

PART NO. EM1J7-1-1

HITACHI

Operator's Manual

ZAXIS

650LC-3

670LCH-3

Hydraulic Excavator

ZAXIS650LC-3 • 670LCH-3 HYDRAULIC EXCAVATOR OPERATOR'S MANUAL

 **Hitachi Construction Machinery Co., Ltd.**

URL:<http://www.hitachi-c-m.com>



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EM1J7-1-1

Serial No 20001 and up

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 machine damage.

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/cm², 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.

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.

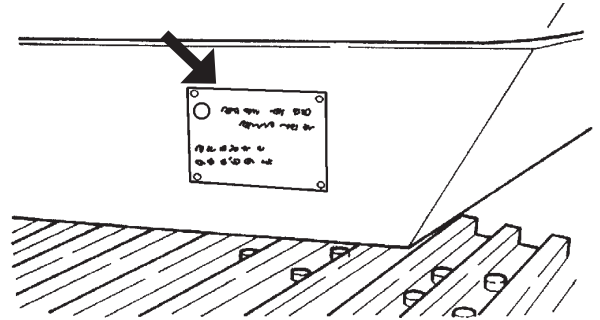
MACHINE NUMBERS

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: _____



M157-00-001

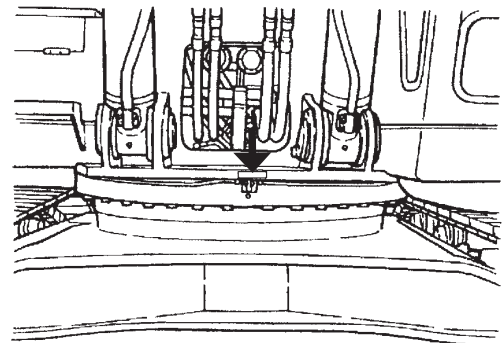
PRODUCT IDENTIFICATION NUMBER

PRODUCT IDENTIFICATION NUMBER: _____



NOTE: Marks to indicate the start and end of the PIN

HCM1J700P00020001
PRODUCT IDENTIFICATION NUMBER (PIN)

