pressed, and increases each time the switch with ⌃ mark is pressed.

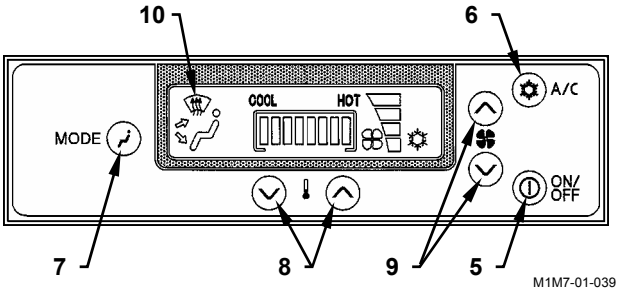
9- Blower Switch
The blower speed can be adjusted in 3 stages from Slow, Medium, and Fast.



M1M7-01-039

Heating Operation

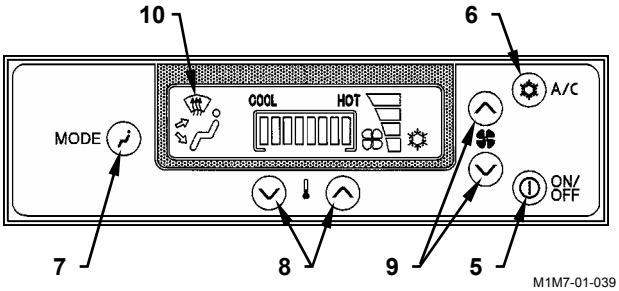
Although warm air will blow out from all three vents, normally the foot vent is used for heating operation. After selecting the foot vent by operating vent mode switch (7), press temperature control switch (8) to set the temperature indicator toward the right end side. Adjust the inside cab temperature using temperature control switch (8). The blower speed can be adjusted manually using blower switch (9). When air conditioner switch (6) is turned ON during heating operation, air in the cab will be dehumidified.



M1M7-01-039

Cooling Operation

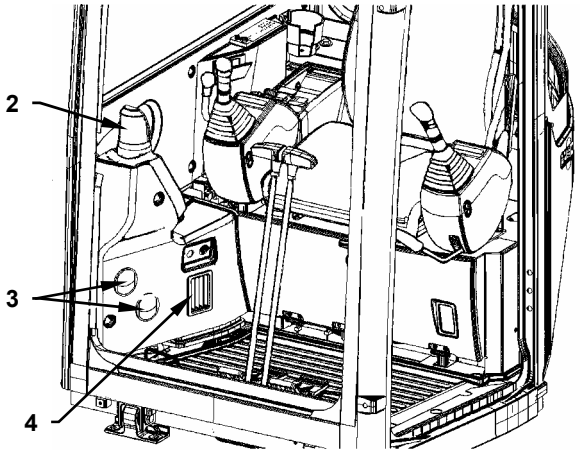
Although cool air will blow out from all three vents, normally the foot vent is used for cooling operation. After selecting the foot vent by operating vent mode switch (7), press temperature control switch (8) to set the temperature indicator toward the left end side. Adjust the inside cab temperature using temperature control switch (8). The blower speed can be adjusted manually using blower switch (9). When air conditioner switch (6) is turned ON during cooling operation, cool air will also blow out from the right front vent.



M1M7-01-039

Defroster Operation

Select the right front vents by operating vent mode switch (7). Adjust the louvers on right front vents 1 and 2 as required. The blower speed can be adjusted manually using blower switch (9). Adjust the inside cab temperature using temperature control switch (8). Turn air conditioner switch (6) ON if the windows become clouded, or if dehumidifying in the cab is required.

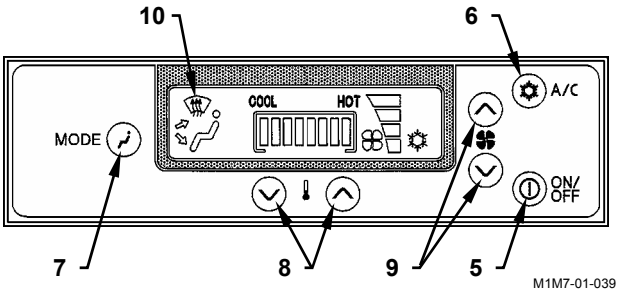


M1M7-01-009

TIPS FOR AIR CONDITIONER USAGE

Rapid Cooling

Temperature in the cab may rise over 80°C when the machine is exposed to direct sunlight with the cab windows closed. Under this condition, in case temperature in the cab is required to be rapidly cooled, ventilate air from the cab first by opening the windows. After starting the engine, set the temperature control toward the far left end using temperature control switch (8). Select the right front vent mode. Run the blower at the slow speed position. Turn air conditioner switch (6) ON. After keep the engine running at slightly faster speed (over 1000 min^{-1}[rpm]) for a few minutes, increase the blower speed. When the air temperature in the cab is decreased to the atmosphere temperature, close the windows.



If Windows Become Clouded

The windows will become cloudy if the humidity in the cab become high. Operate the air conditioner to keep the windows clear. When the atmosphere is very damp, the outside of the windows may become clouded if the air conditioner is operated for long periods. In this case, stop the air conditioner and/or adjust the air temperature in the cab.

When the air conditioner is not used

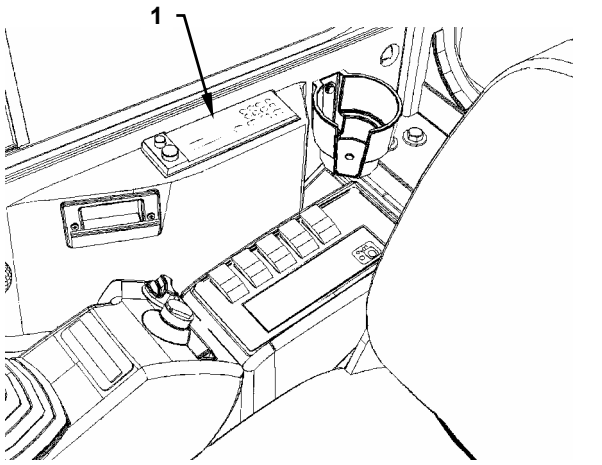
When the air conditioner is not used, to protect each part of the compressor from a lack of lubricant, operate the air conditioner at least once a month for several minutes with the engine running at a slow speed. When the cab temperature is lower than 15°C (59 °F), the air conditioner may not operate. In this case, warm the cab inside using the heater first to increase the cab temperature.

IMPORTANT:

- **Do not suddenly increase the engine speed, failure to do so possibly result in damage to the compressor.**
- **Keep fire hazards away from the control panel.**
- **Refer to the descriptions in Clean/Replace Air Conditioner Filter in the Maintenance Section for the maintenance of the air conditioner filters.**

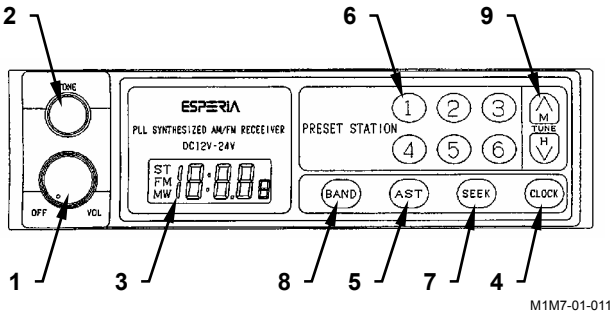
RADIO (Cab Equipped Machines)

1- Radio/Clock



M1M7-01-004

AM/FM RADIO OPERATION



M1M7-01-011

Part Name and Function

1- Power Switch/Volume Control Knob
Rotate the knob to the right to supply electric power (a click sound will be heard when the unit is turned ON). Rotate the knob further to turn up the volume. Rotate the knob in the reverse direction to turn down the volume and the unit OFF.

2- Tone Control Knob
Rotate the knob to the right to intensify the treble. Rotate the knob to the left to reduce the treble.

3- Display
Time, receiving radio wave frequency, or operation mode is displayed.

4- Clock Button
Press this button to display the time. Repress this button to display the receiving radio wave frequency.

5- Auto-Store/ Scan Preset Button (AST)
Press this button to receive the preset frequency station for every 5 seconds sequentially. While you receive the station you wish to listen to, press this button again to receive the station under normal state (scan is interrupted). Press and hold this button for 2 seconds to automatically store the station.

6- Station Preset Buttons (1 to 6)
One FM and MW (AM) station per button can be preset using these respective buttons.

7- Seek Button
Press this button to automatically seek the next receivable station. When a station is received, the auto-seeking function is deactivated.

8- Band Button
Select FM or MW (AM) by pressing this button. The display indicates the receiving station frequency.

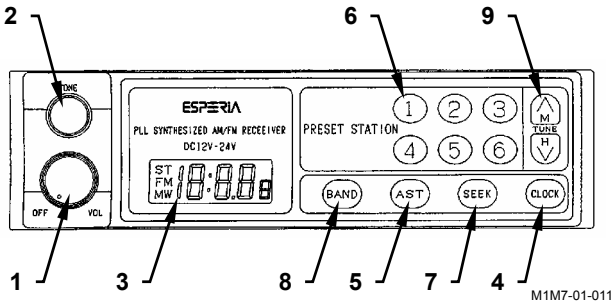
9- Tuning Button
Tap the TUNE $\wedge$ button to increase the frequency.
Tap the TUNE $\vee$ button to decrease the frequency.
Tap and hold the button to change the frequency continuously.

Radio Operation

1. Turn the key switch to the ACC or ON position to switch the radio ON.
2. Select either MW (AM) or FM by operating the brand button.
3. Select the station desired to listen using the preset or tuning button.
4. Adjust the volume and tone according to your preference.
5. When turning the radio OFF, rotate the VOL knob to the left until a click sound is heard.

Tuning Procedure

1. Tap the TUNE ∧ button (9) to increase the frequency. Tap the TUNE ∨ button (9) to decrease the frequency. Tap and hold the button to change the frequency continuously.
2. Automatic Tuning
   Press this button to automatically move the frequency up and to seek a receivable station. When a station is received, the auto-seeking function is deactivated so that the received frequency station is tuned in.

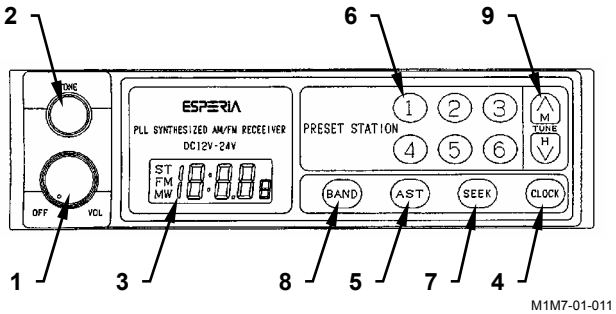


M1M7-01-011

Station Presetting Procedure

1. Select MW (AM) or FM by pressing BAND button (8). Select a station by pressing either TUNE button (9) or SEEK button (7).
2. Continuously press one of PRESET button (6) by which you desire to preset the station for more than 2 seconds. When presetting is complete, the preset button No. is indicated on the display.
3. Repeat the above same procedure steps (1) and (2) to preset other stations with other PRESET buttons (6).

NOTE: After presetting is complete, if the preset button is pressed again and held for more than 2 seconds, the preset station is changed.



M1M7-01-011

- Auto-Storing
  Press and hold the AST button (5) for more than 2 seconds with the radio switch ON, preset buttons (1 to 6) automatically search receivable frequency stations in the selected frequency band (AM or FM) and memorize each station in one button.

NOTE: When auto-store operation is made, the preciously memorized stations are deleted. If it is difficult to set the memory of the desired station to the desired button, conduct preset operation.

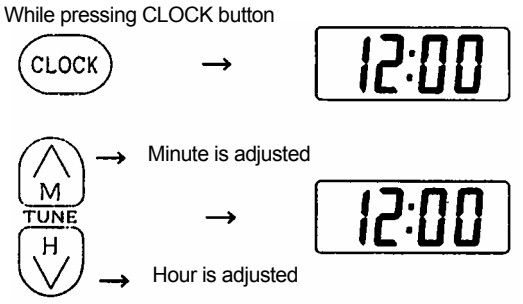
- Preset Scanning
  Press and release the AST button (5) in 2 seconds with the radio switch ON, preset station frequencies are received one by one for 5 seconds. Press the button again to resume normal radio operation.

Deletion of Preset Memory

If the battery power is disconnected such as when the machine is serviced or the radio is removed, the preset memory in the preset buttons will be deleted. Repeat the preset operation again.

Clock Setting Procedure

In case the frequency is indicated on the display, press the CLOCK button (4) to display the time.
While pressing the CLOCK button (4) press TUNE∧M button to change the minute display. While pressing the CLOCK button (4), press TUNE∨H button to change the hour display. Release the CLOCK button (4) to resume the original mode.

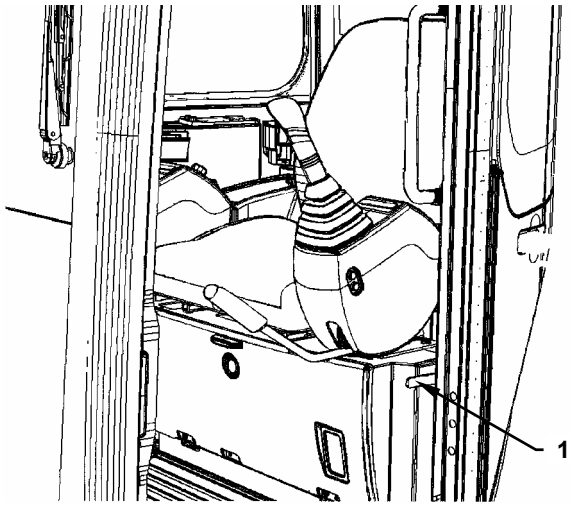


M1M7-01-012

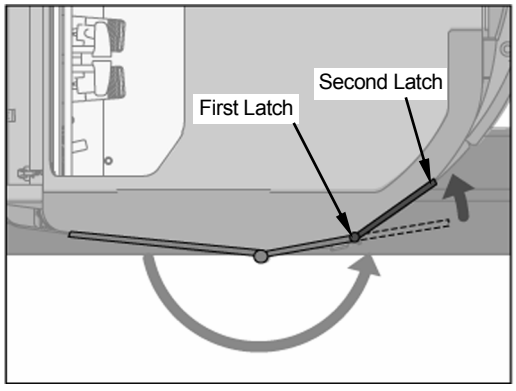
CAB DOOR RELEASE LEVER (Cab-equipped machines)

CAUTION: Open the cab door all the way until the two latches on the side of the cab securely lock.

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



M1M7-01-003

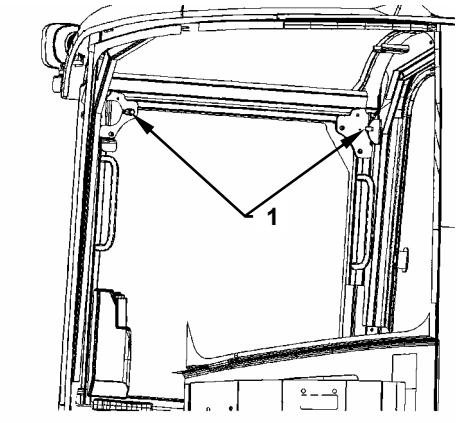


M1M7-01-027

OPENING/CLOSING CAB FRONT WINDOW (Cab-equipped machines)

Front Window

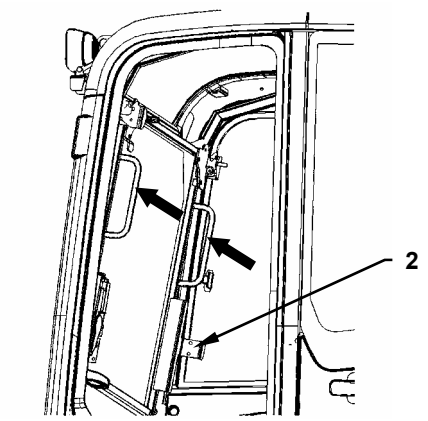
1. Disengage lock lever (1) provided at the upper right and left corner of the front window.
2. Hold the handles (in two places) on the front window frame and raise the window until the lock lever engages with the window frame.



M1M7-01-013

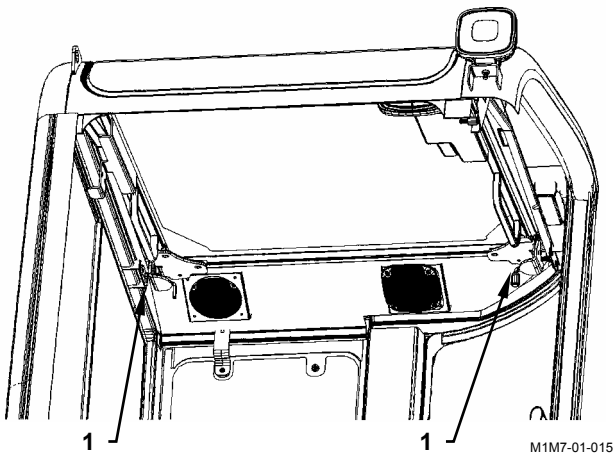
CAUTION:

- **When closing the front window, slowly lower the window. Be alert not to pinch your fingers.**
- **Switch (2) is provided on the front window frame to prevent the wiper from operating when the front window is opened. Before closing the front window, check that the wiper switch is OFF.**
- **After opening the front window, check that both side lock levers are securely engaged in the window frame.**



M1M7-01-014

3. When closing the front window, follow the same steps 1 and 2 above in the reverse order.

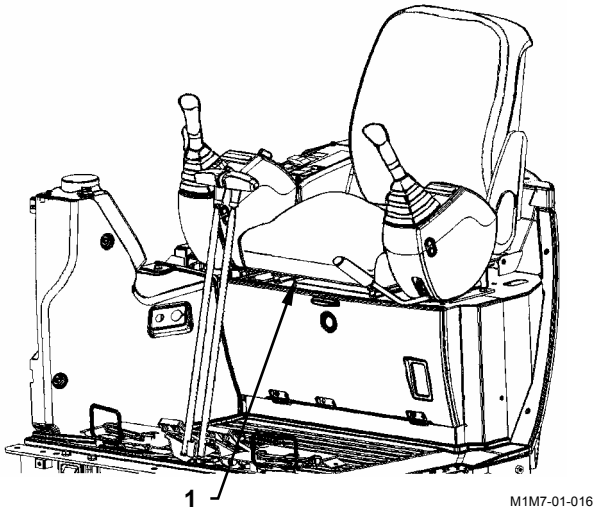


M1M7-01-015

ADJUSTING OPERATOR'S SEAT

Seat Fore-Aft Adjustment

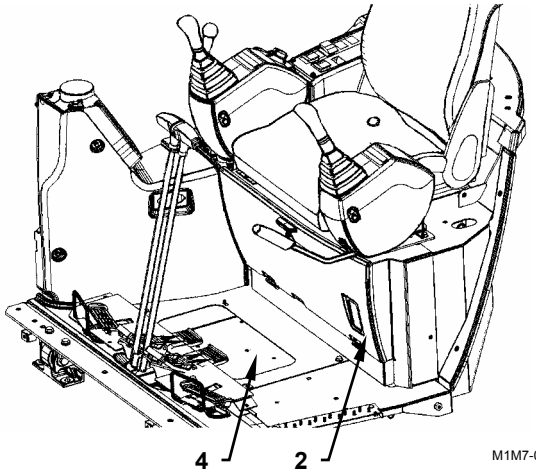
Operate seat fore-aft slide lever (1). Seat fore-aft position can be adjusted at the interval of 20 mm (0.8 in) in 6 steps (120 mm (5 in) in total).



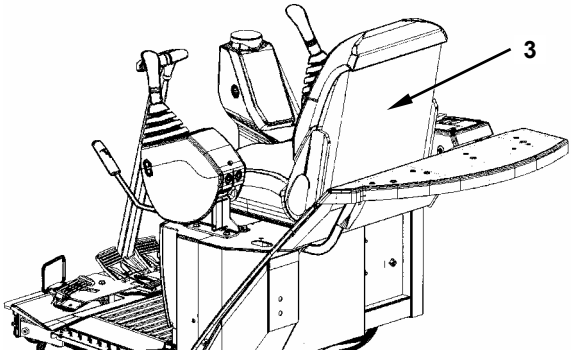
M1M7-01-016

TOOL AND OPERATOR'S MANUAL BOXES

Tool box (2) (4) and operator's manual box (3) are located under the operator's seat, under the floor mat and behind the backrest of the operator's seat respectively.



M1M7-01-017



M1M7-01-018

EMERGENCY EXIT (cab-equipped machines)

If the operator's cab door can not be opened in an emergency, escape in the following methods.

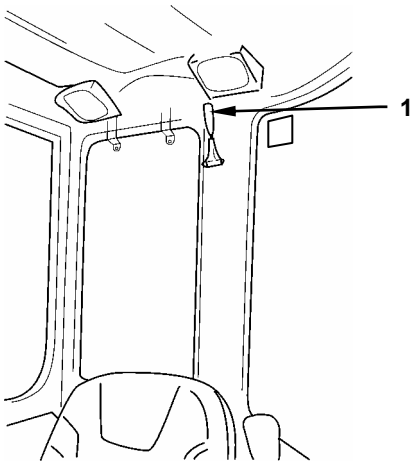
1. When required to escape from the cab when the door is difficult or impossible to open in an emergency, open the front window.

NOTE: Refer to the descriptions in OPENING/CLOSING CAB FRONT WINDOW for the opening method of the front window.

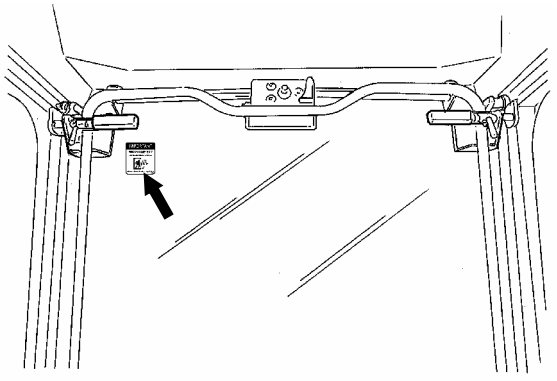
WARNING: Be sure to wear safety glasses when require to break the windowpane.

2. In case opening the front window is impossible, break the front window glass with emergency evacuation hammer (1) provided on the rear side in the cab to escape through the broken window.
3. If the front window is not available for escaping, break the rear window glass with emergency evacuation hammer (1). Then, escape through the broken window.

NOTE: Emergency exit decal is affixed on the front and left rear window.

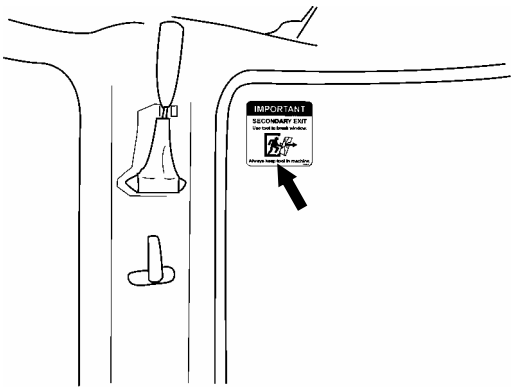


M1M7-01-020



Front

M1M7-01-037



Rear

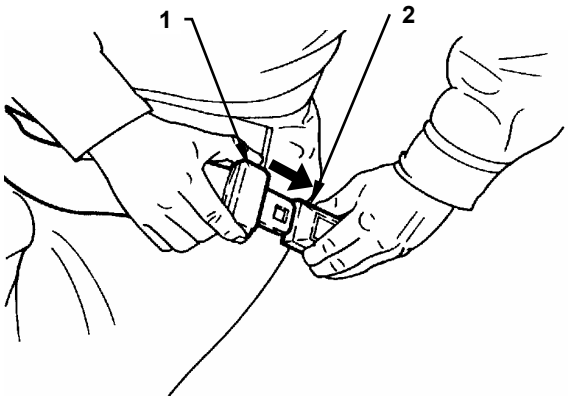
M1M7-01-038

SEAT BELT (OPTIONAL)

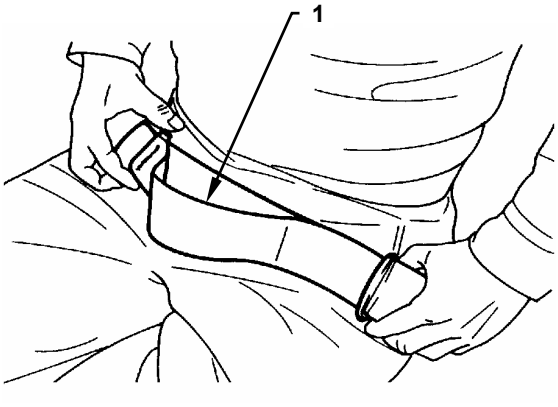
WARNING: Be sure to use the seat belt when operating the machine.
Before operating the machine, be sure to examine seat belt (1), buckle (2), or attaching hardware. Replace seat belt (1), buckle (2), or attaching hardware if they are damaged, or worn.
Replace seat belt (1) every three years, regardless of appearance.

Seat Belt

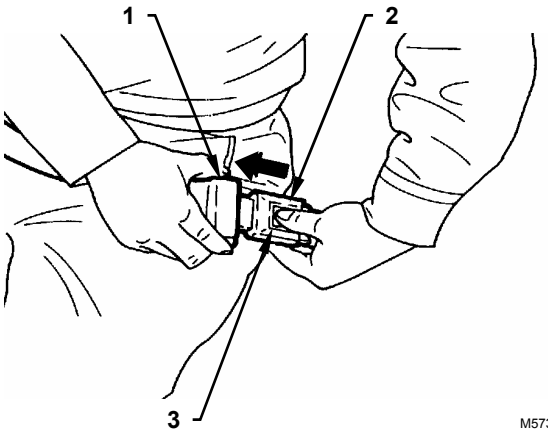
1. Confirm that seat belt (1) is not twisted and securely insert the end of seat belt (1) into buckle (2). Lightly pull on the belt to confirm that the buckle latches securely.
2. Adjust tightness of the seat belt (1) so that the belt is snug but comfortable.
3. Push button (3) on buckle (2) to unfasten seat belt (1).



M573-01-014



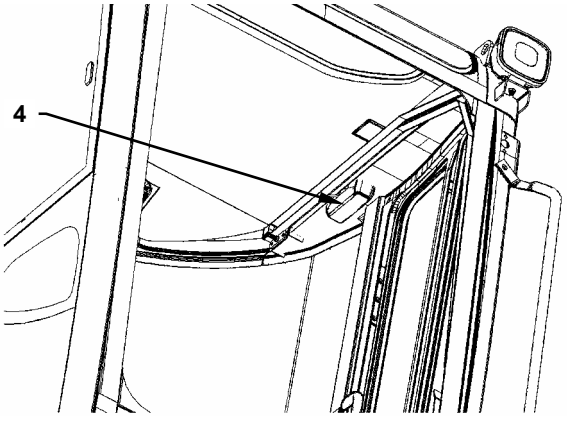
M107-01-045



M573-01-015

CAB LIGHT (cab-equipped machines)

Move cab light switch (4) to turn the cab light ON or OFF. (The cab light comes ON only when the key switch is turned ON.)



M1M7-01-021

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.

MEMO

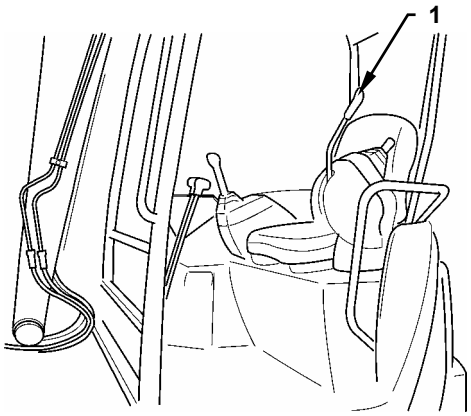
BEFORE STARTING ENGINE

1. Check that pilot control shut-off lever (1) in the LOCK position.
2. Confirm that all control levers are placed in neutral.
3. Check indicator bulbs as follows:
   Turn key switch (2) to the ON position. All indicator lights and warning lamps will come on. They will stay on for approximately 3 seconds, except for alternator (3) and engine oil pressure (4) indicator, which will continue to stay on further.

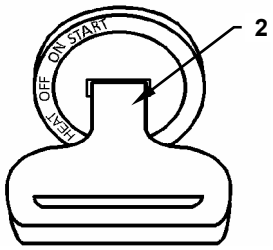
IMPORTANT: The monitor panel indicates the machine operating conditions. If the machine is operated with an indicator bulb or a warning lamp burned out, the alarm will not be displayed even if any abnormality occurs on the machine. Accordingly, in case any of the indicator bulbs or the warning lamps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

4. Adjust the seat position so that all pedals and control levers can be fully stroked to any position when seated in the operator's seat with the operator's back kept in contact with the backrest. Fasten the seat belt.

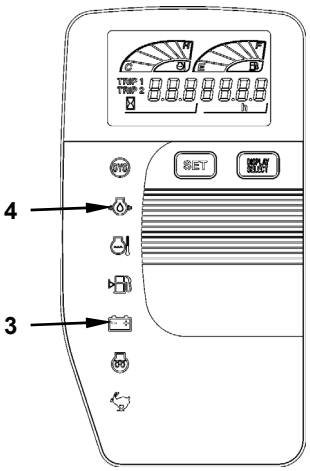
NOTE: The monitor surfaces are resin. Wipe the surface only with a damp cloth when dusty to keep them clean. Never use an organic solvent.



M1M7-03-001

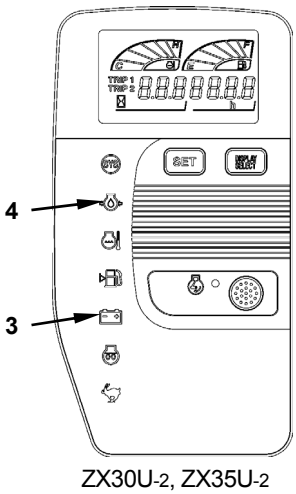


M1M7-01-007



ZX27U-2

M1M7-01-031



ZX30U-2, ZX35U-2
ZX40U-2, ZX50U-2

M1M7-01-028

STARTING ENGINE

Starting in Ordinary Temperature

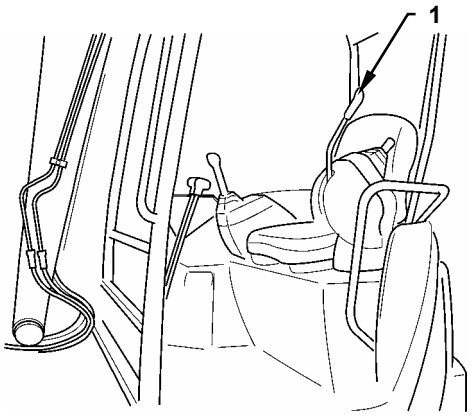
1. Check that pilot control shut-off lever (1) in the LOCK position.
2. Turn engine control dial (3) or engine control lever (3) to the slow idle position.
3. Sound the horn to alert bystanders.
4. Turn key switch (2) to rotate the starter. The engine will be started.

IMPORTANT: Prevent starter damage and/or battery over discharge. Never run the starter for more than 20 seconds at a time. If the engine fails to start, return the key switch to OFF. Wait for more than 30 seconds, then try again.

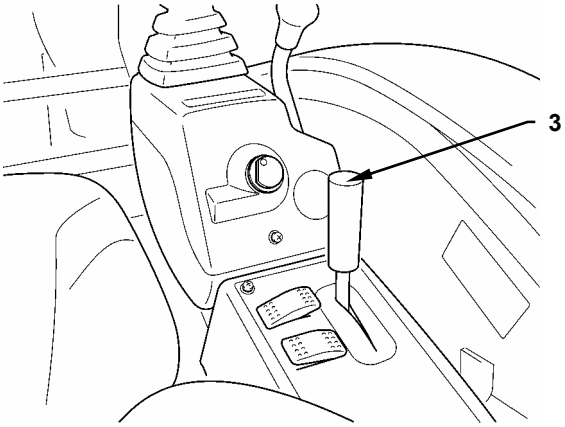
5. Release key switch (2) immediately after the engine has started. It will automatically return to the ON position.

NOTE: The horn sounds even though the key switch is turned OFF. The engine doesn't start unless the pilot control shut-off lever is in the LOCK position.

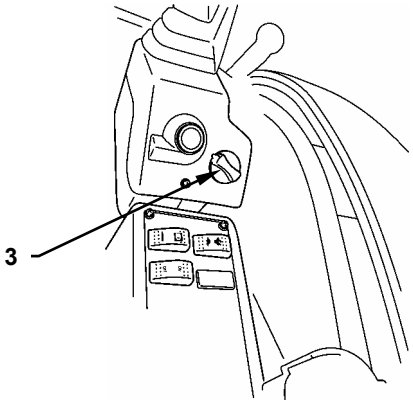
IMPORTANT: Avoid operating key switch (2) with stained hands or gloves.



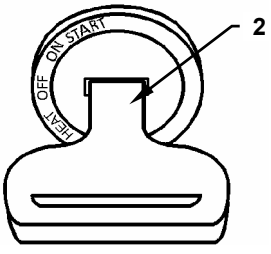
M1M7-03-001



ZX27U-2 M1M7-03-006



ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2 M1M7-03-002



M1M7-01-007

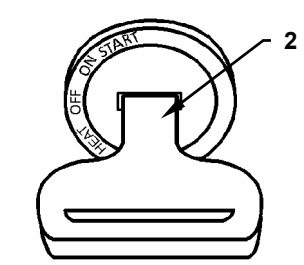
Starting in Cold Weather

1. Check that pilot control shut-off lever (1) is in the LOCK position.
2. Turn engine control dial (3) or engine control lever (3) to around the middle between the slow and fast idle positions.
3. Turn key switch (2) to the HEAT position and hold it in that position for approx. 15 seconds until preheat indicator (4) goes OFF.
4. Sound the horn to alert bystanders.
5. As soon as preheat indicator (4) goes OFF, return key switch (2) to the START position to run the starter.

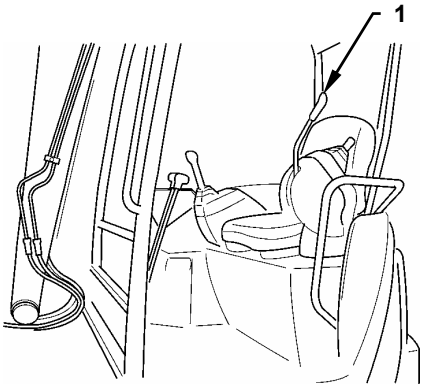
IMPORTANT: Prevent starter damage and/or battery over discharge. Never run the starter for more than 20 seconds at a time. If the engine fails to start, return the key switch to OFF. Wait for more than 30 seconds, then try again.

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

NOTE: Set the engine control dial or lever to the fast idle position to start the engine in an extreme cold weather district. After the engine is started, gradually reduce the engine speed and perform warm-up operation at the medium speed range.



M1M7-01-007



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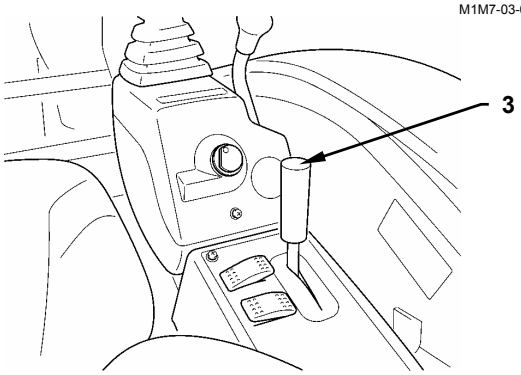
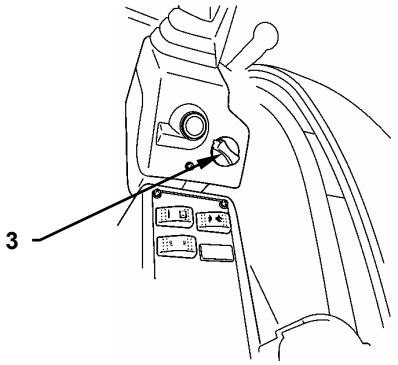


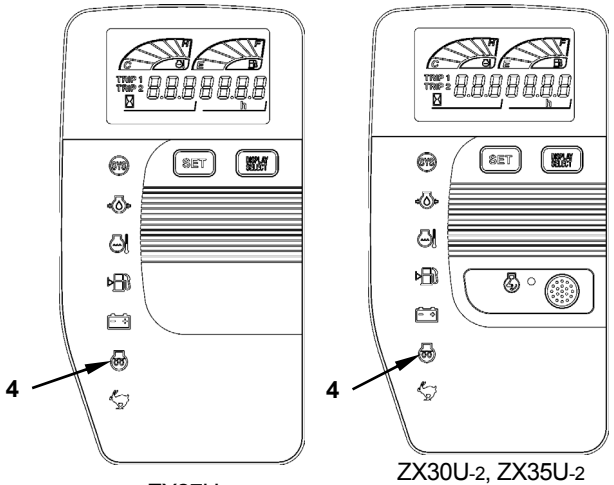
ZX27U-2

M1M7-03-006



ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2

M1M7-03-002



ZX27U-2

ZX30U-2, ZX35U-2
ZX40U-2, ZX50U-2

M1M7-01-031

M1M7-01-028

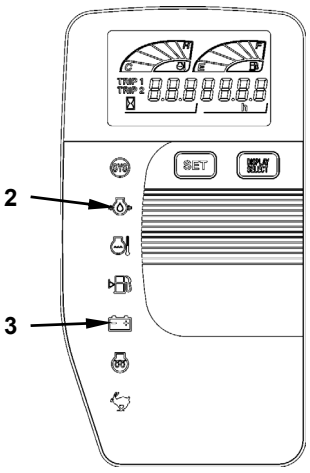
CHECK MACHINE AFTER STARTING ENGINE

IMPORTANT: In case any abnormality is found in the monitor, immediately stop the engine. Trace the cause of the problem.

Check Using the Monitor

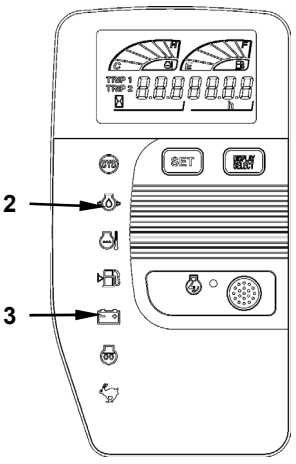
After the engine has started, check the following points through the monitor.

1. Check that alternator indicator (3) is OFF.
   In case alternator indicator (3) stays ON, immediately stop the engine. Then, check the alternator and/or battery system for any abnormality.
2. Check that engine oil pressure indicator (2) is OFF.
   In case engine oil pressure indicator (2) stays ON, immediately stop the engine. Then, check the engine oil pressure system and/or the oil level for any abnormality.



ZX27U-2

M1M7-01-031



ZX30U-2, ZX35U-2
ZX40U-2, ZX50U-2

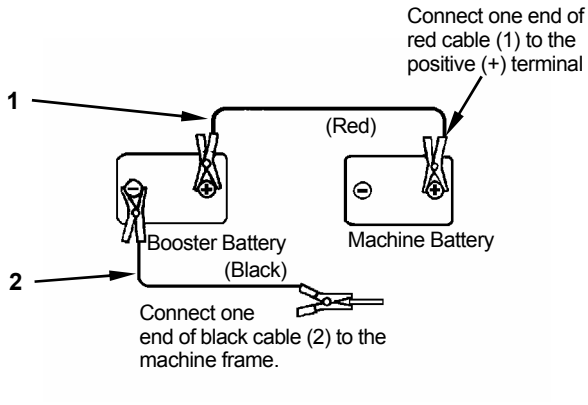
M1M7-01-028

USING BOOSTER BATTERIES

WARNING: An explosive gas is produced while a battery is in use or being charged. Keep flames or sparks away from the battery area. Park the machine and booster battery machine on a dry, firm or concrete surface, not on steel plates. If the machine and/or the booster battery machine are 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.

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

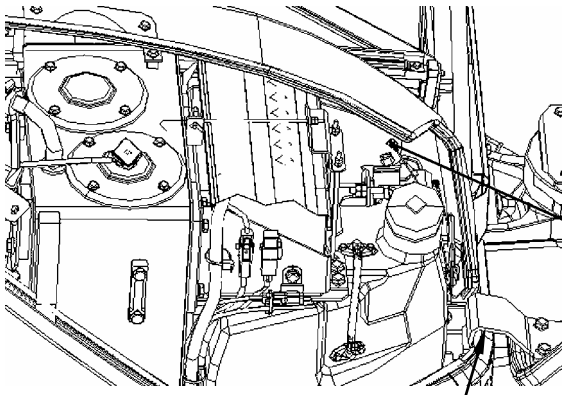
When the machine battery is exhausted, start the engine using a booster battery as shown below.



M503-03-002

Connecting Booster Cables

1. Stop the engine of the booster battery machine.
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. After connecting one end of the black cable (2) to the negative (-) terminal of the booster battery, connect the other end to hydraulic oil tank cover hinge (3) on the machine. Be alert to sparks that may be produced in the last connection to the hydraulic oil tank cover hinge.
4. After securely connecting the booster cables, start the engine of the booster battery machine. Run the engine at a middle speed. Then, start the engine of this machine.
5. After the engine is started, disconnect booster cables (1 and 2) following the procedures below.

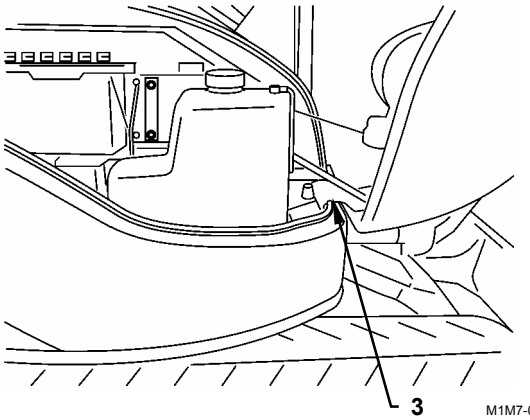


ZX27U-2, ZX30U-2, ZX35U-2

M1LA-03-003

Disconnecting Booster Cables

1. Disconnect black booster negative (-) cable (2) from hydraulic oil tank cover hinge (3) 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.



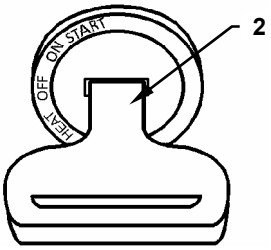
ZX40U-2, ZX50U-2

M1M7-03-004

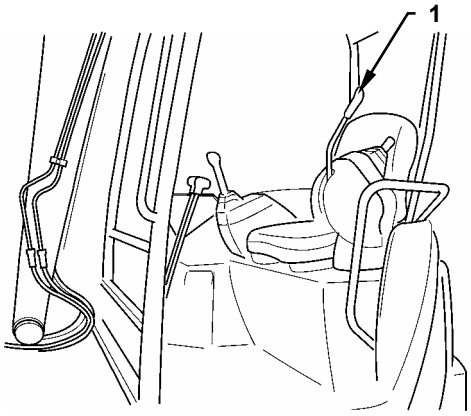
STOPPING THE ENGINE

Stop the engine following the steps below.

1. Before stopping the engine, lower the bucket and blade to the ground unless specified.
2. Return the engine control dial or the engine control lever to the slow idle position and keep the engine running at slow idle speed for 5 minutes.
3. Turn the key switch (2) OFF to stop the engine.
4. Pull up pilot control shut-off lever (1) to the LOCK position.



M1M7-01-007



M1M7-03-001

TRAVEL LEVERS AND PEDALS

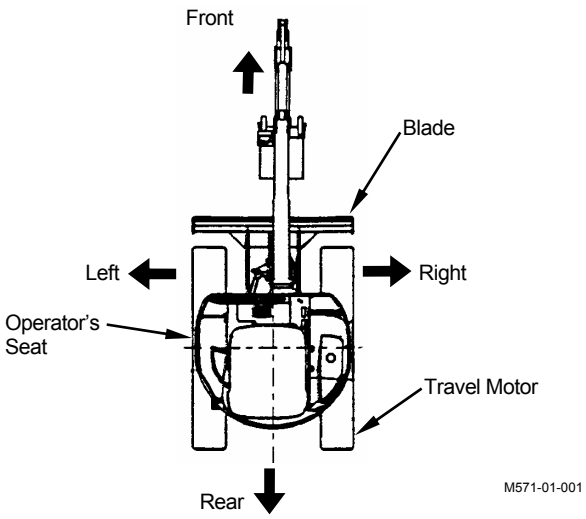
Travel operation can be performed with either the levers or pedals.

WARNING: In the standard traveling position, the front idlers are located in front of the operator's seat and the travel motors at the rear. If the travel motors are positioned at the front of the machine, when the travel levers or pedals are operated in the direction as illustrated on the operation decals, the travel direction of the machine will be reversed. Be sure to confirm the position of the travel motors before traveling.

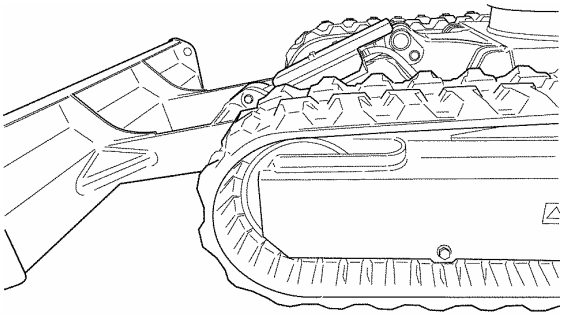
NOTE: Travel lever dampers are provided for smooth control. In extremely cold weather (lower than -20 °C (-68 °F)), the travel lever (or pedal) will become heavy to operate. This is caused by increase in oil viscosity which is not abnormal.

- 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.

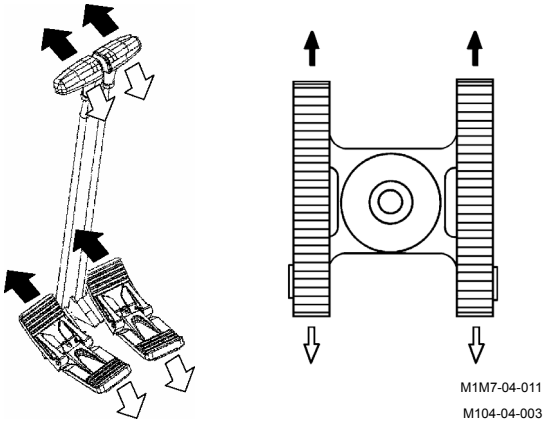
- Ascending/Descending Slopes
  The machine gradeability is 30° (58%). Slowly operate the travel levers (or pedals) when descending a slope. When the travel levers are placed in neutral, the travel brakes are automatically applied to stop the machine.



M571-01-001



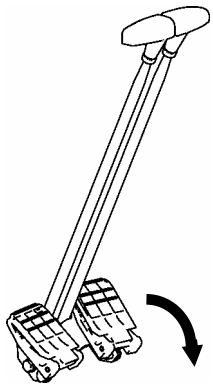
M1LA-04-001



M1M7-04-011
M104-04-003

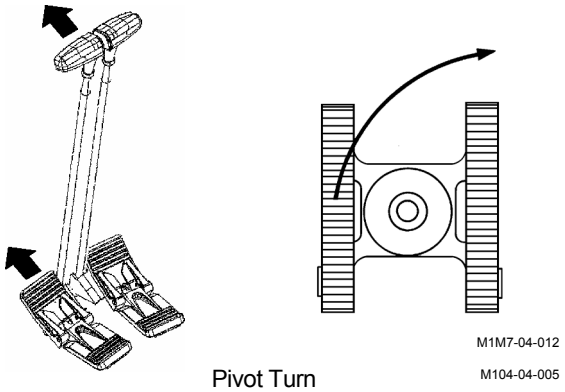
Forward/Reverse Travel Direction

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



M1M7-04-010

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



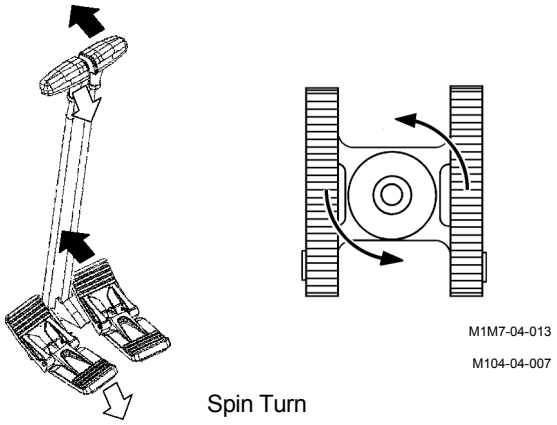
M1M7-04-012

Pivot Turn

M104-04-005

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

CAUTION: 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

Spin Turn

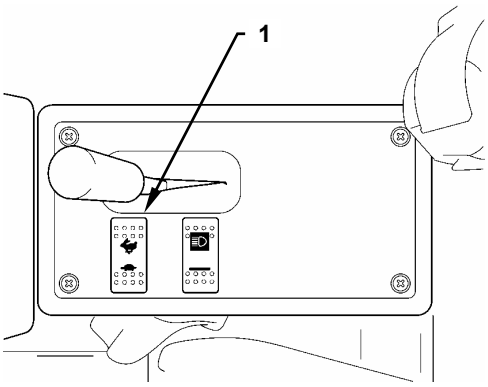
M104-04-007

TRAVEL MODE SWITCH

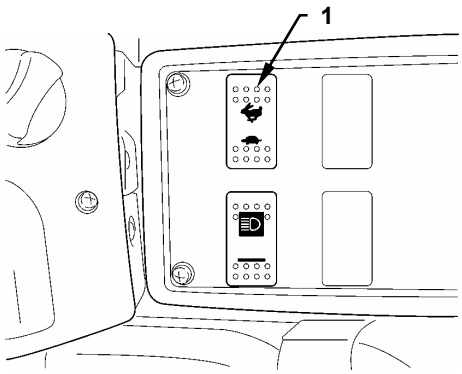
WARNING: Never attempt to shift the travel mode from the slow to fast while descending a slope. Return the travel levers (pedals) to neutral once before shifting the travel mode.