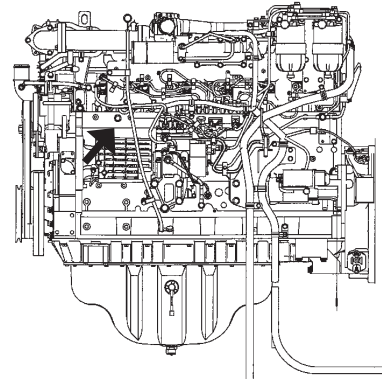


M111-07-010

ENGINE TYPE AND SERIAL NUMBER

TYPE: _____

MFG. NO.: _____

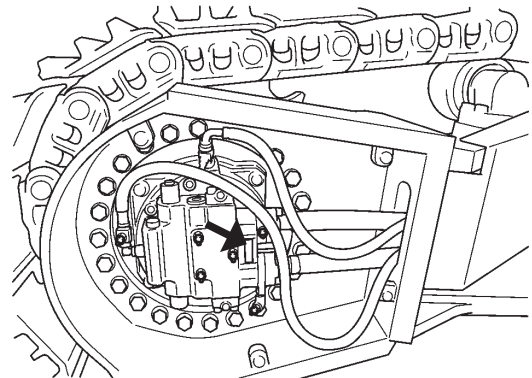


M1J1-00-001

TRAVEL MOTOR TYPE AND SERIAL NUMBER

TYPE: _____

MFG. NO.: _____



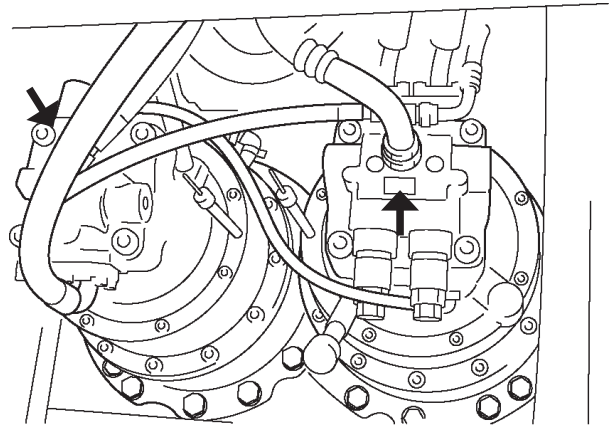
M17P-01-001

MACHINE NUMBERS

SWING MOTOR TYPE AND SERIAL NUMBER

TYPE: _____

MFG. NO.: _____

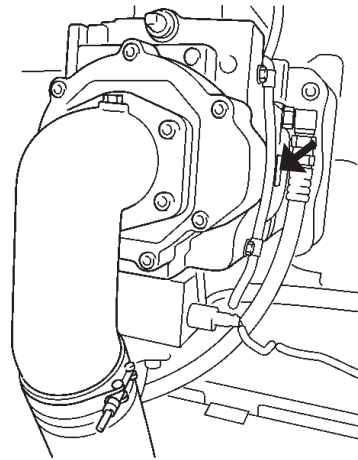


M1J7-07-005

HYDRAULIC PUMP TYPE AND SERIAL NUMBER

TYPE: _____

MFG. NO.: _____

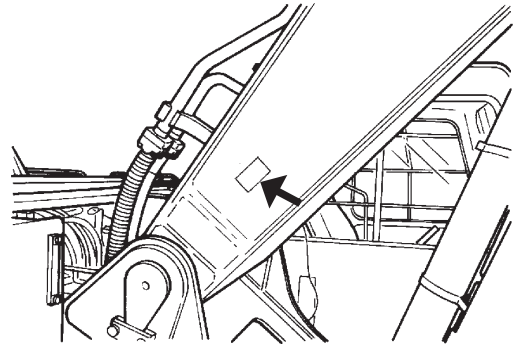


M1J7-07-003

BOOM TYPE AND SERIAL NUMBER

TYPE: _____

MFG. NO.: _____

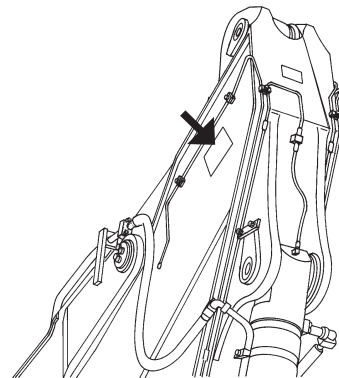


M111-12-005

ARM TYPE AND SERIAL NUMBER

TYPE: _____

MFG. NO.: _____



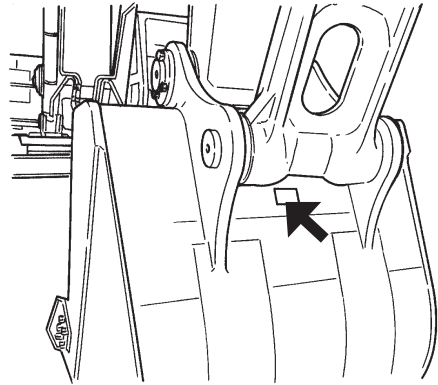
M17V-00-005

MACHINE NUMBERS

BUCKET TYPE AND SERIAL NUMBER

TYPE: _____

MFG. NO.: _____



M116-12-004

MACHINE NUMBERS

MEMO

A series of horizontal dotted lines for writing notes.

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SAFETY

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.



001-E01A-0001

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.



002-E01A-1223

SA-1223

SAFETY

FOLLOW SAFETY INSTRUCTIONS

- Carefully read and follow all safety signs on the machine and all safety messages in this manual.
- Safety signs should be installed, maintained and replaced when necessary.
 - 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).
- Learn how to operate the machine and its controls correctly and safely.
- Allow only trained, qualified, authorized personnel to operate the machine.
- Keep your machine in proper working condition.
 - Unauthorized modifications of the machine may impair its function and/or safety and affect machine life.
 - Do not modify any machine parts without authorization. Failure to do so may deteriorate the part safety, function, and/or service life. In addition, personal accident, machine trouble, and/or damage to material caused by unauthorized modifications will void Hitachi Warranty Policy.
 - Do not use attachments and/or optional parts or equipment not authorized by Hitachi. Failure to do so may deteriorate the safety, function, and/or service life of the machine. In addition, personal accident, machine trouble, and/or damage to material caused by using unauthorized attachments and/or optional parts or equipment will void Hitachi Warranty Policy.
- The safety messages in this SAFETY chapter are intended to illustrate basic safety procedures of machines. However it is impossible for these safety messages to cover every hazardous situation you may encounter. If you have any questions, you should first consult your supervisor and/or your authorized dealer before operating or performing maintenance work on the machine.

003-E01B-0003



SA-003

PREPARE FOR EMERGENCIES

- Be prepared if a fire starts or if an accident occurs.
 - Keep a first aid kit and fire extinguisher on hand.
 - Thoroughly read and understand the label attached on the fire extinguisher to 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 fires and accidents.
 - Keep emergency numbers for doctors, ambulance service, hospital, and fire department posted near your telephone.

004-E01A-0437



SA-437

SAFETY

WEAR PROTECTIVE CLOTHING

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

You may need:

- A hard hat
- 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.

005-E01A-0438



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.



006-E01A-0434

SA-434

INSPECT MACHINE

- Inspect your machine carefully each day or shift by walking around it before you start it to avoid personal injury.
- In the walk-around inspection be sure to cover all points described in the "PRE-START INSPECTION" chapter in the operator's manual.



007-E01A-0435

SA-435

SAFETY

GENERAL PRECAUTIONS FOR CAB

- Before entering the cab, thoroughly remove all dirt and/or oil from the soles of your work boots. If any controls such as a pedal is operated while with dirt and/or oil on the soles of the operator's work boots the operator's foot may slip off the pedal, possibly resulting in a personal accident.
- Do not leave parts and/or tools lying around the operator's seat. Store them in their specified locations.
- Avoid storing transparent bottles in the cab. Do not attach any transparent type window decorations on the windowpanes as they may focus sunlight, possibly starting a fire.
- Refrain from listening to the radio, or using music headphones or mobile telephones in the cab while operating the machine.
- Keep all flammable objects and/or explosives away from the machine.
- After using the ashtray, always cover it to extinguish the match and/or tobacco.
- Do not leave cigarette lighters in the cab. When the temperature in the cab increases, the lighter may explode.

524-E01A-0000

SAFETY

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 and maintain a three-point contact with the steps and handrails.
 - Do not use any controls as hand-holds.
 - Never jump on or off the machine. Never mount or dismount a moving machine.
 - Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.



008-E01A-0439

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 misoperations.
 - The seat should be adjusted whenever changing the operator for the machine.
 - The operator should be able to fully depress the pedals and to correctly operate the control levers with his back against the seat back.
 - If not, move the seat forward or backward, and check again.
 - Adjust the rear view mirror position so that the best rear visibility is obtained from the operator's seat. If the mirror is broken, immediately replace it with a new one.



SA-378

009-E01A-0462

ENSURE SAFETY BEFORE RISING FROM OR LEAVING OPERATOR'S SEAT

- Before rising from the operator's seat to open/close either side 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.

SAFETY

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.
- 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.
- Be sure to remain seated with the seat belt securely fastened at all times when the machine is in operation to minimize the chance of injury from an accident.
- We recommend that the seat belt be replaced every three years regardless of its apparent condition.

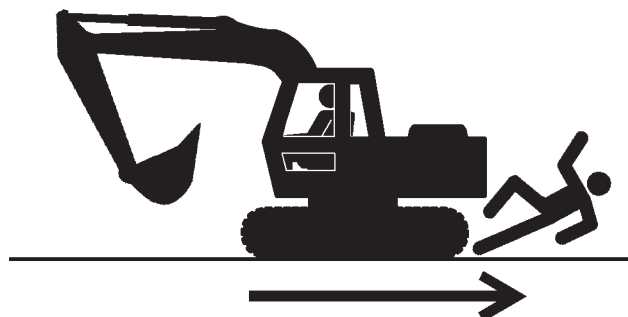


SA-237

010-E01A-0237

MOVE AND OPERATE MACHINE SAFELY

- Bystanders can be run over.
 - 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). It warns people when the machine starts to move.
 - Use a signal person when moving, swinging, or operating the machine in congested areas. Coordinate hand signals before starting the machine.
 - Use appropriate illumination. Check that all lights are operable before operating the machine. If any faulty illumination is present, immediately repair it.