Press the RABBIT mark side on travel mode switch (1) to select the fast travel mode. (The slow travel mode will automatically be selected if the traveling loads increase.) Press the TURTLE mark side on travel mode switch (1) to select the slow travel mode.

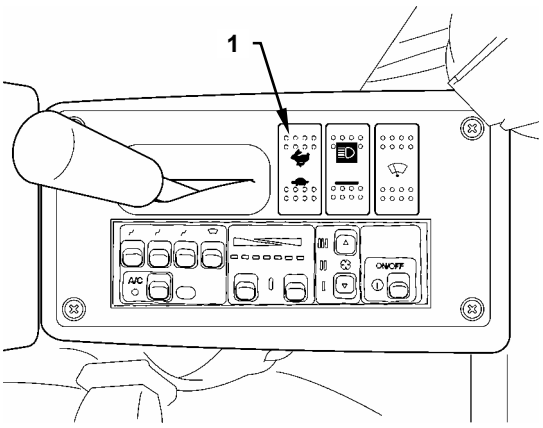
WARNING: In cold weather season, when the machine is traveling with the travel mode switch in the fast travel mode position, the slow travel mode may not automatically be selected even if the traveling loads increase. This symptom is not abnormal. Drive the machine after conducting sufficient warm-up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



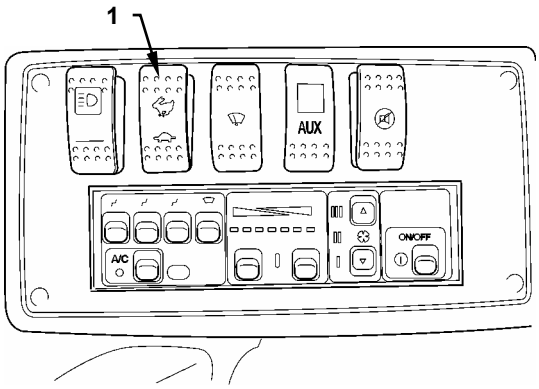
ZX27U-2 (Canopy) M1M7-01-033



ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2 (Canopy) M1M7-01-032



ZX27U-2 (Cab) M1M7-01-036

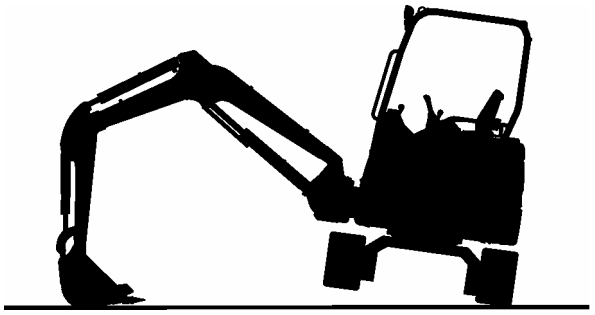


ZX30U-2, ZX35U-2, ZX40U-2, ZX50U-2 (Cab) M1M7-01-024

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 machine may become necessary. Don't 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 come 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 on the next page for the correct rope attaching method.

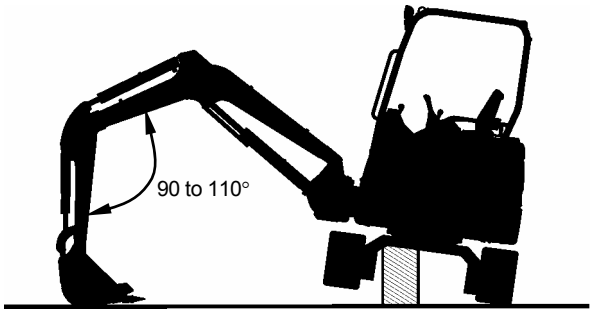


M1M7-04-005

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.

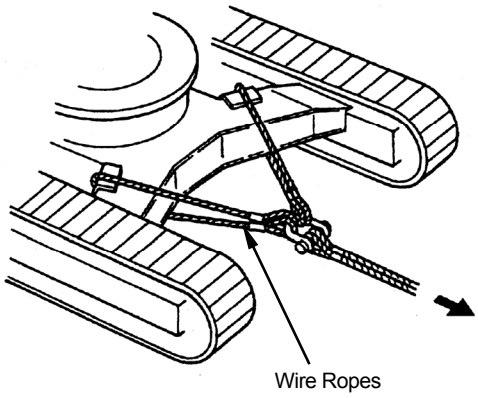


M1M7-04-006

TOWING MACHINE

In case it is difficult for the machine to evacuate from a soft terrain by own propelling power, attach wire ropes as illustrated to the right. Tow the machine using another machine. Be sure to attach the wire ropes around the track frames. To prevent the wire ropes from being damaged, place pieces of soft protective material between the wire ropes and the edge corners of the frame.

IMPORTANT: Do not tow the machine using the light-weight part towing holes provided on the blade. Damage to the towing holes may result.

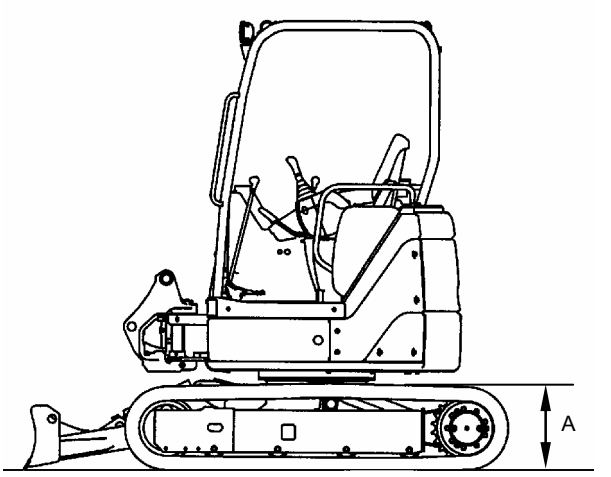


M104-05-010

DRIVING IN WATER OR ON SOFT GROUND

1. If the footing is even and the water slow running, the machine can drive in water up to the upper track shoe surface (A) at the top of the front idler. In case the footing is uneven and the water is flowing fast, be careful not to submerge the swing bearing, swing pinion gears, and/or center joint in water or mud.
2. The machine may enter deeper areas gradually. Check the machine's position often. Reposition the machine if necessary.

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.



M1M7-04-004

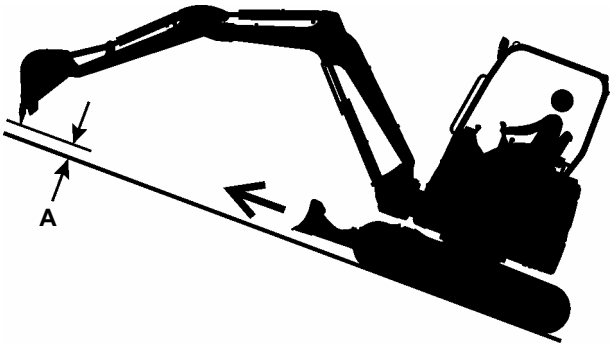
Machine Model	Operable Water Depth (A)
ZX27U-2	480 mm (19 in)
ZX30U-2, ZX35U-2	485 mm (19 in)
ZX40U-2, ZX50U-2	545 mm (21 in)

PRECAUTIONS FOR TRAVELING ON SLOPES

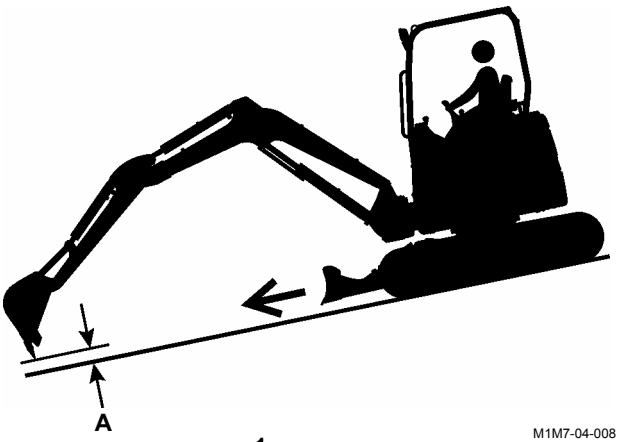
WARNING: Avoid possible injury from traveling on slopes. Tipping over or skidding down of the machine may result. Be sure to travel at slow speed on slopes. Never attempt to travel on slopes with the bucket loaded or any load suspended by the bucket.

- Never attempt to ascend or descend 30 degrees or steeper slopes.
- Be sure to fasten the seat belt. (Cab equipped machine)
- 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 skids or becomes unstable, immediately lower the bucket to the ground to stop traveling.
- Traveling across the face of 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 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 blade 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 driving power to ascend may not be obtained.

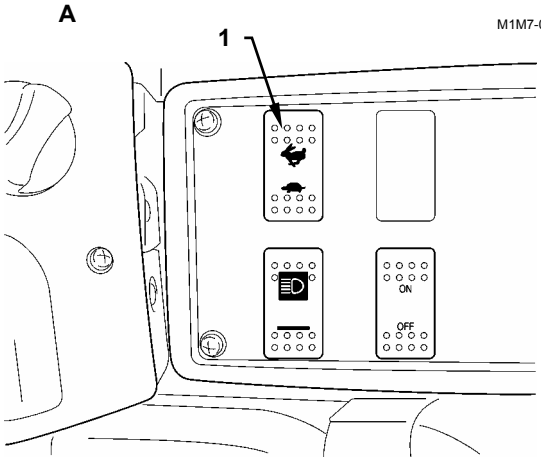
IMPORTANT: Traveling down a slope in the fast mode requires a longer time to stop the machine. When traveling down a slope, placing travel mode switch (1) in the TURTLE position is recommended.



M1M7-04-007



M1M7-04-008

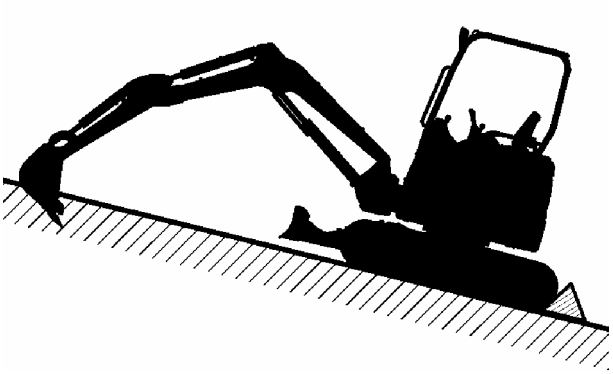


M1M7-01-023

PARKING AND STOPPING ON SLOPES

WARNING: Parking and/or stopping on slopes is extremely dangerous. Avoid parking and/or stopping the machine on slopes.

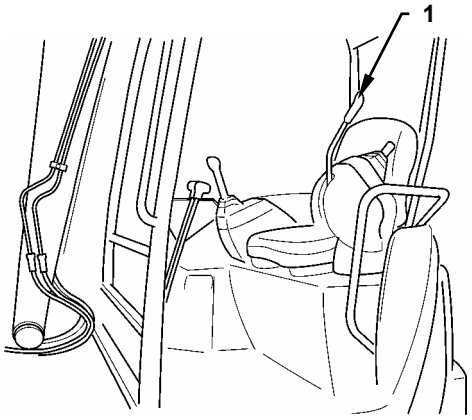
If parking and/or stopping on slopes is unavoidable, lower both the bucket and the blade to the ground, and place all levers in the neutral position. Also, put blocks at the downhill end of the tracks.



M1M7-04-009

PARKING ON SLOPES

1. Park the machine on a level, solid surface. Position the arm vertically and lower the bucket and blade to the ground.
2. Turn the engine control dial or the engine control lever to the slow idle position. Run the engine at the slow idle speed for approx. 5 minutes to cool the engine.
3. Turn the key switch to OFF to stop the engine. Remove the key from the switch.
4. Pull pilot control shut-off lever (1) into the fully LOCK position.
5. Close the window and cab door, if a cab is provided. Be sure to lock all the cab doors and windows.

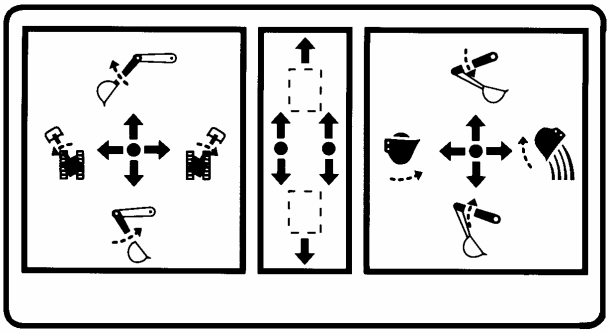


M1M7-03-001

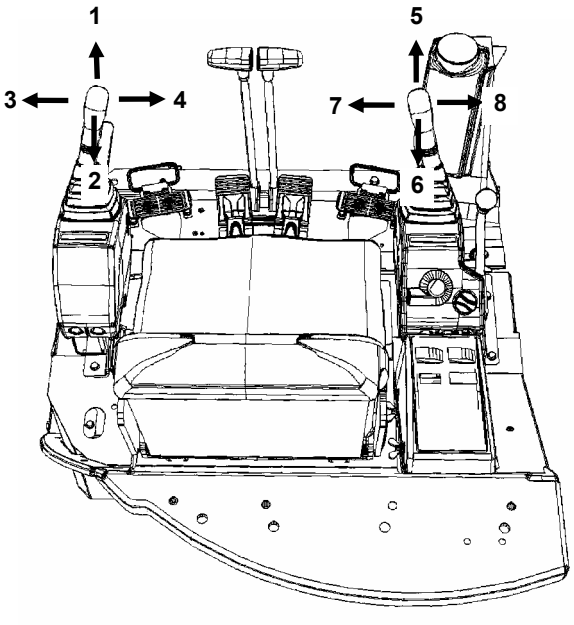
CONTROL LEVER (ISO EXCAVATOR PATTERN)

WARNING: Be sure to check the location and function of each control lever before operating. The upper structure and/or front attachment may unexpectedly move when attempting to turn and look behind the machine as 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 turning and looking behind the machine.

Labels showing the lever control pattern are provided on the operator's right. As illustrated below, the labels indicate the ISO Excavator Pattern.



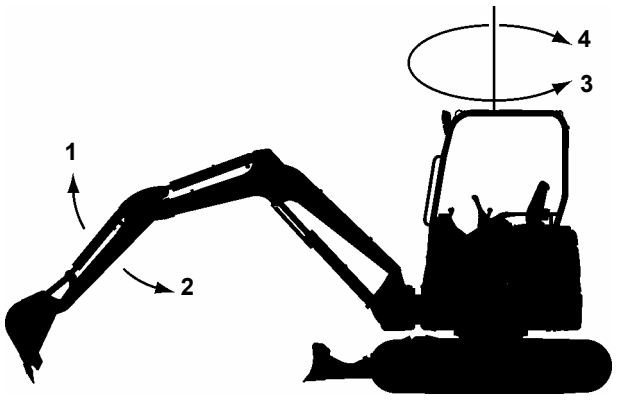
M588-05-050



M1M7-01-002

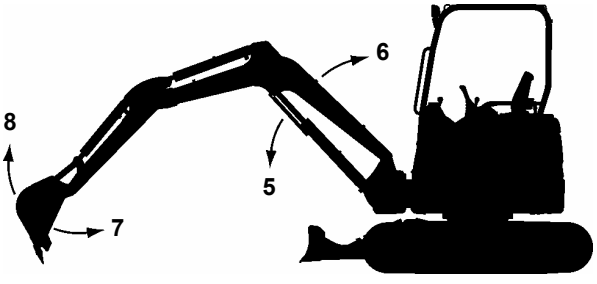
When a control lever is released, it automatically returns to neutral, stopping the function in that position.

1- Arm Roll-Out
2- Arm Roll-In
3- Swing Left
4- Swing Right



M1M7-05-001

5- Boom Lower
6- Boom Raise
7- Bucket Roll-In
8- Bucket Roll-Out

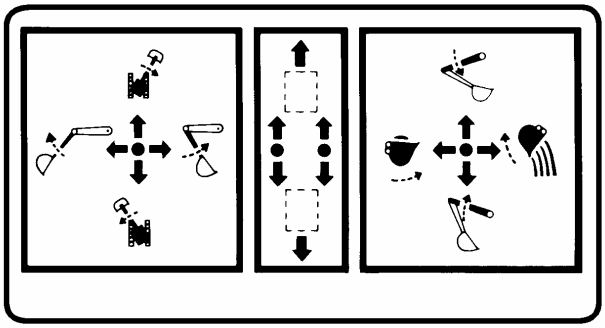


M1M7-05-002

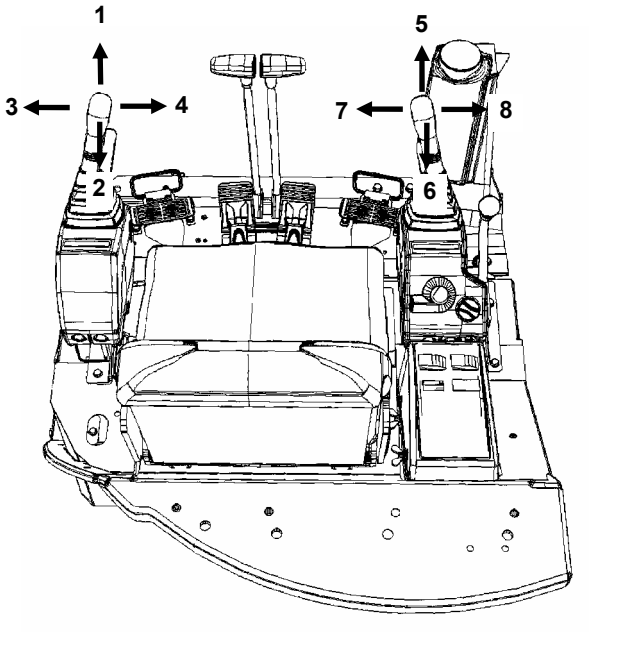
CONTROL LEVER (H-PATTERN: HITACHI EXCAVATOR PATTERN)

WARNING: Make sure to check 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.

Labels displaying the available lever control patterns are provided at the right of the operator. As illustrated below, the labels with H pattern mark at the right bottom corner indicate the HITACHI Excavator Pattern.



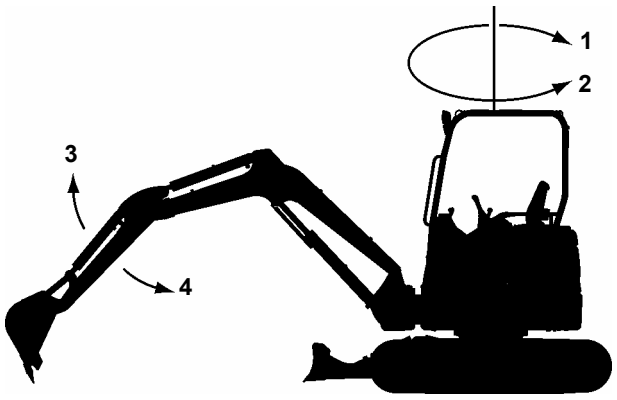
M1LA-05-014



M1M7-01-002

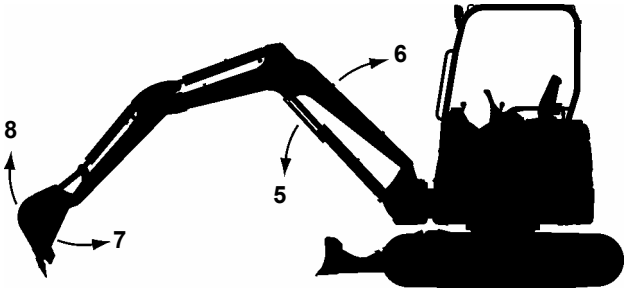
When a control lever is released, it automatically returns to neutral, stopping the function in that position.

1- Swing Right
2- Swing Left
3- Arm Roll-Out
4- Arm Roll-In



M1M7-05-001

5- Boom Lower
6- Boom Raise
7- Bucket Roll-In
8- Bucket Roll-Out

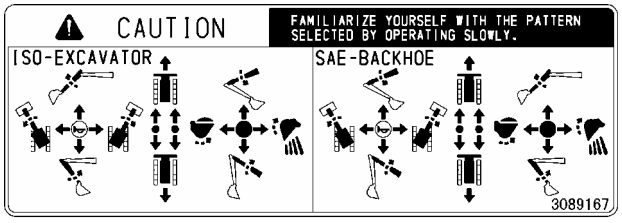


M1M7-05-002

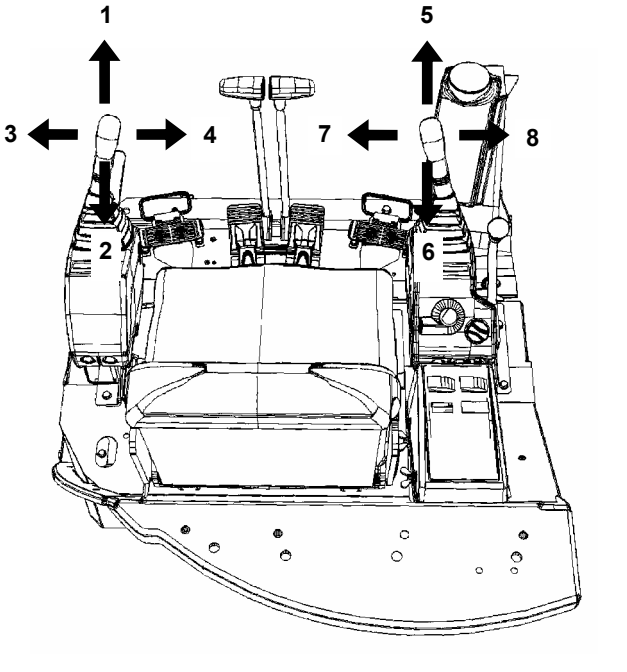
CONTROL LEVER (SAE-BACKHOE PATTERN) --- IF EQUIPPED (2 Way Multi Valve)

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.

Labels showing the SAE-BACKHOE pattern are provided on the operator's right.



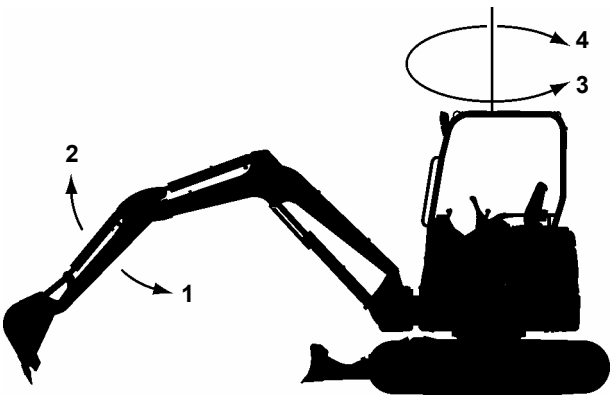
M1M7-05-028



M1M7-01-002

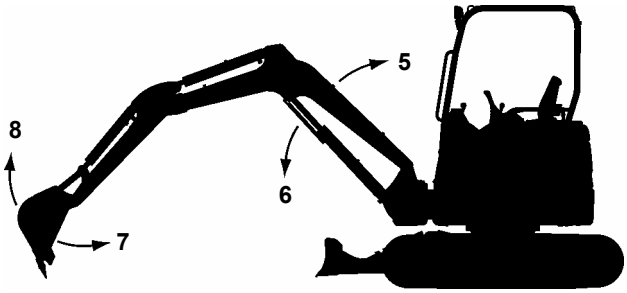
When a control lever is released, it automatically returns to neutral, stopping the function in that position.

1- Boom Lower
2- Boom Raise
3- Swing Left
4- Swing Right



M1M7-05-001

5- Arm Roll-Out
6- Arm Roll-In
7- Bucket Roll-In
8- Bucket Roll-Out



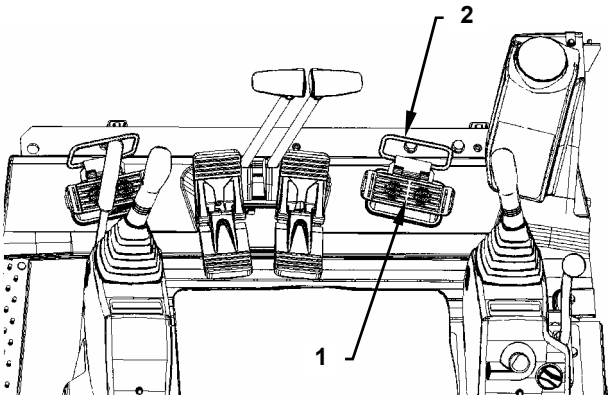
M1M7-05-002

BOOM-SWING PEDAL

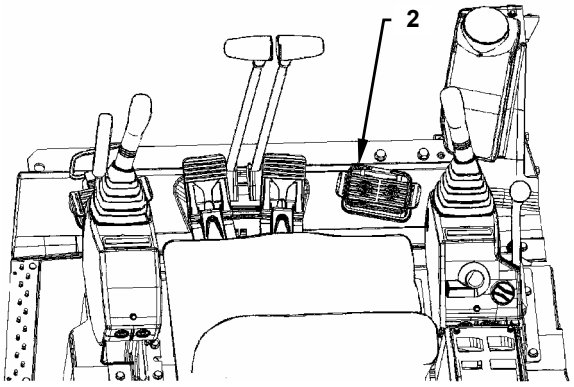
Use the boom swing function to efficiently operate the machine when excavating grooves along roadsides or near walls. The boom swing operation is performed using boom-swing pedal (1) located at the operator's right foot as illustrated to the right

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 the pedal to swing right.
3. Turn cover (2) backward over boom-swing pedal (1) when boom-swing operation is no longer required.



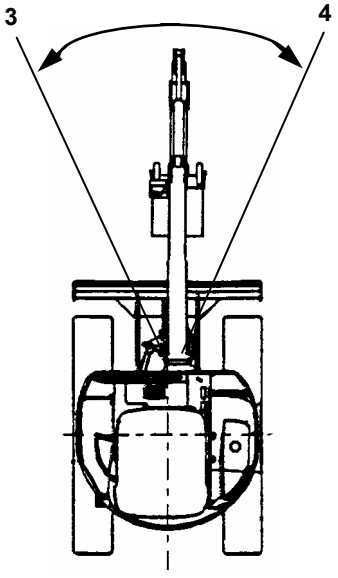
Unlock Position M1M7-05-005



Lock Position M1M7-05-006

3- Swing Left

4- Swing Right



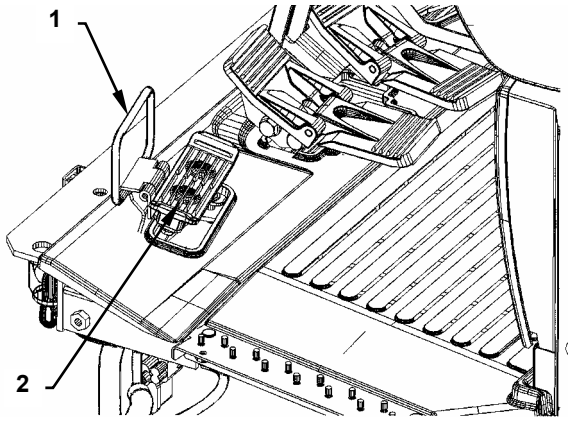
M571-01-001

AUXILIARY PEDAL (OPTIONAL)

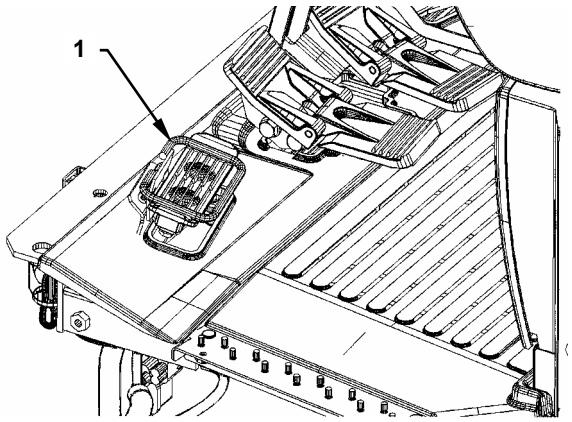
Use the auxiliary pedal (2) located at the operator's left front, as illustrated to the right, to operate hydraulic breaker, crusher, etc.

Operation

1. Turn auxiliary pedal cover (1) forward.
2. Step on the right or the left side of the auxiliary pedal (2) to operate the front-end attachment such as a hydraulic breaker
3. When the auxiliary pedal (2) is not used, turn cover (1) backward on the pedal.



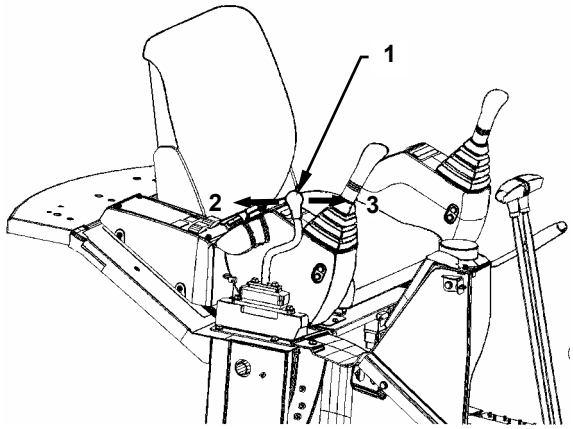
M1M7-05-007



M1M7-05-008

BLADE LEVER

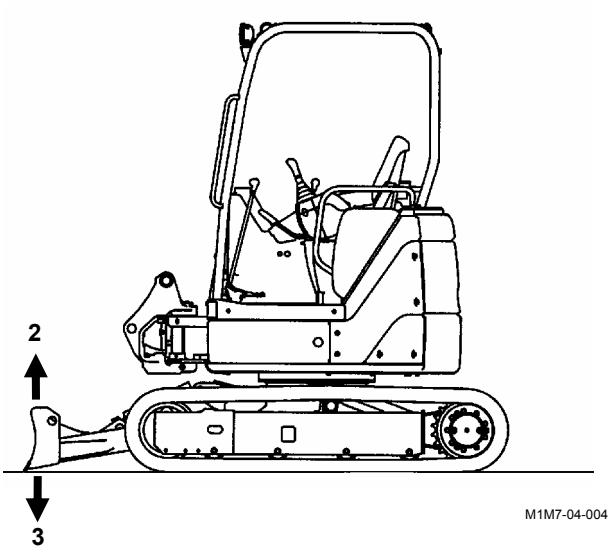
Use blade lever (1) on the operator's right to raise and lower the blade.
When the lever is released, it automatically returns to neutral, holding the blade in the present position until the lever is operated again.



M1M7-05-009

2- Blade Raise

3- Blade Lower

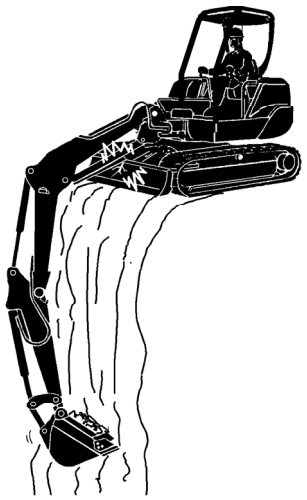


M1M7-04-004

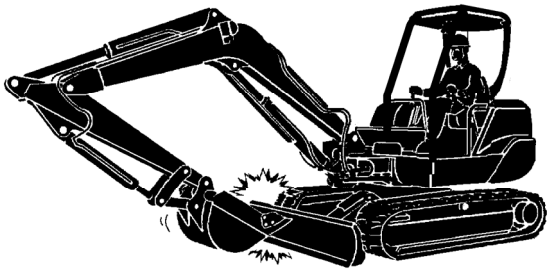
PRECAUTIONS FOR BLADE OPERATION

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

PILOT CONTROL SHUT-OFF LEVER

The pilot control shut-off lever is a device to prevent the machine from being unexpectedly operated even if the control levers are accidentally moved, such as with a part of the body or when the operator is getting in or out of the operator's station.
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 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 levers (3) to reactivate control lever (3) function without holding pilot control shut-off lever (1).**
- **Always stop the engine and pull pilot control shut-off lever (1) to the full LOCK position before exiting the operator's station, even when exiting temporarily.**
- **Be sure to move the pilot control shut-off lever to the LOCK position before exiting the machine after each shift.**
  Pilot Control Shut-off Lever Operation

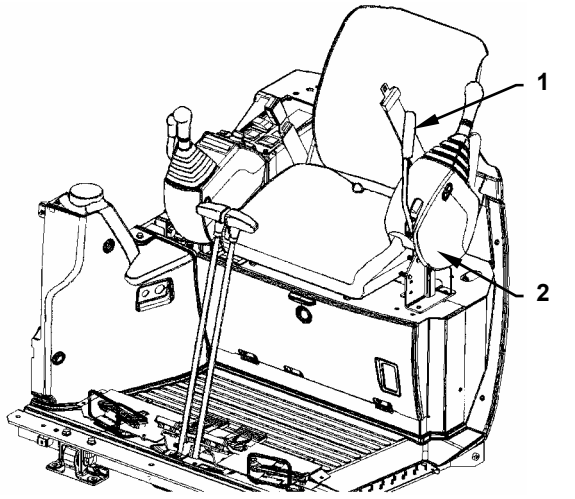
Before Leaving the Machine:

1. Park the machine on a firm, level surface. Lower the bucket and blade to the ground. Return all control levers to neutral. Stop the engine.
2. To deactivate control lever (3) function, be sure to pull pilot control shut-off lever (1) and raise console (2) to the fully locked position.

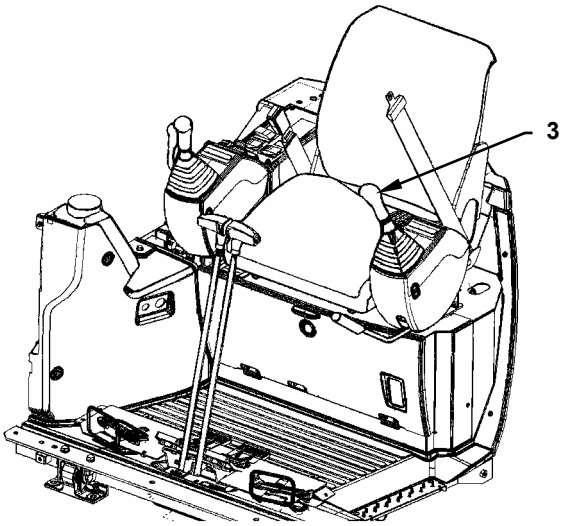
Before Starting Operation:

WARNING: Never attempt to lower the raised console (to reactivate the pilot control shut-off function) by holding and pushing down control lever (3) and/or console (2). Always lower the console using pilot control shut-off lever (1).

Be sure to hold pilot control shut-off lever (1) in LOCK (raised) position when starting the engine.
Slowly lower pilot control shut-off lever (1) to UNLOCK position before starting operation.
After moving the pilot control shut-off lever to the UNLOCK position, check that no activators move when all control levers and pedals are in neutral before starting operation. If any actuator moves after moving the pilot control shut-off lever (1) to the UNLOCK position with all control levers and pedals in neutral, the machine may be experiencing trouble. Immediately return pilot control shut-off lever (1) to the LOCK position and stop the engine. Contact your authorized dealer for repair.



Lock Position M1M7-05-010



Unlock Position M1M7-05-011

WARMING UP OPERATION

The normal operating temperature of hydraulic oil is between 50 and 80 °C (122 and 176 °F). Hydraulic components may be seriously damaged if the machine is operated when the hydraulic oil temperature is below 20 °C (68 °F).
Before starting work, be sure to follow these warm-up procedures until the temperature of the hydraulic oil reaches above 20 °C (68 °F).

Warm-Up Procedures:

1. Run the engine at 100 to 200 min^{-1} (rpm) above slow idle speed for 5 minutes.
2. With the engine speed control lever or the engine speed control dial at the medium position, run the engine for 5 to 10 minutes.
3. Extend and retract each cylinder several times and lightly operate the swing and travel motors to warm up them.

WARMING UP IN COLD WEATHER

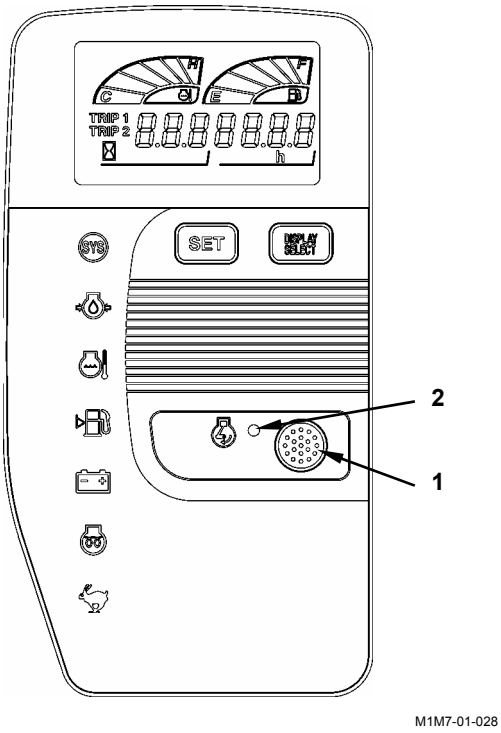
IMPORTANT: In case the hydraulic oil temperature is low, never operate the machine until all actuator speeds become normal after warming up operation.

1. Run the engine at intermediate speed for 5 minutes (longer if the air temperature is extremely low).
2. Do not run the engine at either slow or fast speed during this time.
3. Extend and retract each cylinder several times and lightly operate the swing and travel motors to warm up them.
4. Extend the bucket cylinder to the stroke end. Be sure not to hold the bucket lever in this position for more than 30 seconds.
5. Retract the bucket cylinder to the other stroke end. Be sure not to hold the bucket lever in this position for more than 30 seconds.
6. Repeat steps 4 to 5 until the bucket cylinder cycle time becomes normal.

AUTO-IDLE CONTROL (Except ZX27U-2)

Auto-Idle Function

During operation, approximately 4 seconds after all control levers have been returned to neutral, this system reduces the engine speed to the auto-idle setting until any control lever is operated again to improve fuel consumption. The engine speed immediately increases to the speed set by the engine control dial when any control lever is operated.



M1M7-01-028

CAUTION:

- **Always check if auto-idle indicator (2) is turned ON or OFF before starting operation. When the indicator is ON, the auto-idle function will operate.**
- **When any control lever is operated from the neutral position with auto-idle switch (1) turned ON, the engine speed will increase to the speed set by the engine control dial. Therefore, always be aware of engine control dial setting before starting operation to prevent the engine speed from increasing unexpectedly.**
- **When unexpected machine movement could be dangerous, such as when loading/unloading the machine for transportation, or when the machine is engaging in lifting work, turn auto-idle switch (1) OFF to ensure safe operation.**
- **Use the auto-idle function only after warm-up operation is complete. Failure to do so may not reduce the engine speed.**

Note that the auto-idle function can be turned ON or OFF only when the key switch is in the ON position. Check if the auto-idle function is turned ON or OFF with auto-idle indicator (2).

Auto-Idle Switch

ON: Auto-idle indicator (2) ON.
OFF: Auto-idle indicator (2) OFF.

After the key switch is turned OFF when the auto-idle function is activated [with auto-idle indicator (2) ON], when the engine is restarted, the auto-idle indicator flashes for 10 seconds and the auto-idle function becomes activated later.

OPERATING BACKHOE

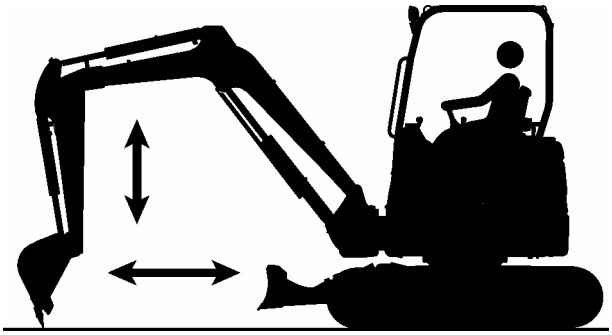
- Select an arm and bucket whose specifications match the working conditions. (Refer to “Kinds and Applications of Buckets” in the specification section.)
- Pull the bucket toward the machine using the arm as the main digging force.
- When soil sticks to the bucket, remove it by moving the arm and/or bucket rapidly back and forth a few times.
- While facing the bucket tooth tip toward the direction of excavation as straight as possible, excavate the ground with the teeth penetrating shallowly using the arm and bucket cylinder full strokes.
- Position the tracks parallel to the trench. After digging to the desired depth, move the machine backward to continue the trench.
- Operate each cylinder with a slight allowance left at both stroke ends.

IMPORTANT:

- **Do not dig the ground in the diagonal direction toward the track frame. Failure to do so may cause the bucket teeth to come in contact with the crawler.**
- **When lowering the boom, avoid sudden stops that may create shock load damage to the machine. Always smoothly lower the boom so that shock loads may not be created.**
- **When digging deep below the ground level, be careful not to allow boom cylinder, boom bottom, and/or bucket cylinder hoses to come in contact with the ground.**
- **When digging with the blade positioned towards the front or when digging at an angle, avoid hitting the blade.**
- **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.**

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.



M1M7-05-012

IMPORTANT: When grading the ground with the bucket, do not pull or push dirt with the bucket while traveling the machine like a bulldozer. Every part of machine may receive excessively large loads, possibly resulting in damage to the machine.

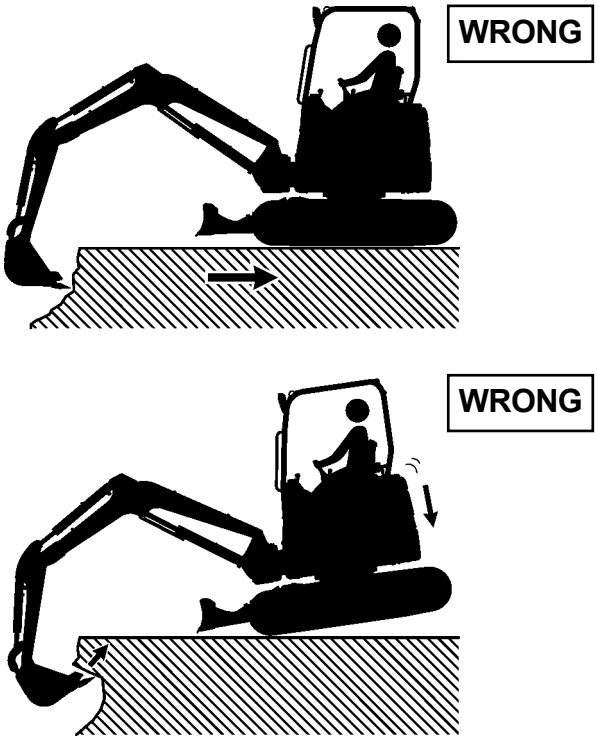
When grading by operating the boom, arm, and bucket simultaneously:

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, operated the arm and bucket rolled back, as shown.

Grading a slope surface can be performed by operating the machine in the same method as mentioned above.

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.



M1M7-05-013

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 ABUSIVE OPERATION

If digging force is increased by driving the machine while pushing the bucket into the ground, or by raising the rear of the machine to apply the machine weight to the bucket teeth, severe machine damage may result due to excessive overloading.

AVOID STRIKING WITH BUCKET

M1M7-05-014

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.

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.

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 track parts such as track links, or rollers. (Refer to the table for Types and Applications of Track Shoes in the specification section. 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

AVOID OTHER THAN SPECIFIED MACHINE OPERATIONS

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

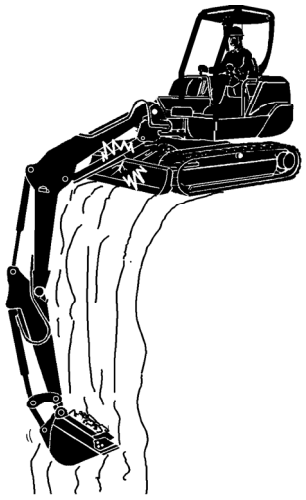
Do not apply this machine to works other than excavation and loading. Do not operate the machine under any conditions beyond the these specifications.

Precautions for Lifting Work

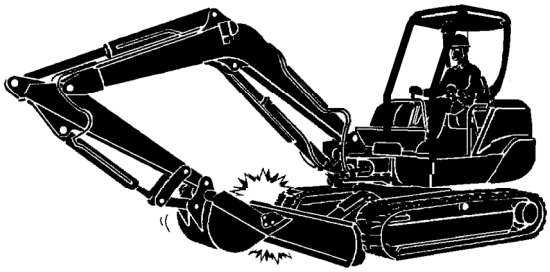
- **Operate the machine on level ground. Operating the machine on a slope may cause the machine to become unstable, possibly resulting in tipping accident.**
- **When lifting a load, carefully swing the machine not to cause the lifting load to come in contact with personnel working near the machine. 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 load lifting 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 load lifting. The lifted load may sway, possibly creating a hazardous situation.**

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.



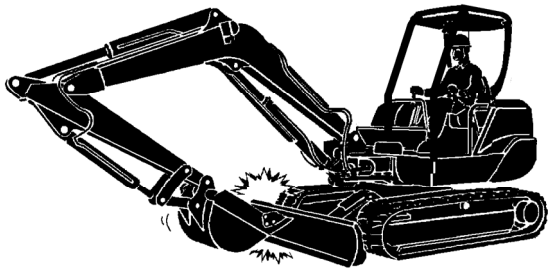
M586-05-016



M586-05-017

AVOID HITTING BLADE WITH BUCKET

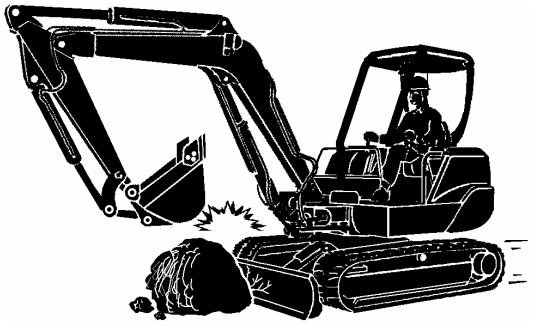
When rolling in the arm in a travel or transportation position, be careful not to hit the blade with the bucket.



M586-05-017

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.



M586-05-035

AVOID COLLIDING BOOM CYLI NDER 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.

M586-05-018

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.

ZX27U-2 : 600 mm (24 in)
ZX30U-2 : 600 mm (24 in)
ZX35U-2 : 600 mm (24 in)
ZX40U-2 : 650 mm (26 in)
ZX50U-2 : 650 mm (26 in)

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:

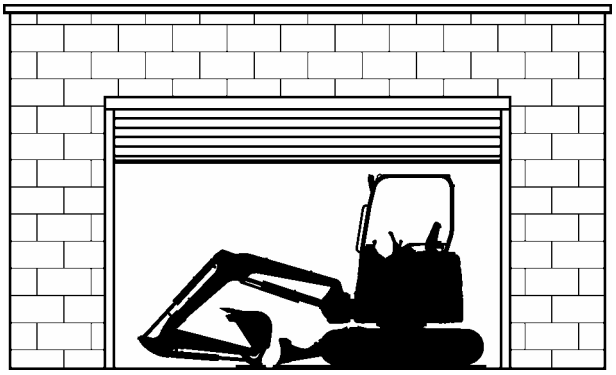
M1M7-05-015

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.

Precautions for Using Rubber Crawlers

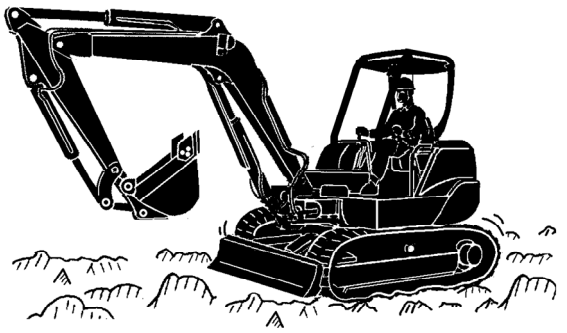
WARNING: The rubber crawler machine is less stable than the steel crawler machine, as the edge of the rubber crawler is easier to deform more than steel crawler. Pay attention when operating the machine at an angle to the tracks.



M1M7-05-016

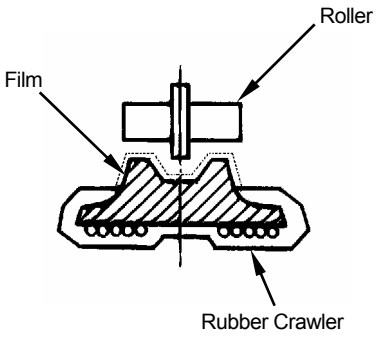
1. Do not store the rubber crawlers in a place where they will be exposed to direct sunlight for a period of more than three months.
2. Avoid unnecessary steering operations on concrete roads, possibly resulting in premature wear of shoe lugs and core metals. Also, avoid operating the machine on high 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.

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 doted 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

HYDRAULIC BREAKER (OPTIONAL)

Before installing a hydraulic breaker to the machine, change in machine stability, and the hydraulic pressure and flow rate to operate the hydraulic breaker must be checked. Consult your authorized dealer for selection of the hydraulic breaker model to be installed. Refer to the Breaker Operation Manual for operation of the hydraulic breaker. Observe the following instructions to prevent the base machine and the hydraulic breaker from being damaged.

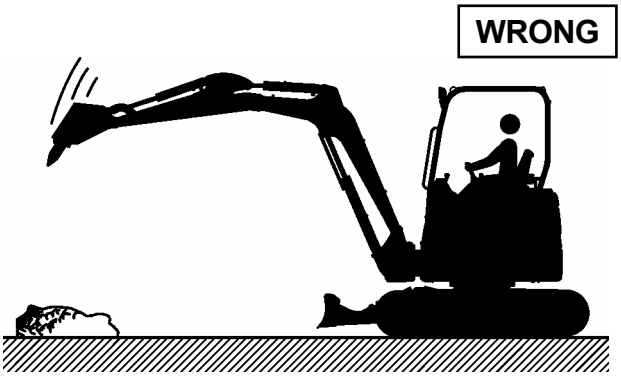
Precautions for Installing Hydraulic Breaker Pipe Lines

- When disconnecting or reconnecting the hydraulic breaker hoses from or to the hydraulic pipe lines at the arm tip, take care not to allow dust to stain or enter the inside of pipes and hoses.
- When the hydraulic breaker is not installed, be sure to put caps or plugs on the arm tip pipe open ends and the hydraulic breaker side hose ends to prevent the hydraulic system from being contaminated by dust. Be careful not to lose the caps and plugs. Always keep the auxiliary parts in the tool box.
- Check that the pipe clamp bolts are tight, and no oil is leaking from the pipe and hose joints before operating the hydraulic breaker.