SA-426

011-E01A-0398

HANDLE STARTING AIDS SAFELY

Starting fluid:

- Starting fluid is highly flammable.
 - Keep all sparks and flame away when using it.
 - Keep starting fluid well away from batteries and cables.
 - Remove container from machine if engine does not need starting fluid.
 - To prevent accidental discharge when storing a pressurized container, keep the cap on the container, and store it in a cool, well-protected location.
 - Do not incinerate or puncture a starting fluid container.



036-E01A-0293-3

SA-293

SAFETY

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 track or on ground.
 - Do not start engine by shorting across starter terminals.
 - Before starting the engine, confirm that all control levers are in neutral.
 - Before starting the engine, confirm the safety around the machine and sound the horn to alert bystanders.



012-E01B-0431

SA-444

JUMP STARTING

- Battery gas can explode, resulting in serious injury.
 - If the engine must be jump started, be sure to follow the instructions shown in the "OPERATING THE ENGINE" chapter in the operator's manual.
 - The operator must be 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.



S013-E01A-0032

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.
 - Only the operator should be on the machine. Keep riders off.
 - Riders also obstruct the operator's view, resulting in the machine being operated in an unsafe manner.

014-E01B-0427

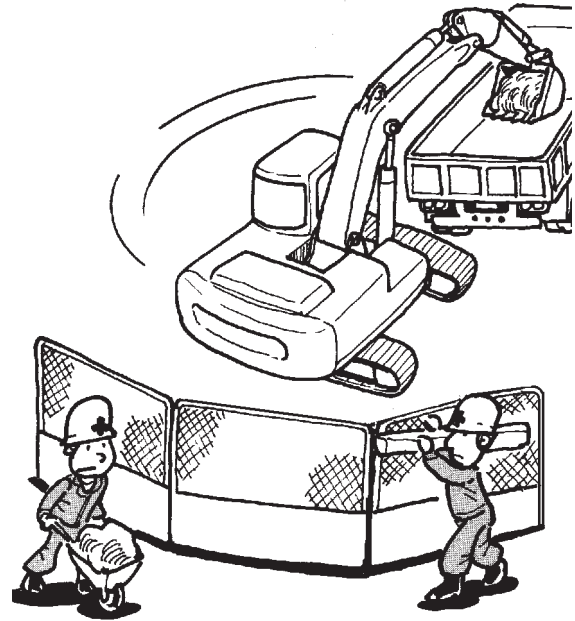


SA-379

SAFETY

PRECAUTIONS FOR OPERATIONS

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



M104-05-015

SAFETY

INVESTIGATE JOB SITE BEFOREHAND

- When working at the edge of an excavation or on a road shoulder, the machine could tip over, 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.
- Confirm that your machine is equipped a FOPS cab before working in areas where the possibility of falling stones or debris exist.
- When the footing is weak, reinforce the ground before starting work.
- When working on frozen ground, be extremely alert. As ambient temperatures rise, footing becomes loose and slippery.
- Beware the possibility of fire when operating the machine near flammable objects such as dry grass.
- Make sure the worksite has sufficient strength to firmly support the machine.

When working close to an excavation or at road shoulders, operate the machine with the tracks positioned perpendicular to the cliff face with travel motors at the rear, so that the machine can more easily evacuate if the cliff face collapses.
- If working on the bottom of a cliff or 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 on the 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 and firm enough 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. When operating on rough terrain or on slopes:
 - Reduce the engine speed.
 - Select slow travel speed mode.
 - Operate the machine slowly and be cautious with machine movements.