Precautions for Hydraulic Breaker Operation

WARNING: When the hydraulic breaker is installed, machine stability is reduced as the breaker is much heavier than the bucket. In addition, soil, broken pieces of rock or metals may be scattered during breaker operation, potentially creating a hazardous situation. Take protective measures against the danger of the machine tipping over and/or the scattering of hard materials and observe the precautions described below to ensure safe operation.

1. Avoid crashing the breaker onto hard materials. The breaker is heavier than the bucket, causing the lowering speed of the breaker to become faster. If breaking hard materials by crashing the breaker onto hard materials is attempted, damage to the front attachment and/or the upperstructure may result due to accelerated crashing reaction force.
2. Do not move crushed materials using the breaker unit and/or the swing function. Damage to the boom, arm, and/or breaker may result.



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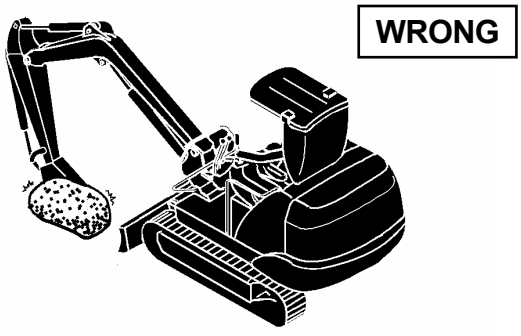
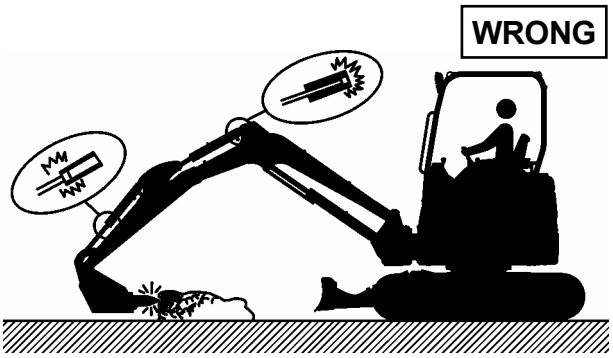


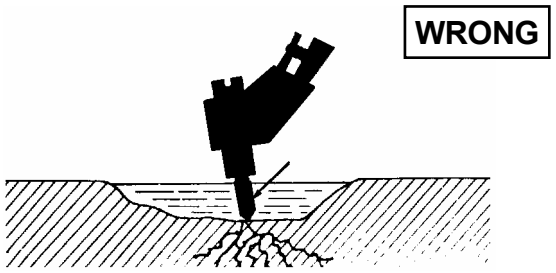
M585-05-020

3. Do not operate the breaker with the hydraulic cylinders fully extended or retracted. When operating the breaker, position each hydraulic cylinder so that an allowance of more than 50 mm (2in) from the stroke end can be given before the cylinder piston comes in contact with the cylinder head or bottom. Failure to do so may result in damage to the hydraulic cylinders, arm and/or boom.



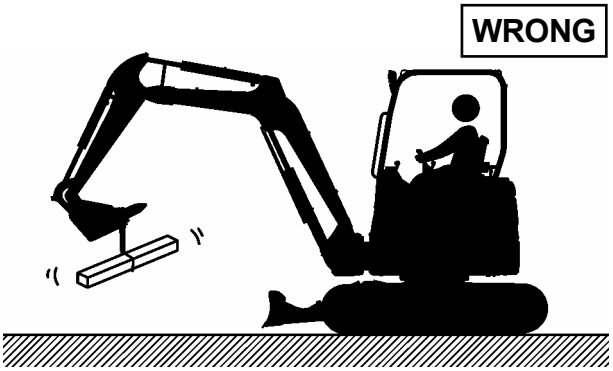
M1M7-05-021

4. Do not operate the breaker in water. Seals may become broken due to rusting of the breaker, possibly allowing rust, dust, and/or water to enter the hydraulic circuit so that damage to the hydraulic components on the base machine may result.



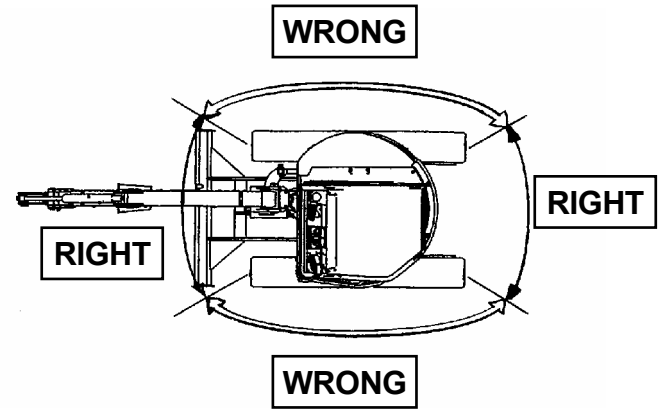
M104-05-059

5. Do not use the breaker to lift objects. Serious accidents may result due to the machine tipping over and/or the lifted load coming off.



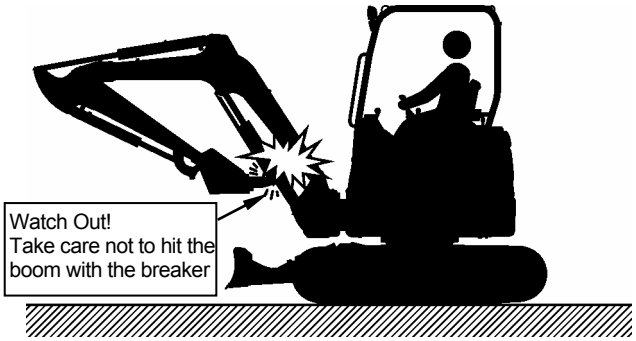
M1M7-05-022

6. Do not operate the breaker over the side of the machine. The machine stability is reduced, possibly resulting in the machine tipping over. In addition, the service lifetime of the undercarriage may become shorter due to receiving more severe breaker operation reaction force.



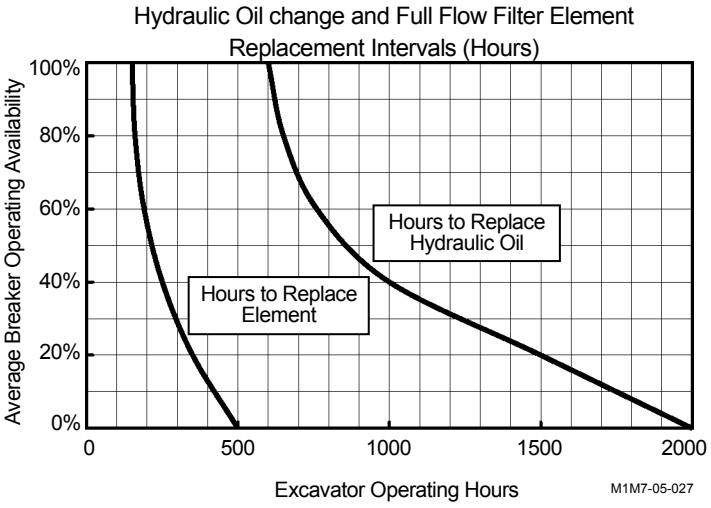
M1M7-05-017

7. Do not allow the breaker chisel to come in contact with the boom when rolling in the arm and the breaker.



M1M7-05-023

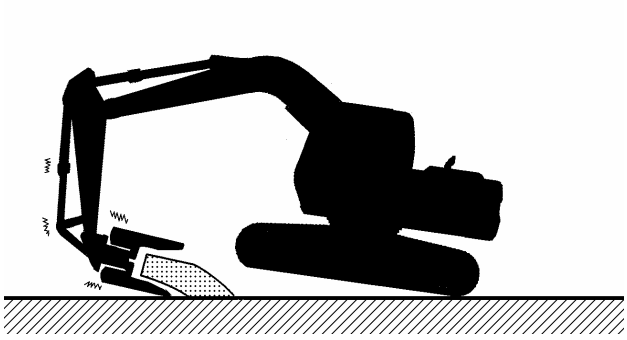
8. Change hydraulic oil and replace the full flow filter element at regular intervals. Hydraulic breaker operation subjects hydraulic oil to become contaminated and/or deteriorated more quickly than bucket operation. Failure to perform proper maintenance of hydraulic oil may cause the base machine and/or the breaker to malfunction. Be sure to change hydraulic oil and replace the full flow filter element at the intervals shown in the table below, especially to extend the service life of the hydraulic pump. (Refer to the Hdraulic System group in the Maintenance Section.)



9. Greasing Front Attachment
   When using a hydraulic breaker, grease all lubrication points on the front attachment every 50 hours of operation.

CRUSHER OPERATION (OPTIONAL)

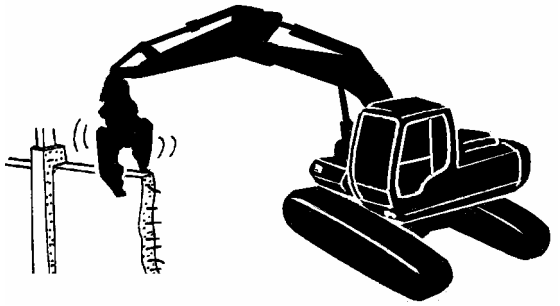
Before installing a hydraulic crusher on the machine, machine stability, and the hydraulic pressure and flow rate to operate the hydraulic crusher must be checked. Consult your authorized dealer for selection of the hydraulic crusher model to be installed. Refer to the Crusher Operation Manual for operation of the hydraulic crusher. Observe the following instructions to prevent the base machine and the hydraulic crusher from being damaged.



M107-05-046

Precautions for Hydraulic Crusher Operation

WARNING: When the hydraulic crusher is used in demolition work, machine stability is reduced as the crusher attachment is much heavier than the bucket. In addition, soil, broken pieces of rock or metals may be scattered during crusher operation, potentially creating a hazardous situation. Take protective measures to prevent the machine tipping over and/or the scattering of hard materials and observe the precautions described below to ensure safe operation.

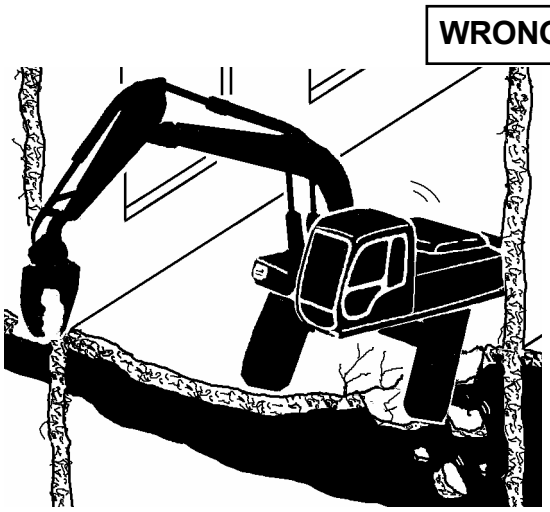


M107-05-047

- Do not raise the base machine off the ground with the bucket cylinder fully retracted or extended. Damage to the front attachment may result. In particular, avoid operating the machine with the bucket cylinder fully extended. The bucket cylinder may easily become damaged under this condition. Use extra care to prevent the bucket cylinder from being damaged during demolition work of structure foundations.
- Operate the crusher over the front or rear side of the machine. Operating the breaker over the side of the machine will reduce the machine stability, possibly resulting in the machine tipping over.

- When crushing objects in high positions such as a ceiling, carefully operate the machine so that falling objects do not come in contact with the machine.
- Before operating the machine on a floor in a building, check that the floor is strong enough to support the machine weight. Depending on type of work the machine is engaged in, crushing reaction force may be added to the floor besides the machine weight.
- Start operation only after the machine is horizontally parked and the footing is stabilized. Never operate the machine positioned on stacks of rubble, or inclined ground.
- Do not move or load crushed materials using the crusher.
- When replacing the crusher with other work tools such as a bucket or breaker, the hydraulic oil may easily become contaminated. Change the hydraulic oil and replace the full flow filter element at the same intervals as applied to the hydraulic breaker.
- Before transporting the machine on a trailer, remove the crusher from the front attachment. Position the bucket cylinder so that the cylinder is not fully extended during transportation. (During transportation, the machine may be raised off the trailer deck floor due to vibration as mentioned in Step 1, possibly resulting in damage to the front attachment.)

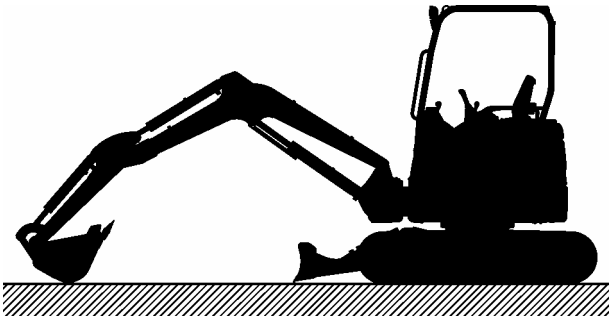
M107-05-048



M107-05-049

PRECAUTIONS FOR AFTER OPERATING THE MACHINE

1. After operating the machine, move the machine to a level, solid ground where no possibility of falling stones, landslide, or flooding is present. (Refer to the Parking group in the Driving Machine section.)
2. Fully refill the fuel.
3. Clean the machine.
4. During cold weather season, remove the coolant from the radiator and the water jacket. Attach “No Coolant” tag in a visible place.



M1M7-05-024

AUXILIARY FLOW RATE CONTROL (OPTIONAL) (Except ZX27U-2)

The maximum and minimum hydraulic flow rate in the auxiliary pipe line can be controlled as follows:

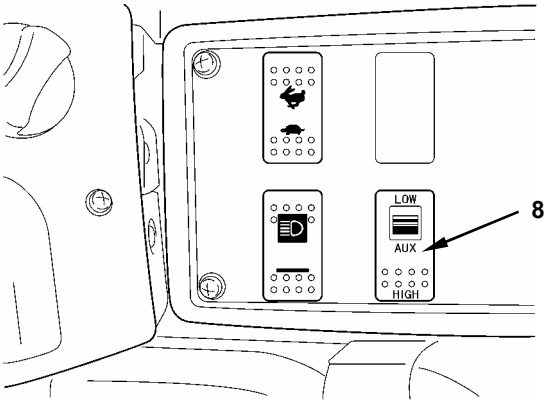
	ZX30U-2 ZX35U-2	ZX40U-2 ZX50U-2	ref. ZX27U-2
Minimum Flow Rate	40 L (11US gal)/min	45 L (12 US gal)/min	–
Maximum Flow Rate	66 L (17 US gal)/min	85 L (22 US gal)/min	53 L (14 US gal)/min

Flow Rate Control Selector (8)

LOW: sets to the minimum flow rate.
HIGH: sets to the maximum flow rate.

When shifting the flow rate from the LOW to HIGH, operate the switch while pulling the lock knob toward the arrow mark.

NOTE: When shifting the flow rate from the HIGH to LOW, no lock knob operation is required.



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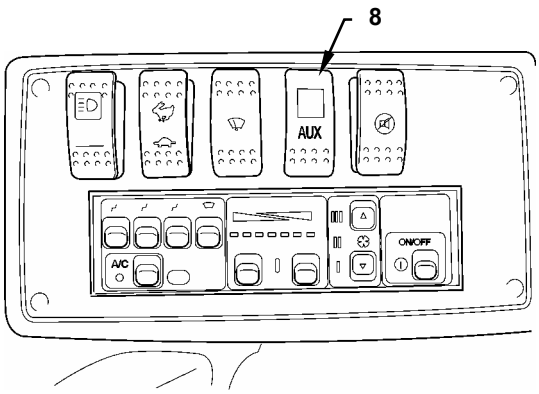

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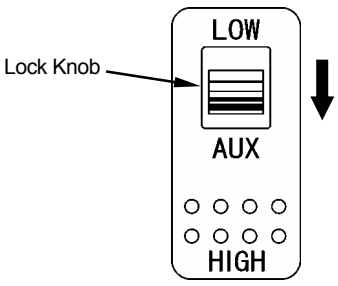


M1M7-05-025

EMERGENCY BOOM LOWERING PROCEDURE

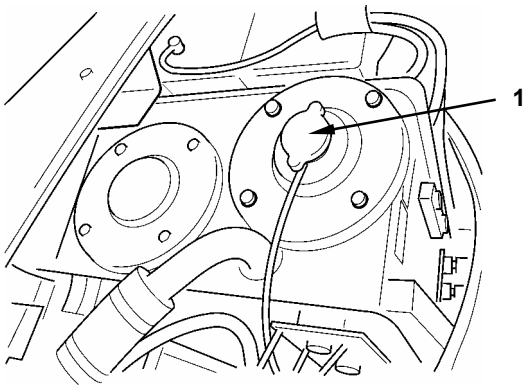
WARNING: Prevent personal injury. Confirm that no one is under the front attachment before starting the procedure below.

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.

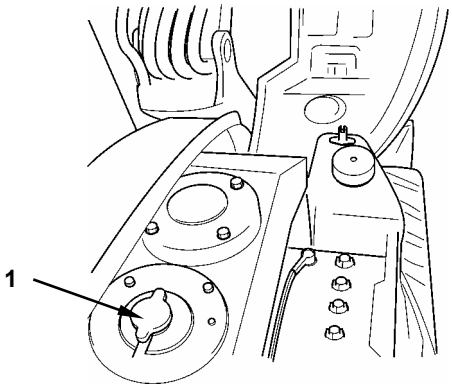
1. Remove the cover above the hydraulic oil tank. Loosen filler cap (1) on the hydraulic oil tank to release air pressure from the hydraulic oil tank.

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.

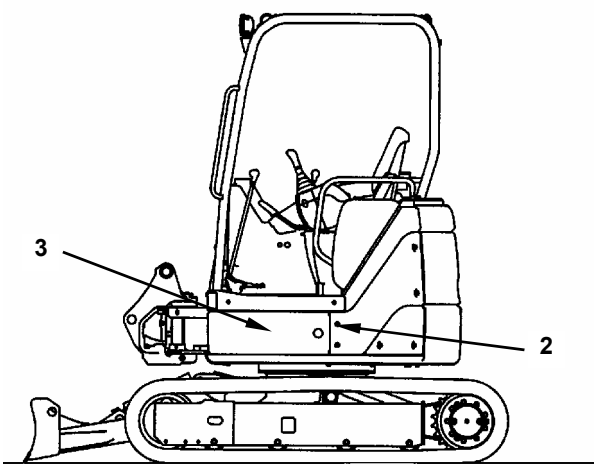
2. Remove bolts (2) from the front and left side of cover (3) to remove cover (3).



ZX27U-2, ZX30U-2, ZX35U-2 M1M7-07-035



ZX40U-2, ZX50U-2 M1M7-07-036



M1M7-04-004

3. Lower the boom in the following procedures.

If the front attachment is not loaded.

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.

   Tool : 24 mm

   Torque : 59 to 69 N·m
   (6 to 7 kgf·m, 43 to 51 lbf·ft)

2. After checking that the boom is completely lowered, tighten the overload relief valve.

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.

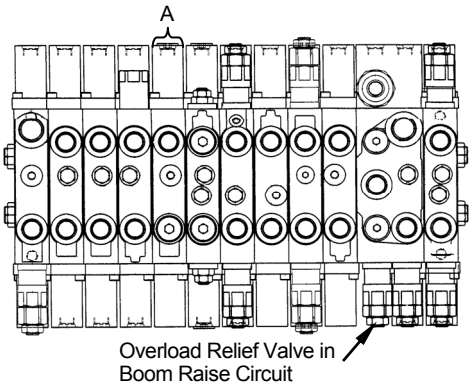
   Tool : 17 mm (Lock Nut)

   Torque : 27 to 31 N·m
   (2.8 to 3.2 kgf·m, 20 to 23 lbf·ft)

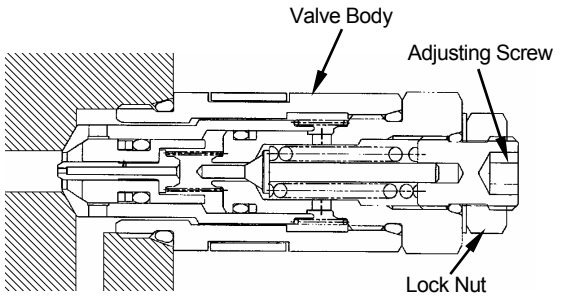
3. After checking that the boom is completely lowered, align the matching marks and tighten the lock nut.

NOTE: Section A is not equipped for ZX27U-2 in right illustration Fig 1.

ZX27U-2/30U-2/35U-2

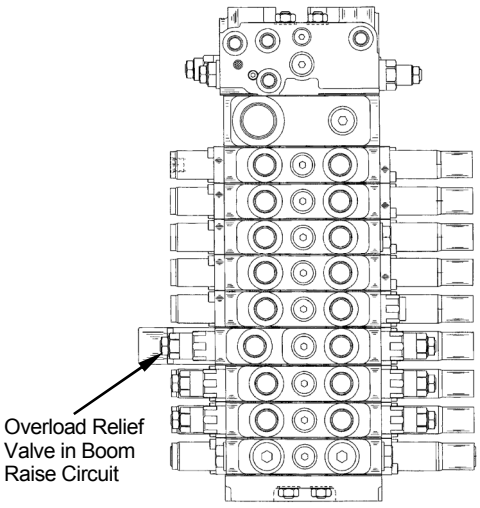


Fig, 1 T1LA-03-03-001



T152-03-03-015

ZX40U-2/50U-2



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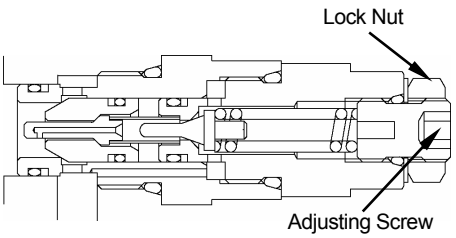


T566-03-03-018

TRANSPORTING BY ROAD

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

1. Before transporting the machine on a trailer, check the width, height, length, and weight of the trailer with the machine loaded.
2. Investigate the conditions of the route to be traveled, such as dimensional limits, weight limits, and traffic regulations, beforehand.

   In some cases, disassemble the machine to bring it within dimensional limits, or weight limits of local rules and regulations.

TRAILER LOADING/UNLOADING

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

WARNING: Be sure to use a loading dock or a ramp when loading/unloading the machine.

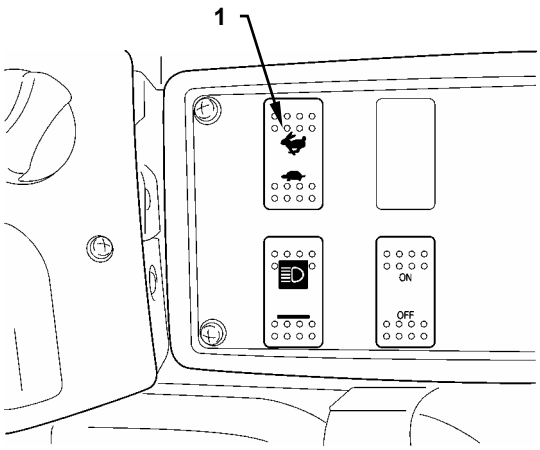
Ramp/ Loading Dock

1. Thoroughly clean the ramp and flatbed. Dirty flatbed ramps contaminated with oil, mud, or ice can be slippery and dangerous.
2. Wedge the trailer wheels with blocks so that the trailer doesn't move.
3. Ramps must be sufficient in length, width, and strength. Secure the ramp with an incline of less than 15 degrees.
4. Loading docks must be sufficient in length, width, and strength. The incline of the loading docks must be less than 15 degrees.
5. When loading/unloading the machine on a trailer, be careful not to allow the blade to come in contact with the ramps or loading docks.

LOADING

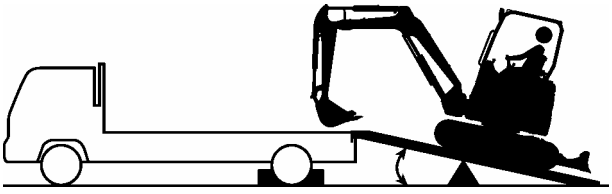
WARNING:

- **Always turn the auto-idle switch OFF. (Except ZX27U-2) Failure to do so may cause the engine speed to suddenly change.**
- **Always travel the machine slowly. Press the travel mode switch (1) toward the TURTLE side.**
- **Steering on a ramp may create a danger of tipping over. Never attempt to change travel direction on a ramp, possibly causing the machine to become unstable. If steering is unavoidable, first move back to the ground, modify traveling direction, and begin to drive again.**
- **The top end of the ramp where it meets the flatbed, there is a sudden bump. Slowly drive over it.**
- **Take extra care when rotating the upperstructure on the flatbed to prevent possible injury from machine tipping. Slowly rotate the upperstructure with the arm fully rolled in under the boom to maintain the good machine stability.**



M1M7-01-023

1. Load the machine on the trailer so that the centerline of the machine aligns with the centerline of the flatbed.
2. Drive the machine onto the ramp slowly.
3. Position the bucket above the flatbed. Operate the front attachment so that the angle between the boom and the arm is maintained at 90 to 110°.
4. The machine tips forward when the machine travels over the top end of the ramp. Lower the bucket onto the flatbed before the machine begins to tip forward.
5. After the machine reaches the specified position, slightly lift the bucket up off the flatbed. Slowly rotate the upperstructure 180° while keeping the arm fully rolled in.
6. Lower the bucket on wooden blocks seated on the flatbed.
7. Stop the engine. Remove the key from the switch.
8. Move the pilot control shut-off lever to the LOCK position.
9. Cover the openings on the machine to prevent wind and/or rain from coming in.



M1M7-06-001

WARNING: In cold weather, be sure to sufficiently warm up the machine before loading or unloading the machine.

SECURING THE MACHINE TO THE TRAILER FOR TRANSPORTATION

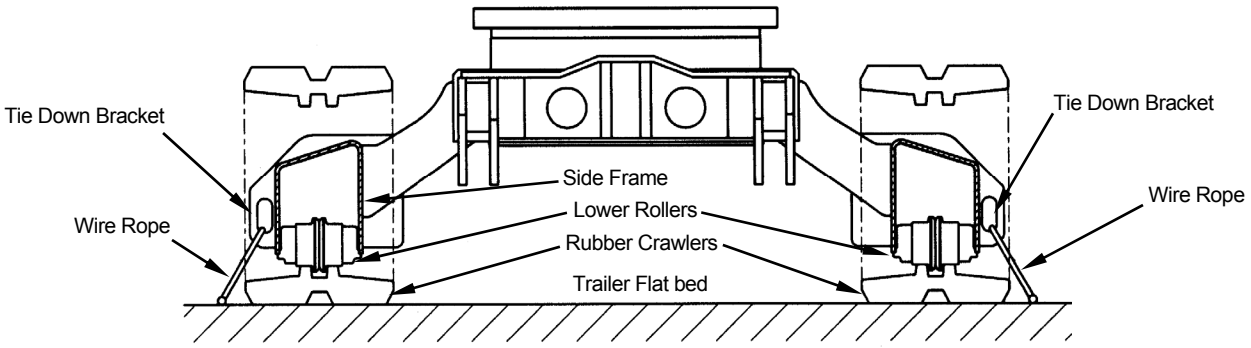
WARNING: Securely tighten the machine to the flatbed with wire ropes.

During transportation, the machine will be moved back and forth or laterally.

1. Wedge the front and rear of the crawlers to secure the machine in position.
2. Securely tighten the base machine and the front attachment to the flatbed with wire ropes.

Transporting the machine equipped with rubber crawlers

When securing the machine to the flatbed, do not directly tighten the rubber crawler with wire ropes. As illustrated below, attach wire ropes to the tie down brackets to securely tighten the machine to the flatbed before transporting the machine.

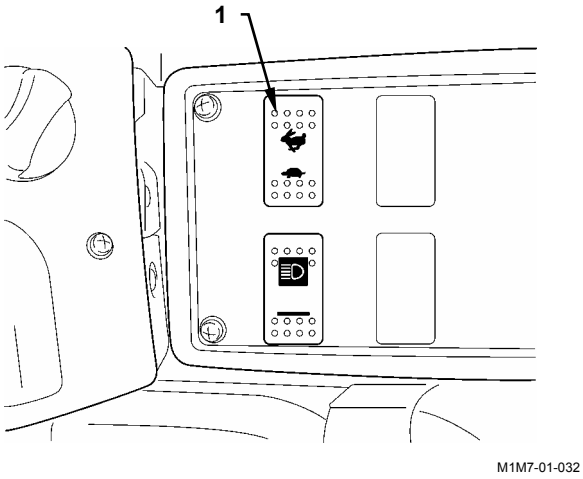


M1LA-06-003

UNLOADING

WARNING:

- **Always turn the auto-idle switch OFF. (Except ZX27U-2) Failure to do so may cause the engine speed to suddenly change.**
- **Always travel the machine slowly. Press the travel mode switch (1) toward the TURTLE side.**
- **Steering on a ramp may create a danger of tipping over. Never attempt to change travel direction on a ramp, possibly causing the machine to become unstable.**
- **The top end of the ramp where it meets the flatbed is a sudden bump. Slowly drive over it.**
- **Take extra care when rotating the upperstructure on the flatbed to prevent possible injury from machine tipping over. Slowly rotate the upperstructure with the arm fully rolled in under the boom to maintain the machine in good stability.**



M1M7-01-032

IMPORTANT: During loading operation, maintain the angle between the boom and the arm at 90 to 110°. If the machine is unloaded with the arm fully rolled in, damage to the base machine may result.

1. Before moving the machine from the flatbed rear end to the ramp, position the front attachment so that the angle between the boom and the arm becomes into the range of 90 to 110°. While allowing the bucket to be contacted on the ground, slowly move the machine.

IMPORTANT: When moving the machine over the end of the flatbed onto the ramp, take care not to allow the bucket to come in contact with the ground. Damage to the hydraulic cylinders may result.

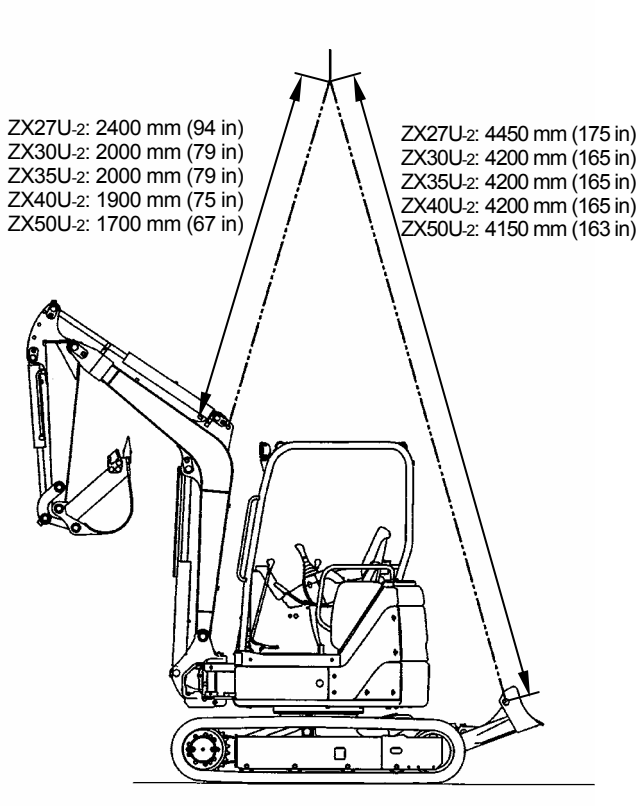
2. Do not lift the bucket off the ground until the machine is completely moved onto the ramp.
3. Slowly move the machine forward while raising the boom and arm gradually until the machine is completely off the ramp.

LIFTING MACHINE WITH CRANE

WARNING:

- **Do not lift the machine with anyone riding on the machine.**
- **Use wire ropes and shackles strong enough to support the weight of the machine.**
- **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.**

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. Pull the pilot control shut-off lever to LOCK position.
4. Position the boom straight ahead of the upperstructure. Apply the boom swing pedal lock.
5. Attach shackles to the boom and blade hooks. Securely thread wire ropes through the shackles.
6. 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.



M1M7-06-002

MEMO

PROCEDURES

IMPORTANT: Never adjust the setting of the engine governor and/or hydraulic components.

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

SA-435

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.

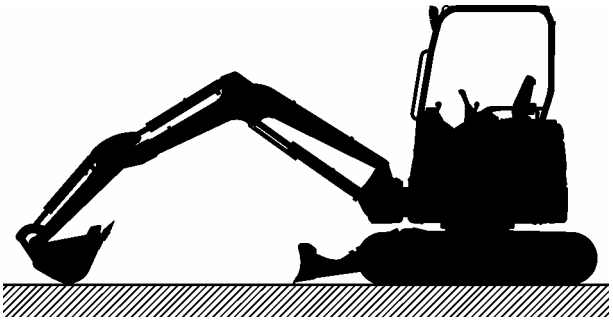
IMPORTANT:

- **Use only recommended fuel and lubricants.**
- **Use only genuine HITACHI parts.**
- **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 sensors, etc.**

PREPARE MACHINE FOR INSPECTION/MAINTENANCE

Before performing inspection/maintenance of the machine, park the machine as described below unless otherwise specified.

1. Park the machine on a solid level surface.
2. Lower the working tools such as the bucket and/or blade to the ground.
3. Turn the auto-idle switch OFF. (Except ZX27U-2)
4. Run the engine at slow idle speed without load for approx. 5 minutes to cool down the engine.
5. Turn the key switch OFF. Remove the key from the switch. If inspection/maintenance must be performed with the engine running, be sure to place a lookout to prevent the machine from being operated mistakenly by other personnel.
6. Be sure to place pilot control shut-off lever (1) in the LOCK position.
7. Attach an “UNDER INSPECTION/MAINTENANCE” tag to a visible place such as the cab door or one of the control levers.



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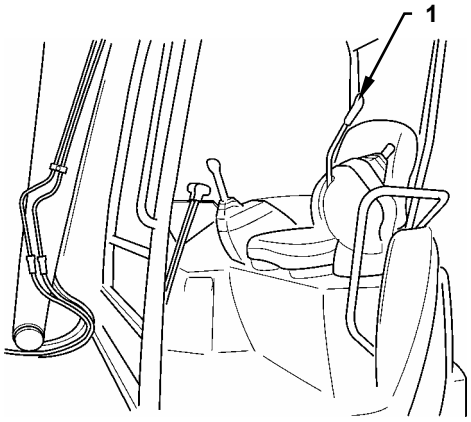

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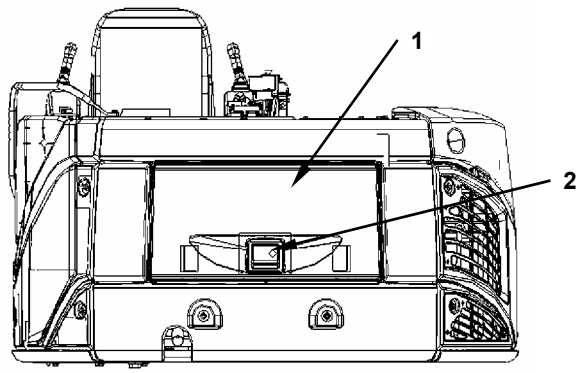
OPENING/CLOSING ENGINE ACCESS COVERS

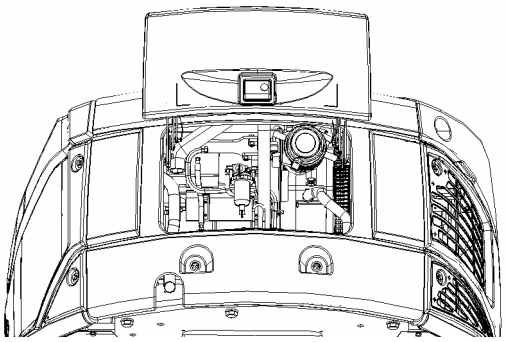
WARNING:

- **Do not keep the engine access covers open when the machine is parked on a slope, or while the wind is blowing hard. The engine access covers may close accidentally, possibly resulting in personal injury.**
- **When opening/closing the engine access covers, take care not to allow your fingers to be become pinched with the covers.**



M1M7-07-008

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



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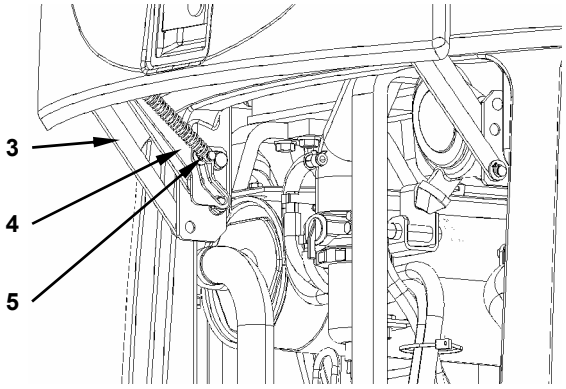
When closing cover (1), while raising cover (1), push stopper (4) at the arrowed position ⇨ to disengage the lock. While pushing stopper (4), lower the cover. When the cover is lowered by the 1/4 stroke, leave stopper (4). Then, lower cover (1) further to completely close it. Be sure to completely remove 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 the cover (1), possibly resulting in severe injury.



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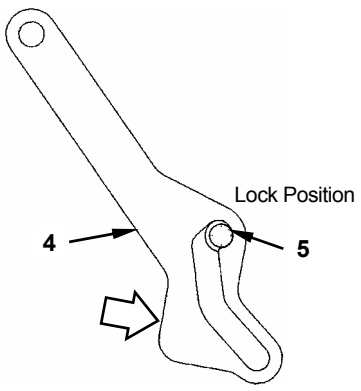


M1M7-07-069

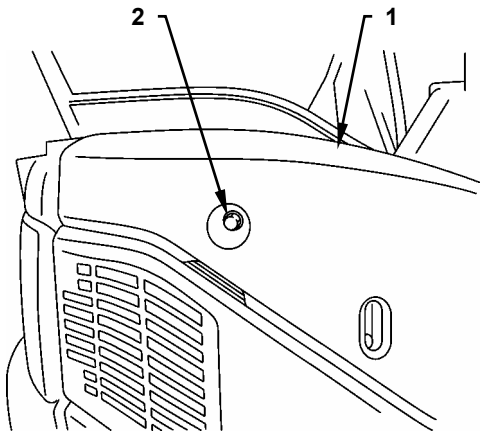
OPENING/CLOSING TANK COVERS

WARNING:
- **Do not keep the tank cover open when the machine is parked on a slope, or while the wind is blowing hard. The tank cover may close accidentally, possibly resulting in personal injury.**
- **When opening/closing the tank cover, take care not to allow your fingers to be pinched with the cover.**

1. Press button (2) and raise cover (1) to open cover (1). Cover (1) will be stopped opening with wire (3).
2. Take stopper (4) out of holder (5). Install stopper (4) into lock hollow (6). Cover (1) is held in position.
3. When closing cover (1), follow the reverse order of the above procedure.

CAUTION: When closing the cover, confirm that the cover securely is locked.

NOTE: Button (2) can be locked with key (7).



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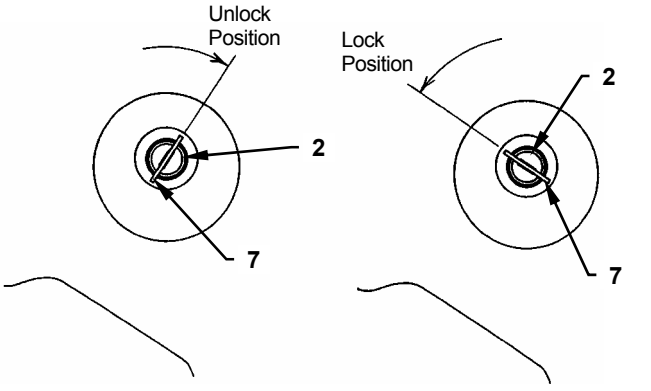
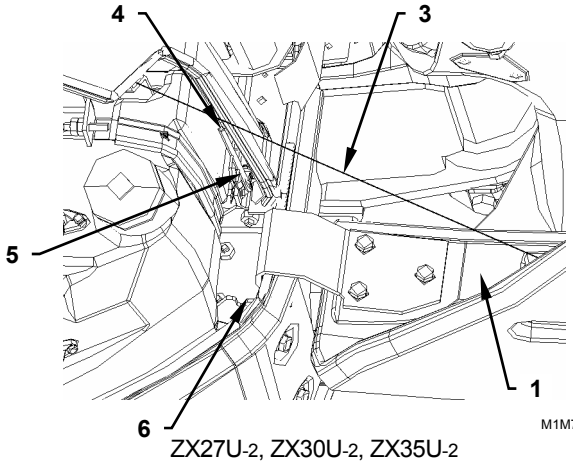


M1MF-07-030

ZX27U-2, ZX30U-2, ZX35U-2



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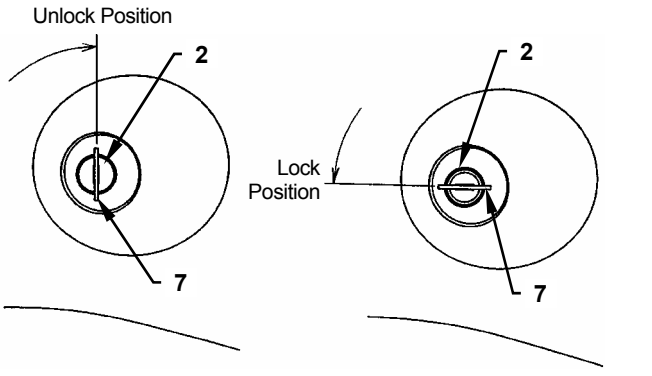
ZX27U-2, ZX30U-2, ZX35U-2



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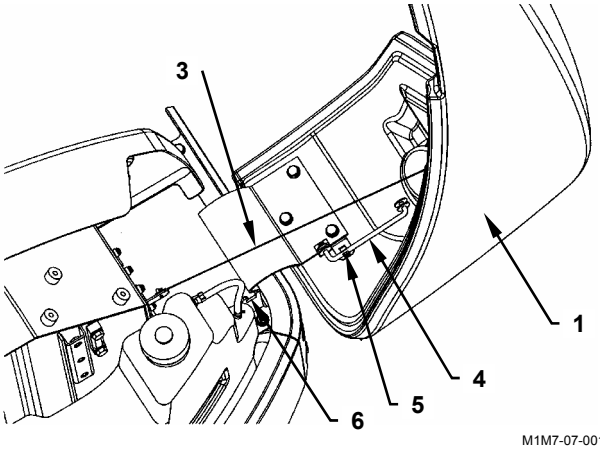
ZX40U-2, ZX50U-2



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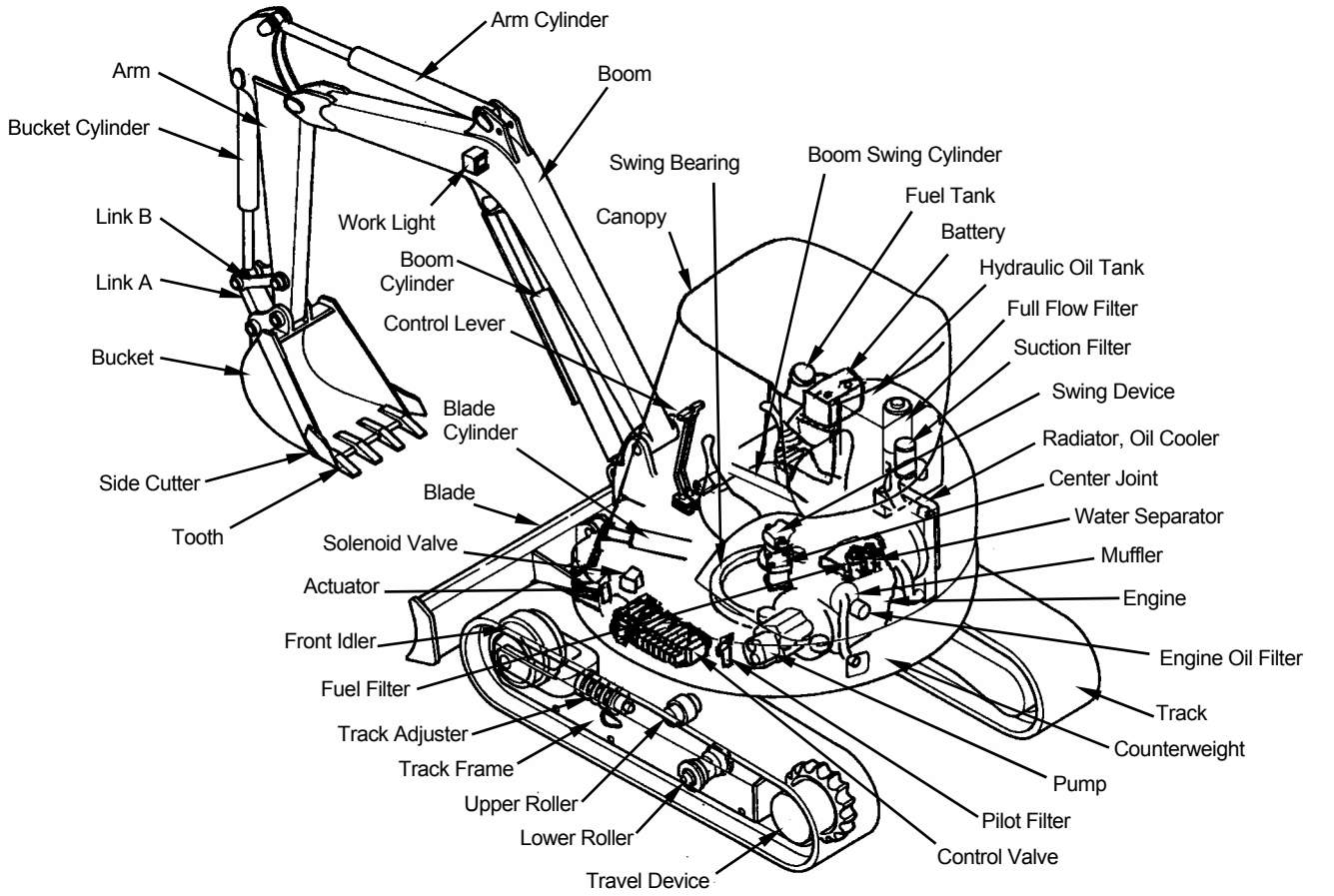
ZX40U-2, ZX50U-2

DAILY INSPECTION



M1M7-07-059

	Checkpoint
Engine	1. Quantity and contamination of engine oil and coolant 2. Ease of engine starting, exhaust gas color, abnormal noises 3. Oil and coolant leaks. Damage to hoses and pipes 4. Clogging of or damage to radiator/oil cooler 5. Loose or missing nuts and bolts
Upperstructure	1. Fuel level, leak, and contamination of foreign material 2. Hydraulic oil level, leaks, and contamination of foreign material 3. Control lever stroke, lever play, operating force 4. Operating condition of hydraulic components, damage to and oil leaks in hoses and pipes 5. Damage to or deformation of components and structures, abnormal noises 6. Loose or missing nuts and bolts 7. Operating condition of pilot control shut-off lever
Undercarriage	1. Loose track sag, and wear on or damage to track components and structures 2. Wear on upper/lower rollers, front idlers, and oil leaks 3. Oil leaks from travel devices 4. Loose or missing nuts and bolts
Front Attachment	1. Damage to or oil leak from cylinders, hoses, and pipes 2. Damage to or wear on bucket and blade 3. Loose, worn or missing bucket teeth 4. Lubrication at greasing points 5. Damage to lock pins, stoppers, fastener rings and lock bolts for front joint pins 6. Loose or missing nuts and bolts
Miscellaneous	1. Malfunction of gauges, switches, lights, buzzer 2. Deformation of or damage to canopy 3. Abnormalities in machine appearance

NOTE: The operator must perform the daily inspection before operating the machine.

PERIODIC REPLACEMENT OF PARTS

To ensure safe and long trouble free operation, be sure to conduct periodic inspections of the machine. In addition, the parts as listed below are directly related to safety operation so that they are recommended to be periodically replaced. These part material properties will change due to aging, or repeated operation may cause deterioration, wear, and/or fatigue of these parts, possibly resulting in serious safety/fire hazards. It is very difficult to gauge the remaining service lifetime of these parts simply by visual inspection alone. For this reason, replace these parts at the intervals shown in the table below. If any of these parts are found to be defective by inspection, immediately replace it regardless of the recommended intervals.
Consult your authorized dealer for correct replacement.

Periodic Replacement Parts			Replacement Interval
Engine		Fuel hose (Fuel tank to filter)	Every 2 years or 4000 hours whichever comes first
		Fuel hose (Fuel tank to injection pump)	
		Heater hose (Heater to engine)	
		Engine rubber vibration insulator	Every 5 years or 3000 hours whichever comes first
		Floor mount rubber	
		Pump coupling	
Hydraulic System	Base Machine	Pump suction hose	Every 2 years or 4000 hours whichever comes first
		Pump delivery hose	
		Swing hose	
		Auxiliary hose	
		Oil cooler hose (C/V to oil cooler)	
	Front Attachment	Boom cylinder line hose	
		Arm cylinder line hose	
		Bucket cylinder line hose	
		Pilot hose	
Seat Belt			Every 3 years

NOTE: When replacing a hose, be sure to replace seals, such as O-rings and gaskets, along with the hose.

MAINTENANCE GUIDE

A. GREASING (See Page 7-11)

Parts	Quantity	Interval (hours)						
		8	50	100	250	500	1000	2000
1. Front Joint Pins (Incl. around the swing post)	9	★		★★			Or every year	
2. Bucket and Link Pins	5	★						
3. Blade Pins	4						Or every year	
4. Swing Bearing	1							
5. Swing Internal Gear	1							
6. Control Lever Universal Joint	2						Or every year	
7. Tilt Mechanism	1							

NOTE: ★ Grease all submerged pins after operating in water.
Grease all pins daily during break-in operation for 50 hours.
★★ Grease all pins every 100 hours only during first time operation up to 500 hours.

B. ENGINE (See Page 7-18)

Parts			Quantity	Intervals (Hours)						
				8	50	100	250	500	1000	2000
1. Engine oil	Check Oil Level		–							
	Change	ZX27U-2, ZX30U-2, ZX35U-2	7.2 L (1.9 US gal)					★		
		ZX40U-2, ZX50U-2	8.6 L (2.27 US gal)							
2. Replace engine oil filter			1							

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

C. TRANSMISSION (See Page 7-20)

Parts			Quantity	Interval (hours)						
				8	50	100	250	500	1000	2000
1. Travel Reduction Gear	Check Oil Level		–							
	Change	ZX27U-2, ZX30U-2, ZX35U-2	0.6 L (0.63 US qt)×2							
		ZX40U-2, ZX50U-2	0.9 L (0.95 US qt)×2							

D. HYDRAULIC SYSTEM (See Page 7-22)

Parts		Quantity	Interval (hours)						
			8	50	100	250	500	1000	2000
1. Check Hydraulic Oil Level		1							
2. Drain Hydraulic Oil Tank Sump		1							
3. Change Hydraulic Oil	ZX27U-2, ZX30U-2, ZX35U-2	58 L (15.3 US gal)						★	★
	ZX40U-2, ZX50U-2	85 L (22.5 US gal)							
4. Clean Suction Filter		1	When changing hydraulic oil						
5. Replace Full Flow Filter Element		1				★★			
6. Replace Pilot Filter Element		1							
7. Check Hoses and Lines	for leaks or looseness	–							
	for cracks, bend, etc.	–							

NOTE: ★ Hydraulic oil changing intervals differ according to kind of hydraulic oils used.
See recommended oil chart.
★★ For the first time only.

E. FUEL SYSTEM (See Page 7-37)

Fuel tank capacity: ZX27U-2, ZX30U-2 and ZX35U-2: 40L (11 US gal), ZX40U-2 and ZX50U-2: 70L (18 US gal)

Parts		Quantity	Interval (hours)						
			8	50	100	250	500	1000	2000
1. Check Water Separator		1	■						
2. Drain Fuel Tank Sump		1	As required						
3. Replace Fuel Filter		1					■		
4. Check Fuel Hoses	for leaks, cracks, etc.	–	■						
	for cracks, bend, etc.	–				■			

NOTE: The fuel filter may become clogged earlier than normal due to contaminated fuel. In case the engine power is reduced, or black smoke increases, shorten the intervals of inspection/maintenance.

F. AIR CLEANER (See Page 7-41)

Parts		Quantity	Interval (hours)						
			8	50	100	250	500	1000	2000
1. Air Cleaner Element	Clean	1				★	Or clogged		
	Replace	1	After cleaning 6 times or 1 year						

NOTE: ★ Shorten the interval in a dusty work site.

G. COOLING SYSTEM (See Page 7-42)

Parts		Quantity	Interval (hours)						
			8	50	100	250	500	1000	2000
1. Check Coolant Level		1	■						
2. Check and Adjust Fan Belt Tension		1		★★	■				
3. Change Coolant	ZX27U-2, ZX30U-2, ZX35U-2	6.0 L (1.6 US gal)	Twice a years (in spring and autumn)						
	ZX40U-2, ZX50U-2	6.6 L (1.7 US gal)							
4. Clean Radiator Core	Outside	1					■		
	Interior	1	When changing coolant						

NOTE: ★ Shorten maintenance interval in dusty work site.
★★ For the first time only.

NOTE: When genuine Hitachi long life coolant (LLC) is used, replace it every two years (in autumn) or after 2000 operating hours, whichever comes first.

IMPORTANT: Use fresh water or tap water for the coolant. Avoid using strong acid or alkaline water. Be sure to use genuine Hitachi long life coolant (LLC).

H. ELECTRICAL SYSTEM (See Page 7-47)

I. MISCELLANEOUS (See Page 7-51)

Parts		Quantity	Interval (hours)								
			8	50	100	250	500	1000	1500	2000	3000
1. Check Bucket Teeth		–	■								
2. Replace Bucket		1	As required								
3. Adjust Track Sag (Rubber Crawler) and Check for Damage		2	■								
4. Replace Rubber Crawler		2	As required								
5. Check Track Sag (Steel Crawler) (Optional)		2		■							
6. Check and Replace Seat Belt		–	■	Every 3 years (Replace)							
7. Check Air Conditioner (Cab Equipped Machine)		–	■								
8. Clean and Replace Air Conditioner Re-circulation Filter.	Clean	–					■				
	Replace	–	Replace after cleaning approx. 6 times.								
9. Clean Cab Floor		–	As required								
10. Check Injection Nozzle	Clean	–							♦		
	Adjust	–									♦
11. Check and Adjust Value Clearance		–	Or every year					♦			
12. Check Injection Timing		–	Or every 2 years							♦	
13. Measure Engine Compression Pressure		–	As required ♦								
14. Check Starter and Alternator		–						♦			
15. Check Radiator Cap		–								♦	
16. Check Tightening Torque of Bolts and Nuts		–		★★		■					

NOTE: Consult your authorized dealer for inspection/maintenance of items with mark ♦. The recommended oil chart is affixed on the tank access cover.
★★ For the first time only.

THE BRAND NAMES OF RECOMMENDED OILS AND LUBRICANTS

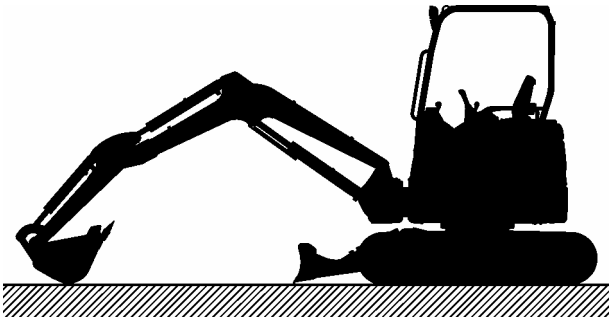
Air Temp / Manufacturer	Grease	Engine Oil			Gear Oil
	–20 to 40 °C (–6 to 104 °F)	–20 to 0 °C (–6 to 32 °F)	–10 to 35 °C (14 to 95 °F)	25 to 40 °C (77 to 104 °F)	–20 to 40 °C (–6 to 104 °F)
For New Machine	Eneos Epinoc Grease AP 2	Yanmar Genuine Engine Oil Super Royal (CD) 10W-30			ZX27U-2/30U-2/35U-2 Apoll oil diesel motive CD-S ZX40U-2/50U-2 Mitsubishi Diamond Hypoid Gear oil 90
British Petroleum	BP Energrease LS-EP2	BP Vanellus C3			BP Gear oil SAE 90 EP
		10W	30	40	
Caltex Oil	Multifax EP2	RPM DELO 300 C3			Universal Thuban SAE 90
		10W	30	40	
Esso	Beacon EP2	Essolube D-3			Esso Gear oil 90
		10W	30	40	
Idemitsu Kosan	Daphne coronex grease EP2	Apoll oil diesel motive			Apoll oil gear HE90
		S-310	S-330	S-340	
		(–15 to 40 °C) (5 to 104 °F) Apoll oil custom wide 15W-40 Apoll oil super wide 15W-40			
Exxon Mobil	Mobilux EP2	Mobil Delvac			Mobilube HD80W-90
		1310	1330	1340	
Eneos	Epinoc Grease Ap2	Hi-diesel S3			Hypoid gear 90
		–20 to 35 °C (–6 to 95 °F) 10W-30		–10 to 40 °C (14 to 104 °F) 15W-40	
Shell Oil	Shell Alvania EP Grease 2	Rymla D			Shell Spirax EP 90
		10W	30	40	
Remarks		API CD CLASS			API GL4 class

	Hydraulic Oil				Fuel Oil
Change Interval	2000 hours		1000 hours		Use high quality Diesel Fuel only. ASTM2-D (JIS K-2204) Kerosene must not be used.
Air Temp / Manufacturer	–20 to 40 °C (–6 to 104 °F)	–10 to 40 °C (14 to 104 °F)	–20 to 40 °C (–6 to 104 °F)	–10 to 40 °C (14 to 104 °F)	
Hitachi	* Super EX 46 HN		Malti M		
TOTAL			Equivis ZS 46		
Idemitsu Kosan			Dephne Superhydro LW46H		
British Petroleum			Bartran HV46		
Caltex Oil			Rando Oil HD46		
Texaco INC.			Rando Oil HD46		
Chevron U.S.A INC			Chevron AW46		
Esso			NUTO H46		
Mobil Oil				DTE 25	
Shell Oil		Tellus Oil S46	Tellus Oil R46		

*NOTE: The machine shipped from the factory is filled with oil marked *.*

A. GREASING

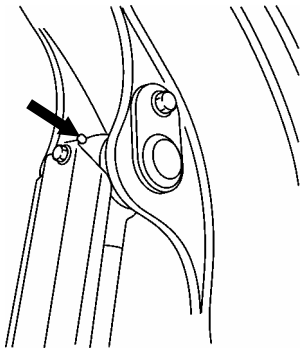
1 **Front Joint Pins (Incl. Swing Post Joint Pins) --- every 500 hours or every year (every 100 hours up to 500 hours of operation)**



M1M7-05-024

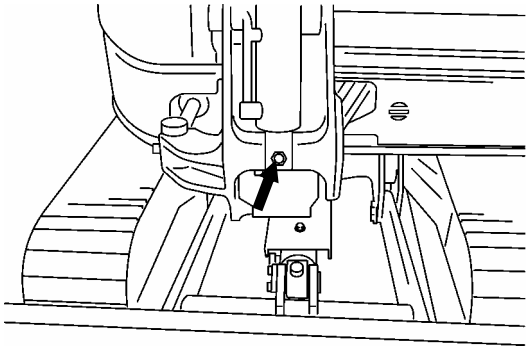
1. Position machine with the arm cylinder fully retracted and the bucket cylinder fully extended. Lower bucket to the ground (the front attachment inspection position). All greasing points can be lubricated from the ground.
2. Grease all grease fittings illustrated below.

(1) Boom cylinder rod end



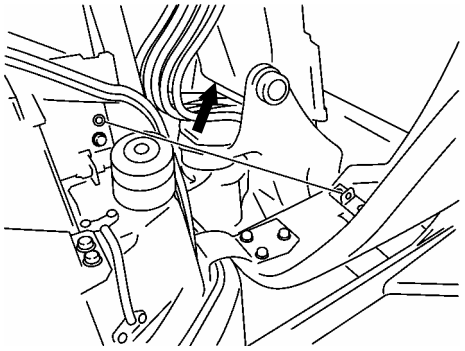
M1M7-07-020

(2) Boom cylinder bottom

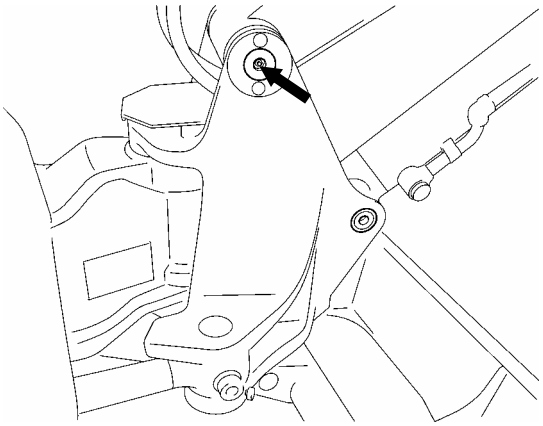


M1M7-07-021

(3) Boom foot

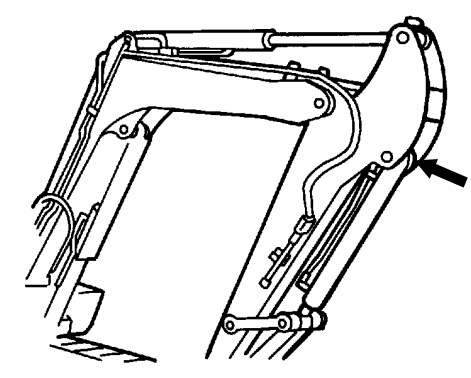


ZX27U-2, ZX30U-2, ZX35U-2 M1M7-07-022



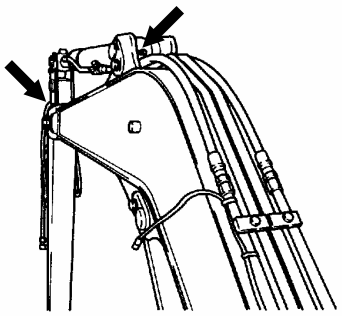
ZX40U-2, ZX50U-2 M1M7-07-058

(4) Arm cylinder rod end and bucket cylinder bottom



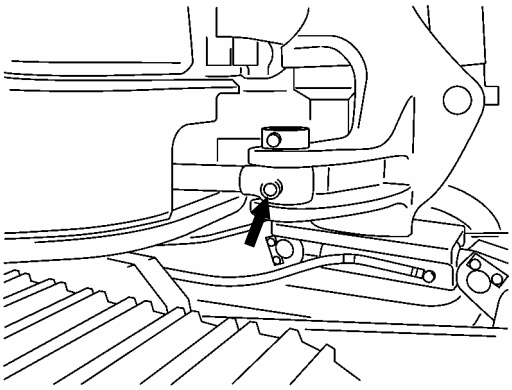
M571-07-006

(5) Boom and arm joint pin, and arm cylinder bottom



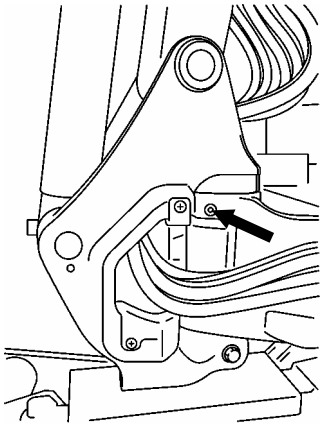
M585-07-046

(6) Swing cylinder



M1M7-07-023

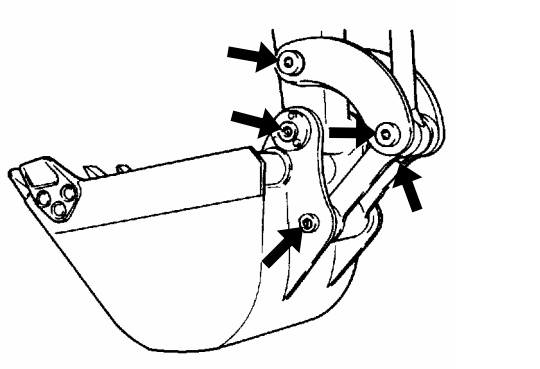
(7) Swing post



M1M7-07-024

2 **Bucket and Link Pins**

--- every 100 hours
Grease all submerged pins after operating in water.

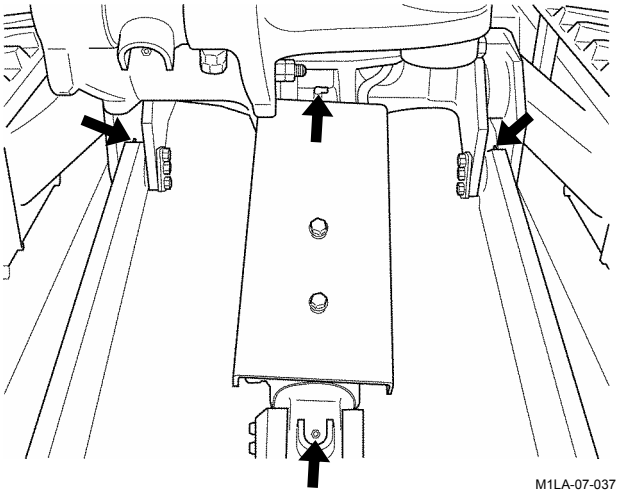


M503-07-092

3 **Blade Pins**

--- every 500 hours or every year

- Blade connecting pin
- Blade cylinder rod end and bottom



M1LA-07-037

Precautions for Front Attachment and Blade Removal

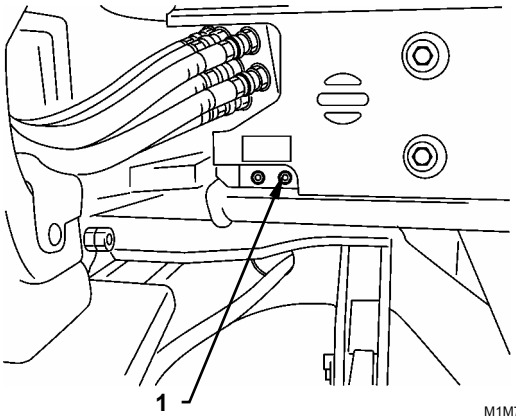
1. When pins are removed to replace the front attachment or blade, do not attempt to clean the bore insides of the bushings.
2. Before installing the front attachment or the blade, apply grease sufficiently to the pin-boss ends or the dust seals of the cylinders.
3. Be sure to install at least one shim on both sides of front joint pins.
4. When the swing post is disassembled, coat the pins and the thrust plates with grease before reinstalling them.

4 **Swing Bearing --- every 250 hours**

WARNING: Before lubricating the swing bearing, lower the bucket and the blade to the ground, stop the engine, and place the pilot control shut-off lever to the LOCK position. Lubrication and rotation of the upperstructure must be done by one person only. Be sure to check that no personnel are present around the machine before starting to work.

Grease via grease fitting (1).

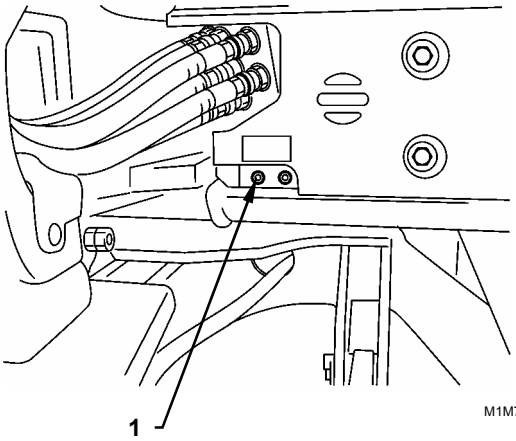
1. Lower the bucket and the blade to the ground, stop the engine, and place the pilot control shut-off lever to the LOCK position. Add grease with a grease gun by two to three strokes. Lower the bucket and blade to the ground.
2. Raise the bucket approx. 200 mm (8 in) above the ground. While rotating the upperstructure, add grease in 8 places at approximately every 90° interval until the upperstructure is made two turns.



M1M7-07-025

5 Swing Internal Gear --- every 500 hours

WARNING: Before lubricating the swing bearing, lower the bucket and the blade to the ground, stop the engine, and place the pilot control shut-off lever to the LOCK position. Lubrication and rotation of the upperstructure must be done by one person only. Be sure to check that no personnel are present around the machine before starting to work.



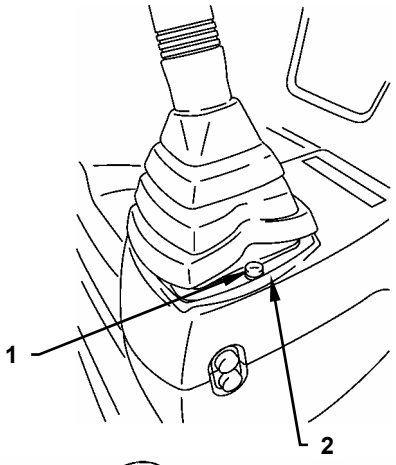
M1M7-07-025

1. Remove the cover from the bottom center of the undercarriage.
   Check if grease inside is cloudy due to mixing of water or dirt.
2. Apply grease via grease fitting (1) by the quantity shown in the table
3. In order to apply grease evenly to the swing gear, raise the bucket approximately 200 mm (8 in) above the ground. While swinging the upperstructure at approximately 90° intervals until one full turn is made, add grease at each interval.

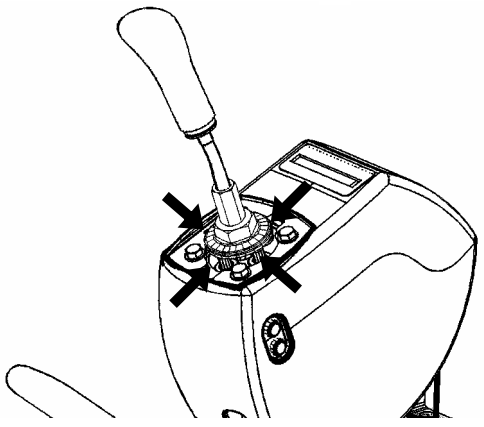
	Greasing Quantity	Total Grease Capacity
ZX27U-2 ZX30U-2 ZX35U-2	0.2 L (0.21 US qt)	3.0 to 3.3 L (3.1 to 3.5 US qt)
ZX40U-2 ZX50U-2	0.2 L (0.21 US qt)	3.2 to 3.5 L (3.4 to 3.7 US qt)

6 Control Lever Universal Joint --- every 500 hours or every year

Pull up the rubber boots under the right and left control levers, remove two screws (1) to remove bracket (2). After moving the rubber boots upward, add grease to the four places of the pilot valve pushers as indicated by arrows.

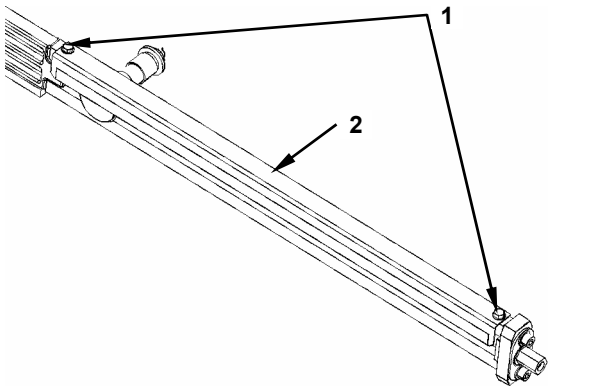


M1M7-07-026


M1M7-07-016

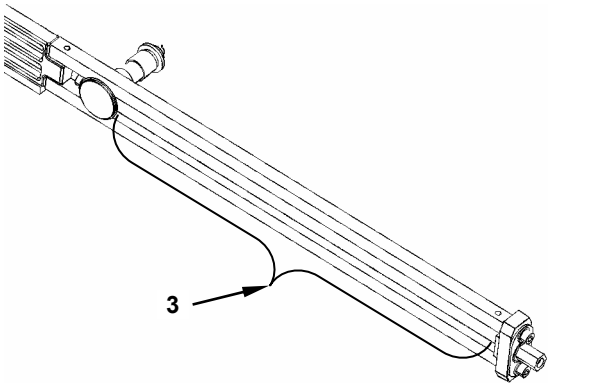
7 Tilt Mechanism --- every 250 hours

1. Remove bolts (1) from the top of the tilt mechanism and remove cover (2).



M1M7-07-077

2. Coat the full length of operation bolt (3) with grease. Recommended grease: MOLYKOTE EM-30L manufactured by Dow Corning Toray Co., Ltd.

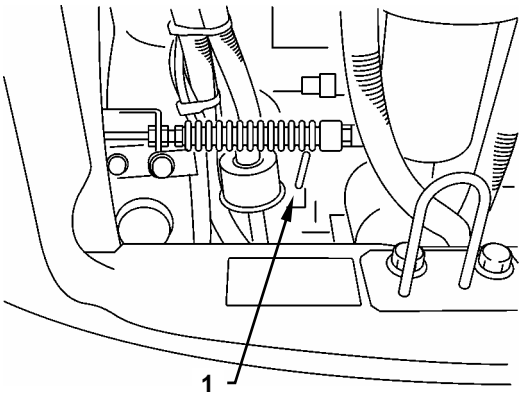


M1M7-07-078

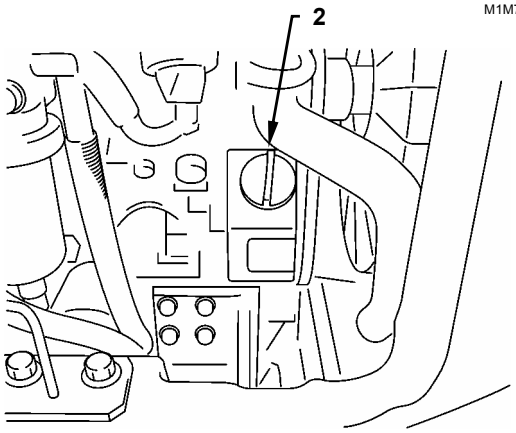
B. ENGINE

1 **Engine Oil --- Level check daily**
(Check before starting the engine.)

Check the oil level every day before starting the machine. Oil level must be between the marks on oil level gauge (1). If necessary, add the specified engine oil via oil filler (2). Re-check the oil level after refilling.



M1M7-07-027



M1M7-07-028

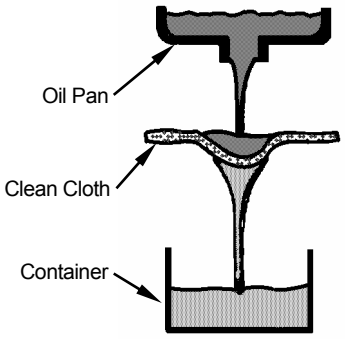
1 **Change Engine Oil --- every 500 hours**

2 **Replace Engine Oil Filter --- every 500 hours**

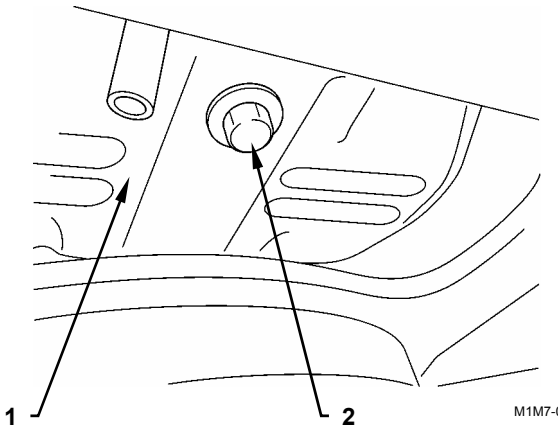
WARNING: Each component of the engine may be hot immediately after operation. Allow components to cool before starting to work on them.

1. Prepare a 10-liter (2.6 US gal) container to receive the drain oil.
2. Remove drain plug (2) from engine oil pan (1) to drain the oil.
3. Allow oil to drain through a clean cloth to check if any debris such as small pieces of metal are present on the cloth.
4. After all oil has drained, re-Install and tighten drain plug (2).

   Wrench size : 19 mm
   Tightening torque : 88 N·m (9 kgf·m, 65 lbf·ft)



M104-07-010



M1M7-07-029

5. Remove oil filter (3) from the engine by turning it counterclockwise using a filter wrench. The oil may spill from the filter bottom bracket at this time. Use an empty container to catch the spilled oil.
6. Coat the gasket of new filter (3) with engine oil. Turn the filter clockwise by hand until the gasket touches the sealing surface.
7. Tighten oil filter (3) 3/4 turns more using the filter wrench. Take care if oil filter (3) may become deformed if excessively tightened.

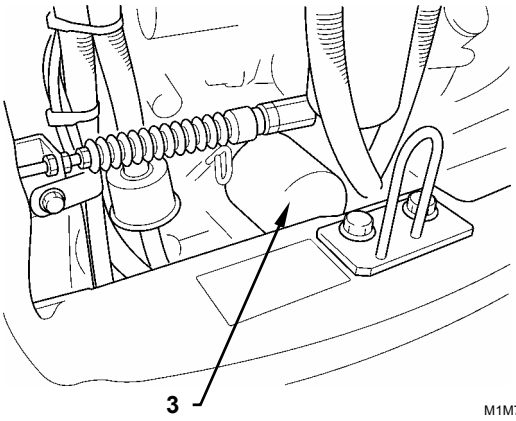
NOTE: Tightening torque: 19.6 to 23.5 N·m (2.0 to 2.4 kgf·m, 14.5 to 17 lbf·ft)

8. Remove oil filler cap (4). Refill the engine.

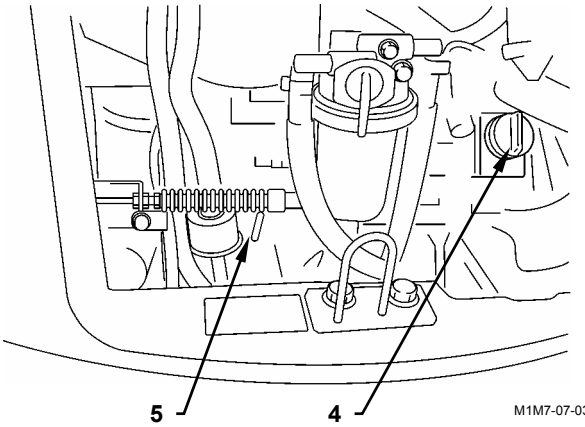
NOTE: Refer to the recommended oil and grease chart on page 7-10 for the brand names of oils.

9. Check that oil level is between the upper and lower limit marks on the dipstick (5). Start the engine.
10. Check that no oil is leaking from the sealing joints.
11. Run the engine at slow idle for 5 minutes. Stop the engine. After 15 minute later, recheck the oil level. Add as needed.

IMPORTANT: Do not re-use the engine oil filter (3).



M1M7-07-030



M1M7-07-031

C. TRANSMISSION

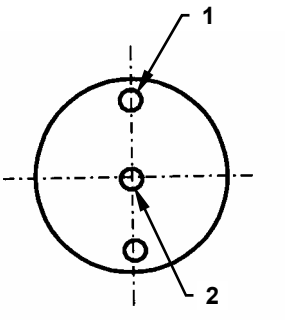
1 Travel Reduction Gear

WARNING:

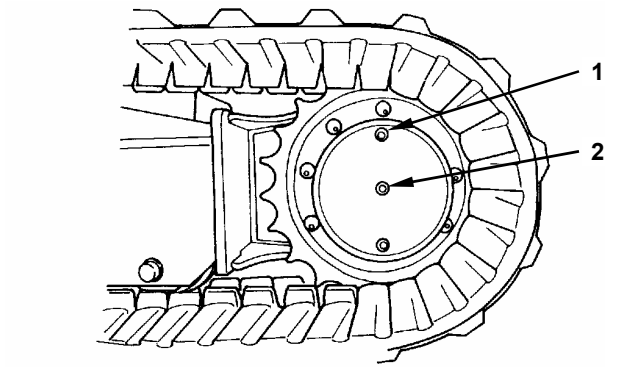
- **Each component of the travel reduction gear may be hot immediately after operation. Allow components to cool before starting to work on them.**
- **The travel reduction gear may be pressurized. Be sure to release the internal pressure by slowly loosen the air bleed plug two to three turns before removing the plug. Failure to do so may cause the plug and/or gear oil to fly out, possibly resulting in personal injury. Keep body and face away from the air bleed plug.**

Check Oil Level --- every 250 hours

1. Park the machine on a level surface.
2. Rotate the travel motor until plugs are positioned as illustrated on the right. Stop the engine.
3. Slowly loosen plug (1) to release pressure.
4. Remove plugs (1 and 2). Check that oil flows out of the thread hole for plug (2). If no oil flows out, add oil until oil flows out of the plughole.
5. After cleaning plugs (1 and 2), wrap the plug threads with sealing-type tape. Install the plugs (1 and 2).
   Tightening torque: 29 to 39 N·m
   (3 to 4 kgf·m, 21.5 to 29 lbf·ft).



M503-07-015



M585-07-080

Change Gear Oil --- every 1000 hours

1. Park the machine on a level surface.
2. Rotate the travel motor until plugs are positioned as illustrated on the right. Stop the engine.
3. Slowly loosen plug (1) to release pressure.
4. Remove drain plug (3) and plug (1) to drain oil.
5. After draining oil completely, clean plug (3). Wrap the threads of plug (3) with sealing-type tape. Install plug (3).

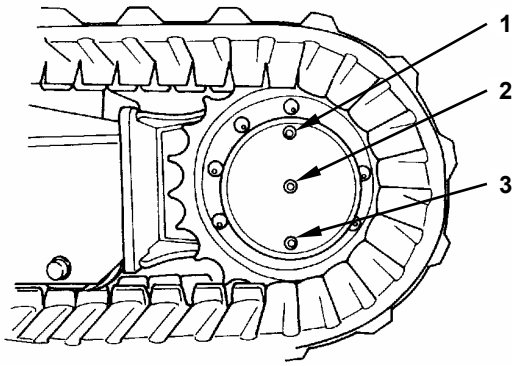
   Tightening torque: 29 to 39 N·m
   (3 to 4 kgf·m, 21.5 to 29 lbf·ft).
6. Supply oil through the thread hole for plug (1).

NOTE: Refer to the recommended oil and grease chart on page 7-10 for the brand names of oils.

7. Remove plug (2). Add oil until oil flows out of the tread hole for plug (2).

	Oil Quantity
ZX27U-2, ZX30U-2, ZX35U-2	0.6 L (0.63 US qt)
ZX40U-2, ZX50U-2	0.9 L (0.95 US qt)

8. After cleaning plugs (1 and 2), wrap the threads of the plugs with sealing-type tape. Reinstall the plugs.
   Tightening torque: 29 to 39 N·m
   (3 to 4 kgf·m, 21.5 to 29 lbf·ft).



M585-07-080

D. HYDRAULIC SYSTEM

Inspection and Maintenance of Hydraulic Equipment

WARNING: When inspecting and/or maintaining hydraulic equipment, pay special attention to the following points.

1. Be sure to park the machine on a level, solid surface.
2. Lower the bucket and blade to the ground and stop the engine.
3. Begin servicing hydraulic components only after the components, hydraulic oil and lubricants are completely cooled, and after releasing residual pressure.

3.1 Bleed air pressure from the hydraulic oil tank.

3.2 Each component, hydraulic oil, and lubricant may be hot and/or pressurized immediately after operation. Allow the machine to cool down before beginning inspection or maintenance. Failure to do so may cause burns caused by contact with hot component and/or oil, or injury by contacting flying off of plugs and /or screws. Hydraulic components may be pressurized even when cooled. Keep body parts and face away from plugs or screws and slowly loosen them. Remove plugs and screws only after thoroughly releasing the residual pressure.

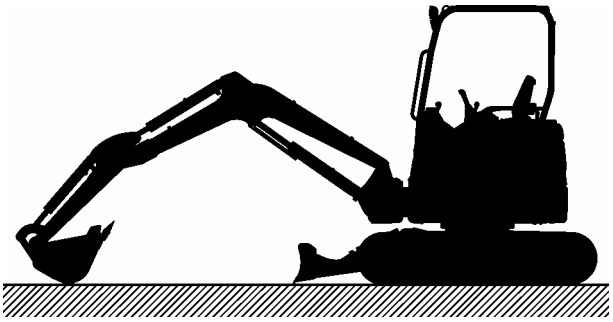
3.3 Never attempt to service or inspect the travel and swing motor circuits on slopes. Even after air pressure is released from the hydraulic oil tank, the machine on a slope will create force to pressurize hydraulic oil in the travel and swing circuit by its own weight.

IMPORTANT:

- **Take special care to keep seal surfaces of hydraulic components free from dirt and to avoid damaging them.**
  - **Wash hoses, pipes, tank and their surrounding areas with a washing liquid and thoroughly wipe it out before reconnecting them.**
  - **Only use O-rings that are free of damage or defects. Never carelessly file O-ring seat surfaces. Do not allow high pressure hoses to twist when connecting them. Failure to do so may considerably shorten the service life of the hoses.**
- **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 selecting to use another brand of oil, be sure to completely replace the oil in the system.**
- **Never run the engine without oil present in the hydraulic oil tank.**

1 Check Hydraulic Oil Level --- daily

1. Park the machine on a solid level surface. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended. Lower the bucket and blade to the ground. Stop the engine.
2. Check oil level gauge (1) on the side of the hydraulic oil tank. Oil must be at the specified level on the gauge.



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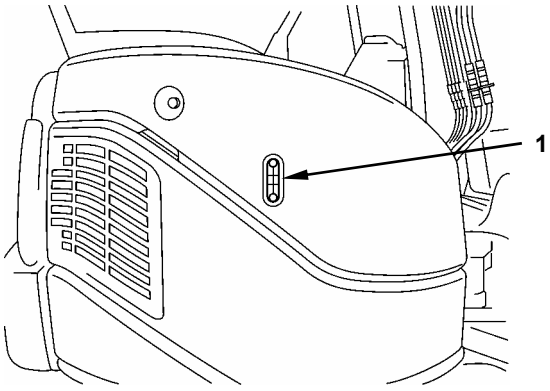
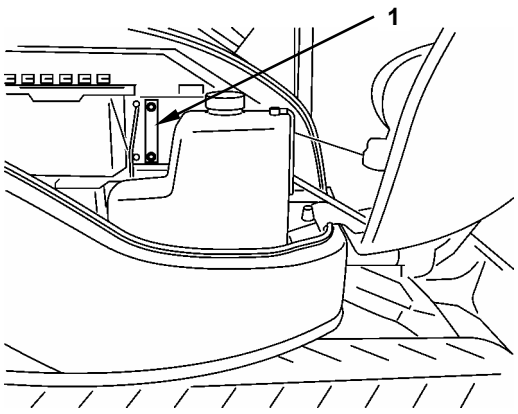


ZX27U-2, ZX30U-2, ZX35U-2 M1M7-07-032

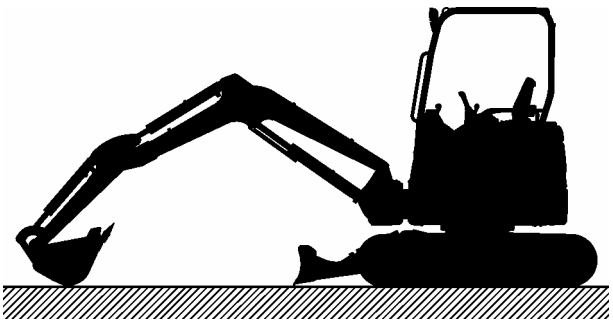


ZX40U-2, ZX50U-2 M1M7-03-004

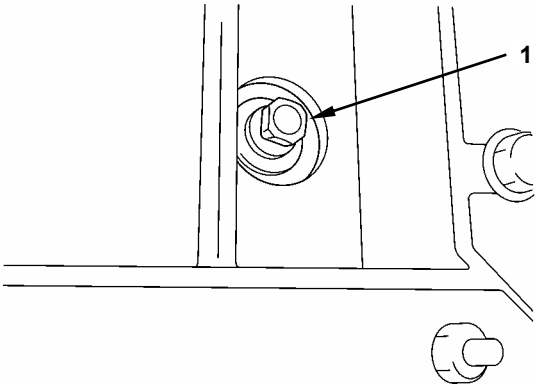
2 **Drain Hydraulic Oil Tank Sump**
--- every 250 hours

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.

1. Park the machine on a solid level surface. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended. Lower the bucket and blade to the ground. Stop the engine.
2. Leave the machine without operating the machine until hydraulic oil becomes cool. Then, bleed air pressure from the hydraulic oil tank.
3. Slowly loosen drain plug (1) on the bottom of the hydraulic oil tank to drain water and sediment.



M1M7-05-024



M1M7-07-033

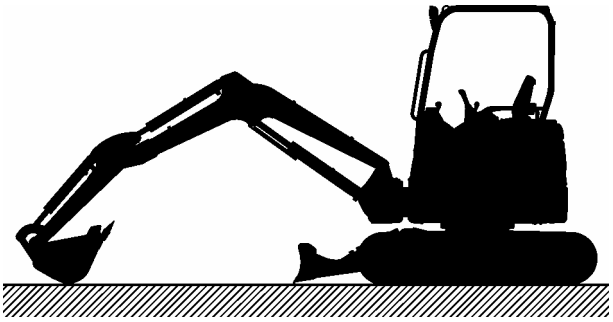
3 **Change Hydraulic Oil**
--- every 1000 hours or 2000 hours

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.

IMPORTANT: When changing hydraulic oil, take care not to allow foreign matter such as dirt, water or soil to enter the hydraulic system. Hydraulic oil changing intervals differ according to kind of hydraulic oil used.

1. Park the machine on a solid level surface. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended. Lower the bucket and blade to the ground. Stop the engine.
2. 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.
3. Remove cap (1).
4. Arrange a container with the capacity (A). Drain oil using a suction pump.

	Oil Quantity (A)
ZX27U-2, ZX30U-2, ZX35U-2	60 L (15.9 US gal)
ZX40U-2, ZX50U-2	90 L (23.8 US gal)



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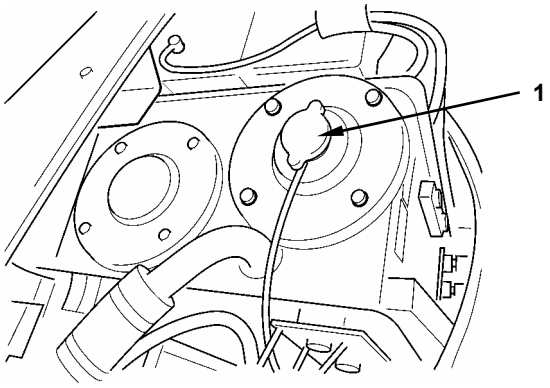
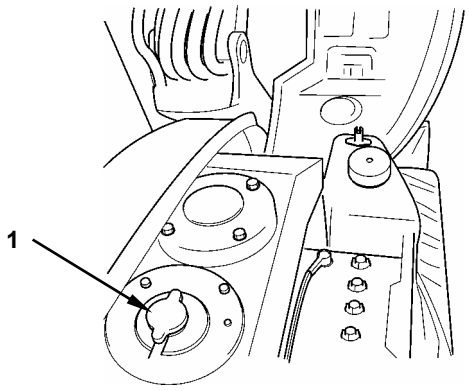


ZX27U-2, ZX30U-2, ZX35U-2 M1M7-07-035



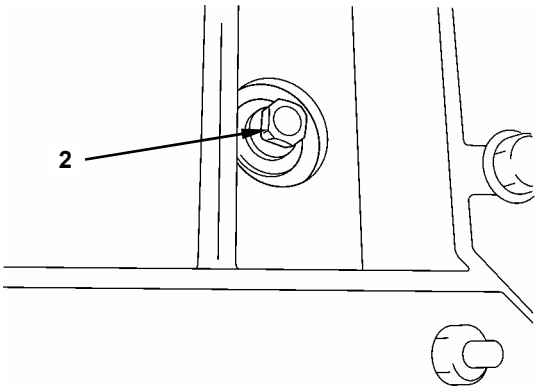
ZX40U-2, ZX50U-2 M1M7-07-036

5. Slowly loosen drain plug (2) on the bottom of the hydraulic oil tank. Allow oil to drain thoroughly
6. Clean, install and tighten drain plug (2) to the original position.

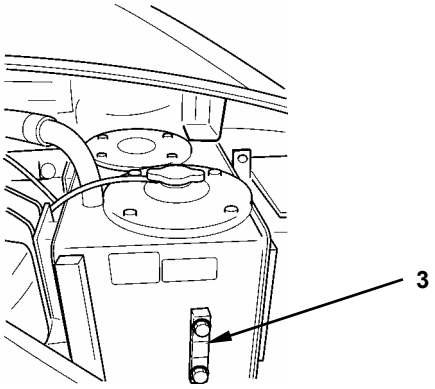
   ZX27U-2 · ZX30U-2 and ZX35U-2
   Wrench Size : 12 mm (PT3/8 Square Head Plug)
   Tightening Torque : 49 N·m (5 kgf·m, 36 lbf·ft)

   ZX40U-2 and ZX50U-2
   Wrench Size : 27 mm (G1/2 Hexagonal Head Plug with O-ring)
   Tightening Torque : 95 N·m (9.7 kgf·m, 70 lbf·ft)

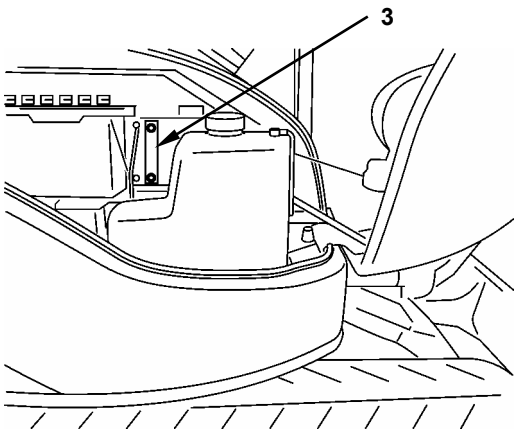
7. Supply hydraulic oil via the filler port on the top of the hydraulic oil tank while checking the oil level with level gauge (3).



M1M7-07-033



ZX27U-2, ZX30U-2, ZX35U-2 M1M7-07-034



ZX40U-2, ZX50U-2 M1M7-03-004

Bleed Air from Hydraulic System

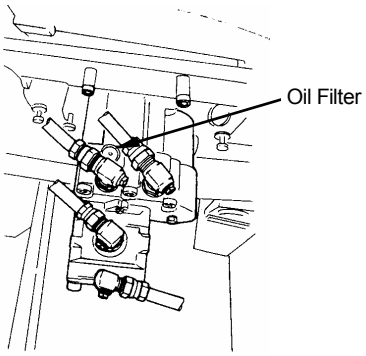
After changing hydraulic oil, bleed air from the hydraulic system by following the procedure described below.

Bleed Air from Pump

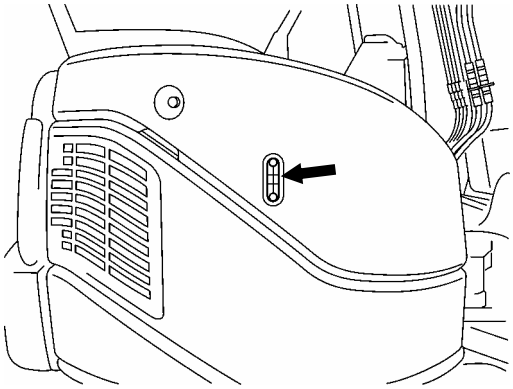
IMPORTANT: If the engine is started when the pump is not filled with hydraulic oil, damage to the pump may result.

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

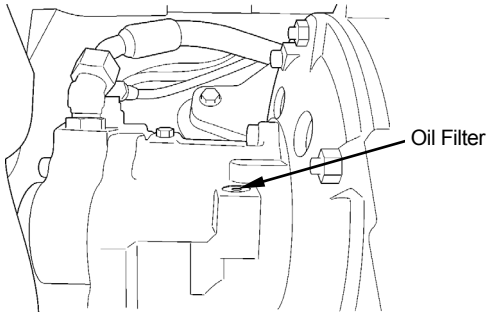
NOTE: If the hydraulic pump is left empty overnight or longer, be sure to fill the pump with clean hydraulic oil before performing the air bleeding procedure above.



ZX27U-2, ZX30U-2, ZX35U-2 M589-07-010



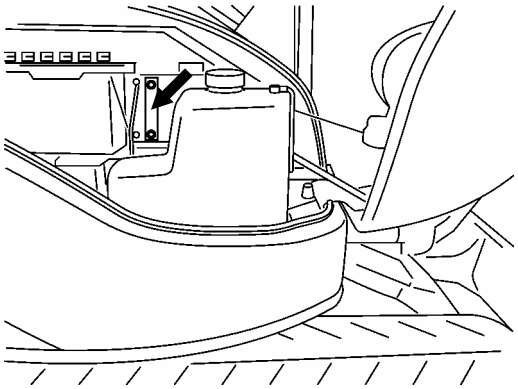
ZX27U-2, ZX30U-2, ZX35U-2 M1M7-07-032



ZX40U-2, ZX50U-2 M1LD-07-006

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 as necessary.



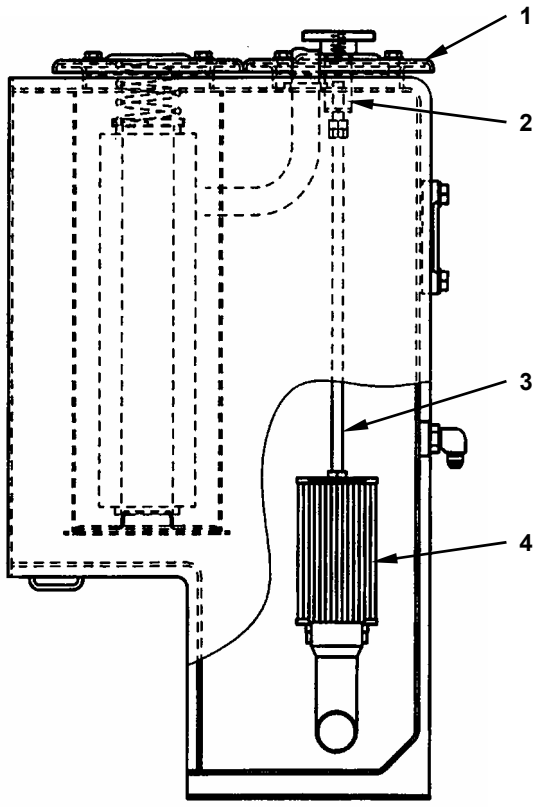
ZX40U-2, ZX50U-2 M1M7-03-004

4 Clean Suction Filter--- when changing hydraulic oil

The suction filter is located on the bottom side in the hydraulic oil tank. Clean the suction filter when changing hydraulic oil.