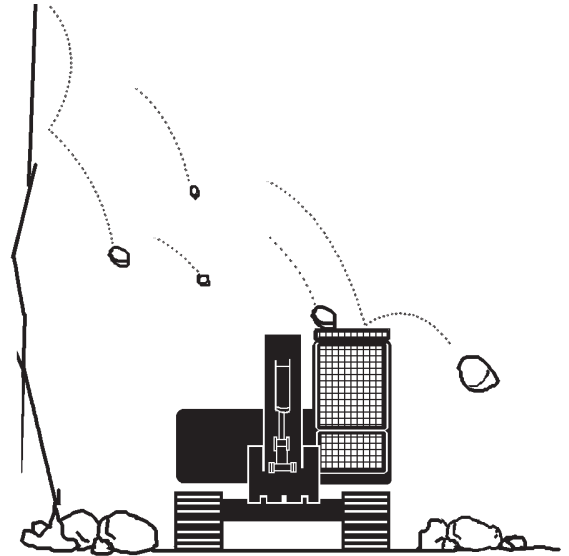
SA-380

SAFETY

EQUIPMENT OF HEAD GUARD, ROPS, FOPS

In case the machine is operated in areas where the possibility of falling stones or debris exist, equip a head guard, ROPS, or FOPS according to the potential hazardous conditions. (The standard cab for this machine corresponds to ROPS and FOPS.)

ROPS: Roll-Over Protective Structure
FOPS: Falling Object Protective Structure



SA-490

PROVIDE SIGNALS FOR JOBS INVOLVING MULTIPLE NUMBERS OF MACHINES

- 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.



018-E01A-0481

SA-481

CONFIRM DIRECTION OF MACHINE TO BE DRIVEN

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



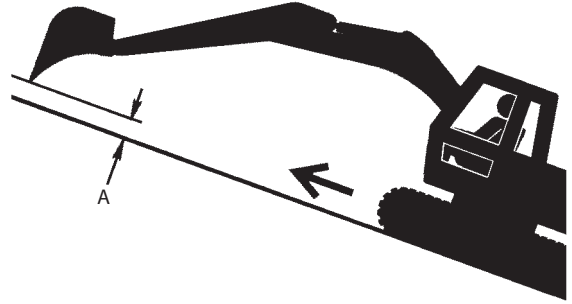
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SA-491

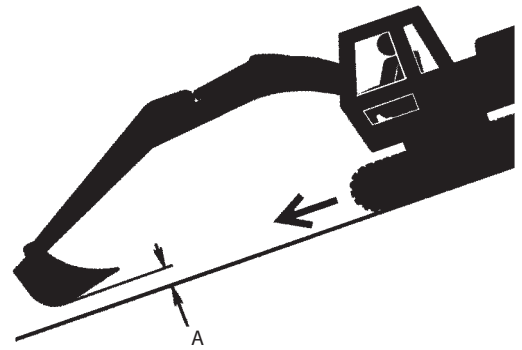
SAFETY

DRIVE MACHINE SAFELY

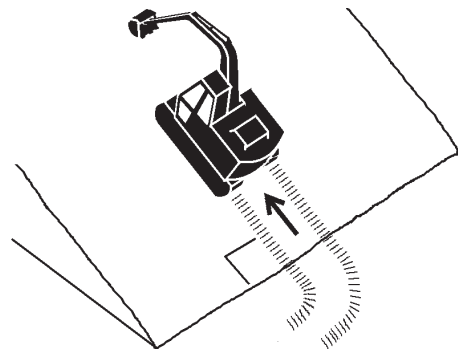
- Before driving the machine, always confirm that the travel levers/pedals direction corresponds to the direction you wish to drive.
 - Be sure to detour around any obstructions.
 - Avoid traveling over obstructions. Soil, fragments of rocks, and/or metal pieces may scatter around the machine. Don't 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 35 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 0.5 to 1.0 m (A) above the ground.
 - If the machine starts to skid or becomes unstable, immediately lower the bucket to the ground and stop.