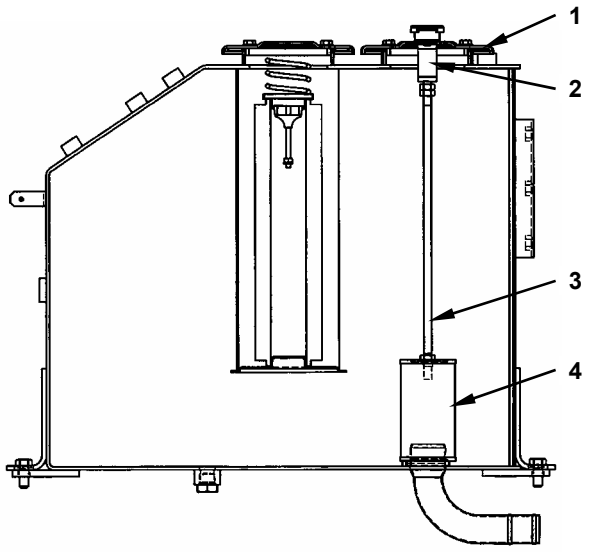
1. After draining hydraulic oil, remove cover (1). Take care not to allow the O-ring to come off cover (1) at this time.
2. Remove suction filter (4) together with rod (3).
3. Clean the hydraulic oil tank interior and the suction filter.
4. Install suction filter (4) together with rod (3) to the suction pipe.
5. Install cover (1) so that rod (3) is securely inserted into support (2) on cover (1).
6. Secure cover (1) with four bolts.

   Wrench Size : 13 mm
   Tightening Torque : 49 N·m (5 kgf·m, 36 lbf·ft)



ZX27U-2, ZX30U-2, ZX35U-2

M1M7-07-002

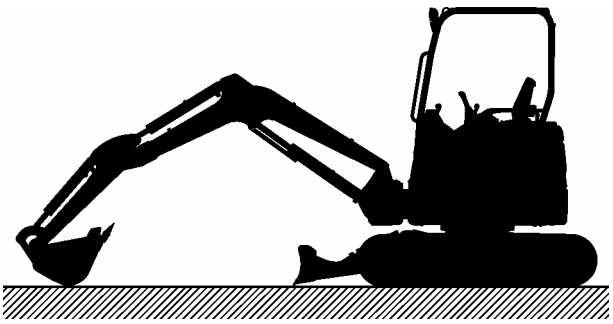


M1M7-07-003

ZX40U-2, ZX50U-2

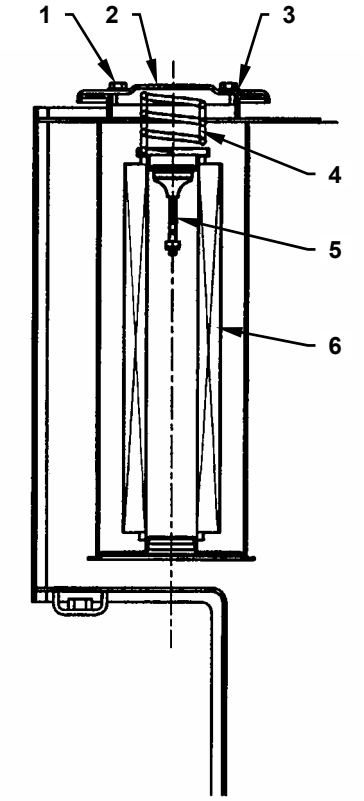
5 **Replace Full Flow Filter Element**
--- every 500 hours (first time after 250 hours)

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.



M1M7-05-024

1. Park the machine on a solid level surface. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended. Lower the bucket and blade to the ground. Stop the engine.
2. Before replacing the element, be sure to loosen the hydraulic oil tank cap to release the air pressure from the hydraulic oil tank.
3. Loosen four bolts (1) to remove cover (2) and O-ring (3). While pressing cover (2) down, slowly remove cover (2) so that spring (4) doesn't fly out.
4. Remove spring (4), valve (5) and element (6).
5. Take care not to allow water and/or dirt to enter the filter case.
6. Be careful not to damage element (6) and O-ring (3). Don't use a broken element.
7. Install new element (6), and O-ring (3) in the hydraulic oil tank
8. Install cover (2) with four bolts (1).
   Tightening torque: 49 N·m (5 kgf·m, 36 lbt·ft)
9. After replacing the element, bleed air from the pump. Check the oil level in the hydraulic oil tank. (Refer to **3** "Bleed Air from Hydraulic System.") If the machine is operated without completely bleeding air from the hydraulic system, damage to the pump may result.
10. Replace the element at the specified interval to keep hydraulic oil clean and extend the service life of hydraulic components.



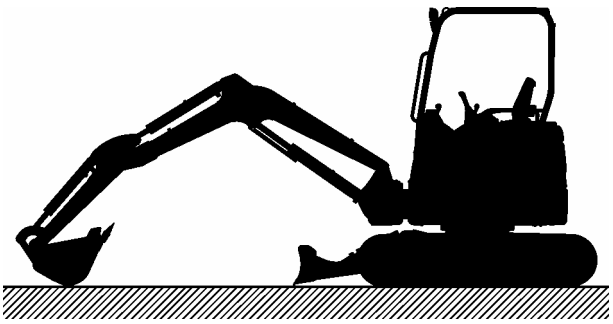
M1M7-07-004

6 Replace Pilot Filter Element --- every 1000 hours

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.

1. Park the machine on a solid level surface. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended. Lower the bucket and blade to the ground. Stop the engine.
2. Before replacing the element, be sure to loosen the hydraulic oil tank cap (1) to release the air pressure from the hydraulic oil tank.
3. Remove bolts (3) to remove under cover (2) from the rear left bottom side of the base machine.

   Wrench size: 17 mm



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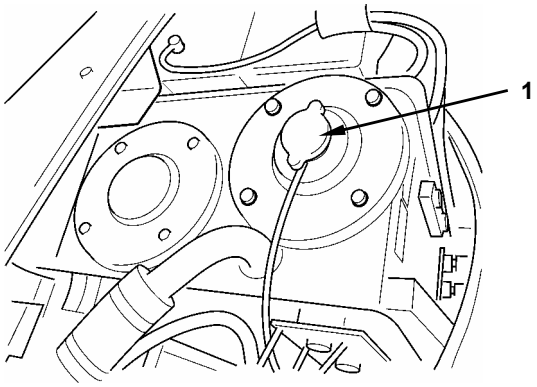

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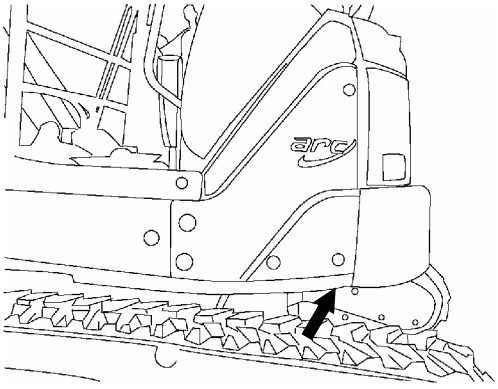
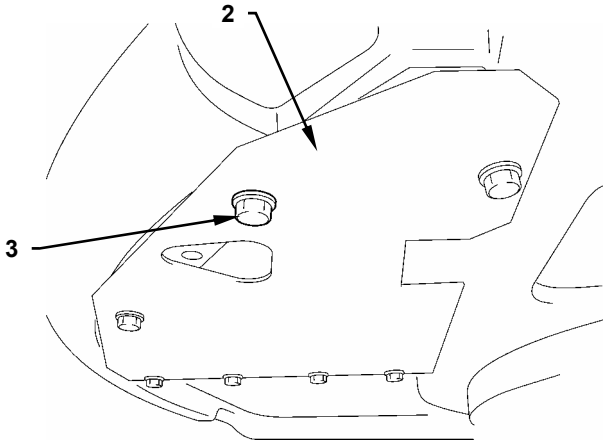
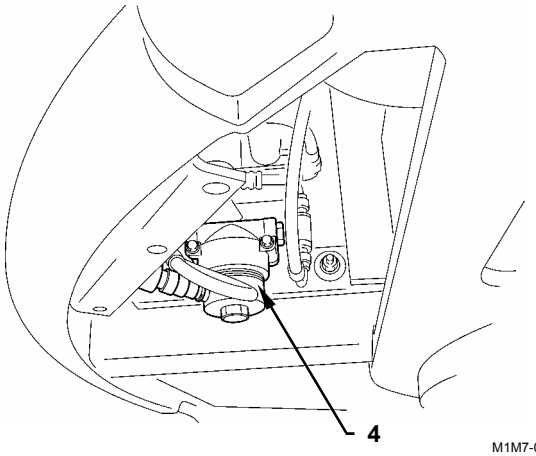


M1M7-07-037

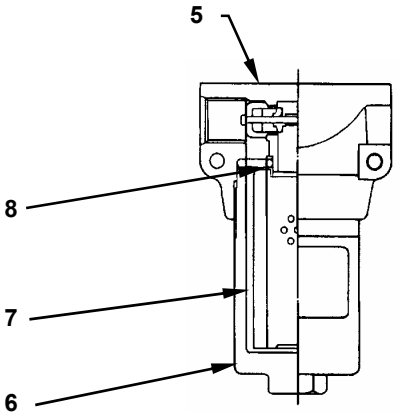


M1M7-07-071

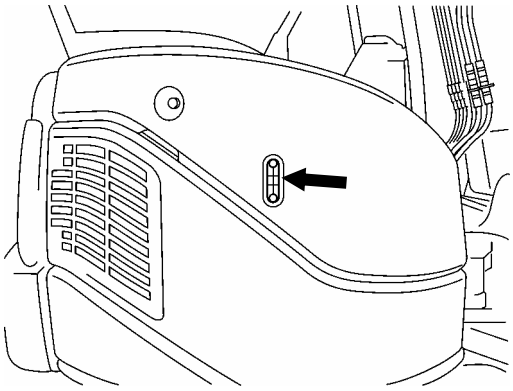
4. Rotate the hexagon section on the bottom of filter (4) case (6) counterclockwise using a tool such as a wrench to remove filter case (6) from head cover (5).
5. While rotating filter element (7), pull to remove filter element (7) downward.
6. Replace O-ring (8) with a new one.
7. Securely install O-ring (8) in the O-ring groove on head cover (5).
8. 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 the filter element.
9. Take care not allow dust and/or water enter the filter case.
10. Install case (6) into head cover (5) while rotating the case clockwise.
    Tightening Torque: 25 to 34 N·m
    (2.5 to 3.5 kgf·m, 18.0 to 25.5 lbf·ft)
11. After replacing the filter element, bleed any remaining air from the hydraulic circuit while running the engine at a slow speed for approx. 3 minutes.
12. Check the oil level in the hydraulic oil tank. Add oil as needed.
13. Install under cover (2).
    Wrench size: 17 mm
14. Tighten the hydraulic oil tank cap (1).

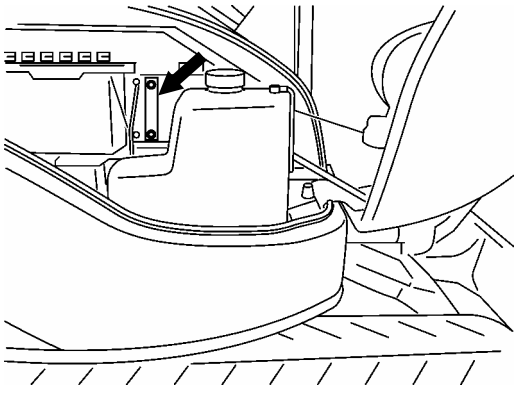


M1M7-07-072



M503-07-031


ZX27U-2, ZX30U-2, ZX35U-2 M1M7-07-032

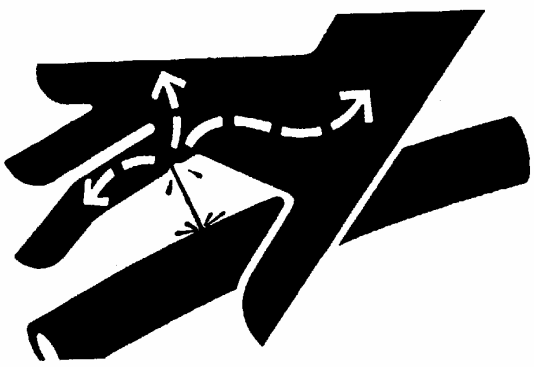

ZX40U-2, ZX50U-2 M1M7-03-004

7 **Check Hoses and Lines**

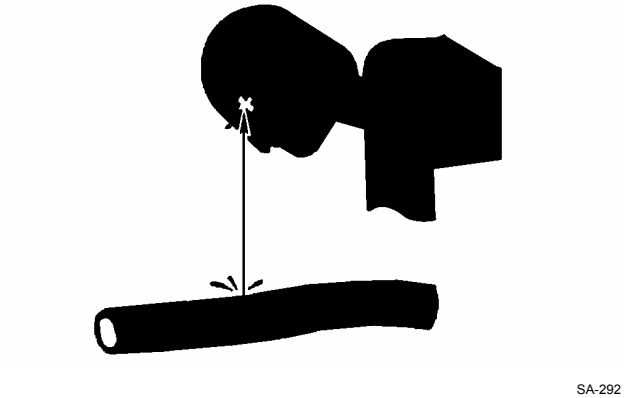
--- daily
--- every 250 hours

WARNING:

- **Escaping flammable fluid may cause fire. Check for missing or loose clamps, kinked hoses, lines or hoses that rub against each other and/or come in contact with other components, and any oil leaks.**
- **Escaping fluid under pressure can penetrate the skin causing serious injury. To avoid this hazard, search for 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.**
- **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.**

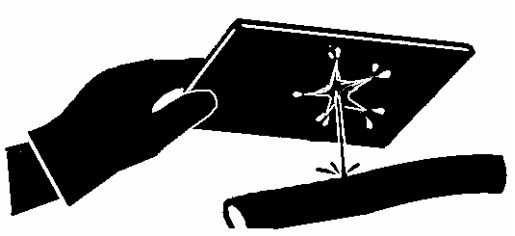


SA-031



SA-292

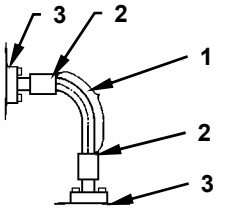
Check hoses and lines for oil leaks and/or damage while referring to the following tables. If any abnormality is found, repair it as instructed in the remedy column.



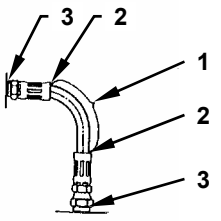
SA-044

Hoses

Interval (Hours)	Check Point	Abnormality	Remedy
Daily	Hose surface	Oil leak (1)	Replace
	Hose end	Oil leak (2)	Replace
	Hose connection	Oil leak (3)	Retighten or replace hose or O-ring
Every 250 hours	Hose surface	Oil leak (4)	Replace
	Hose end	Oil leak (5)	Replace
	Hose surface	Exposed reinforcement (6)	Replace
	Hose surface	Blister (7)	Replace
	Hose	Acute bend (8), Collapse (9)	Replace
	Hose and hose fitting	Deformation or Corrosion (10)	Replace



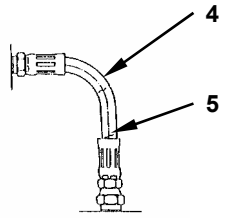
M137-07-008



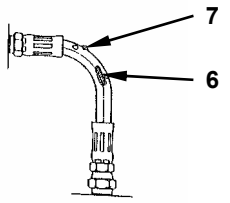
M115-07-145

Lines

Interval (Hours)	Check Point	Abnormality	Remedy
Daily	Flange type fitting mating face and connection bolt	Oil leak (11)	Replace
		Looseness or oil leak (11)	Replace O-ring and/or retighten bolt
	Weld joint surface on flange type fitting	Oil leak (12)	Replace
Every 250 hours	Flange type fitting neck	Crack (13)	Replace
	Weld joint surfaces on flange type fitting	Crack (12)	Replace
	Clamp	Omission, deformation, or loose	Replace or retighten



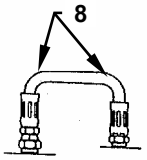
M115-07-146



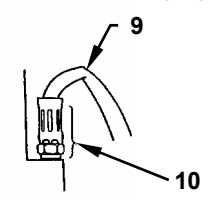
M117-07-147

Oil cooler

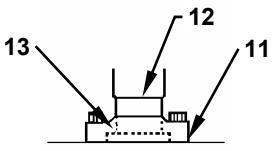
Interval (Hours)	Check Point	Abnormality	Remedy
Every 250 hours	Hose and hose connection	Oil leak (14)	Retighten or replace
	Oil cooler	Oil leak (15)	Replace



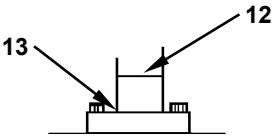
M117-07-148



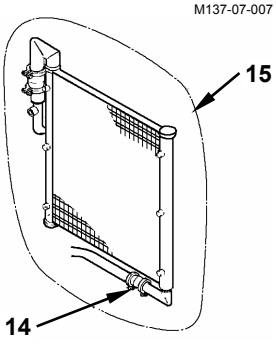
M117-07-149



M137-07-001



M137-07-007



M155-07-049

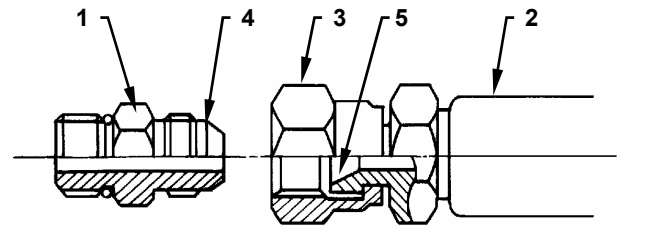
Hose Fitting

- **Metal Face Seal Fittings**
  (Width Across Flats of Union Nut: 17, 19, 22, and 27 mm)

  Fittings are used on smaller size hoses. Metal flare seat (4) on adapter (1) and metal flare (5) on hose (2) ends seal pressure oil.

  Precaution for Application
  Take care not to damage flare seat (4) and flare (5) when disconnecting or connecting them.

  Tightening Torque
  Tighten adapter (1) and nut (3) to the torque values shown in the table below.



M202-07-051

±10%

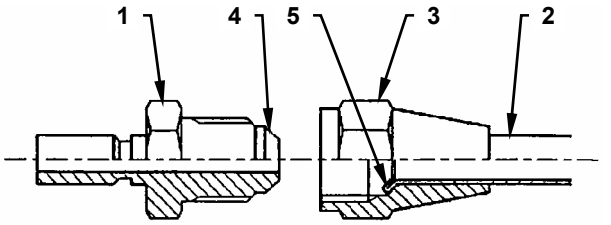
Width across flats (mm)		17	19	22	27
Tightening torque	N·m	24.5	29.5	39	64
	(kgf·m)	(2.5)	(3)	(4)	(6.5)
	(lbf·ft)	(18)	(21.5)	(29)	(47)

- **Pipe Metal Seal Fitting**
  (Width Across Flats of Union Nut: 17)

  Metal flare seat (4) on adapter (1) and metal flare (5) on pipe (2) ends seal pressure oil.

  Precaution for Application
  Take care not to damage flare seat (4) and flare (5) when disconnecting or connecting them.

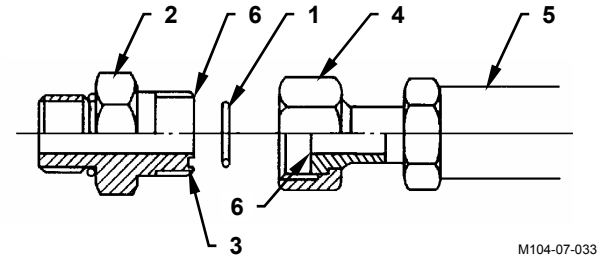
  Tightening Torque
  Tighten adapter (1) and nut (3) to the torque values shown in the table below.



M1M7-07-005

Width across flats (mm)		17
Tightening torque	N·m	39
	(kgf·m)	(4)
	(lbf·ft)	(29)

- **Flat Face O-ring Seal Fitting (ORS Fitting)**
  O-ring (1) is used on the end face of adapter (2) to prevent oil leakage between the joints.



Precautions for Application

1. Replace O-ring (1) with a new one when re-assembling fittings.
2. Before tightening union nut (4), check that O-ring (1) is correctly seated in O-ring groove (3). If union nut (4) is tightened when O-ring is not correctly seated in O-ring groove (3), damage to O-ring (1) and oil leak from fittings may result.
3. Take care not to make dents on O-ring groove (3) of adapter (2) and seal face (6) on the hose or valve side (5) when re-assembling fittings. Failure to do so may cause damage to O-ring (1) and oil leak from fittings.
4. If oil leaks from a loose connection of union nut (4), open the connection, replace O-ring (1), and check that the O-ring is correctly seated in O-ring groove (3) before re-tightening the connection.

Tightening Torque
Tighten adapter (2) and union nut (4) to the torque values shown in the table below

±10%

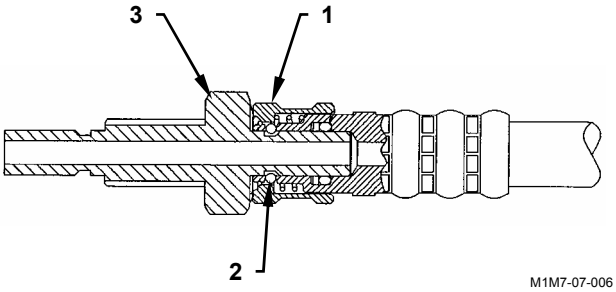
Width across flats (mm)		19	22	24	27
Fastening torque	N·m	44	74	78	93
	(kgf·m)	(4.5)	(7.5)	(8.0)	(9.5)
	(lbf·ft)	(32.5)	(54)	(57.5)	(68.5)

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.



M1M7-07-006

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.

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 that socket ring (1) has been moved back fully to the right original position.**

E. FUEL SYSTEM

WARNING: Fuel is highly flammable. Handle fuel with care. Keep open flame or sparks away from fuel.

Refueling

After parking the machine on a level surface, check the fuel level with fuel gauge (1) and level gauge (2). When necessary to add fuel, remove fuel tank cap (3) and refill fuel.

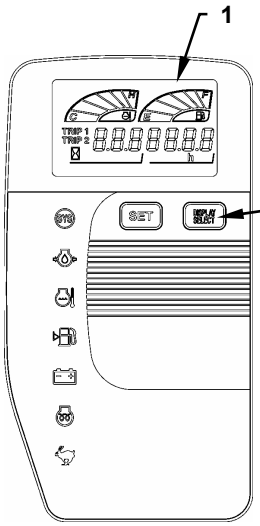
NOTE: Even though the key switch is OFF, the fuel level can be checked by pressing and holding display selector (5) for longer than 0.5 seconds. As long as display selector (5) is kept pressed, the fuel level is displayed. As soon as the switch is released, the display disappears.

1. To avoid condensation, fill the tank at the end of each day's operation. Take care not to add more fuel than the specified level.

	Fuel Tank Capacity
ZX27U-2, ZX30U-2, ZX35U-2	40 L (10.6 US gal)
ZX40U-2, ZX50U-2	70 L (18.5 US gal)

2. After refilling fuel, close tank cover (4). Be sure to lock the cover to prevent vandalism.

IMPORTANT: Take care not to allow water and/or dirt to enter the fuel system when refilling fuel.



ZX27U-2

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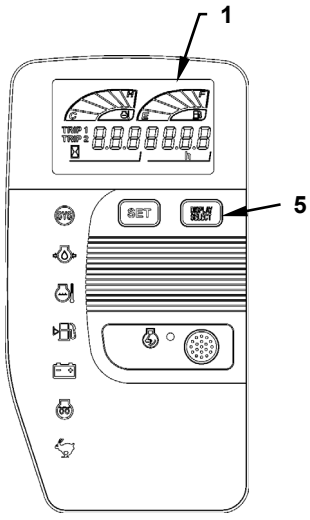
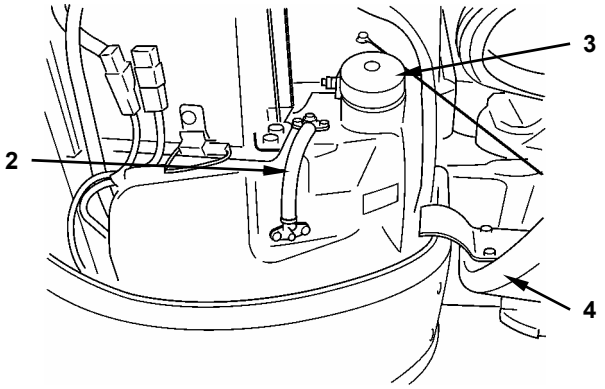


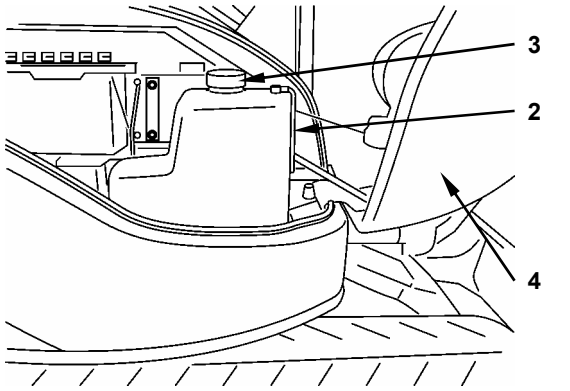
ZX30U-2, ZX35U-2
ZX40U-2, ZX50U-2

M1M7-01-028



ZX27U-2, ZX30U-2, ZX35U-2

M1M7-07-039



ZX40U-2, ZX50U-2

M1M7-03-004

Bleed Air from Fuel System

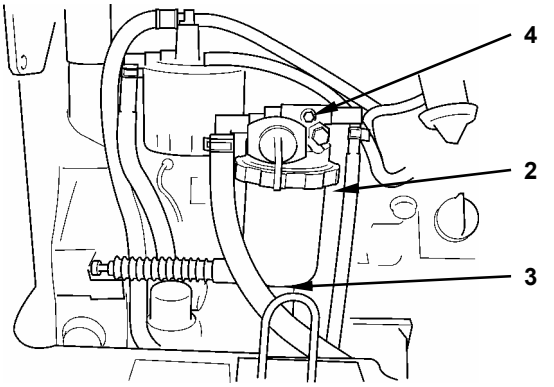
Air in the fuel system will cause the engine to start hard and/or run roughly. Be sure to bleed air from the system after replacing the fuel filter or draining the tank.

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.

1 **Check Water Separator**
--- daily

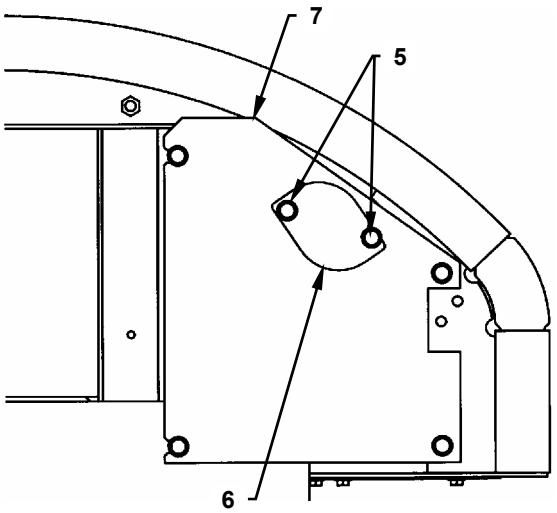
When water is accumulated in water separator (2), Loosen drain plug (3) to drain water and sediment. If water is difficult to drain, loosen air bleed plug (4).



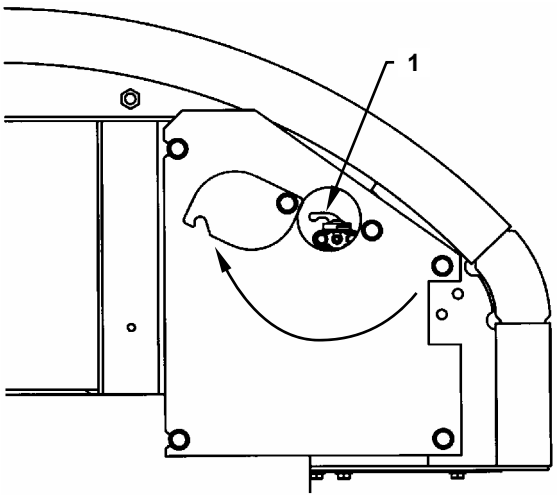
M1M7-07-040

2 **Drain Fuel Tank Sump --- as required**

Park the machine on a solid level surface. Loosen bolts (5) to remove drain valve cover (6) from right-front cover (7). Rotate drain valve cover (6) to open the checking port. Open drain valve (1) on the bottom of the fuel tank and allow the water and sediments to drain from the fuel tank sump.



M1MF-07-032

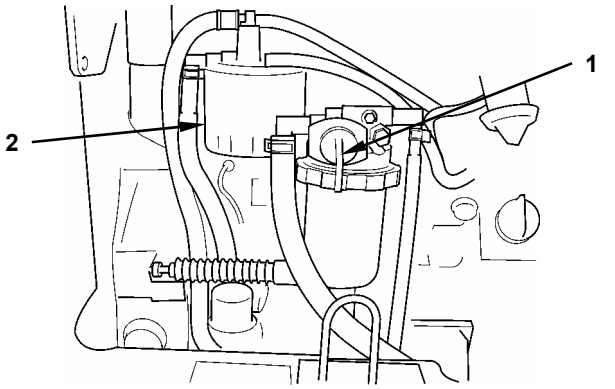


M1MF-07-033

3 Replace Fuel Filter
--- every 500 hours

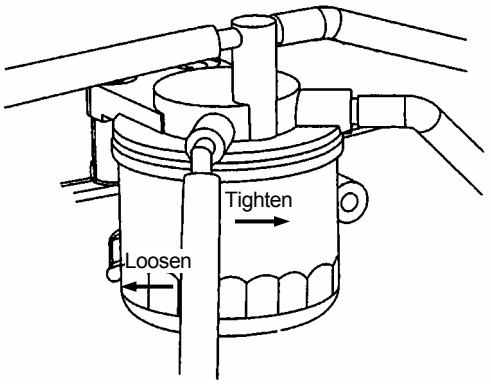
1. Close stop valve (1).
2. Remove fuel filter (2) with a fuel filter wrench.
3. Clean the mounting surface for fuel filter (2).
4. Install new fuel filter (2) while rotating the fuel filter clockwise until the fuel filter comes in contact with the mounting surface. Tighten the fuel filter about 1/2 turns more using the filter wrench.

NOTE: Tightening torque: 11.8 to 15.6 N·m (1.2 to 1.6 kgf·m, 9 to 11.5 lbf·ft)



M1M7-07-040

5. Open stop valve (1).
6. Turn the key switch ON and hold for 10 to 15 seconds.
7. Start the engine and check the fuel system for fuel leaks.



M1M7-07-007

4 **Check Fuel Hoses**

--- daily
--- every 250 hours

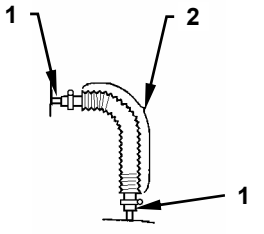
WARNING:

- **Escaping fuel may cause fire. Check for kinked hoses, or hoses that rub against each other and/or come in contact with other components, and any oil leaks.**
- **Repair or replace any loose or damaged hoses.**
- **Never install accurately bent or damaged hoses.**

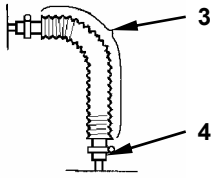
Check hoses for oil leaks and/or damage while referring to the following tables. If any abnormality is found, repair it as instructed in the remedy column.

Hoses

Interval (Hours)	Check Point	Abnormality	Remedy
Daily	Hose fittings	Leak (1)	Retighten or replace
	Soutache braid hose surface	Rubbed marks (2) Crack (2)	Replace Replace
Every 250 hours	Soutache braid hose surface	Crack (3)	Replace
	Hose fittings	Crack (4)	Replace
	Hose	Acute bend (5) Collapse (6)	Replace Replace
	Hose ends and fittings	Corrosion (7)	Replace



M137-07-003



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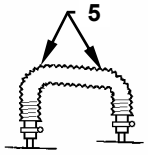

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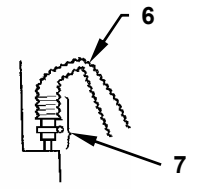


M137-07-006

F. AIR CLEANER

1 **Clean the Air Cleaner Element**

--- every 250 hours or when the air cleaner indicator comes ON.
Replace the Air Cleaner Element
--- after cleaning six times or after one year

Clean and replace air cleaner element.

1. Before servicing element (1), be sure to stop the engine.

WARNING: Be sure to wear safety glasses or goggles before removing cover (3).

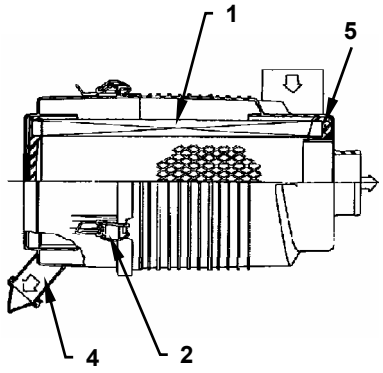
2. Loosen two clamps (2) to remove cover (3) and element (1).

WARNING: Wear safety glasses or goggles when using compressed air pressure [less than 0.2 MPa (2 kgf/cm^2, 29 psi)].

IMPORTANT:

- **Clean cover (3) to prevent dirt or water from entering the air cleaner suction port. If water enters the air cleaner suction port, damage to the engine may result.**
- **When cleaning, don't hit element (1) or force the element to collide against other object.**

3. Clean element (1) by blowing compressed air pressure [less than 0.2 MPa (2 kgf/cm^2, 29 psi)] from the inside of the element. After cleaning, be sure to check element (1) for damage. If any damage is found, replace the element with a new one.
4. If air filter indicator (5) comes ON immediately after cleaning the element (1) even though cleaning is less than six times, replace the element with a new one.
5. When installing cover (3), position the cover so that valve (4) faces downward. Then, tighten the cover with clamps (2) in the specified position.



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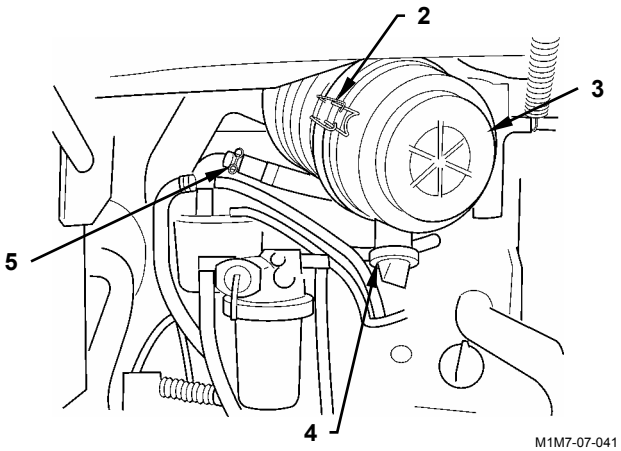

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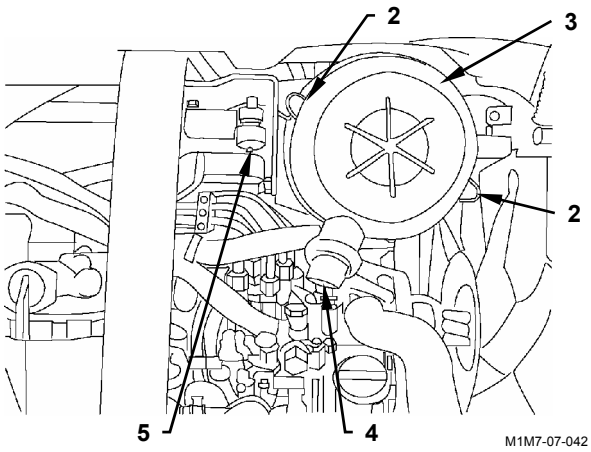
ZX27U-2, ZX30U-2, ZX35U-2



M1M7-07-042

ZX40U-2, ZX50U-2

G. COOLING SYSTEM

NOTE: When a new machine is shipped from the Hitachi factory, the cooling system is filled with a mixture of water and genuine Hitachi Long-Life Coolant (LLC).

Coolant

Use fresh water which includes fewer impurities or normal tap water for the coolant. Avoid using strong acid or alkaline water. Be sure to use genuine Hitachi long life coolant (LLC).

Long Life Coolant (LLC)

LLC has two functions, antifreeze and anti-rust agent. As a general rule, the ratio of antifreeze should range between 30% and 60%. If the ratio is below 30%, the system may develop rust, and if it is above 60% the engine may overheat.

NOTE: As for Borax Coolant, the mixed ratio, 50% is recommended for anti-rust.

LLC Mixing Ratio

Mixing ratio	%	30	35	40	45	50
Air temperature	°C	–10	–15	–20	–25	–30
	(°F)	(14)	(5)	(–4)	(–13)	(–22)

Precautions for Handling LLC

WARNING: LLC is poisonous.

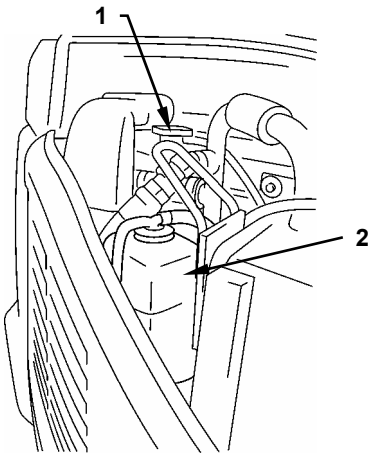
1. If ingested, Induce vomiting and immediately get emergency medical attention.
2. If antifreeze is accidentally splashed in the eyes, sufficiently flush the eyes with water and get emergency medical attention.
3. When storing antifreeze, be sure to keep it in a clearly marked container with tight closing lid. Always keep antifreeze out of the reach of children.
4. Keep open flame or sparks away from LLC.
5. When disposing LLC, comply with local regulations.

1 **Check Coolant Level --- daily**

Check that the coolant level is between the FULL and LOW marks on coolant reservoir (2). If the coolant level is below the low mark, remove the reservoir cap and add coolant to coolant reservoir (2).

WARNING: Do not loosen radiator filler cap (1) unless the system is cool. Hot steam may escape, possibly causing severe burns. Loosen the cap (1) slowly to the stop after the coolant becomes cool. Release all pressure before removing the cap (1).

If coolant reservoir (2) is empty, add coolant through radiator cap (1).



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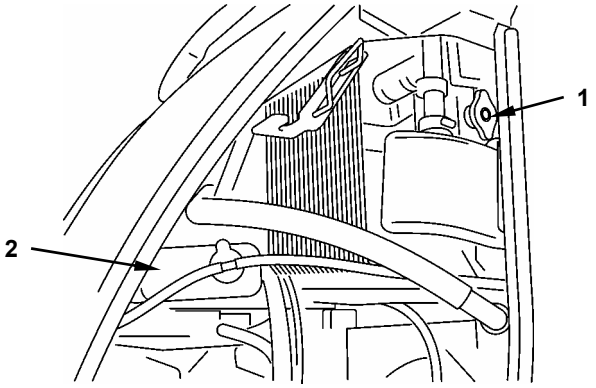
ZX27U-2, ZX30U-2, ZX35U-2



M1M7-07-044

ZX40U-2, ZX50U-2

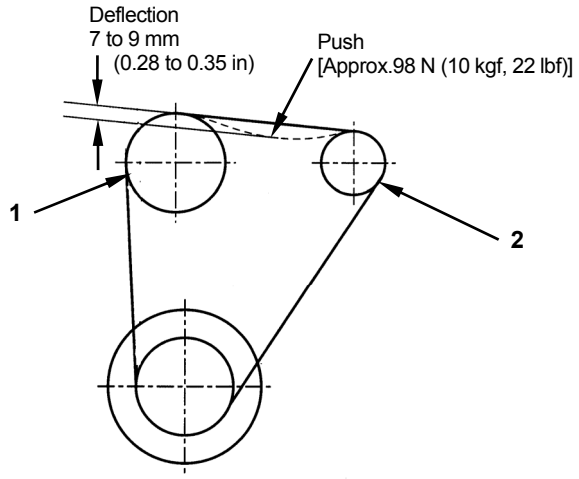
2 Check and Adjust Fan Belt Tension --- every 100 hours (first time after 50 hours)

IMPORTANT: Loose fan belt tension may result in insufficient battery charging, engine overheating as well as a rapid, abnormal belt wear. Belts that are too tight, however, can damage both water pump and alternator bearings, and belts.

Check

Check fan belt tension by depressing the fan belt mid-point with the force [approx. 98 N (10kgf, 22 lbf)] of thumb. Deflection must be 7 to 9 mm (0.28 to 0.35 in) at a mid point between fan pulley (1) and alternator pulley (2).

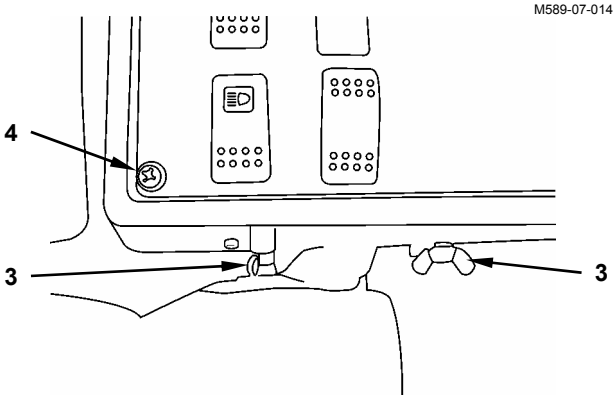
In addition, check the fan belt for any damage. If the belt has any cracks, replace the belt with a new one.



M589-07-014

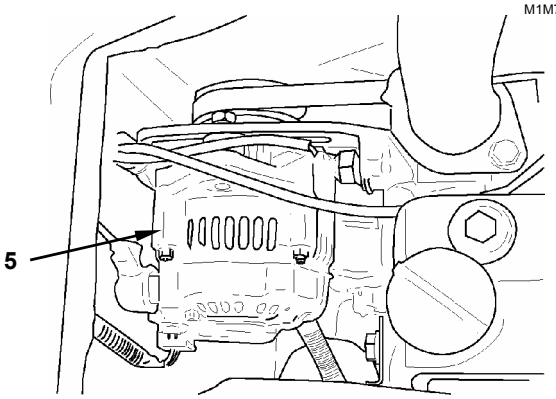
Adjustment of Fan Belt Tension

1. Remove wing bolt (3) from the right side of the seat and switch box (4) to open the inspection door.
2. Loosen mounting bolts (6) of alternator (5).
3. Move alternator (5) to correctly adjust the fan belt tension.
4. Securely tighten bolts (6).



M1M7-07-045

IMPORTANT: When a new belt is installed, the new belt is difficult to be correctly seated from the beginning. Be sure to readjust the tension after operating the engine for 3 to 5 minutes at slow idle speed.



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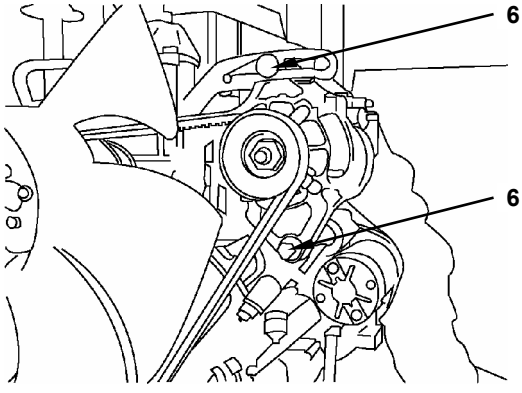


M1M7-07-047

3 **Change Coolant**

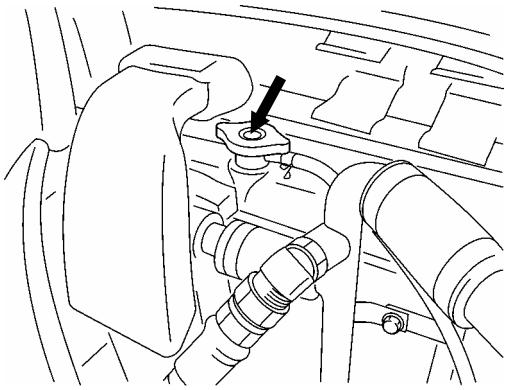
--- twice a years (in spring and autumn)

NOTE: In case genuine Hitachi Long-Life Coolant is used, change the coolant every two years (in autumn every other year), or every 2000 hours, whichever comes first.

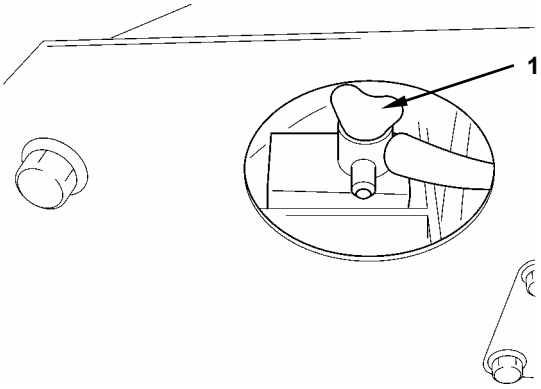
WARNING: Do not loosen the radiator cap unless the system is cool. Hot steam may escape, possibly causing severe burns. Loosen the radiator cap slowly to the stop after the coolant becomes cool. Release all pressure before removing the cap.

Procedure of Coolant Change

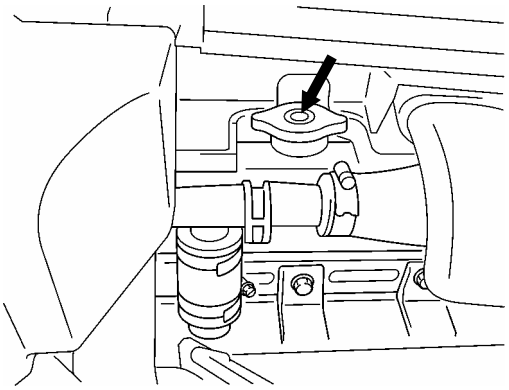
1. Remove the radiator cap. Open drain cock (1) on the radiator and drain the drain valve on the water jacket to allow the coolant to drain completely. Drain impurities such as water scale at the same time.
2. Close radiator drain cock (1) and the drain valve on the water jacket. Fill the radiator with fresh water including less impurity or normal tap water and a radiator cleaner agent. Start the engine and run it at a speed slightly higher than slow idle to raise the coolant temperature until the needle of the temperature gauge reaches the white zone. Then, run the engine further for about ten minutes.
3. Stop the engine and open radiator drain cock (1) to allow the coolant to drain. Flush out the cooling system with fresh water including less impurity or normal tap water, until draining water becomes clear. This helps remove water scale.
4. Close radiator drain cock (1). Fill the radiator with fresh water which includes fewer impurities or normal 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 the air from the cooling system.
5. After adding coolant, operate the engine for several minutes. Check the coolant level again, and add coolant if necessary.



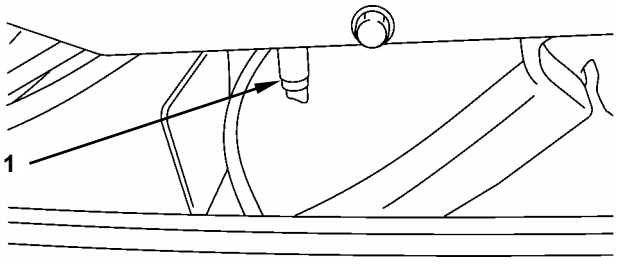
ZX27U-2, ZX30U-2, ZX35U-2 M1M7-07-048



ZX27U-2, ZX30U-2, ZX35U-2 M1M7-07-049



ZX40U-2, ZX50U-2 M1M7-07-050



ZX40U-2, ZX50U-2 M1M7-07-051

4 **Clean Radiator Core**
--- every 500 hours

WARNING: Always wear safety glasses or goggles when using compressed air [less than 0.2 MPa (2 kgf/cm^2, 29 psi)] to clean radiator core.

IMPORTANT:

- **Cover air cleaner inlet opening to prevent entry of dust and water while cleaning the radiator.**
- **High-pressure air [less than 0.2 MPa (2 kgf/cm^2, 29 psi)] or water can damage radiator fins. Keep the pressure nozzle 500 mm (19.7 in) or more away from the core face.**

The radiator and the oil cooler are arranged in series. In case dust or dirt should become stuck to the radiator core, clean the radiator with compressed air and/or water to maintain the cooling ability of the cooling system.

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 equipment's may cause machine failure and/or a fire on the machine. Be sure to consult your authorized dealer when installing s radio communication equipment or additional electrical parts, or when replacing electrical parts.**
- **Never attempt to disassemble or modify the electrical/electronic components. If replacement is required, consult your authorized dealer.**

1 Batteries

WARNING: Battery generates explosive gas during operation or charge. Keep sparks and flames away from battery.

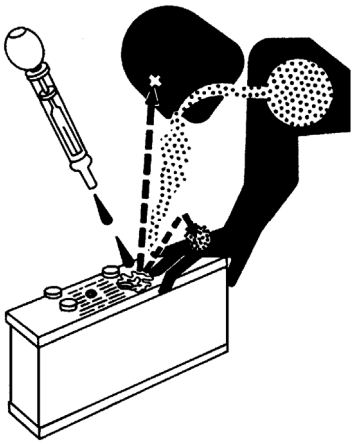
Do not continue to use or charge the battery when the electrolyte level is lower than specified. Explosion of the battery may result.

Charge battery in a well-ventilated area. Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

SA-032

IMPORTANT: If the battery is used with the electrolyte level lower than the specified low level, the battery may deteriorate quickly.

IMPORTANT: Don't refill electrolyte more than the specified upper level. Electrolyte may spill, damaging the painted surfaces and/or corroding other machine parts.



SA-036

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 (Baking powder), flush with plenty of water, otherwise, consult the battery manufacturer.

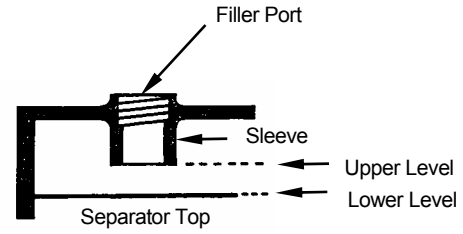
Electrolyte Level Check

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 level check lines with a wet towel. Don't use a dry towel. Static electricity maybe 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.

M146-07-109

3.2 When it is 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. Check if the electrolyte surface touches the bottom end of the sleeve or not according to the right illustrations. When the electrolyte surface 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. After refilling, securely tighten the filler plug.



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

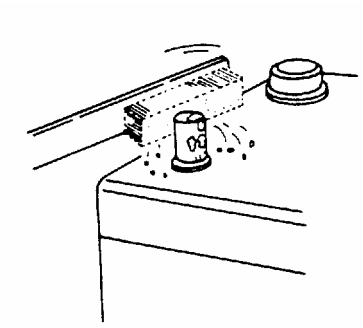
Lower

When the electrolyte surface is lower than the bottom end of the sleeve, the electrode ends are seen straight.

M146-07-112

3.3 When an indicator is available to check the level, follow its check result.

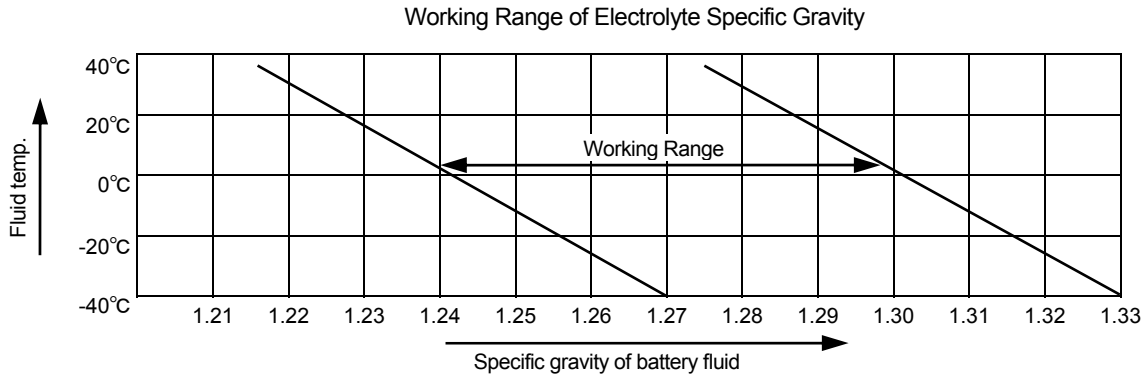
4. Always keep the vicinity around the battery terminals clean to prevent battery discharge. Check battery terminals for looseness and rust. Coat terminals with grease or petroleum jelly to the terminals to prevent corrosion.



M409-07-072

Check Electrolyte Specific Gravity

The specific gravity for 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.



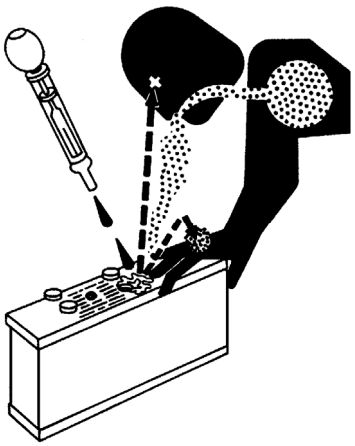
M104-07-054

NOTE: Check the specific gravity of electrolyte after it is cooled to air temperature. As electrolyte temperature changes immediately after operation, correct measurement can be difficult.

Precautions for Handling Batteries

- If electrolyte spills on your skin or clothes, immediately flush the spilled skin or clothes with water. Then, sufficiently wash them with soapy water. If electrolyte splashes in eyes, flush your eyes with water for 10 to 15 minutes. Get medical attention immediately.
- Don't use fire hazards such as matches or tobacco, or don't allow sparks to fly near the batteries.
- Perform battery maintenance only after turning the key switch OFF and removing the battery caps.
- Touching the batteries soon after operation is hazardous. Wait for the batteries to cool.
- During charging, batteries generate flammable hydrogen gas. Remove the batteries from the base machine. Then, charge the batteries in a well-ventilated area only after removing the caps.
- When disconnecting the battery terminals, be sure to disconnect the negative (ground) terminal first, and when reconnecting the battery terminals, reconnect the negative (ground) terminal last. If a conductor such as a metal tool is placed between the battery positive terminal and the vehicle frame with the battery negative terminal kept connected to the vehicle frame, electric short circuit may occur, possibly creating a hazardous situation.
- Loosely tightened terminals may cause sparks to fly. Securely tighten the terminals.

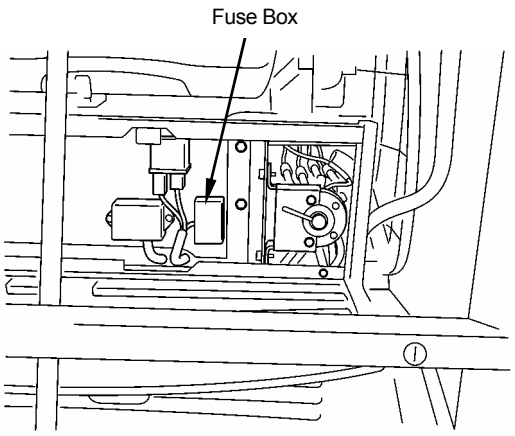
SA-032



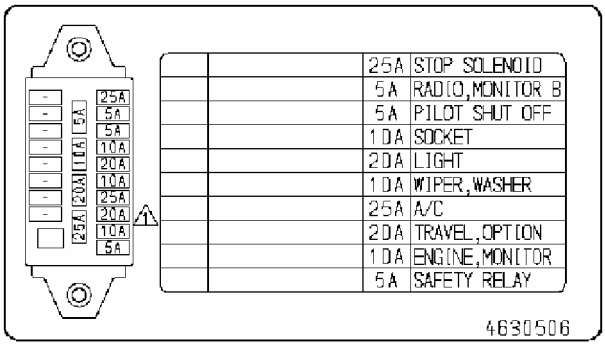
SA-036

2 Replacing Fuses

1. If any electrical equipment fails to operate, first check the fuses in the fuse box.
2. One each capacity of spare fuses are provided in the fuse box.



M1M7-07-052



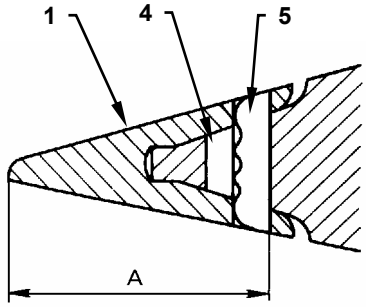
M1M7-07-076

I. MISCELLANEOUS

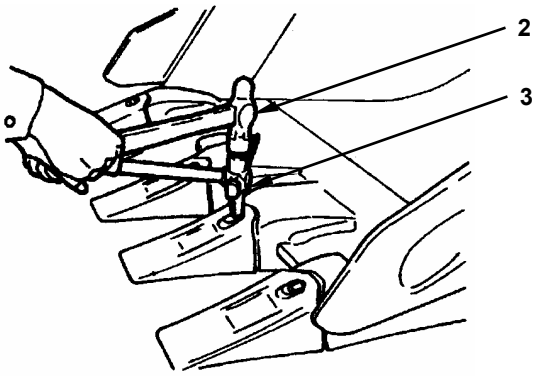
1 **Check Bucket Teeth for Looseness and/or Wear --- daily**

Check the bucket teeth for wear and looseness. Replace teeth (1) if tooth wear exceeds the service limit shown below.

Dimension A in mm (in.)	
New	Limit of Use
128 (5.0″)	65 (2.6″)



M104-07-056

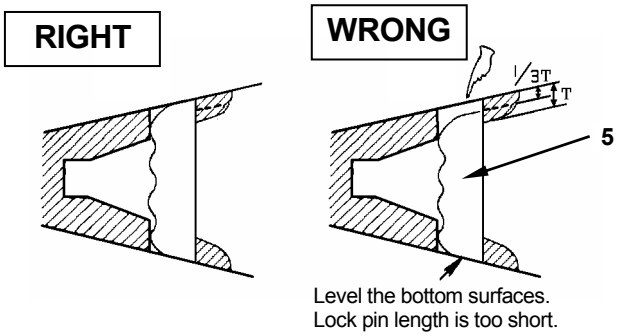


M589-07-017

WARNING: Guard against injury from flying pieces of metal. Use safety equipment such as a hard hat and safety glasses.

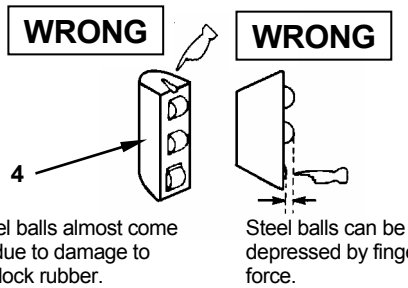
Procedure of Bucket Teeth Change

1. Use hammer (2) and drift (3) to drive out locking pin (5). Be careful not to damage rubber pin lock (4) while removing locking pin (5).
2. Inspect locking pin (5) and rubber pin lock (4) for any damage. Replace short or damaged locking pins as illustrated below with new ones.



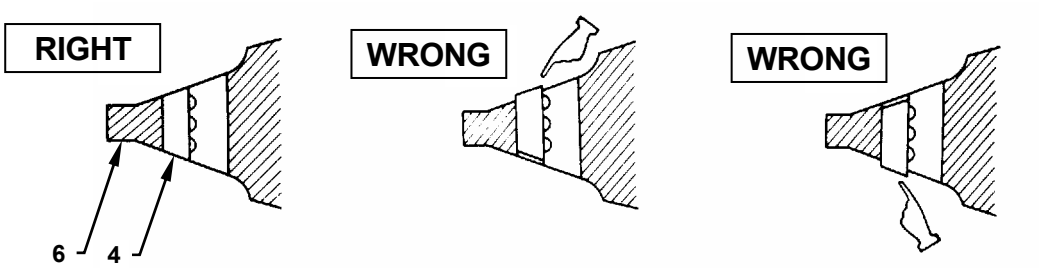
M104-07-118

M104-07-058



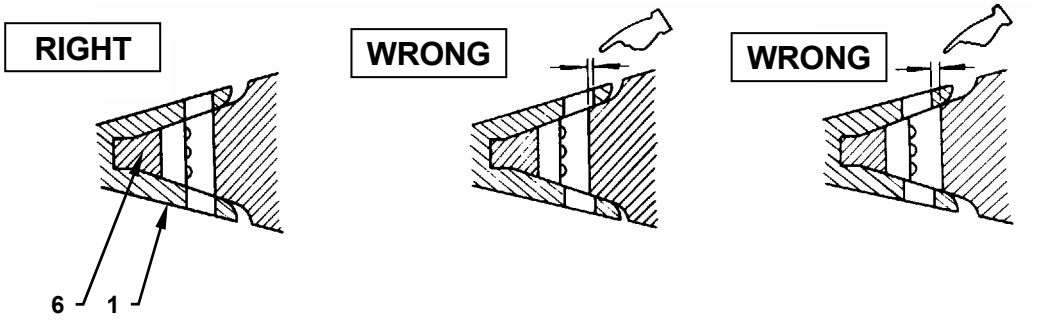
M104-07-059

3. Clean shank (6) surface.
4. Install rubber pin lock (4) into shank (6) hole as shown.



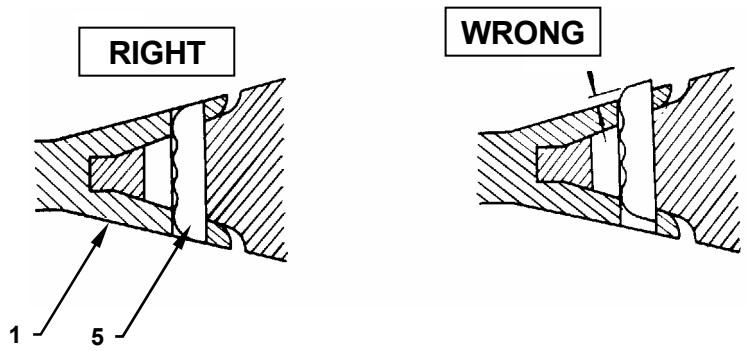
M104-07-060

5. Position new tooth (1) over shank (6).



M104-07-061

6. Drive locking pin (5) fully into the hole as shown.



M104-07-062

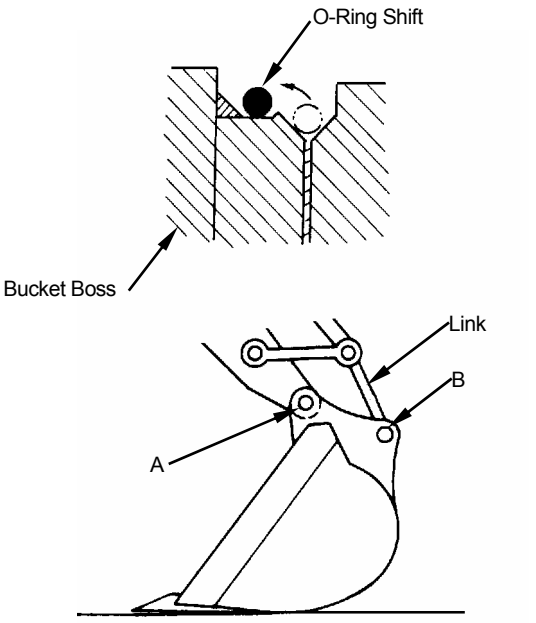
2 **Replace Bucket --- As required**

WARNING: When driving the connecting pins in or out, guard against injury from flying pieces of metal or debris; wear a hard hat, goggles or safety glasses, heavy gloves and safety equipment appropriate for the job.

Select a spacious job site with good footing. Start working only after ensuring the safety of other personnel around the machine. Avoid quick operation of the front attachment. Give the highest priority to safety when engaging in teamwork by strictly exchanging safety signs.

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 specified position to the bucket boss side.
3. Remove bucket pins A and B to separate the arm and bucket.



M104-07-063

Installation

1. Clean the removed pins and pin bores. Apply sufficient grease to the pins and pin bores.
2. Place a new bucket in a stabilized position.
3. Join the arm to hole A and the link to hole B with pins.
4. Securely install the lock washers to all pins.
5. Reinstall the sealing O-ring to the specified position.
6. Apply grease to all pin joints.
7. Start the engine and run it at slow idle. Slowly operate the bucket in both directions to check for any interference in bucket movement.

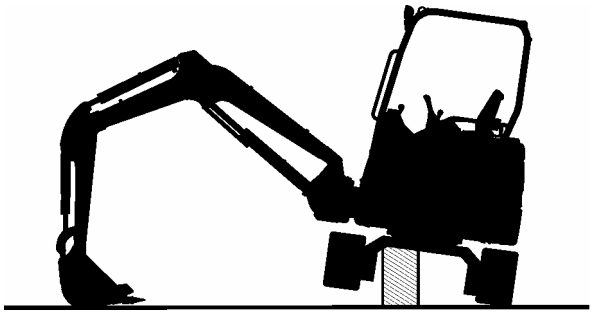
3 Adjust Track Sag (rubber crawler) and Check for Damage --- daily

Proper track sag adjustment is necessary to extend the service life of the rubber track and the travel device.

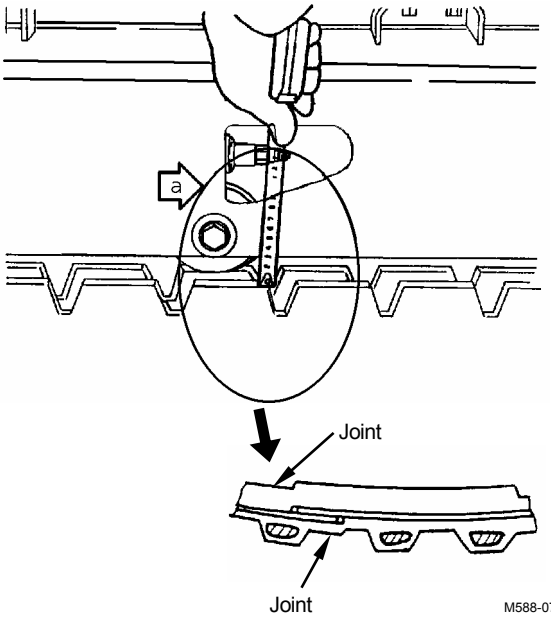
Check Track Sag

As illustrated to the right, raise the one side track which sag is to be measured, off the ground. Place blocks under machine frame to support the machine. 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.

	Dimension
Track Sag Specifications A in mm (in.)	10 to 15 (0.39 to 0.59)



M1M7-04-006

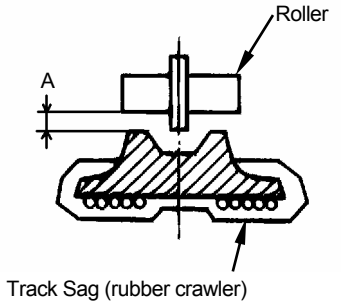


M588-07-055

M102-07-075

Adjusting Track Sag

1. If track sag is not within specifications, loosen or tighten the track following the procedures shown on the next page.
2. Before adjusting track sag, lower the bucket and blade to the ground to raise both tracks off the ground. Be sure to place blocks under machine frame to support the machine.
3. After adjusting track sag of both tracks, run the tracks back and forth several times to equalize the track sag on both side tracks.
4. After doing so, check track sag again. If track sag is not within specifications, repeat adjustment until the correct sag is obtained.



M503-05-050

Side a

Check Rubber Track for Damage

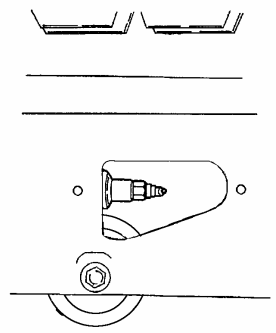
Check the rubber track for damage. If any, consult your authorized dealer for repair.

Loosen Track (Rubber Crawler)

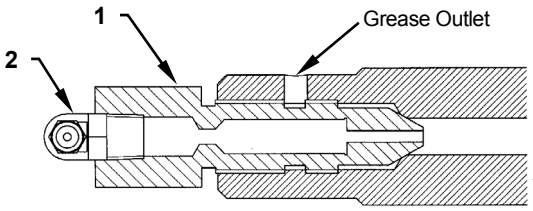
WARNING: Do not loosen valve (1) too quickly or too much as high-pressure grease in the adjusting cylinder may spout out. Loosen carefully, keeping body parts and face away from valve (1). Never loosen grease fitting (2).

IMPORTANT: When gravel or mud is packed around the components in the undercarriage, remove it before loosening valve (1).

1. To loosen track, slowly turn valve (1) counterclockwise using a socket wrench (long socket 19); grease will escape from grease outlet.
2. Between 1 and 1.5 turns of valve (1) are sufficient to loosen track. Never attempt to loosen the valve further.
3. If grease does not drain smoothly, raise the track to be loosed off the ground and slowly rotate the track.
4. When proper track sag is obtained, turn valve (1) clockwise and tighten it to 88 N·m (9 kgf·m, 65 lbf·ft).



M1LA-07-012

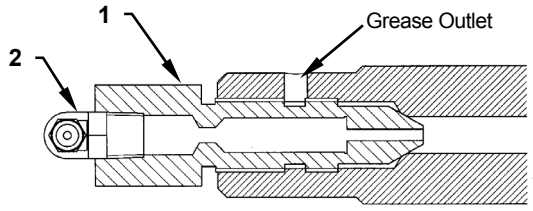


M1LA-07-036

Tighten Track (Rubber Crawler)

WARNING: In case the track sag is not adjustable, this is a very hazardous situation. Since the track adjuster spring is excessively loaded, the grease pressure inside the track adjuster cylinder is very high. Incorrect adjustment or disassembly may result in personal injury and/or death. Immediately consult your authorized dealer for repair.

To tighten track, connect a grease gun to cylinder grease fitting (2) located inside the side frame and add grease until the sag is within specifications.

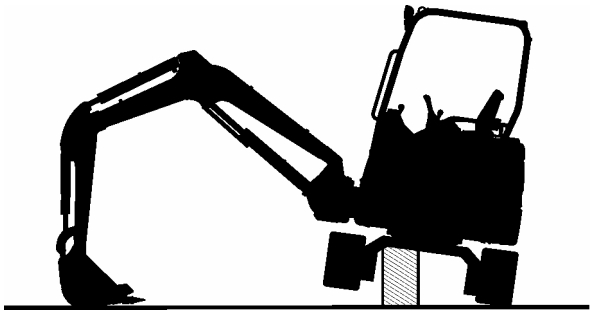


M1LA-07-036

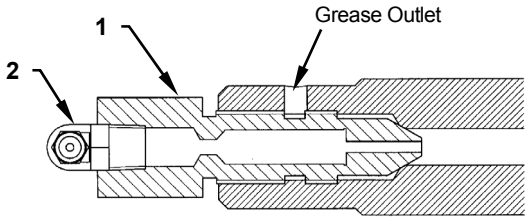
4 **Replace Rubber Crawler --- As required**

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 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 appropriate measures to prevent the front idler from coming off.**



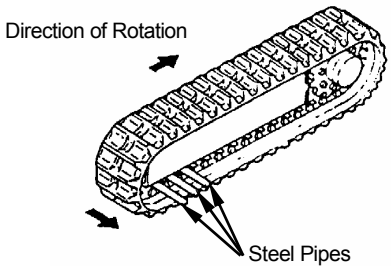
M1M7-04-006



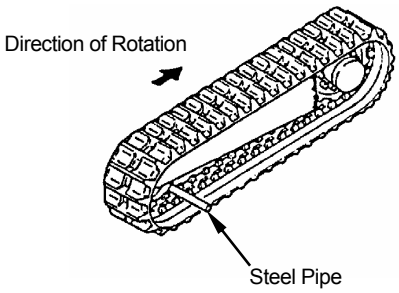
M1LA-07-036

Removing Rubber Crawler

1. Lower the bucket and blade to raise both tracks 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.



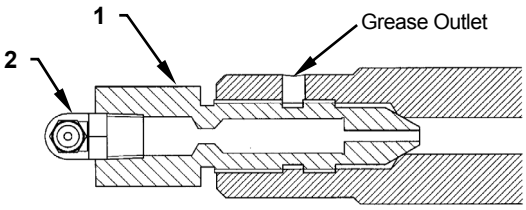
M503-07-062



M503-07-063

Installing Rubber Crawler

1. Lower the bucket and blade to raise both tracks 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. (See page 7-54.)
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.



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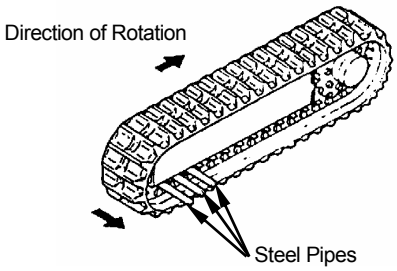
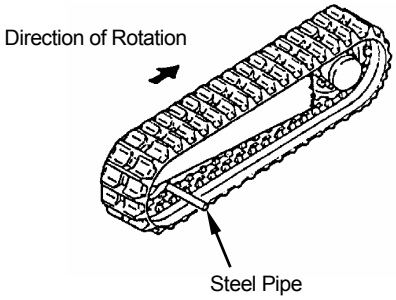


M503-07-062



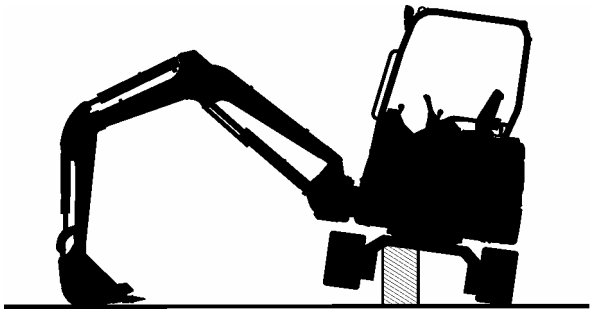
M503-07-063

5 Check Track Sag (steel crawler) (optional) --- every 50 hours

Proper adjustment of track sag is vital to extending the service life of the track and travel device.

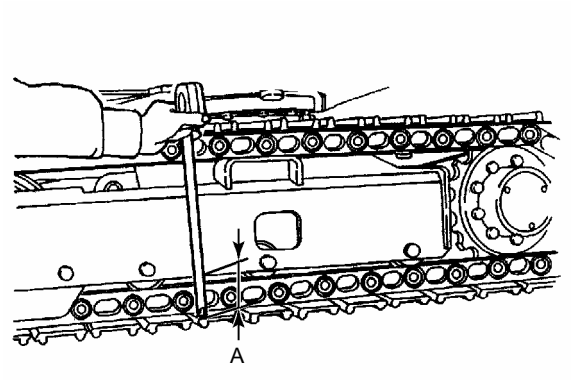
Check Track Sag

As illustrated to the right, raise the one side track, which sag is measured, off the ground. Place blocks under machine frame to support the machine.



M1M7-04-006

	Dimension	
Track Sag Specifications A in mm (in.)	ZX27U-2 ZX30U-2 ZX35U-2	120 to 140 (4.7 to 5.5)
	ZX40U-2 ZX50U-2	140 to 160 (5.5 to 6.3)



M588-07-062

NOTE: 1. Check track sag after thoroughly removing soil stuck on track area by pressure washing.

2. When operating the machine on ground such as mud or gravel, these materials may easily become packed into the undercarriage, adjust the track sag so that it is slightly loose.

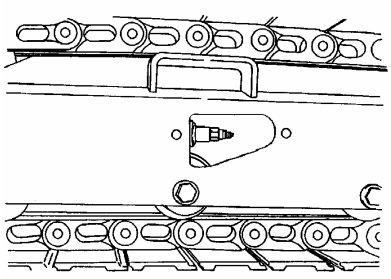
Adjusting Track Sag

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. Every time, be sure to place blocks under machine frame to support the machine.
3. After adjusting track sag of both tracks, move the machine back and forth several times to equalize the track sag on both side tracks.
4. After doing so, check track sag again. If track sag is not within specifications, repeat adjustment until the correct sag is obtained.

Loosen Track (Steel Crawler)

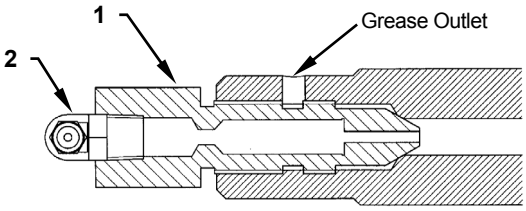
WARNING: Do not loosen valve (1) too quickly or too much as high-pressure grease in the adjusting cylinder may spout out. Loosen carefully, keeping body parts and face away from valve (1). Never loosen grease fitting (2).

IMPORTANT: When gravel or mud is packed around the components in the undercarriage, remove it before loosening valve (1).



M1LA-07-013

1. To loosen track, slowly turn valve (1) counterclockwise using a socket wrench (long socket 19); grease will escape from grease outlet.
2. Between 1 and 1.5 turns of valve (1) are sufficient to loosen track. Never attempt to loosen the valve further.
3. If grease does not drain smoothly, raise the track to be loosed off the ground and slowly rotate the track.
4. When proper track sag is obtained, turn valve (1) clockwise and tighten it to 88 N·m (9 kgf·m, 65 lbf·ft).

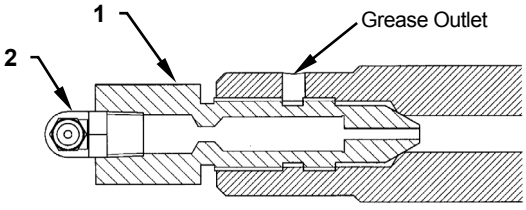


M1LA-07-036

Tighten Track (Steel Crawler)

WARNING: In case the track sag is not adjustable, this is a very hazardous situation. Since the track adjuster spring is excessively loaded, the grease pressure inside the track adjuster cylinder is very high. Incorrect adjustment or disassembly may result in personal injury and/or death. Immediately consult your authorized dealer for repair.

To tighten track, connect a grease gun to cylinder grease fitting (2) located inside the side frame and add grease until the sag is within specifications.



M1LA-07-036

Converting the Track

WARNING:

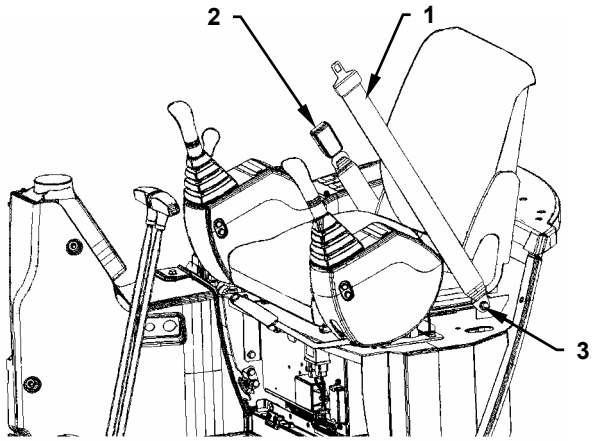
- **Consult your nearest authorized dealer for converting the track. Extremely strong force is being applied. Do no allow anyone to stand in front of the front idler.**
- **After the rubber track is removed, the front idle will become free to remove. If the front idle comes off unexpectedly, personal 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 nearest authorized dealer for converting the track. Change the track adjuster whenever converting the steel or rubber track.

6 Check and Replace Seat Belt

Check --- daily
Replace --- every 3 years

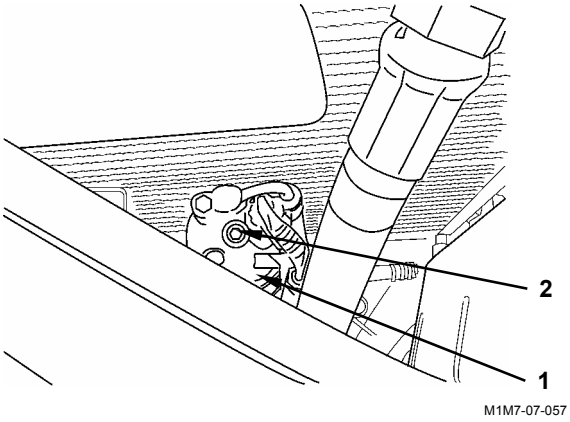
Prior to operating the machine, thoroughly examine belt (1), buckle (2) and attaching hardware (3). If any item is damaged or materially worn, replace the damaged or worn item(s) before operating the machine.
Replace seat belt (1) every three years regardless of its apparent condition.



M1M7-07-012

7 **Check Air Conditioner (Machine with Cab) --- daily**

WARNING: If refrigerant splashes into eyes or spills onto skin, blindness or cold contact burn may result. Never loosen the refrigerant circuit parts.



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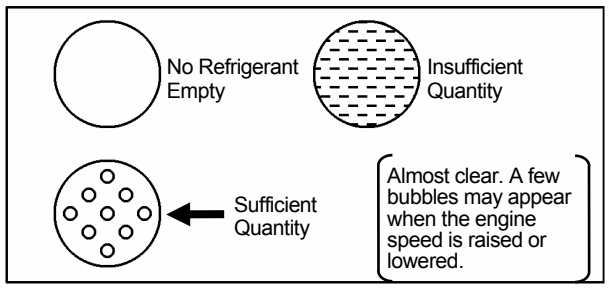
Check for refrigerant leaking from the pipe joints

If an oil seepage mark is found at the pipe joints illustrated to the right, the refrigerant is possibly leaking.

Check the refrigerant level

After operating the air conditioner in the cooling mode for 2 to 3 minutes with the engine running at 1500 min^{-1} (rpm), check the refrigerant level through sight glass (inspection window) (2) on receiver dryer (1).

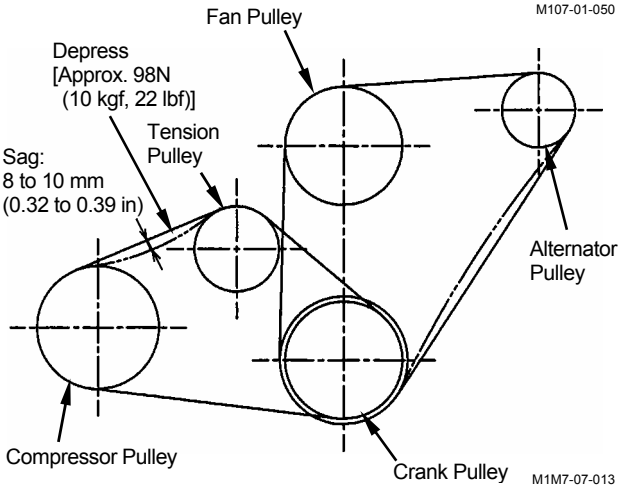


Check the condenser

If the condenser surface is contaminated with foreign matter such as dust or dead insects, cooling performance may be reduced. Keep the condenser clean. (Refer to the descriptions for Clean Radiator in MAINTENANCE section.)

Check the compressor

After operating the air conditioner for 5 to 10 minutes, touch both high and low pressure pipe lines with your hands. Normally, the high pressure side should be hot and the low pressure side should be cool.



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Check each bolt for looseness

Check that the compressor mounting bolts and all other tightening bolts are securely tightened.

Check the compressor belts and fan belts

Check all belts for looseness and/or wear. If any faulty is found, consult your authorized dealer for receiving detailed inspection.

8 **Clean and Replace Air conditioner Re-circulation Filter**

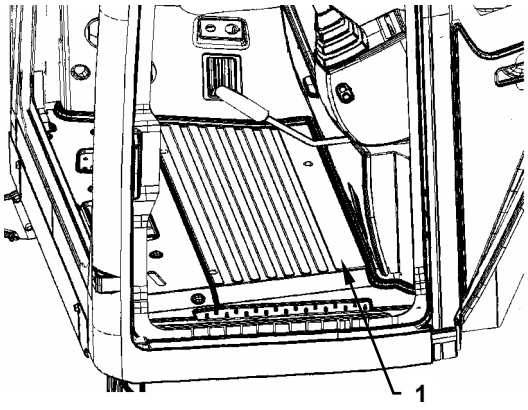
Clean Re-circulation Filter --- every 500 hours

Replace Re-circulation Filter--- after cleaning approx. 6 times

NOTE: The recommenced maintenance hour is a reference value. In case the machine is operated in dusty job site, replace the filter at a shorter interval.

Removal of Re-circulation Filter

1. Remove floor mat (1). Remove bolts (3) to remove floor plate (2).
2. Grasp and pull the grips of re-circulation filters (4, 5, and 6) upright to remove them.



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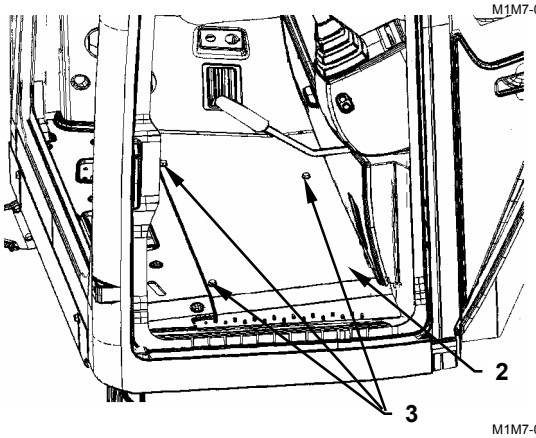

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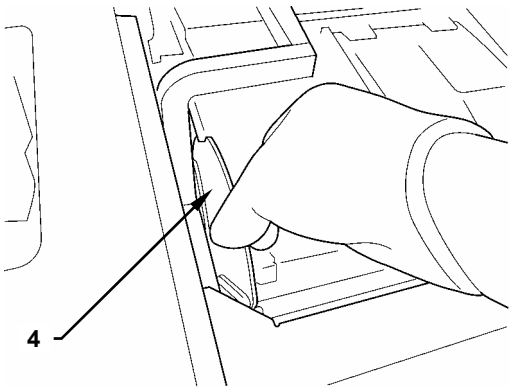

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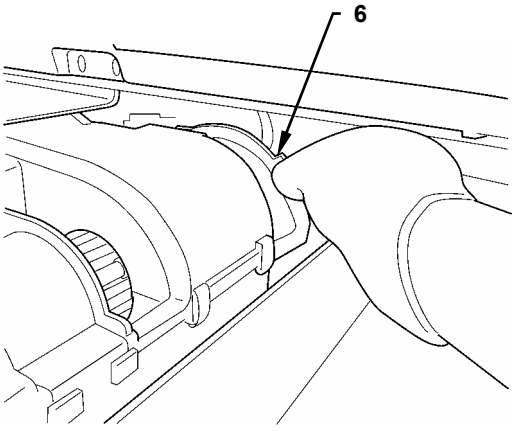

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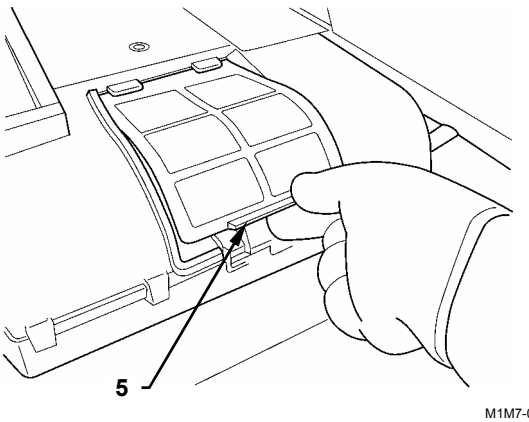

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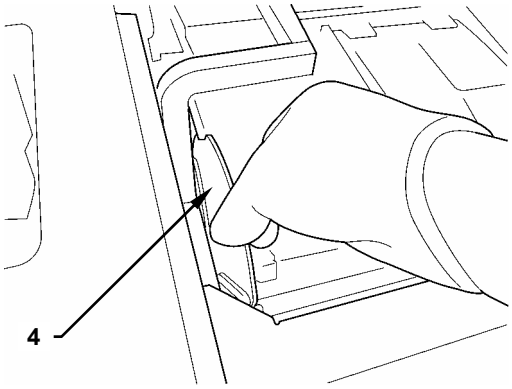
WARNING: Always wear safety glasses or goggles when using compressed air.

Cleaning

Clean the re-circulation filter by blowing compressed air or with water.

When cleaning the filter with water, follow the procedure below.

1. Clean the filter using tap water.
2. Hold the filter in water with a neutral detergent dissolved for about 5 minutes.
3. Clean the filter again with water.
4. Dry the filter.



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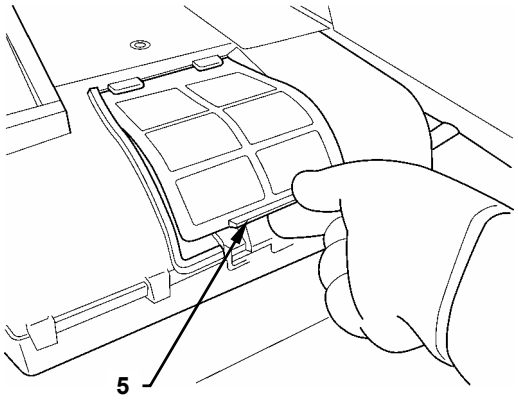
Installation

Install the cleaned filters or new filters by following the removal procedure described on the previous page in the reverse order.

- Insert filters (4 and 6) into the grooves on both sides. Install filter (5) into the center duct.



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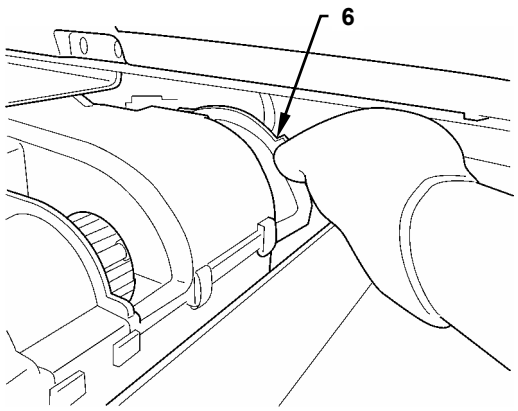

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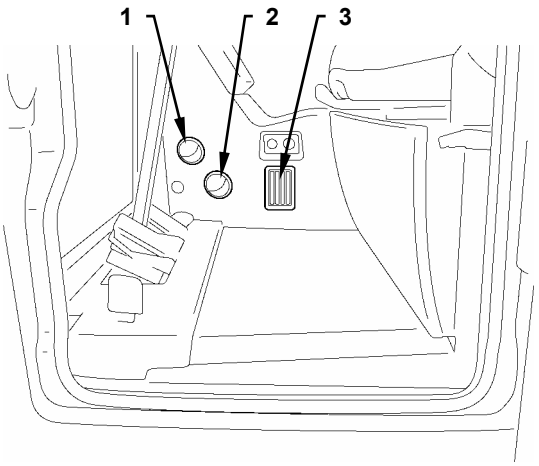
9 Clean Cab Floor--- as required

IMPORTANT: Only the cab floor can be washed with water. Take care not to splash other parts of the cab with water. Don't 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 duct. Failure to do so may result in malfunction of the air conditioner.
If the box located under the seat is splashed with water, failure of the inside electrical parts may result.



M1M7-07-073

1. Park the machine on a level surface. Lower the bucket to the floor. Stop the engine.
2. Sweep the dust out of the cab floor and the pedals with a brush, or use a brush while directing water. (Sweep out the mud and bust with a brush as much as possible before applying water.)
3. When cleaning the floor mat, sweep out the dust and/or water along the grooves on the floor mat.
4. When cleaning the cab floor with the floor mat removed, remove only the rear mat. Then, sweep the dust and/or water through the steps.
5. In case the cab floor becomes seriously stained from using a lot of water when cleaning, check that no water has permeated into the air conditioner unit by removing the floor plates. In addition, clean the circulation air filter. If water permeation is recognized, run the blower at the maximum speed for several minutes until water drops disappear. Turn the air conditioner OFF at this time.

10 **Check Injection Nozzle**

- **Cleaning Nozzle --- every 1500 hours**
- **Adjusting Nozzle --- every 3000 hours**

Consult your authorized dealer for inspection and repair.

11 **Check and Adjust Valve Clearance**
--- every 1000 hours or every year

Consult your authorized dealer for inspection and repair.

12 **Check Injection Timing**
--- every 2000 hours or every 2 years

Consult your authorized dealer for inspection and repair.

13 **Measure Engine Compression Pressure**
--- As required

Consult your authorized dealer for inspection and repair.

14 **Check Starter and Alternator**
--- every 1000 hours

Consult your authorized dealer for inspection and repair.

15 **Check Radiator Cap**
--- every 2000 hours

Consult your authorized dealer for inspection and repair.

16 Check Tightening Torque of Bolts and Nuts (ZX27U-2, ZX30U-2, ZX35U-2) --- every 250 hours (first time after 50 hours)

Tighten or retighten all bolts and nuts to the torque values shown in the Table below. In addition, check bolts and nuts for looseness and omission. if any are loose or missing, be sure to retighten or supply new parts. Check tightness after the first 50 hours then every 250 hours.

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	88	(9)	(65)
2.	Engine bracket mounting bolt (Front)		10	8	17	49	(5)	(36)
3.	Hydraulic oil tank mounting bolt		12	4	19	88	(9)	(65)
4.	Fuel tank mounting nut		10	3	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	24.5	(2.5)	(18)
			9/16-18UNF		19	29.5	(3)	(22)
					22	39	(4)	(29)
			3/4-16UNF		27	64	(6.5)	(47)
			1-1/16-12UNF		36	175	(18)	(129)
			1-5/16-12UNF		41	205	(21)	(151)
		ORS	9/16 UNF		19	44	(4.5)	(32)
			11/16 UNF		22	74	(7.5)	(55)
			13/16 UNF		27	93	(9.5)	(69)
6.	Pump mounting bolt		12	2	10 (Socket)	88	(9)	(65)
7.	Pump cover mounting bolt		10	8	17	49	(5)	(36)
8.	Control valve mounting bolt		10	4	17	49	(5)	(36)
	Control valve base mounting bolt		10	4	17	49	(5)	(36)
9.	Swing device mounting bolt		14	6	22	137	(14)	(101)
10.	Battery mounting nut		6	6	10	5	(0.5)	(3.5)
11.	Canopy mounting bolt		12	5	19	88	(9)	(65)
			10	5	17	49	(5)	(36)
12.	Cab mounting bolt		12	5	19	88	(9)	(65)
			10	5	17	49	(5)	(36)
13.	Swing bearing mounting bolt	Upperstructure	12	22	19	108	(11)	(80)
		Undercarriage	12	20	19	108	(11)	(80)
14.	Travel device mounting bolt		12	24	19	113	(11.5)	(83)
15.	Sprocket mounting bolt		12	24	19	113	(11.5)	(83)
16.	Upper roller mounting bolt		16	2	24	231	(23.5)	(170)
17.	Lower roller mounting bolt		14	16	22	177	(18)	(130)
18.	Cover mounting bolt		6		10	5	(0.5)	(3.5)
			8		13	9.8	(1)	(7)
			10		17	49	(5)	(36)
19.	Counterweight mounting bolt		22	3	32	540	(55)	(398)
20.	Front pin lock plate bolts		10		17	49	(5)	(36)
			12		19	88	(9)	(65)
			14		22	137	(14)	(101)
			16		24	205	(21)	(152)
			18		27	390	(40)	(290)
21.	Side-cutter mounting bolts		14	6	22	175	(18)	(130)
22.	Track roller guard mounting bolt		14	12	22	175	(18)	(130)
23.	Tilt mechanism floor connection pins		10	1	17	49	(5)	(36)
24.	Tilt mechanism support-holding bolts		10	2	17	49	(5)	(36)
25.	Tilt mechanism support connection pins		8	1	13	9.8	(1)	(7)

IMPORTANT:

1. **Before installing, clean the bolt and nut threads to remove soil, rust, and/or dust.**
2. **When installing new bolts and/or nuts, apply lubricant (e.g. white zinc B solved into spindle oil) to the screw threads.**
3. **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.**
4. **In case the counterweight mounting bolts became loose, consult your authorized dealer for re-tightening.**

16 Check Tightening Torque of Bolts and Nuts

(ZX40U-2, ZX50U-2)

--- every 250 hours (first time after 50 hours)

Tighten or retighten all bolts and nuts to the torque values shown in the Table below. In addition, check bolts and nuts for looseness and missing parts. If any are loose or missing, be sure to retighten or supply new parts. Check tightness after the first 50 hours then every 250 hours.

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	88	(9)	(65)
2.	Engine bracket mounting bolt (Front)		10	8	17	49	(5)	(36)
3.	Hydraulic oil tank mounting bolt		12	4	19	88	(9)	(65)
4.	Fuel tank mounting nut		10	3	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	24.5	(2.5)	(18)
			9/16-18UNF		19	29.5	(3)	(22)
					22	39	(4)	(29)
			3/4-16UNF		27	64	(6.5)	(47)
			1-1/16-12UNF		36	175	(18)	(129)
			1-5/16-12UNF		41	205	(21)	(151)
		ORS	9/16 UNF		19	44	(4.5)	(32)
			11/16 UNF		22	74	(7.5)	(55)
			13/16 UNF		27	93	(9.5)	(69)
6.	Pump mounting bolt		12	2	10 (Socket)	88	(9)	(65)
7.	Pump cover mounting bolt		10	8	17	49	(5)	(36)
8.	Control valve mounting bolt		10	4	17	49	(5)	(36)
	Control valve base mounting bolt		10	4	17	49	(5)	(36)
9.	Swing device mounting bolt		16	8	24	265	(27)	(195)
10.	Battery mounting nut		6	2	10	5	(0.5)	(3.5)
11.	Canopy mounting bolt		12	5	19	88	(9)	(65)
			10	5	17	49	(5)	(36)
12.	Cab mounting bolt		12	5	19	88	(9)	(65)
			10	5	17	49	(5)	(36)
13.	Swing bearing mounting bolt	Upperstructure	12	27	19	108	(11)	(80)
		Undercarriage	12	24	19	108	(11)	(80)
14.	Travel device mounting bolt		14	24	22	175	(18)	(130)
15.	Sprocket mounting bolt		14	24	22	175	(18)	(130)
16.	Upper roller mounting bolt		16	2	24	231	(23.5)	(170)
17.	Lower roller mounting bolt		16	16	24	265	(27)	(195)
18.	Track shoe bolt		12	312	19	137	(14)	(101)
19.	Cover mounting bolt		6		10	5	(0.5)	(3.5)
			8		13	9.8	(1)	(7)
			10		17	49	(5)	(36)
20.	Counterweight mounting bolt		24	3	36	930	(95)	(398)
21.	Front pin lock plate bolts		10		17	49	(5)	(36)
			12		19	88	(9)	(65)
			14		22	137	(14)	(101)
			16		24	205	(21)	(152)
			18		27	390	(40)	(290)
22.	Side-cutter mounting bolts		14	6	22	175	(18)	(130)
23.	Track roller guard mounting bolt		16	12	24	265	(27)	(196)
24.	Tilt mechanism floor connection pins		10	1	17	49	(5)	(36)
25.	Tilt mechanism support-holding bolts		10	2	17	49	(5)	(36)
26.	Tilt mechanism support connection pins		8	1	13	9.8	(1)	(7)

IMPORTANT:

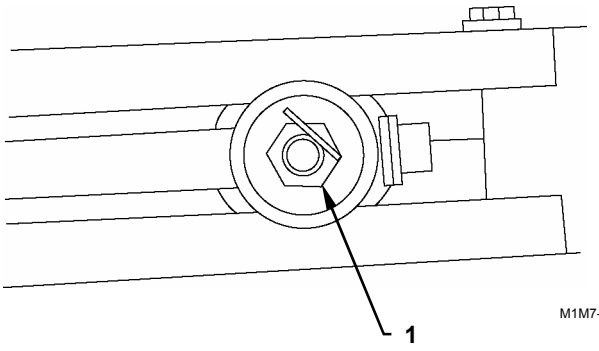
1. **Before installing, clean the bolt and nut threads to remove soil, rust, and/or dust.**
2. **When installing new bolts and/or nuts, apply lubricant (e.g. white zinc B solved into spindle oil) to the screw threads.**
3. **Tighten bolts and nuts to the specifications. If tightened with excessively high or low torque, missing or breakage of bolts and/or nut may result.**
4. **In case the counterweight mounting bolts became loose, consult your authorized dealer for re-tightening.**

Tightening Torque Chart

Nominal Size mm	Hexagon Head Bolt										Socket Bolt			
	 M552-07-091			 M552-07-090			 M552-07-092			Wrench Size	Socket Bolt			Wrench Size
	N·m	(kgf·m)	(lbf·ft)	N·m	(kgf·m)	(lbf·ft)	N·m	(Kgf·m)	(lbf·ft)	mm	N·m	(kgf·m)	(lbf·ft)	mm
6							3.3 to 4.2	(0.3 to 0.4)	(2.2 to 2.9)	10				5
8	29.5	(3.0)	(22)	19.5	(2.0)	(14)	9.8	(1.0)	(7.2)	13	19.5	(2.0)	(14)	6
10	64	(6.5)	(47)	49	(5.0)	(36)	19.5	(2.0)	(14)	17	49	(5.0)	(36)	8
12	108	(11)	(80)	88	(9.0)	(65)	34	(3.5)	(25)	19	88	(9.0)	(65)	10
14	175	(18)	(130)	137	(14)	(101)	54	(5.5)	(40)	22	137	(14)	(101)	12
16	265	(27)	(195)	205	(21)	(152)	78	(8.0)	(58)	24	205	(21)	(152)	14
18	390	(40)	(289)	295	(30)	(217)	118	(12)	(87)	27	295	(30)	(217)	14
20	540	(55)	(398)	390	(40)	(290)	167	(17)	(123)	30	390	(40)	(289)	17
22	740	(75)	(542)	540	(55)	(398)	215	(22)	(159)	32				
24	930	(95)	(687)	690	(70)	(506)	275	(28)	(203)	36				
27	1370	(140)	(1013)	1030	(105)	(759)	390	(40)	(289)	41				
30	1910	(195)	(1410)	1420	(145)	(1049)	540	(55)	(398)	46				
33	2550	(260)	(1881)	1910	(195)	(1410)	740	(75)	(542)	50				
36	3140	(320)	(2315)	2400	(245)	(1772)	930	(95)	(687)	55				

CHECK TILT MECHANISM FULCRUM BOLTS FOR LOOSENESS

1. Check tilt mechanism fulcrum pin nut (1) for looseness every 250 hours. In case nut (1) is found loose, remove the operator's seat access cover on the right side. Then, retighten nut (1) to 49 N·m (5.0 kgf·m, 36 lbf·ft).