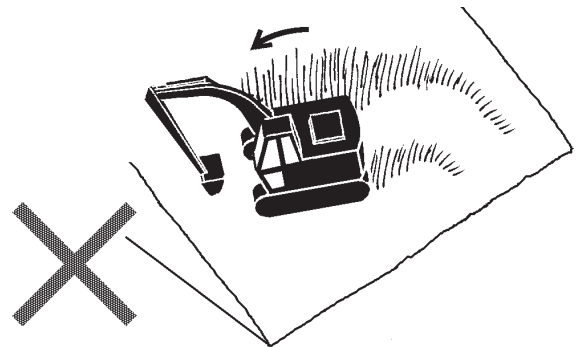
SA-657



SA-658



SA-441



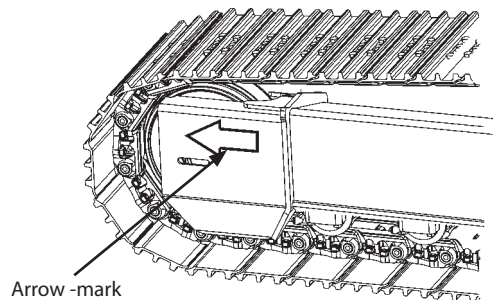
SA-442

SAFETY

- 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.
- Use a signal person when moving, swinging or operating the machine in congested areas. Coordinate hand signals before starting the machine.
- Before moving machine, determine which way to move travel pedals/levers for the direction you want to go. When the travel motors are in the rear, pushing down on the front of the travel pedals or pushing the levers forward moves the machine forward, towards the idlers. An arrow-mark seal is stuck on the inside surface of the side frame to indicate the machine front direction.
- Select a travel route that is as flat as possible. Steer the machine as straight as possible, making small gradual changes in direction.
- Before traveling on them, check the strengths of bridges and road shoulders, and reinforce if necessary.
- Use wood plates in order not to damage the road surface. Be careful of steering when operating on asphalt roads in summer.
- When crossing train tracks, use wood plates in order not to damage them.
- Do not make contact with electric wires or bridges.
- When crossing a river, measure the depth of the river using the bucket, and cross slowly. Do not cross the river when the depth of the river is deeper than the upper edge of the upper roller.
- When traveling on rough terrain, reduce engine speed. Select slow travel speed. Slower speed will reduce possible damage to the machine.
- Avoid operations that may damage the track and undercarriage components.
- During freezing weather, always clean snow and ice from track shoes before loading and unloading machine, to prevent the machine from slipping.



M104-05-008



M178-03-001



SA-011

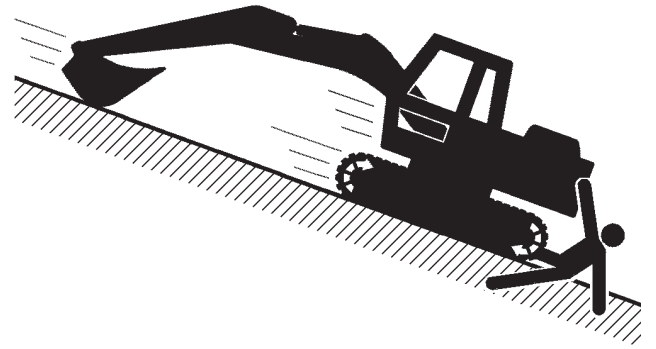
SAFETY

AVOID INJURY FROM ROLLAWAY ACCIDENTS

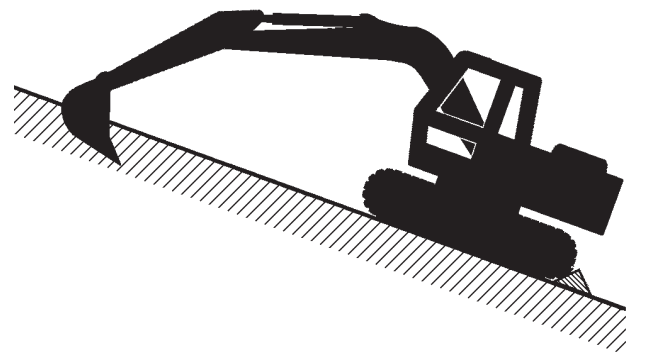
- Death or serious injury may result if you attempt to mount or stop a moving machine.

To avoid rollaways:

- Select level ground when possible to park machine.
- Do not park the machine on a grade.
- Lower the bucket and/or other work tools to the ground.
- Turn the auto-idle switch and the H/P mode switch off.
- Run the engine at slow idle speed without load for 5 minutes to cool down the engine.
- Stop the engine and remove the key from the key switch.
- Pull the pilot control shut-off lever to LOCK position.
- Block both tracks and lower the bucket to the ground. Thrust the bucket teeth into the ground if you must park on a grade.
- Position the machine to prevent rolling.
- Park a reasonable distance from other machines.