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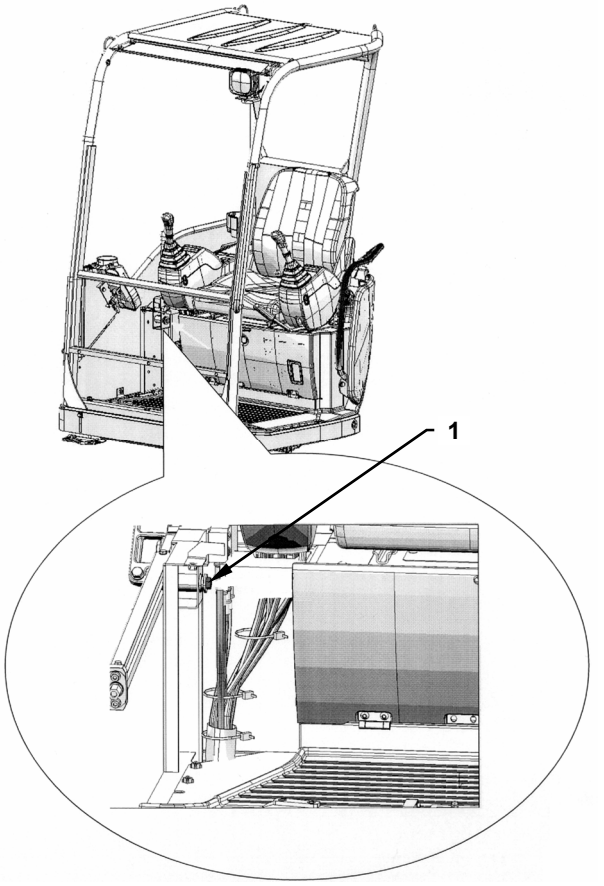

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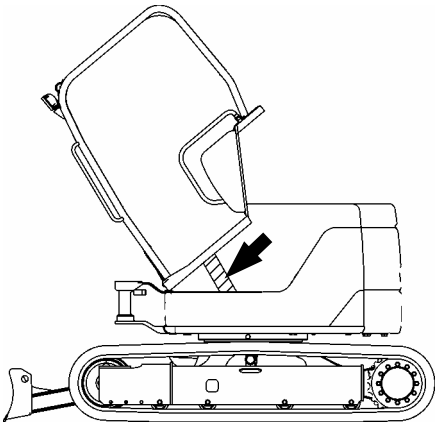
2. Tilt the cab floor forward. Support the floor with a fall prevention bar. Retighten arrowed bolts (3, 4, and 5).

   (3) Tightening torque: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)
   (4) Tightening torque: 49 N·m (5.0 kgf·m, 36 lbf·ft)
   (5) Tightening torque: 49 N·m (5.0 kgf·m, 36 lbf·ft)



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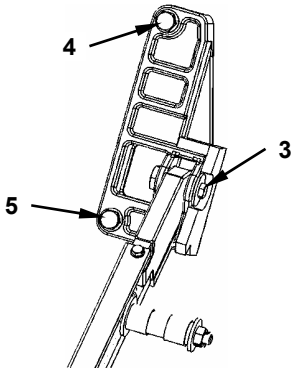

ZX27U-2, ZX30U-2, ZX35U-2

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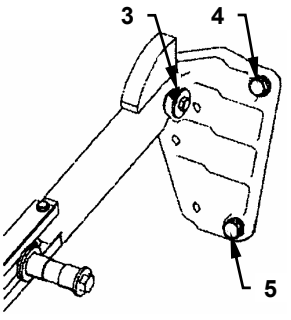


ZX40U-2, ZX50U-2

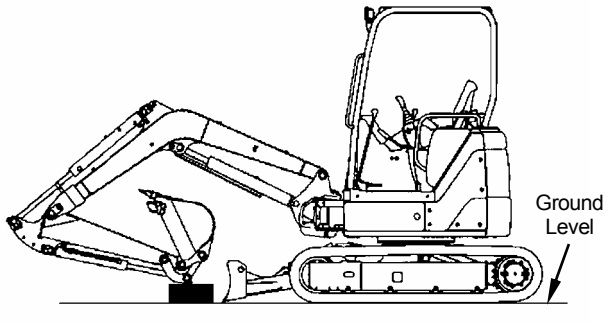
M1MH-07-014

PREPARATION FOR INSPECTION AND MAINTENANCE

When the floor tilt mechanism is used:

CAUTION: Do not open or close the floor tilt mechanism in daily inspection. The daily inspection can be performed through the maintenance cover ports.

CAUTION: When using the floor tilt mechanism, consult your authorized dealer. If bolts (3) are removed or installed by unauthorized personnel, mismatch to ROPS may occur.



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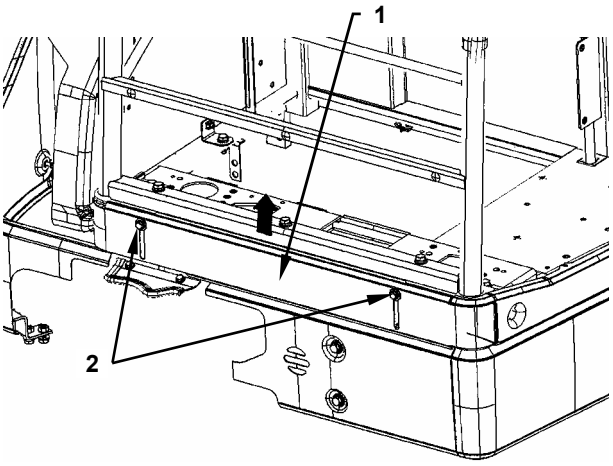
When performing inspection and maintenance using the floor tilt mechanism, park the machine in the following procedure.

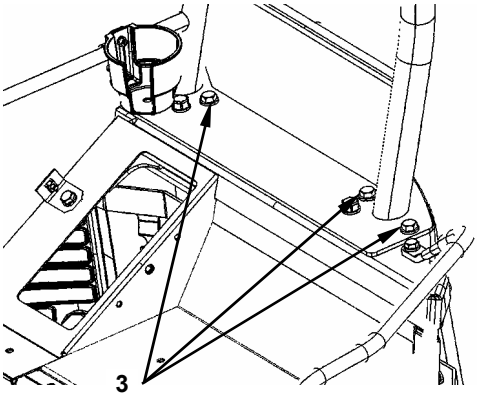
1. After operating the machine, wait the machine to sufficiently cool.
2. Park the machine on solid and level surface.
3. Lower the blade on the ground.
4. After rolling the arm and the bucket in, lower the bucket a wooden block down to the ground.
5. Face the front attachment straightforward toward 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.
8. After loosening two bolts (2) of cover (1) on the front of the base machine, fully slide the cover upward. Then, temporarily tighten bolts (2) so that the cover does not fall.
9. Remove bolts (3) (not covered with resin caps) in the rear section of the operator's seat.



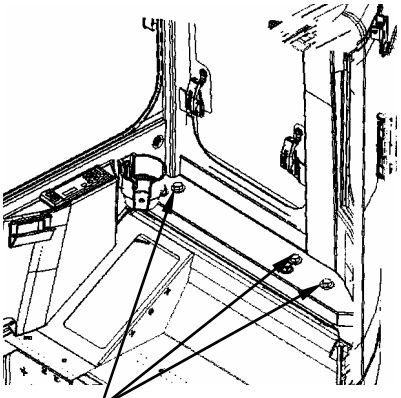
M1M7-07-061

CAUTION: Be careful. When bolts (3) are removed, the canopy or the cab may come off the floor.

CAUTION: Be careful that if the floor is tilted upward while raising the front attachment, the canopy or cab (optional) may come in contact with the boom.

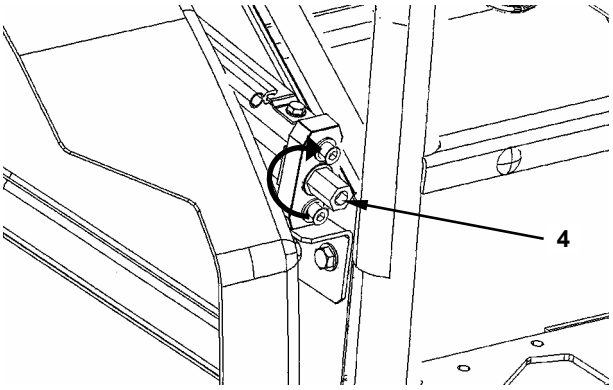


Canopy M1M7-07-063



Cab M1M7-07-064

IMPORTANT: The operation torque of adjuster screw (4) shall be less than 24.5 N·m (2.5 kgf·m, 18 lbf·ft). In case the operating torque requires more than 24.5 N·m (2.5 kgf·m, 18 lbf·ft), bolts (3) may not be completely removed yet. Recheck whether all bolts (3) are completely removed.
In case the canopy or cab is tilted without removing bolts (3), adjuster screw (4) may be deformed, cracked or damaged. Then, replace adjuster screw (4).

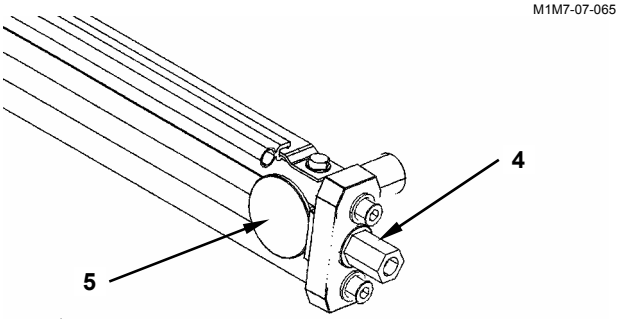


M1M7-07-065

10. Turn adjuster screw (4) to tilt canopy or cab assembly toward the front attachment.

    Wrench size: 17 mm

11. Turn adjuster screw (4) clockwise until disc plate (5) on the side of the floor tilt mechanism is moved to the end of the floor tilt mechanism.

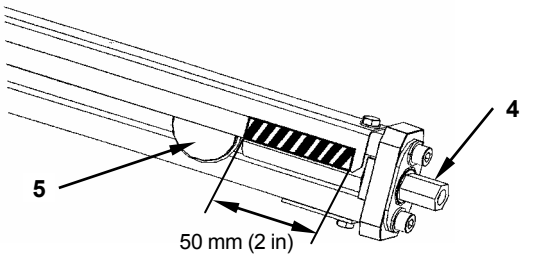


Canopy

M1M7-07-066

WARNING: In case the cab is mounted, stop tilting the floor before the disc plate reaches the striped area. If the floor is tilted into the striped area, the cab may become unbalance so that it may fall downward, potentially creating hazardous conditions.

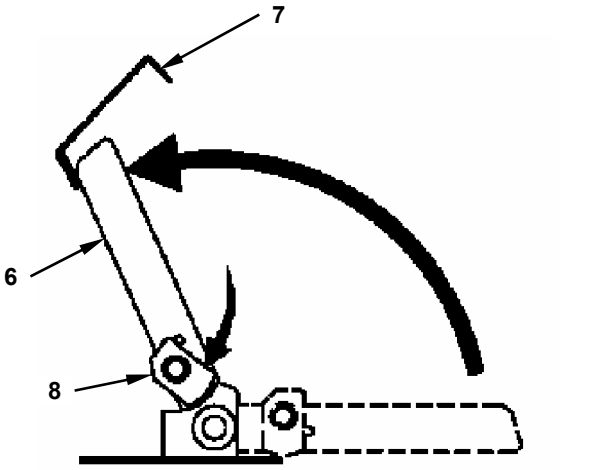
IMPORTANT: Don't tilt the canopy or cab using other than the floor tilt mechanism (such as a crane). Failure to do so may cause damage to the floor tilt mechanism and/or floor.



Cab (Optional)

M1MF-07-040

12. Raise fall prevention bar (6) in the arrowed direction until it comes in contact with the bracket (7) mounted on the cab floor reverse surface. Lock stopper (8) will automatically turns and retains the fall prevention bar in position at this time so that fall prevention bar (6) does not come off.
13. Before starting to work under the tilted cab floor, make sure if fall prevention bar (6) does not come off by jolting fall prevention bar (6) by hand.



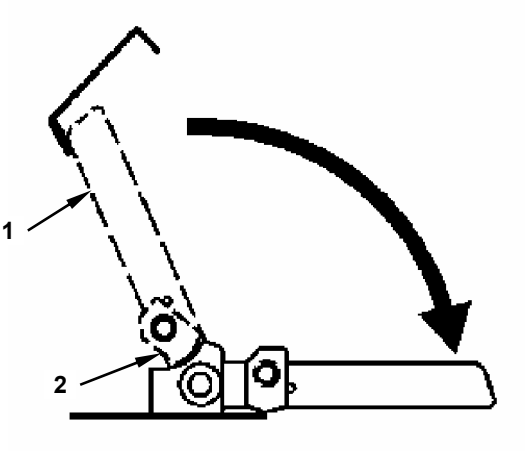
M1M7-07-081

WARNING: The fall prevention bar 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 the fall prevention bar. Failure to do so may result in a serious personal accident.

TILTING FLOOR DOWN

WARNING: Don't quickly lower the floor. If the adjust screw (4) is quickly turned to lower the floor, the floor may severely vibrate, potentially creating hazardous conditions.

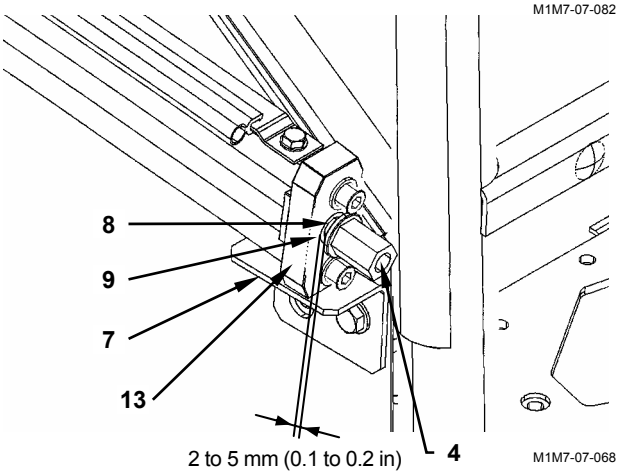
1. Before tilting the cab floor down, check if any tools or workshop towels are not left behind on the base machine or in the operator's cab, and the fall prevention bar has been stowed in position. When detaching fall prevention bar (1), tilt the fall prevention bar in the arrowed reverse direction while picking up lock stopper (2).
2. Slowly turn adjuster screw (4) counterclockwise. Wrench size: 17 mm
3. Continue to turn adjuster screw (4) counterclockwise until the edge of bracket (13) comes in contact with bearing bracket (7).



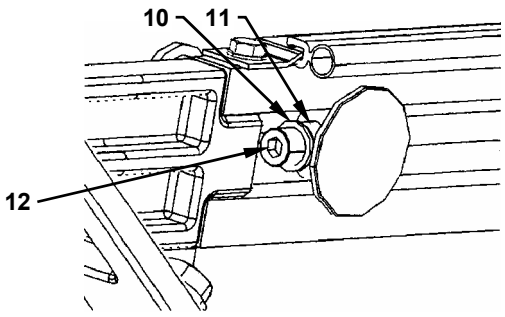
M1M7-07-082

WARNING: If adjuster screw (4) is continuously turned after the floor is completely lowered, when the adjuster screw is extended by approx. 15 mm (0.6 in), washer (10) will come come in contact with the end face of pin (11) so that adjuster screw (4) will not turn further. Take care that if adjuster screw (4) is forcibly turned further, deformation of washer (10) or missing of bolt (12) may result.

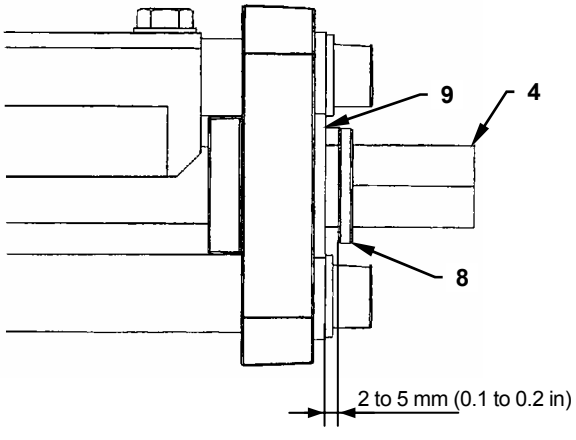
4. When the floor is completely lowered, adjuster screw (4) will be extended. Adjust the clearance between flange (8) of adjuster screw (4) and contact face (9) to 2 to 5 mm (0.1 to 0.2 in).



M1M7-07-068



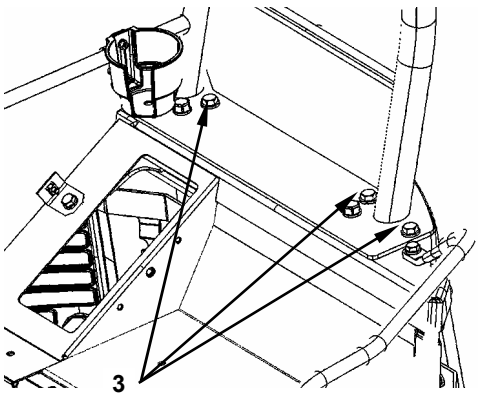
W1M9-01-05-002



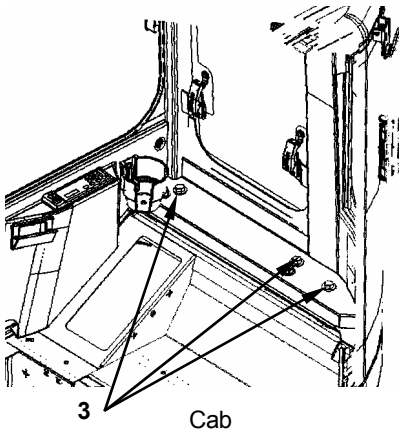
M1M7-07-075

5. Securely install the canopy or cab with three bolts (3).
   Wrench size: 19 mm
   Tightening torque: 90 N·m (9.2 kgf·m, 67 lbf·ft)

CAUTION: Unless bolts (3) are tightened to the specification, the machine will not meet the standard of the Roll-Over Protective Structure (ROPS).



Canopy M1M7-07-063



Cab M1M7-07-064

MEMO

CONSUMABLE PARTS LIST

Filter Element (ZX27U-2, ZX30U-2, ZX35U-2)

	ZX27U-2	ZX30U-2, ZX35U-2
Full Flow Filter	4129280	←
Hydraulic Oil Suction Filter	4617512	←
Pilot Filter	4294130	←
Engine Oil Filter	4626337	4641043
Fuel Filter	4626336	←
Water Separator	4632694	←
Air Cleaner Element	4417516	←

Filter Element (ZX40U-2, ZX50U-2)

Full Flow Filter	4129280
Hydraulic Oil Suction Filter	4617512
Pilot Filter	4294130
Engine Oil Filter	4641043
Fuel Filter	4626336
Water Separator	4632694
Air Cleaner Element	4417516

Bucket Parts (ZX27U-2, ZX30U-2, ZX35U-2)

		ZX27U-2		ZX30U-2, ZX35U-2	
		Part No.	Quantity	Part No.	Quantity
Tooth	Tooth	4339865	3	4339865	4
	Lock Pin	4339868	3	4339868	4
	Lock Rubber	4339867	3	4339867	4
Side Cutter	Side Cutter (R)	4626441	1	4626441	1
	Side Cutter (L)	4626442	1	4626442	1
	Bolt	J921440	6	J921440	6
	Spring Washer	A590914	6	A590914	6
	Nut	J950014	6	J950014	6
O-ring		4275520	(4)	4275533	(4)
Shim		4354262	2	4354260	2

Bucket Parts (ZX40U-2, ZX50U-2)

		Part No.	Quantity
Tooth	Tooth	4339865	4
	Lock Pin	4339868	4
	Lock Rubber	4339867	4
Side Cutter	Side Cutter (R)	4622021	1
	Side Cutter (L)	4626430	1
	Bolt	4317650	6
	Spring Washer	A590914	6
	Nut	J951014	6
O-ring		4291436	(4)
Shim		4354258	2

NOTE: The quantities shown in the above tables are those required for the one standard bucket. The quantities for an optional bucket may differ. The figures in ( ) in the O-ring columns include the O-ring quantities used at the joints between the arm and the link. Shims are used to adjust the clearance at the joint between the arm and bucket.

MAINTENANCE UNDER SPECIAL ENVIRONMENTAL CONDITIONS

Operating Conditions	Precautions for Maintenance	
Muddy Soil, Rainy or Snowy Weather	Before Operation: After Operation:	Check the tightness of plugs and all drain cocks. Clean the machine and check for cracks, damaged, loose or missing bolts and nuts. Lubricate all necessary part without delay.
Near the Ocean	Before Operation: After Operation:	Check the tightness of plugs and all drain cocks. Thoroughly clean the machine with fresh water to wash off salt. Service electrical equipment often to prevent corrosion.
Dusty Atmosphere	Air Cleaner: Radiator: Fuel System: Electrical Equipment:	Clean the element regularly, at shorter service intervals. Clean the oil cooler screen to prevent clogging of the radiator core. Clean the filter element and strainer regularly, at shorter service intervals. Clean them regularly, in particular, the commutator surface of the alternator and starter.
Rocky Ground	Tracks: Front Attachment:	Carefully operate while checking for cracks, damage and loose bolts and nuts. Loosen the tracks a little more than usual. Standard attachment may be damaged when digging rocky ground. Reinforce the bucket before using it, or use a heavy duty bucket.
Freezing Weather	Fuel: Lubricant: Engine Coolant: Battery: Tracks:	Use high quality fuel suitable for low temperature. Use high quality low viscosity hydraulic oil and engine oil. Be sure to use antifreeze. Fully charge the batteries regularly with shorter service intervals. If not charged fully, electrolyte may freeze. Keep the tracks clean. Park the machine on a hard surface to prevent the tracks from freezing to the ground.
Falling Stones	Cab:	Provide a cab guard to protect the machine from falling stones when necessary.
High Ground (Altitudes: Higher than 1500 m (4900 ft))	Engine oil: Engine oil filter: ※ When the machine is operated at the altitudes of 2000 m (6600 ft)or higher, the ignition of the engine may be deteriorate, possibly resulting in significant reduction in durability or function. In case the machine is unavoidably operated under these conditions, consult your authorized dealer in advance.	Change at 1/2 normal service intervals. Replace at 1/2 normal service intervals.

MEMO

STORAGE

STORING THE MACHINE

1. Thoroughly wash the machine to remove dirt, soil and debris from the machine.
2. Inspect the machine. Repair worn or damaged parts. Install new parts if necessary.
3. Clean the primary air cleaner element.
4. Lubricate all grease points.
5. Retract all hydraulic cylinders, if possible. If not, coat exposed cylinder rods with grease.
6. Park the tracks on long stable blocks.
7. 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.
8. Add an antirust agent to the coolant. In cold weather, add an antifreeze, or drain the coolant completely. Be sure to attach a “No Water in Radiator” tag on a clearly visible location if the system is drained.
9. Loosen the alternator belt and fan belt.
10. Paint necessary areas to prevent rust.
11. Store the machine in a dry, protected place. If stored outside, cover with a waterproof cover.
12. If the machine is stored for a long time, oil films on sliding surfaces may break down. Operate the travel, swing and digging functions, 2 to 3 cycles each, to lubricate, the sliding surfaces, at least once a month. Be sure to check the coolant level and lubrication conditions before operating.

REMOVING THE MACHINE FROM STORAGE

WARNING: Start the engine ONLY in a well-ventilated place.

1. Remove grease from the cylinder rods if coated.
2. Adjust alternator and fan belt tension.
3. Fill the fuel tank. Bleed air from the fuel system. Check all fluid levels.
4. Start the engine.
   Run the engine at half speed for several minutes before beginning full load operation.
5. Operate all hydraulic functions several cycles.
6. Carefully check all systems before operating the machine with a full load.

NOTE: When the machine has been stored for a long time, be sure to perform the following steps as well:

(a) Check the condition of all hoses and connections.

(b) Warm up the engine.

(c) Stop the engine.

(d) Install new fuel filters. Replace the engine oil filter and fill the engine with oil.

IMPORTANT: If the machine is not used for a long time, oil films on sliding surfaces may have break down. Operate the travel, swing and digging functions, 2 to 3 cycles each to lubricate the sliding surfaces.

TROUBLESHOOTING

If any problem is found, troubleshoot to pinpoint the cause and take appropriate action to prevent the problem from occurring again. If the cause cannot be pinpointed, contact your authorized dealer.

WARNING: Never attempt to adjust, disassemble, or repair hydraulic or electrical components by yourself.

1. Engine

Trouble	Cause	Solution
Engine does not start.	• Starter does not rotate	• If the battery power is low, recharge or replace the battery • If the starter has failed, repair or replace • If the connections are loose or corroded, clean and tighten
	• Engine is too cold	• Preheat the engine or warm up coolant (Pour some hot water into the cooling system)
	• Incomplete air bleeding from the fuel system	• Thoroughly bleed air
	• No fuel in the fuel tank	• Refuel
	• Fuel filter restriction	• Clean or replace the fuel filter
Engine stalls.	• No fuel in the fuel tank	• Refuel
	• Air in the fuel system	• Re-tighten connections and bleed
Low engine oil pressure (Engine oil pressure indicator comes on)	• Insufficient engine oil	• Add oil
	• Oil leak at connections	• Repair
	• Oil pressure switch failure	• Replace
Engine knocks or runs irregularly.	• Fuel filter restriction	• Clean or replace the filter
	• Air in the fuel system	• Re-tighten connections and bleed
	• Air cleaner restriction	• Clean or replace the element
Engine overheats	• Insufficient coolant and/or coolant leak	• Add coolant. Repair leak
	• Loose fan belt or oil on fan belt	• Adjust or replace the fan belt
	• Radiator fins are clogged or bent	• Clean and/or repair
	• Thermostat failure	• Replace

2. Electrical System

Trouble	Cause	Solution
Starter does not rotate.	• Harness failure	• Inspect and repair
	• Low battery power	• Charge the battery
	• Loose or corroded battery connections	• Clean and tighten
	• Key switch failure	• Replace
Alternator indicator does not go off after engine is started.	• Alternator failure	• Replace
	• Harness failure	• Inspect and repair
Monitor indicators do not come on or gauges do not operate.	• Blown fuse	• Replace
	• Sensor failure	• Replace
	• Harness failure	• Inspect and repair
	• Burned indicator bulb(s)	• Replace
Travel mode does not shift from fast mode to slow mode and/or vice versa.	• Shift switch failure	• Replace
	• Harness failure	• Inspect and repair
	• Switch valve failure	• Replace

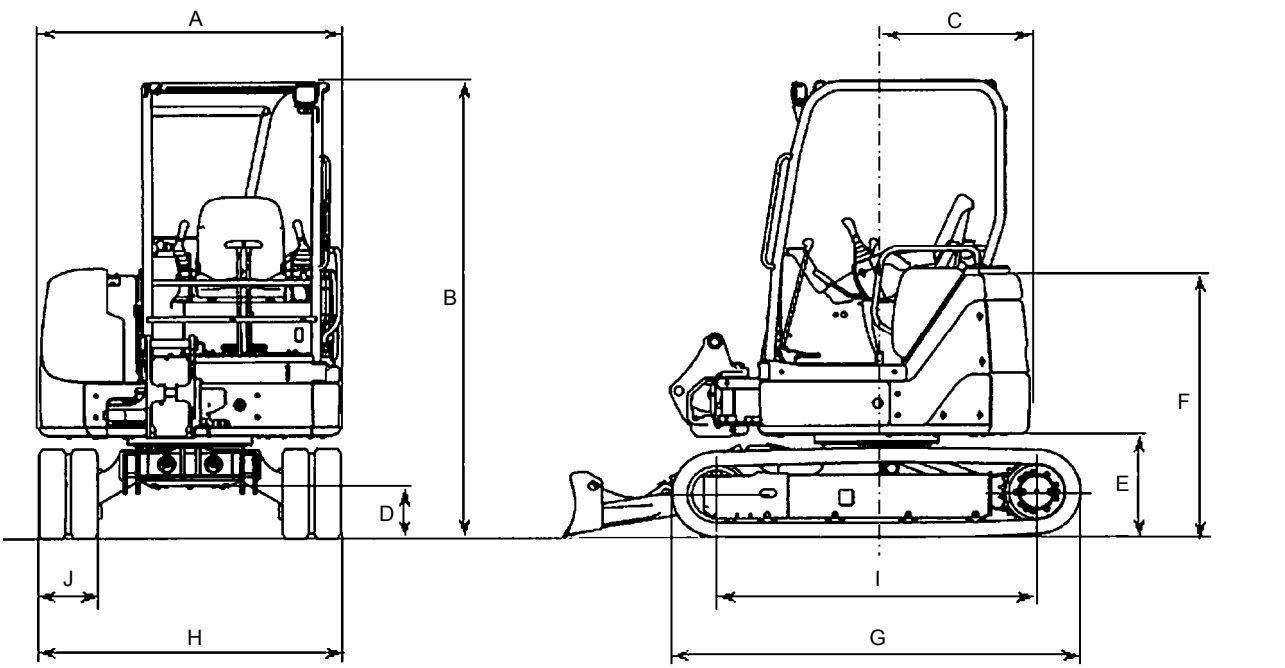
3. Hydraulic System

Trouble	Cause	Solution
Insufficient power: all actuators	• Insufficient engine power • Excessively worn hydraulic pump • Main relief valve failure • Hydraulic oil is low • Suction filter restriction	• Inspect and repair • Replace • Re-adjust pressure setting, or replace • Add hydraulic oil • Clean or replace
Insufficient power: front attachment	• Failure or incorrect pressure setting of main or pilot relief valve • Damaged hydraulic cylinder packing • Damaged cylinder piston or cylinder tube	• Re-adjust pressure setting, or replace • Replace cylinder packing • Replace cylinder piston, cylinder tube, or the cylinder
Machine does not travel smoothly.	• Too tight track (sag) • Foreign matter, such as rocks, stuck in the tracks • Counterbalance valve failure • Travel motor performance drop	• Adjust track sag • Remove foreign matter • Replace • Replace
Machine mistracks	• Track sag is not equal on both sides • Hydraulic pump performance drop • Oil leak inside control valve	• Adjust track sag properly (and equally on both sides) • Replace • Replace the control valve
Insufficient swing power or jerky upperstructure swing	• Hydraulic pump performance drop • Low pressure valve setting • Swing motor performance drop • Swing bearing seizure • Foreign matter sticking in brake valve • Oil leak inside control valve	• Replace • Adjust pressure setting, or replace • Replace • Lubricate or replace swing bearing • Clean the brake valve • Replace the control valve

NOTE: Contact your authorized dealer for any inspection, adjustment, repair, and/or replacement as required.

SPECIFICATIONS

ZX27U-2

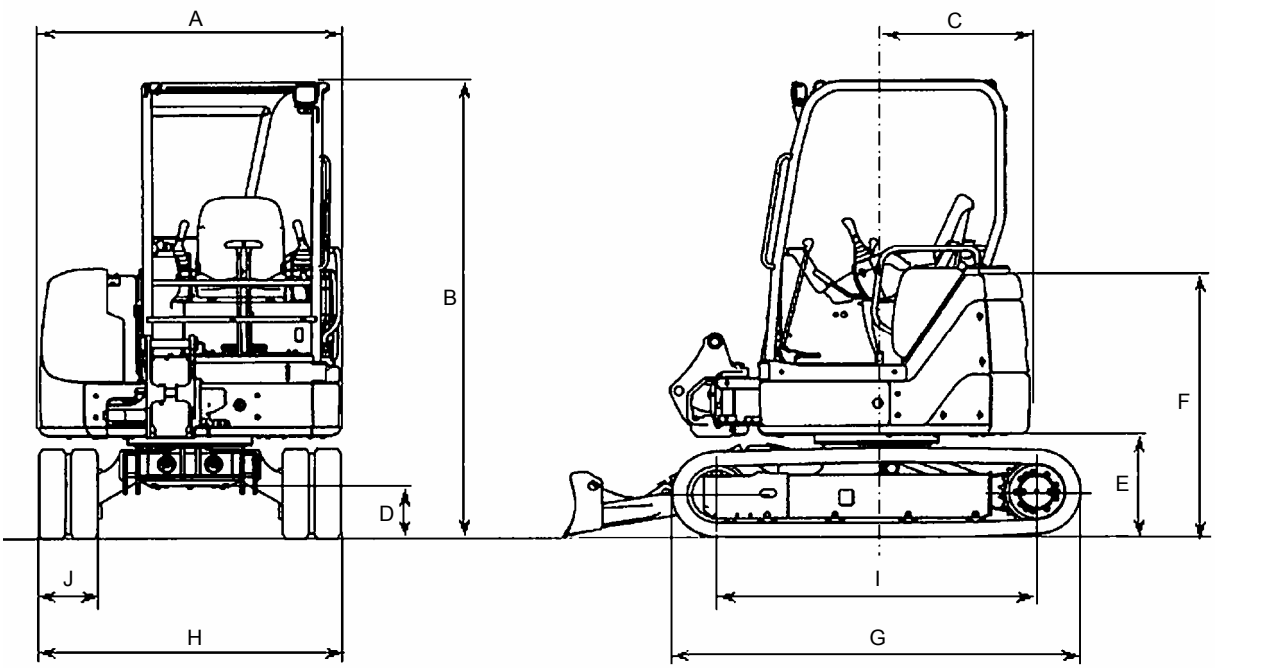


M1M7-12-001

Type		ZX27U-2	
		Canopy	Cab
Type of Front-End Attachment		Boom Swing Type	
Bucket Capacity (Heaped)	m^3 (yd^3)	0.08 (0.10)	
Operating Weight	kg (lb)	2800 (6170)	2950 (6500)
Basic Machine Weight	kg (lb)	2040 (4500)	2190 (4830)
Engine	kW/min^{-1} (PS/rpm)	Yanmar 3TNV88 19.7/2200 (26.8/2200)	
A: Overall Width	mm (ft·in)	1550 (5′1″)	
B: Overall Height	mm (ft·in)	2460 (8′1″)	2500 (8′2″)
C: Rear-End Swing Radius	mm (ft·in)	775 (2′7″)	
D: Minimum Ground Clearance	mm (ft·in)	320 (1′1″)	
E: Counterweight Height	mm (ft·in)	560 (1′10″)	
F: Engine Cover Height	mm (ft·in)	1420 (4′8″)	
G: Undercarriage Length	mm (ft·in)	1950 (6′5″)	
H: Undercarriage Width	mm (ft·in)	1550 (5′1″)	
I: Sprocket Center to Idler Center	mm (ft·in)	1490 (4′11″)	
J: Track Shoe Width	mm (ft·in)	300 (1′0″) (Rubber Crawler)	
Ground Pressure	kPa (kgf/cm^2, psi)	27.0 (0.28, 4.0)	28.0 (0.29, 4.1)
Swing Speed	min^{-1} (rpm)	9.1 (9.1)	
Travel Speed (fast/slow)	km/h (mph)	4.5/2.6 (2.8/1.6)	
Gradeability		30° (tan θ = 0.58)	

NOTE: The dimensions do not include the height of the shoe lug.

ZX30U-2

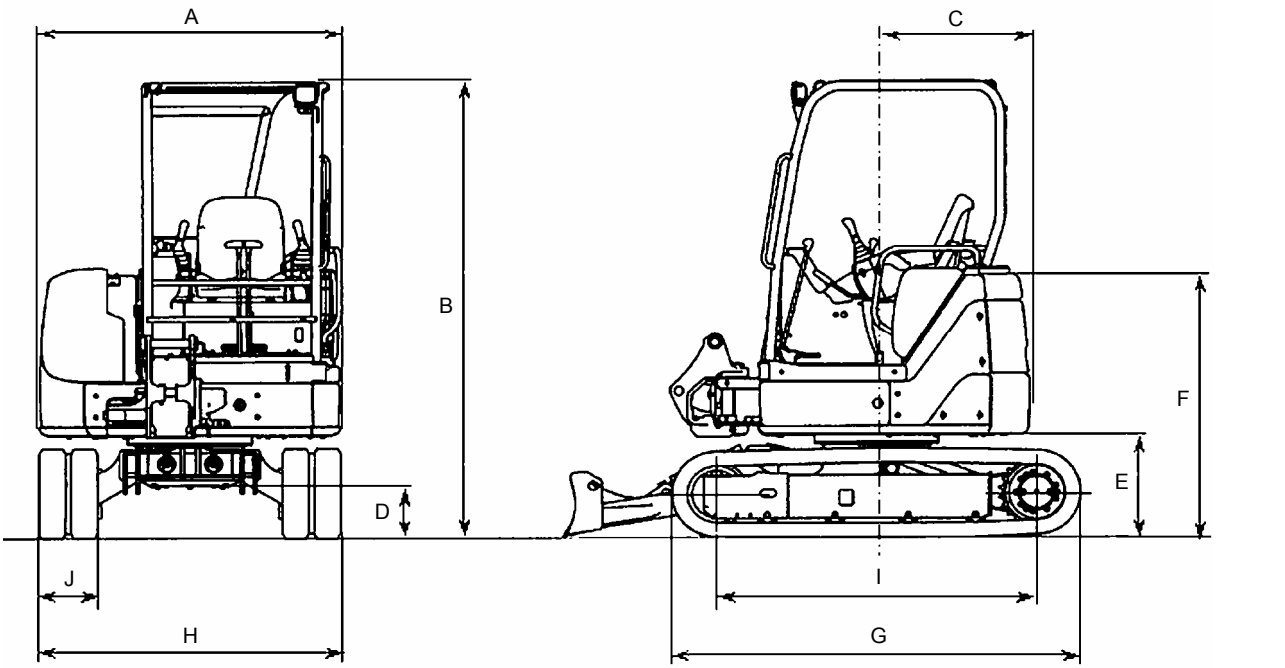


M1M7-12-001

Type		ZX30U-2	
		Canopy	Cab
Type of Front-End Attachment		Boom Swing Type	
Bucket Capacity (Heaped)	m^3 (yd^3)	0.09 (0.12)	
Operating Weight	kg (lb)	3070 (6770)	3220 (7100)
Basic Machine Weight	kg (lb)	2270 (5000)	2420 (5340)
Engine	kW/min^{-1} (PS/rpm)	Yanmar 3TNV88 22.3/2500 (30.3/2500)	
A: Overall Width	mm (ft·in)	1550 (5′1″)	
B: Overall Height	mm (ft·in)	2460 (8′1″)	2500 (8′2″)
C: Rear-End Swing Radius	mm (ft·in)	775 (2′7″)	
D: Minimum Ground Clearance	mm (ft·in)	290 (11″)	
E: Counterweight Height	mm (ft·in)	560 (1′10″)	
F: Engine Cover Height	mm (ft·in)	1420 (4′8″)	
G: Undercarriage Length	mm (ft·in)	2100 (6′11″)	
H: Undercarriage Width	mm (ft·in)	1550 (5′1″)	
I: Sprocket Center to Idler Center	mm (ft·in)	1650 (5′5″)	
J: Track Shoe Width	mm (ft·in)	300 (1′0″) (Rubber Crawler)	
Ground Pressure	kPa (kgf/cm^2, psi)	28.0 (0.28, 4.0)	29.0 (0.30, 4.3)
Swing Speed	min^{-1} (rpm)	9.3 (9.3)	
Travel Speed (fast/slow)	km/h (mph)	4.5/2.8 (2.8/1.7)	
Gradeability		30° (tan θ = 0.58)	

NOTE: The dimensions do not include the height of the shoe lug.

ZX35U-2

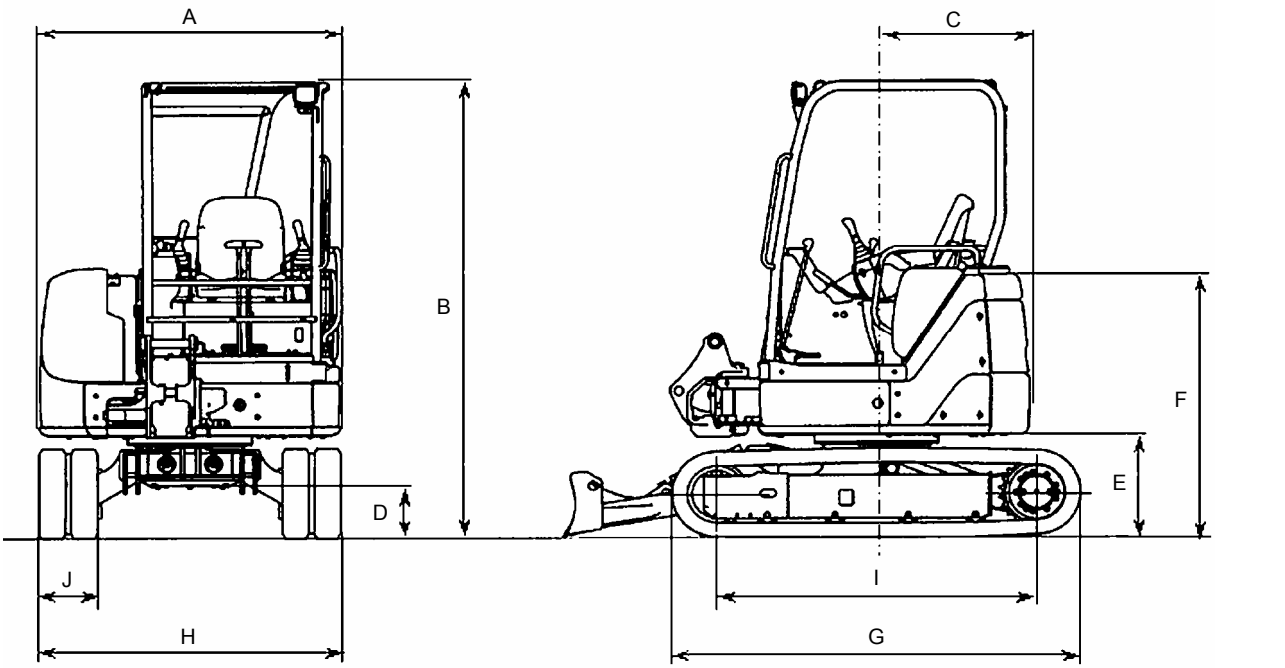


M1M7-12-002

Type		ZX35U-2	
		Canopy	Cab
Type of Front-End Attachment		Boom Swing Type	
Bucket Capacity (Heaped)	m^3 (yd^3)	0.11 (0.14)	
Operating Weight	kg (lb)	3480 (7670)	3630 (8000)
Basic Machine Weight	kg (lb)	2630 (5800)	2780 (6130)
Engine	kW/min^{-1} (PS/rpm)	Yanmar 3TNV88 22.3/2500 (30.3/2500)	
A: Overall Width	mm (ft·in)	1550 (5′1″)	
B: Overall Height	mm (ft·in)	2460 (8′1″)	2500 (8′2″)
C: Rear-End Swing Radius	mm (ft·in)	870 (2′10″)	
D: Minimum Ground Clearance	mm (ft·in)	290 (11″)	
E: Counterweight Height	mm (ft·in)	560 (1′10″)	
F: Engine Cover Height	mm (ft·in)	1420 (4′8″)	
G: Undercarriage Length	mm (ft·in)	2100 (6′11″)	
H: Undercarriage Width	mm (ft·in)	1740 (5′9″)	
I: Sprocket Center to Idler Center	mm (ft·in)	1650 (5′5″)	
J: Track Shoe Width	mm (ft·in)	300 (1′0″) (Rubber Crawler)	
Ground Pressure	kPa (kgf/cm^2, psi)	31.0 (0.32, 4.6)	33.0 (0.33, 4.7)
Swing Speed	min^{-1} (rpm)	9.3 (9.3)	
Travel Speed (fast/slow)	km/h (mph)	4.5/2.8 (2.8/1.7)	
Gradeability		30° (tan θ = 0.58)	

NOTE: The dimensions do not include the height of the shoe lug.

ZX40U-2

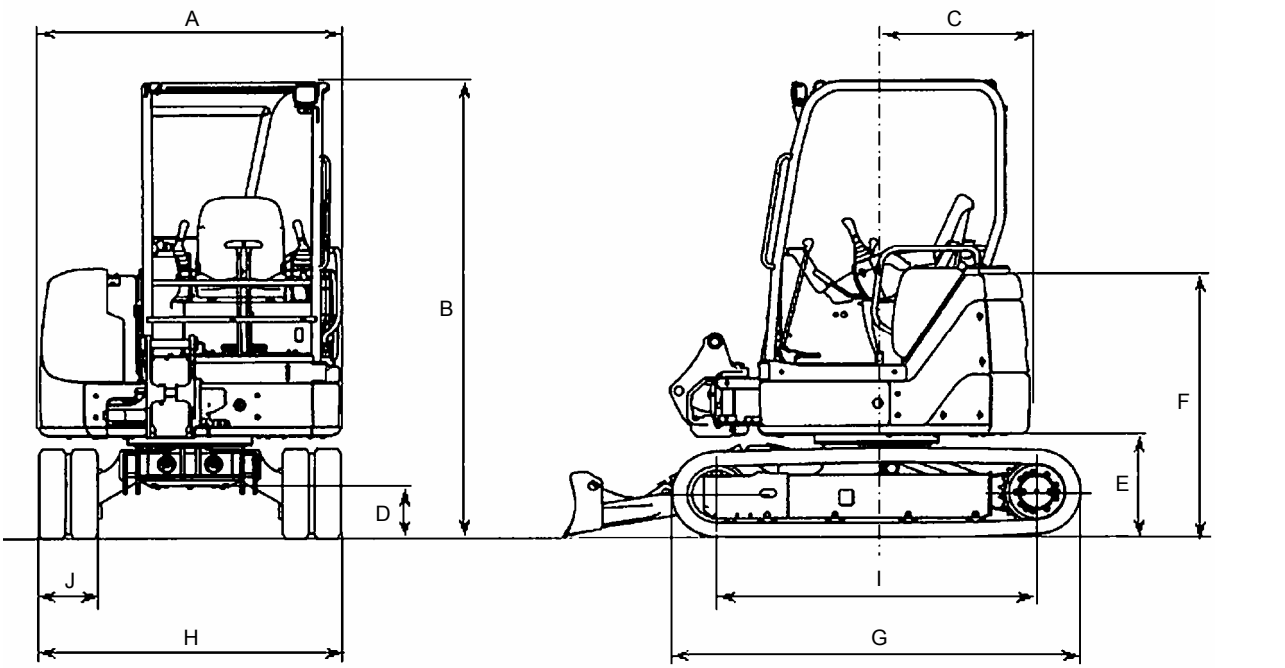


M1M7-12-003

Type		ZX40U-2	
		Canopy	Cab
Type of Front-End Attachment		Boom Swing Type	
Bucket Capacity (Heaped)	m^3 (yd^3)	0.14 (0.18)	
Operating Weight	kg (lb)	4390 (9680)	4540 (10010)
Basic Machine Weight	kg (lb)	3240 (7140)	3390 (7470)
Engine	kW/min^{-1} (PS/rpm)	Yanmar 4TNV88 29.8/2500 (40.5/2500)	
A: Overall Width	mm (ft·in)	1850 (6′1″)	
B: Overall Height	mm (ft·in)	2510 (8′3″)	2550 (8′4″)
C: Rear-End Swing Radius	mm (ft·in)	980 (3′3″)	
D: Minimum Ground Clearance	mm (ft·in)	335 (1′1″)	
E: Counterweight Height	mm (ft·in)	605 (2′0″)	
F: Engine Cover Height	mm (ft·in)	1510 (4′11″)	
G: Undercarriage Length	mm (ft·in)	2540 (8′4″)	
H: Undercarriage Width	mm (ft·in)	1960 (6′5″)	
I: Sprocket Center to Idler Center	mm (ft·in)	2000 (6′7″)	
J: Track Shoe Width	mm (ft·in)	400 (1′4″) (Rubber Crawler)	
Ground Pressure	kPa (kgf/cm^2, psi)	27.0 (0.27, 3.8)	28.0 (0.28, 4.0)
Swing Speed	min^{-1} (rpm)	9.3 (9.3)	
Travel Speed (fast/slow)	km/h (mph)	4.5/2.8 (2.8/1.7)	
Gradeability		30° (tan θ = 0.58)	

NOTE: The dimensions do not include the height of the shoe lug.

ZX50U-2



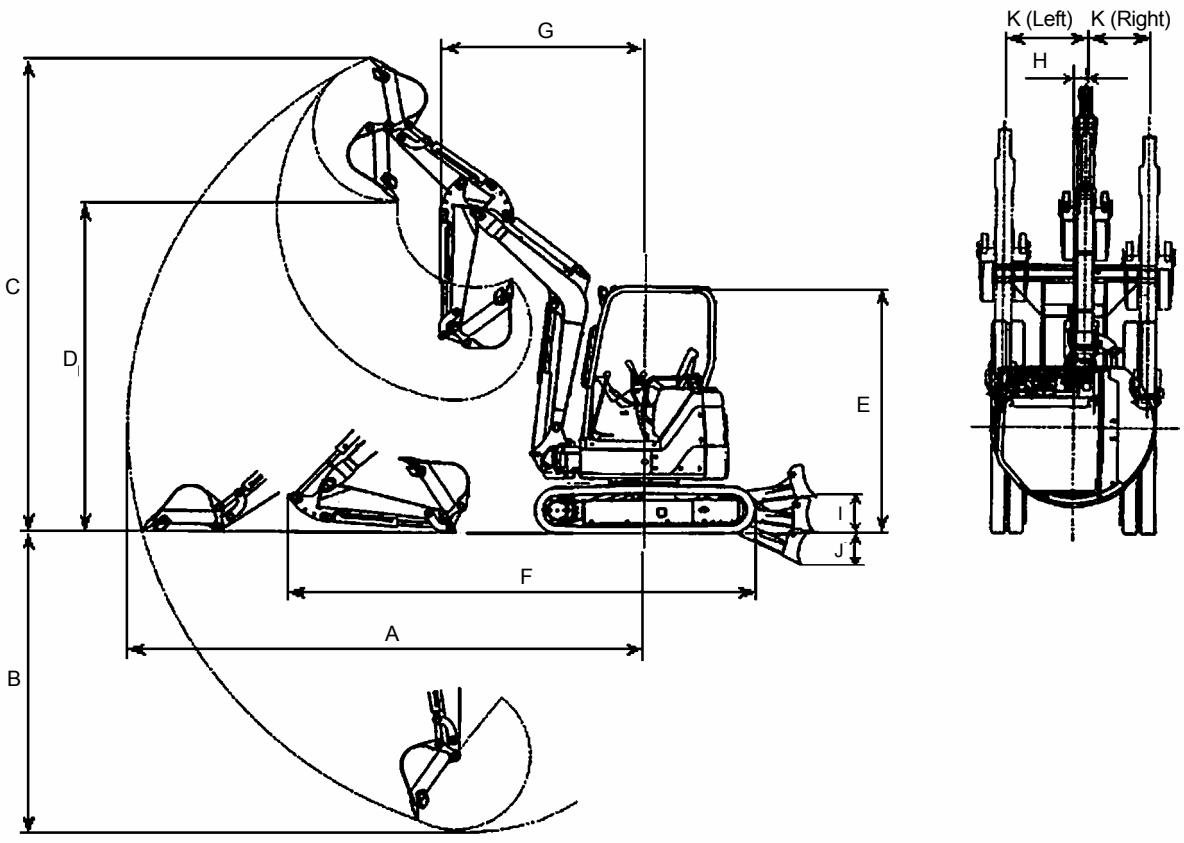
M1M7-12-004

Type		ZX50U-2	
		Canopy	Cab
Type of Front-End Attachment		Boom Swing Type	
Bucket Capacity (Heaped)	m^3 (yd^3)	0.16 (0.21)	
Operating Weight	kg (lb)	4730 (10430)	4880 (10760)
Basic Machine Weight	kg (lb)	3560 (7850)	3710 (8180)
Engine	kW/min^{-1} (PS/rpm)	Yanmar 4TNV88 29.8/2500 (40.5/2500)	
A: Overall Width	mm (ft·in)	1850 (6′1″)	
B: Overall Height	mm (ft·in)	2510 (8′3″)	2550 (8′4″)
C: Rear-End Swing Radius	mm (ft·in)	1000 (3′3″)	
D: Minimum Ground Clearance	mm (ft·in)	335 (1′1″)	
E: Counterweight Height	mm (ft·in)	605 (2′0″)	
F: Engine Cover Height	mm (ft·in)	1510 (4′11″)	
G: Undercarriage Length	mm (ft·in)	2540 (8′4″)	
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″) (Rubber Crawler)	
Ground Pressure	kPa (kgf/cm^2, psi)	29.0 (0.30, 4.3)	30.0 (0.30, 4.3)
Swing Speed	min^{-1} (rpm)	9.3 (9.3)	
Travel Speed (fast/slow)	km/h (mph)	4.5/2.8 (2.8/1.7)	
Gradeability		30° (tan θ = 0.58)	

NOTE: The dimensions do not include the height of the shoe lug.

WORKING RANGES

ZX27U-2

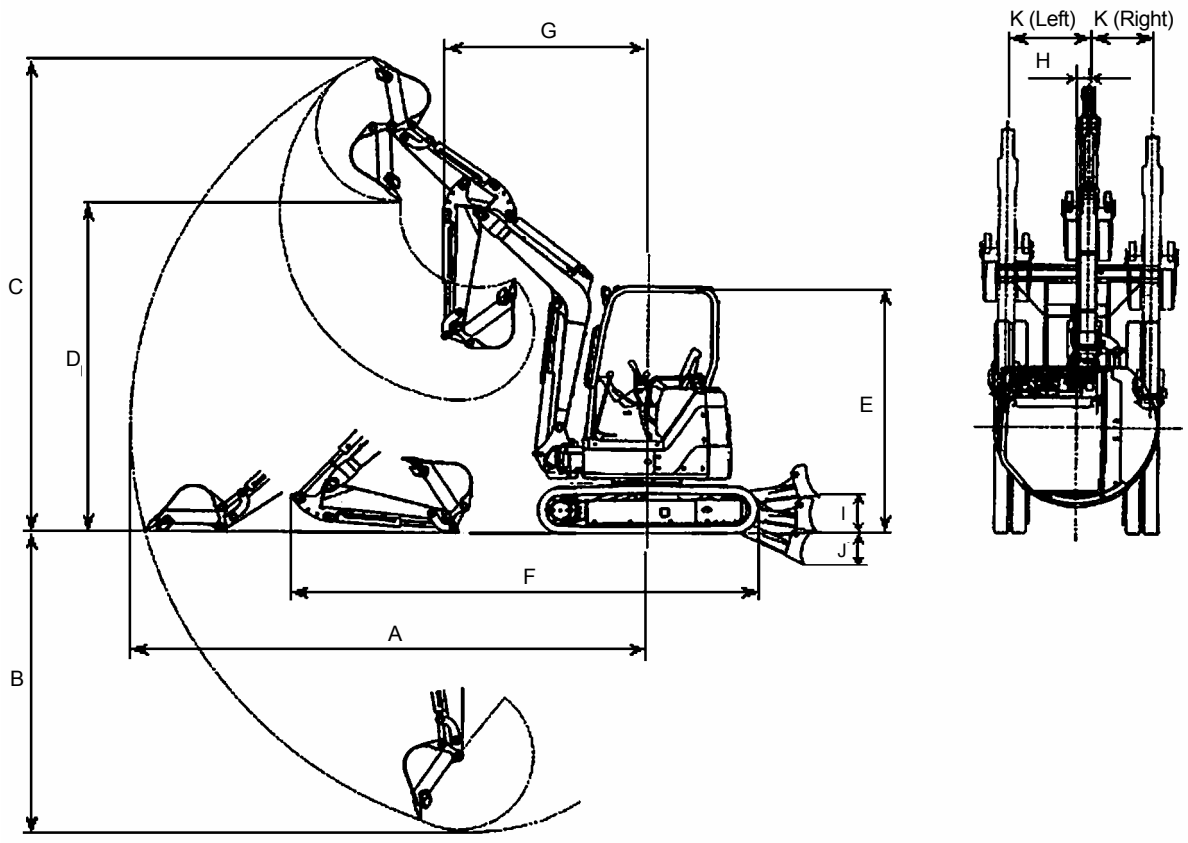


M1M7-12-005

Item	Category	ZX27U-2	
		Canopy	Cab
A: Maximum Digging Reach	mm (ft·in)	4670 (15′4″) [4920 (16′2″)]	
B: Maximum Digging Depth	mm (ft·in)	2620 (8′7″) [2920 (9′7″)]	
C: Maximum Cutting Height	mm (ft·in)	4460 (14′8″) [4570 (14′12″)]	4290 (14′1″) [4350 (14′3″)]
D: Maximum Dumping Height	mm (ft·in)	3210 (10′6″) [3320 (10′11″)]	3040 (10′0″) [3120 (10′3″)]
E: Transport Height (Rubber Crawler)	mm (ft·in)	2460 (8′1″)	2500 (8′2″)
F: Overall Transport Length	mm (ft·in)	4200 (13′9″) [4280 (14′1″)]	
G: Minimum Swing Radius	mm (ft·in)	1950 (6′5″) [2030 (6′8″)]	2050 (6′9″) [2090 (6′10″)]
H: Boom-Swing Pivot Offset Distance	mm (ft·in)	100 (4″)	
I: Blade Bottom Highest Position (above ground level)		360 (1′2″)	
J: Blade Bottom Lowest Position (above ground level)	mm (ft·in)	315 (1′0″)	
K: Offset Distance	mm (ft·in)	L705 (L 2′4″) R640 (R 2′1″)	L705 (L 2′4″) R600 (R 1′12″)
Maximum Boom-Swing Angle		L72°/R62°	L62°/R62°

NOTE: The dimensions do not include the height of the shoe lug.
The dimensions for the machine equipped with the long arm are shown in brackets [ ].

ZX30U-2

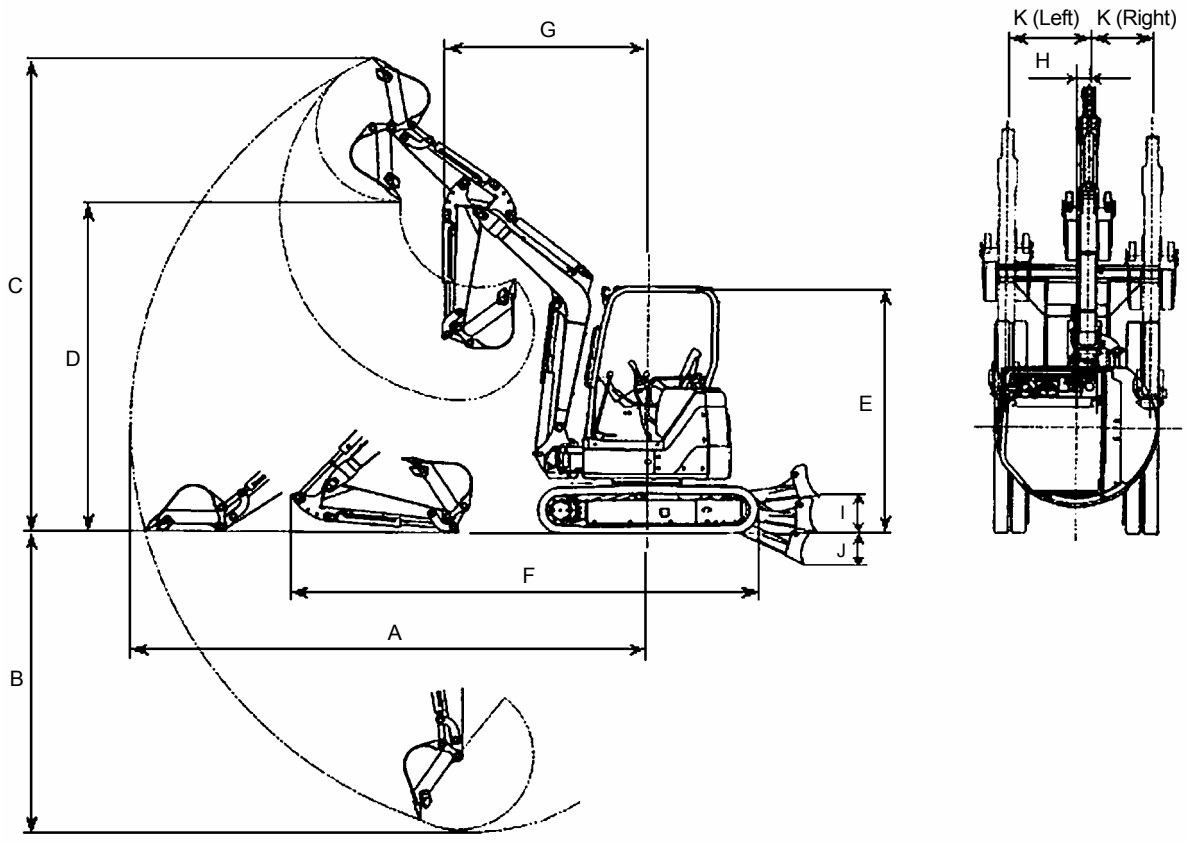


M1M7-12-005

Item	Category	ZX30U-2	
		Canopy	Cab
A: Maximum Digging Reach	mm (ft·in)	4900 (16′1″) [5170 (17′0″)]	
B: Maximum Digging Depth	mm (ft·in)	2830 (9′3″) [3130 (10′3″)]	
C: Maximum Cutting Height	mm (ft·in)	4680 (15′4″) [4720 (15′6″)]	4450 (14′7″) [4480 (14′8″)]
D: Maximum Dumping Height	mm (ft·in)	3260 (10′8″) [3340 (11′0″)]	3040 (10′0″) [3130 (10′3″)]
E: Transport Height (Rubber Crawler)	mm (ft·in)	2460 (8′1″)	2500 (8′2″)
F: Overall Transport Length	mm (ft·in)	4450 (14′7″) [4560 (15′0″)]	
G: Minimum Swing Radius	mm (ft·in)	1940 (6′4″) [2060 (6′9″)]	2140 (7′0″) [2170 (7′1″)]
H: Boom-Swing Pivot Offset Distance	mm (ft·in)	100 (4″)	
I: Blade Bottom Highest Position (above ground level)		360 (1′2″)	
J: Blade Bottom Lowest Position (above ground level)	mm (ft·in)	315 (1′0″)	
K: Offset Distance	mm (ft·in)	L705 (L 2′4″) R640 (R 2′1″)	L705 (L 2′4″) R600 (R 1′12″)
Maximum Boom-Swing Angle		L72°/R62°	L62°/R62°

NOTE: The dimensions do not include the height of the shoe lug.
The dimensions for the machine equipped with the long arm are shown in brackets [ ].

ZX35U-2

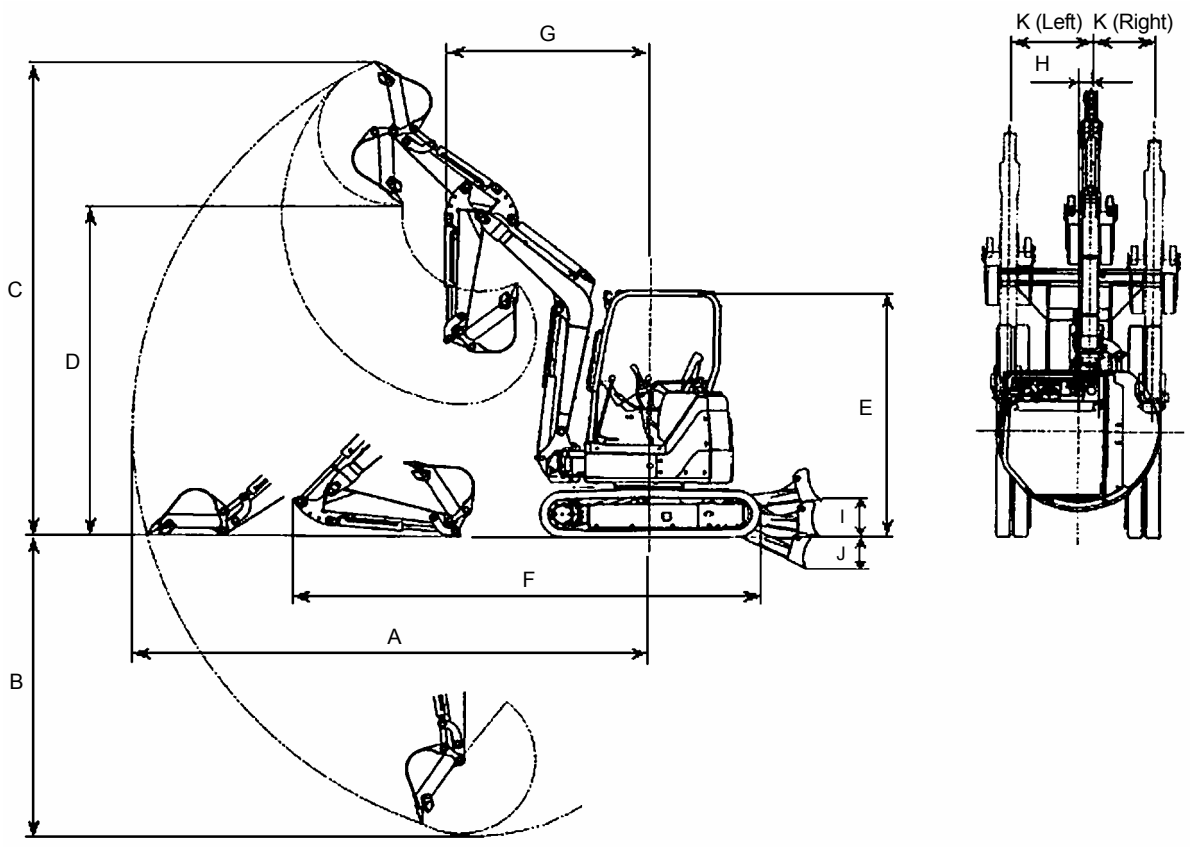


M1M7-12-006

Item	Category	ZX35U-2	
		Canopy	Cab
A: Maximum Digging Reach	mm (ft·in)	5220 (17′2″) [5530 (18′2″)]	
B: Maximum Digging Depth	mm (ft·in)	3060 (10′0″) [3460 (11′4″)]	
C: Maximum Cutting Height	mm (ft·in)	4900 (16′1″) [5010 (16′5″)]	4720 (15′6″) [4820 (15′10″)]
D: Maximum Dumping Height	mm (ft·in)	3490 (11′5″) [3600 (11′10″)]	3330 (10′11″) [3430 (11′3″)]
E: Transport Height (Rubber Crawler)	mm (ft·in)	2460 (8′1″)	2500 (8′2″)
F: Overall Transport Length	mm (ft·in)	4650 (15′3″) [4780 (15′8″)]	
G: Minimum Swing Radius	mm (ft·in)	2070 (6′10″) [2170 (7′1″)]	2230 (7′4″) [2290 (7′6″)]
H: Boom-Swing Pivot Offset Distance	mm (ft·in)	100 (4″)	
I: Blade Bottom Highest Position (above ground level)	mm (ft·in)	360 (1′2″)	
J: Blade Bottom Lowest Position (above ground level)	mm (ft·in)	390 (1′0″)	
K: Offset Distance	mm (ft·in)	L705 (L 2′4″) R640 (R 2′1″)	L705 (L 2′4″) R600 (R 1′12″)
Maximum Boom-Swing Angle		L72°/R62°	L62°/R62°

NOTE: The dimensions do not include the height of the shoe lug.
The dimensions for the machine equipped with the long arm are shown in brackets [ ].

ZX40U-2

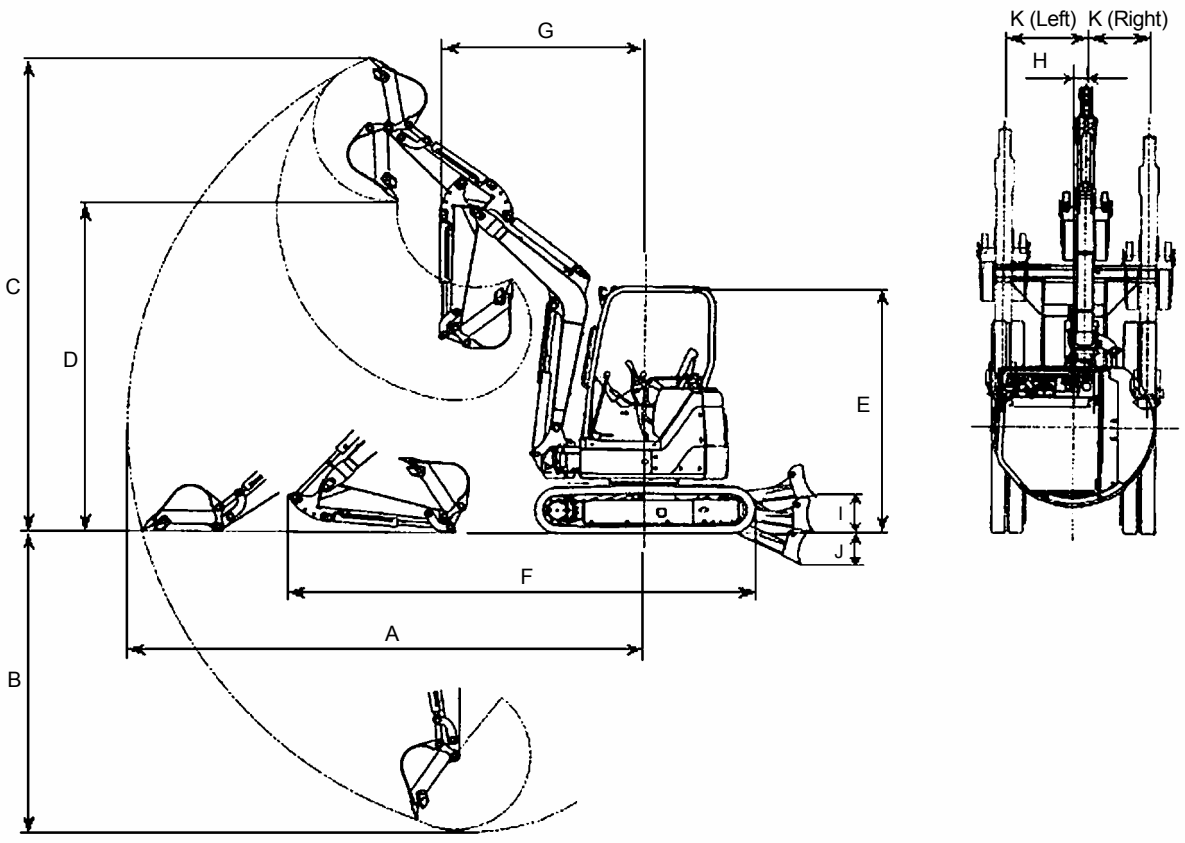


M1M7-12-007

Item	Category	ZX40U-2	
		Canopy	Cab
A: Maximum Digging Reach	mm (ft·in)	5750 (18′10″) [6050 (19′10″)]	
B: Maximum Digging Depth	mm (ft·in)	3350 (11′0″) [3660 (12′0″)]	
C: Maximum Cutting Height	mm (ft·in)	5600 (18′4″) [5840 (19′2″)]	5480 (18′0″) [5710 (18′9″)]
D: Maximum Dumping Height	mm (ft·in)	3920 (12′10″) [4160 (13′8″)]	3810 (12′6″) [4040 (13′3″)]
E: Transport Height (Rubber Crawler)	mm (ft·in)	2510 (8′3″)	2550 (8′4″)
F: Overall Transport Length	mm (ft·in)	5340 (17′6″) [5380 (17′8″)]	
G: Minimum Swing Radius	mm (ft·in)	2190 (7′2″) [2340 (7′8″)]	2270 (7′5″) [2390 (7′10″)]
H: Boom-Swing Pivot Offset Distance	mm (ft·in)	100 (4″)	
I: Blade Bottom Highest Position (above ground level)	mm (ft·in)	425 (1′5″)	
J: Blade Bottom Lowest Position (above ground level)	mm (ft·in)	335 (1′1″)	
K: Offset Distance	mm (ft·in)	L795 (L 2′7″) R760 (R 2′6″)	
Maximum Boom-Swing Angle		L80°/R60°	

NOTE: The dimensions do not include the height of the shoe lug.
The dimensions for the machine equipped with the long arm are shown in brackets [ ].

ZX50U-2



M1M7-12-008

Item	Category	ZX50U-2	
		Canopy	Cab
A: Maximum Digging Reach	mm (ft·in)	6000 (19′8″) [6250 (20′6″)]	
B: Maximum Digging Depth	mm (ft·in)	3600 (11′10″) [3860 (12′8″)]	
C: Maximum Cutting Height	mm (ft·in)	5770 (18′11″) [6020 (19′9″)]	5640 (18′6″) [5870 (19′3″)]
D: Maximum Dumping Height	mm (ft·in)	4100 (13′5″) [4330 (14′2″)]	4000 (13′1″) [4200 (13′9″)]
E: Transport Height (Rubber Crawler)	mm (ft·in)	2510 (8′3″)	2550 (8′4″)
F: Overall Transport Length	mm (ft·in)	5460 (17′11″) [5520 (18′1″)]	
G: Minimum Swing Radius	mm (ft·in)	2150 (7′1″) [2260 (7′5″)]	2300 (7′7″) [2340 (7′8″)]
H: Boom-Swing Pivot Offset Distance	mm (ft·in)	100 (4″)	
I: Blade Bottom Highest Position (above ground level)	mm (ft·in)	425 (1′5″)	
J: Blade Bottom Lowest Position (above ground level)	mm (ft·in)	335 (1′1″)	
K: Offset Distance	mm (ft·in)	L795 (L 2′7″) R760 (R 2′6″)	
Maximum Boom-Swing Angle		L80°/R60°	

NOTE: The dimensions do not include the height of the shoe lug.
The dimensions for the machine equipped with the long arm are shown in brackets [ ].

SHOE TYPES AND APPLICATIONS

ZX27U-2 (Canopy)

Shoe Width	300 mm (1′0″) Rubber Shoe	300 mm (1′0″) Grouser Shoe
Application	For Paved Road (Standard)	For Ordinary Ground (Option)
Operating Weight kg (lb)	2800 (6170)	2810 (6190)
Minimum Ground Clearance mm (ft·in)	320 (1′1″)	310 (1′0″)
Undercarriage Length mm (ft·in)	1950 (6′5″)	1920 (6′4″)
Undercarriage Width mm (ft·in)	1550 (5′1″)	1550 (5′1″)
Ground Pressure kPa (kgf/cm^2, psi)	27.0 (0.28, 4.0)	28.0 (0.29, 4.1)

ZX27U-2 (Cab)

Shoe Width	300 mm (1′0″) Rubber Shoe	300 mm (1′0″) Grouser Shoe
Application	For Paved Road (Standard)	For Ordinary Ground (Option)
Operating Weight kg (lb)	2950 (6500)	3040 (6700)
Minimum Ground Clearance mm (ft·in)	320 (1′1″)	310 (1′0″)
Undercarriage Length mm (ft·in)	1950 (6′5″)	1920 (6′4″)
Undercarriage Width mm (ft·in)	1550 (5′1″)	1550 (5′1″)
Ground Pressure kPa (kgf/cm^2, psi)	28.0 (0.29, 4.1)	29.0 (0.30, 4.3)

NOTE: The specifications for the front-end attachment are for 1.17 m (3 ft 10 in) arm with ISO 0.08 m^3 (0.10 yd^3) bucket.

ZX30U-2 (Canopy)

Shoe Width	300 mm (1′0″) Rubber Shoe	300 mm (1′0″) Grouser Shoe
Application	For Paved Road (Standard)	For Ordinary Ground (Option)
Operating Weight kg (lb)	3070 (6770)	3155 (6960)
Minimum Ground Clearance mm (ft·in)	290 (11″)	280 (11″)
Undercarriage Length mm (ft·in)	2100 (6′11″)	2120 (6′11″)
Undercarriage Width mm (ft·in)	1550 (5′1″)	1550 (5′1″)
Ground Pressure kPa (kgf/cm^2, psi)	28.0 (0.28, 4.0)	28.0 (0.29, 4.1)

ZX30U-2 (Cab)

Shoe Width	300 mm (1′0″) Rubber Shoe	300 mm (1′0″) Grouser Shoe
Application	For Paved Road (Standard)	For Ordinary Ground (Option)
Operating Weight kg (lb)	3220 (7100)	3305 (7290)
Minimum Ground Clearance mm (ft·in)	290 (11″)	280 (11″)
Undercarriage Length mm (ft·in)	2100 (6′11″)	2120 (6′11″)
Undercarriage Width mm (ft·in)	1550 (5′1″)	1550 (5′1″)
Ground Pressure kPa (kgf/cm^2, psi)	29.0 (0.30, 4.3)	30.0 (0.30, 4.3)

NOTE: The specifications for the front-end attachment are for 1.17 m (3 ft 10 in) arm with ISO 0.09 m^3 (0.12 yd^3) bucket.

ZX35U-2 (Canopy)

Shoe Width	300 mm (1′0″) Rubber Shoe	300 mm (1′0″) Grouser Shoe
Application	For Paved Road (Standard)	For Ordinary Ground (Option)
Operating Weight kg (lb)	3480 (7670)	3565 (7860)
Minimum Ground Clearance mm (ft·in)	290 (11″)	280 (11″)
Undercarriage Length mm (ft·in)	2100 (6′11″)	2120 (6′11″)
Undercarriage Width mm (ft·in)	1740 (5′9″)	1740 (5′9″)
Ground Pressure kPa (kgf/cm^2, psi)	31.0 (0.32, 4.6)	32.0 (0.33, 4.7)

ZX35U-2 (Cab)

Shoe Width	300 mm (1′0″) Rubber Shoe	300 mm (1′0″) Grouser Shoe
Application	For Paved Road (Standard)	For Ordinary Ground (Option)
Operating Weight kg (lb)	3630 (8000)	3715 (8190)
Minimum Ground Clearance mm (ft·in)	290 (11″)	280 (11″)
Undercarriage Length mm (ft·in)	2100 (6′11″)	2120 (6′11″)
Undercarriage Width mm (ft·in)	1740 (5′9″)	1740 (5′9″)
Ground Pressure kPa (kgf/cm^2, psi)	33.0 (0.33, 4.7)	33.0 (0.34, 4.8)

NOTE: The specifications for the front-end attachment are for 1.32 m (4 ft 4 in) arm with ISO 0.11 m^3 (0.14 yd^3) bucket.

ZX40U-2 (Canopy)

Shoe Width	400 mm (1′4″) Rubber Shoe	400 mm (1′4″) Grouser Shoe
Application	For Paved Road (Standard)	For Ordinary Ground (Option)
Operating Weight kg (lb)	4390 (9680)	4460 (9830)
Minimum Ground Clearance mm (ft·in)	335 (1′1″)	315 (1′0″)
Undercarriage Length mm (ft·in)	2540 (8′4″)	2490 (8′2″)
Undercarriage Width mm (ft·in)	1960 (6′5″)	1960 (6′5″)
Ground Pressure kPa (kgf/cm^2, psi)	27.0 (0.27, 3.8)	28.0 (0.28, 4.0)

ZX40U-2 (Cab)

Shoe Width	400 mm (1′4″) Rubber Shoe	400 mm (1′4″) Grouser Shoe
Application	For Paved Road (Standard)	For Ordinary Ground (Option)
Operating Weight kg (lb)	4540 (10010)	4610 (10160)
Minimum Ground Clearance mm (ft·in)	335 (1′1″)	315 (1′0″)
Undercarriage Length mm (ft·in)	2540 (8′4″)	2490 (8′2″)
Undercarriage Width mm (ft·in)	1960 (6′5″)	1960 (6′5″)
Ground Pressure kPa (kgf/cm^2, psi)	28.0 (0.28, 4.0)	29.0 (0.29, 4.1)

NOTE: The specifications for the front-end attachment are for 1.38 m (4 ft 6 in) arm with ISO 0.14 m^3 (0.18 yd^3) bucket.

ZX50U-2 (Canopy)

Shoe Width	400 mm (1′4″) Rubber Shoe	400 mm (1′4″) Grouser Shoe
Application	For Paved Road (Standard)	For Ordinary Ground (Option)
Operating Weight kg (lb)	4730 (10430)	4800 (10580)
Minimum Ground Clearance mm (ft·in)	335 (1′1″)	315 (1′0″)
Undercarriage Length mm (ft·in)	2540 (8′4″)	2490 (8′2″)
Undercarriage Width mm (ft·in)	2000 (6′7″)	2000 (6′7″)
Ground Pressure kPa (kgf/cm^2, psi)	29.0 (0.30, 4.3)	30.0 (0.30, 4.3)

ZX50U-2 (Cab)

Shoe Width	400 mm (1′4″) Rubber Shoe	400 mm (1′4″) Grouser Shoe
Application	For Paved Road (Standard)	For Ordinary Ground (Option)
Operating Weight kg (lb)	4880 (10760)	4950 (10910)
Minimum Ground Clearance mm (ft·in)	335 (1′1″)	315 (1′0″)
Undercarriage Length mm (ft·in)	2540 (8′4″)	2490 (8′2″)
Undercarriage Width mm (ft·in)	2000 (6′7″)	2000 (6′7″)
Ground Pressure kPa (kgf/cm^2, psi)	30.0 (0.30, 4.3)	31.0 (0.31, 4.4)

NOTE: The specifications for the front-end attachment are for 1.38 m (4 ft 6 in) arm with ISO 0.16 m^3 (0.21 yd^3) bucket.

BUCKET TYPES AND APPLICATIONS

ZX27U-2

Bucket	Bucket Capacity m^3 (yd^3) ISO (Heaped)	Bucket Width mm		Front-End Attachment	
		(With side cutter) mm (in)	(Without side cutter) mm (in)	1.17 m (3′10″) Arm	1.47 m (5′0″) Arm
Hoe Bucket	0.050 (0.065)	350 (14″)	300 (12″)	⊙	⊙
	0.060 (0.078)	400 (16″)	350 (14″)	⊙	⊙
	0.070 (0.092)	450 (18″)	400 (16″)	⊙	⊙
	0.080 (0.105)	500 (20″)	450 (18″)	⊙	○
	0.090 (0.118)	550 (22″)	500 (20″)	○	○
	0.100 (0.121)	600 (24″)	550 (22″)	○	□

NOTE: (1) Symbols in the above table have the following meanings.

⊙: *General excavating*

○: *Light duty excavating*

□: *Loading work*

(2) 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 loading operation of dried, loosened earth, sand, mud so on.

Their bulk density shall be less than 1600 kg/m^3 as a standard.

For loading operation of dried, loosened earth and sand.

Their bulk density shall be less than 1100 kg/m^3 as a standard.

ZX30U-2

Bucket	Bucket Capacity m^3 (yd^3) ISO (Heaped)	Bucket Width mm		Front-End Attachment	
		(With side cutter) mm (in)	(Without side cutter) mm (in)	1.17 m (3′10″) Arm	1.52 m (5′0″) Arm
Hoe Bucket	0.040 (0.052)	300 (12″)	250 (10″)	⊙	⊙
	0.055 (0.072)	350 (14″)	300 (12″)	⊙	⊙
	0.065 (0.085)	400 (16″)	350 (14″)	⊙	⊙
	0.080 (0.10)	450 (18″)	400 (16″)	⊙	⊙
	0.090 (0.12)	500 (20″)	450 (18″)	⊙	○
	0.100 (0.13)	550 (22″)	500 (20″)	○	□
	0.110 (0.14)	600 (24″)	550 (22″)	□	□
	0.130 (0.17)	650 (26″)	600 (24″)	□	–

NOTE: (1) Symbols in the above table have the following meanings.

⊙: General excavating

○: Light duty excavating

□: Loading work

(2) 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 loading operation of dried, loosened earth, sand, mud so on.

Their bulk density shall be less than 1600 kg/m^3 as a standard.

For loading operation of dried, loosened earth and sand.

Their bulk density shall be less than 1100 kg/m^3 as a standard.

ZX35U-2

Bucket	Bucket Capacity m^3 (yd^3) 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	0.040 (0.052)	300 (12″)	250 (10″)	⊙	⊙
	0.055 (0.072)	350 (14″)	300 (12″)	⊙	⊙
	0.065 (0.085)	400 (16″)	350 (14″)	⊙	⊙
	0.080 (0.10)	450 (18″)	400 (16″)	⊙	⊙
	0.090 (0.12)	500 (20″)	450 (18″)	⊙	⊙
	0.100 (0.13)	550 (22″)	500 (20″)	⊙	⊙
	0.110 (0.14)	600 (24″)	550 (22″)	⊙	○
	0.130 (0.17)	650 (26″)	600 (24″)	○	□
	0.140 (0.18)	700 (28″)	650 (26″)	□	–
	0.150 (0.20)	750 (30″)	700 (28″)	□	–

NOTE: (1) Symbols in the above table have the following meanings.

⊙: General excavating

○: Light duty excavating

□: Loading work

(2) 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 loading operation of dried, loosened earth, sand, mud so on.

Their bulk density shall be less than 1600 kg/m^3 as a standard.

For loading operation of dried, loosened earth and sand.

Their bulk density shall be less than 1100 kg/m^3 as a standard.

ZX40U-2, ZX50U-2

Bucket	Bucket Capacity m^3 (yd^3) ISO (Heaped)	Bucket Width mm		Front-End Attachment			
		(With side cutter) mm (in)	(Without side cutter) mm (in)	ZX40U-2		ZX50U-2	
				1.38 m (4′6″) Arm	1.69 m (5′7″) Arm	1.38 m (4′6″) Arm	1.69 m (5′7″) Arm
Hoe Bucket	0.100 (0.13)	450 (18″)	400 (16″)	⊙	⊙	⊙	⊙
	0.110 (0.14)	500 (20″)	450 (18″)	⊙	⊙	⊙	⊙
	0.130 (0.17)	550 (22″)	500 (20″)	⊙	○	⊙	⊙
	0.140 (0.18)	600 (24″)	550 (22″)	⊙	□	⊙	⊙
	0.160 (0.21)	650 (26″)	600 (24″)	□	□	⊙	○
	0.170 (0.22)	700 (28″)	650 (26″)	□	□	□	□

NOTE: (1) Symbols in the above table have the following meanings.

⊙: General excavating

○: Light duty excavating

□: Loading work

(2) 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 loading operation of dried, loosened earth, sand, mud so on.

Their bulk density shall be less than 1600 kg/m^3 as a standard.

For loading operation of dried, loosened earth and sand.

Their bulk density shall be less than 1100 kg/m^3 as a standard.

MEMO

ADDITIONAL COUNTERWEIGHT

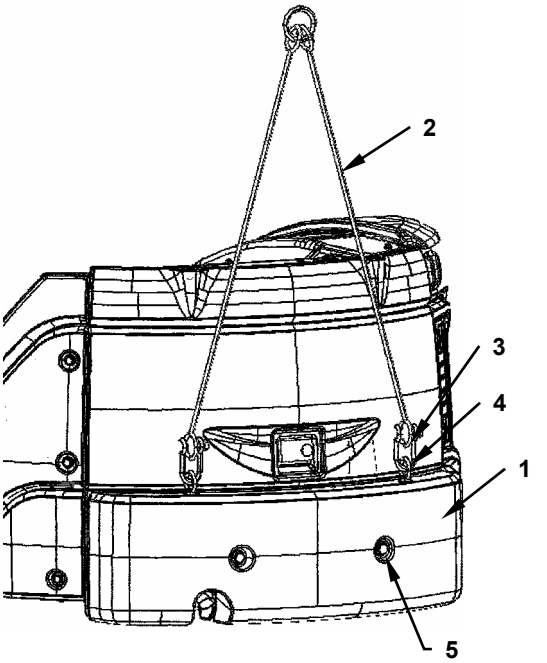
The mass values of the additional counterweights are shown in the table below.

Model	Mass	Overhang from the end of the base machine
ZX27U-2	190 kg (420lb)	90 mm (3.5 in)
ZX30U-2	190 kg (420lb)	90 mm (3.5 in)
ZX35U-2	230 kg (510lb)	90 mm (3.5 in)
ZX40U-2	220 kg (490lb)	80 mm (3.1 in)
ZX50U-2	220 kg (490lb)	80 mm (3.1 in)

Removal

Remove the additional counterweights by following the procedure below.

1. Suspend additional counterweight (1) using the lifting tools described below so that the counterweight doesn't 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 : M20
2. Remove mounting bolts (5).



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WARNING: Take care if the additional counterweight is eccentrically lifted, the lifted counterweight may widely sway. Place the removed additional counterweight on a level surface.

Installation

1. Lift the additional counterweight using the lifting tools described above. Mount the additional counterweight on the standard counterweight. Tighten mounting bolts (5).

   ZX27U-2, ZX30U-2, ZX35U-2
   Wrench Size : 24 mm
   Tightening Torque : 265 N·m (27 kgf·m, 195 lbf·ft)

   ZX40U-2, ZX50U-2
   Wrench Size : 30 mm
   Tightening Torque : 540 N·m (55 kgf·m, 400 lbf·ft)

MEMO

INDEX

A

AM/FM Radio Operation 1-16
Additional Counterweight 13-1
Adjust Track Sag (Rubber Crawler) and Check for Damage 7-54
Adjust the Operator's Seat S-5
Adjusting Operator's Seat 1-20
Air Cleaner 7-41
Air Conditioner Operation 1-12
Alternator Indicator 1-7
Auto-Idle Control (Except ZX27U-2) 5-10
Auto-Idle Switch (Except ZX27U-2) 1-11
Auxiliary Flow Rate Control (Optional) (Except ZX27U-2) 5-24
Auxiliary Pedal (Optional) 5-5
Avoid Abusive Operation 5-12
Avoid Applying Heat to Lines Containing Flammable Fluids S-29
Avoid Colliding Blade Against Rocks 5-16
Avoid Colliding Boom Cylinder with Track 5-16
Avoid Driving Bucket Teeth Into Ground 5-12
Avoid Excavation Using Upperstructure and/or Boom Swing Power 5-13
Avoid Heating Near Pressurized Fluid Lines S-29
Avoid High-Pressure Fluids S-25
Avoid Hitting Blade with Bucket 5-16
Avoid Injury from Back-Over and Swing Accidents S-14
Avoid Injury from Rollaway Accidents S-13
Avoid Other than Specified Machine Operations 5-14
Avoid Power Lines S-17
Avoid Striking with Bucket 5-13
Avoid Tipping S-16
Avoid Undercutting S-15

B

Batteries 7-47
Before Starting Engine 3-1
Beware of Asbestos Dust S-28
Beware of Exhaust Fumes S-28
Blade Lever 5-6
Blade Pins 7-14
Boom Cylinder May Hit Blade 5-15
Boom-Swing Pedal 5-4
Breaking in New Machine 2-1
Bucket Types and Applications 12-16
Bucket and Link Pins 7-14

C

Cab Door Release lever (Cab-equipped machines) 1-18
Cab Light (Cab-equipped machines) 1-22
Change Coolant 7-45
Change Engine Oil 7-18
Change Hydraulic Oil 7-25
Check Air conditioner (Machine with Cab) 7-62
Check Bucket Teeth for Looseness and/or Wear 7-51
Check Coolant Level 7-43
Check Fuel Hoses 7-40
Check Hoses and Lines 7-32
Check Hydraulic Oil Level 7-23
Check Injection Nozzle 7-66
Check Injection Timing 7-66
Check Machine After Starting Engine 3-4
Check Radiator Cap 7-67
Check Starter and Alternator 7-67
Check Tightening Torque of Bolts and Nuts 7-68
Check Tilt Mechanism Fulcrum Bolts for Looseness 7-71
Check Track Sag (Steel Crawler) (Optional) 7-58
Check Water Separator 7-38
Check and Adjust Fan Belt Tension 7-44
Check and Adjust Valve Clearance 7-66
Check and Replace Seat Belt 7-61
Clean Cab Floor 7-65
Clean Radiator Core 7-46
Clean Re-circulation Filter 7-63
Clean Suction Filter 7-28
Clean and Replace Air Conditioner Re-circulation Filter 7-63
Clean the Air Cleaner Element 7-41
Components Name 1-1
Confirm Direction of Machine to be Driven S-10
Consumable Parts List 8-1
Control Lever (H-Pattern: HITACHI Excavator Pattern) 5-2
Control Lever (ISO Excavator Pattern) 5-1
Control Lever (SAE-Backhoe Pattern) --- If Equipped (2 Way Multi Valve) 5-3
Control Lever Universal Joint 7-16
Coolant Temperature Gauge 1-5
Cooling System 7-42
Crusher Operation (Optional) 5-22

D

Daily Inspection 7-5
Dig with Caution S-17
Dispose of Waste Properly S-32
Do Not Use for Craning Operations S-18
Drain Fuel Tank Sump 7-38
Drain Hydraulic Oil Tank Sump 7-24
Drive Machine Safely S-11
Driving In Water or on Soft Ground 4-6

E

Electrical System 7-47
Emergency Boom Lowering Procedure 5-25
Emergency Exit (Cab-equipped machines) 1-21
Engine 7-18
Engine Oil 7-18

Engine Oil Pressure Indicator....1-6
Ensure Safety Before Rising From or Leaving Operator's Seat....S-5
Evacuating in Case of Fire....S-28

F
Fast Travel Mode Indicator....1-7
Fasten Your Seat Belt....S-5
Follow Safety Instructions....S-2
Front Joint Pins....7-11
Fuel Gauge....1-5
Fuel Level Indicator....1-6
Fuel System....7-37

G
Grading Operation....5-12
Greasing....7-11

H
Handle Chemical Products Safely....S-31
Handle Fluids Safely – Avoid Fires....S-19
How to Operate Trip Meter....1-9
Hydraulic Breaker (Optional)....5-19
Hydraulic System....7-22

I
Inspect Machine....S-3
Inspection and Maintenance of Hydraulic Equipment....7-22
Investigate Job Site Beforehand....S-9

J
Jump Starting....S-7

K
Keep Person Clear from Working Area....S-15
Keep Riders Off Machine....S-7
Key Switch....1-4

L
Lifting Machine with Crane....6-5
Liquid Crystal display (LCD), Display Selection Switch, and Set Switch....1-8
Loading....6-2

M
Maintenance Guide....7-7
Maintenance Under Special Environmental Conditions....9-1
Measure Engine Compression Pressure....7-66
Miscellaneous....7-51
Monitor Panel....1-5
Move and Operate Machine Safely....S-6

N
Never Position Bucket Over Anyone....S-15
Never Undercut a High Bank....S-16

O
Opening/Closing Cab Front Window (Cab-equipped machines)....1-19
Opening/Closing Engine Access Covers....7-3
Opening/Closing Tank Covers....7-4
Operate Only from Operator's Seat....S-7
Operate with Caution....S-17
Operating Backhoe....5-11
Overheat Indicator....1-6

P
Park Machine Safely....S-19
Parking and Stopping on Slopes....4-8
Parking on Slopes....4-8
Pedals, Levers and Monitor Panel....1-2
Periodic Replacement of Parts....7-6
Pilot Control Shut-Off Lever....5-8
Practice Safe Maintenance....S-21
Precautions for After Operating the Machine....5-23
Precautions for Blade Operation....5-7
Precautions for Front Attachment and Blade Removal....7-14
Precautions for Handling Refrigerant....S-31
Precautions for Installing Wide Bucket or Special Type Bucket....5-16
Precautions for Lightening....S-18
Precautions for Operations....S-8
Precautions for Traveling on Slopes....4-7
Precautions for Welding and Grinding....S-29
Preheat Indicator....1-7
Preparation for Inspection and Maintenance....7-72
Prepare Machine for Inspection/Maintenance....7-2
Prepare for Emergencies....S-2
Prevent Battery Explosions....S-30
Prevent Burns....S-24
Prevent Fires....S-26
Prevent Parts from Flying....S-23
Procedures....7-1
Protect Against Falling Stones and Debris....S-10
Protect Against Flying Debris....S-18
Protect Against Noise....S-3
Provide Signals for Jobs Involving Multiple Numbers of Machines....S-10

R
Radio (Cab Equipped Machines)....1-15
Raise One Track Using Boom and Arm....4-4
Recognize Safety Information....S-1
Remove Paint before Welding or Heating....S-30
Removing the Machine From Storage....10-2
Replace Bucket....7-53
Replace Engine Oil Filter....7-18
Replace Fuel Filter....7-39
Replace Full Flow Filter Element....7-29

Replace Pilot Filter Element 7-30
Replace Re-circulation Filter 7-63
Replace Rubber Crawler 7-56
Replace Rubber Hoses Periodically..... S-25
Replace the Air Cleaner Element 7-41
Replacing Fuses.....7-50

S

Safety Signs..... S-33
Safety Transporting S-20
Seat Belt (Optional) 1-22
Securing the Machine to the Trailer
for Transportation 6-3
Shoe Types and Applications 12-11
Specifications.....12-1
Starting Engine 3-2
Starting in Cold Weather.....3-3
Starting in Ordinary Temperature 3-2
Stay Clear of Moving Parts S-23
Stopping the Engine 3-6
Store Attachments Safely S-24
Storing the Machine.....10-1
Support Machine Properly S-23
Swing Bearing.....7-15
Swing Internal Gear 7-16
Switch Panel 1-4
System Failure Indicator 1-6

T

The Brand Names of Recommended Oils
and Lubricants 7-10
Tidy Up Inside Operator's Space..... S-4
Tilt Mechanism.....7-17
Tilting Floor Down.....7-74
Tips for Air Conditioner Usage 1-14
Tool and Operator's manual Boxes.....1-20
Towing Machine.....4-5
Trailer Loading/Unloading 6-1
Transmission 7-20
Transporting by Road 6-1
Travel Levers and Pedals.....4-1
Travel Mode Switch 4-3
Travel Reduction Gear.....7-20
Traveling on Soft Ground.....4-4
Troubleshooting 11-1

U

Understand Signal Words..... S-1
Unloading.....6-4
Use Correct Track Shoe 5-13
Use Handholds and Steps..... S-4
Using Booster Batteries.....3-5
Using Rubber Crawler 5-17

W

Warming Up Operation.....5-9
Warming Up in Cold Weather 5-9
Warn Others of Service Work S-22
Wear Protective Clothing S-3
Working Ranges..... 12-6

MEMO