SA-391



SA-392

020-E02A-0493

SAFETY

AVOID INJURY FROM BACK-OVER AND SWING ACCIDENTS

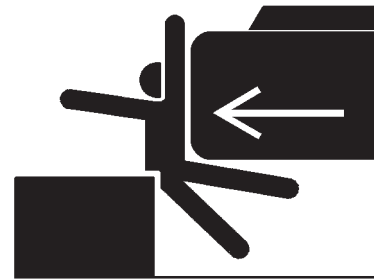
- If any person is present near the machine when backing or swinging the upperstructure, the machine may hit or run over that person, resulting in serious injury or death.

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



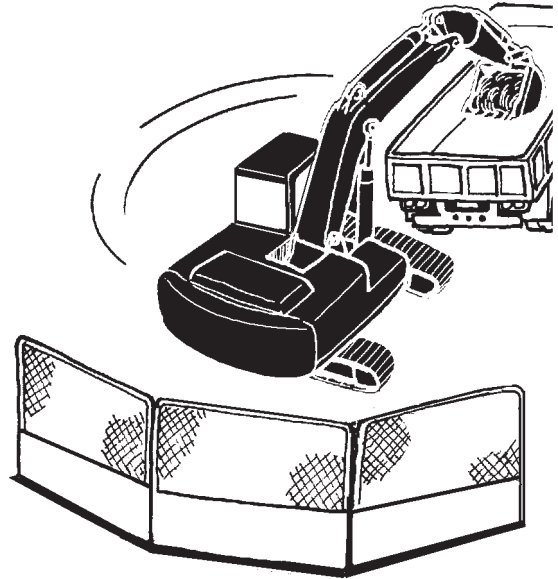
SA-384

021-E01A-0494

SAFETY

KEEP PERSON CLEAR FROM WORKING AREA

- A person may be hit severely by the swinging front attachment or counterweight and/or may be crushed against another object, resulting in serious injury or death.
- Keep all persons clear from the area of operation and machine movement.
- 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.



022-E01A-0386

SA-386

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.

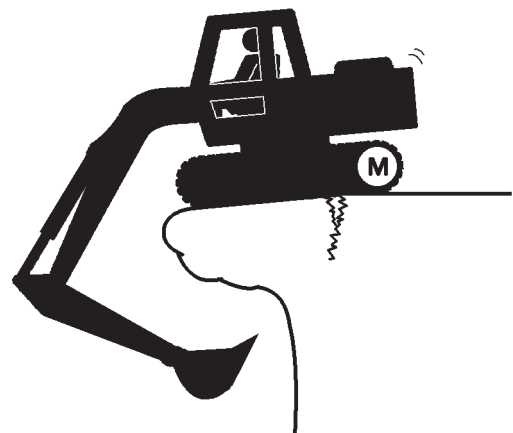


023-E01A-0487

SA-487

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. Often, the machine can be secured by lowering the front attachment, in such cases.



024-E01A-0488

SA-488

SAFETY

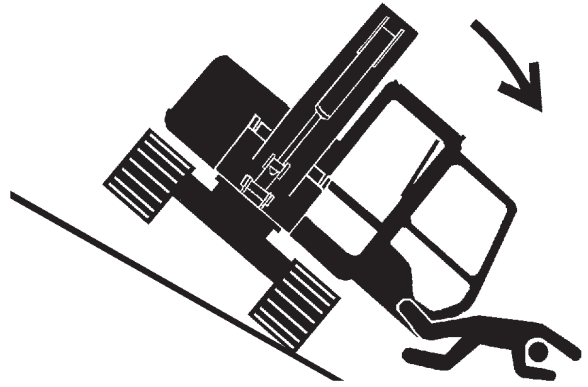
AVOID TIPPING

DO NOT ATTEMPT TO JUMP CLEAR OF TIPPING MACHINE---SERIOUS OR FATAL CRUSHING INJURIES WILL RESULT

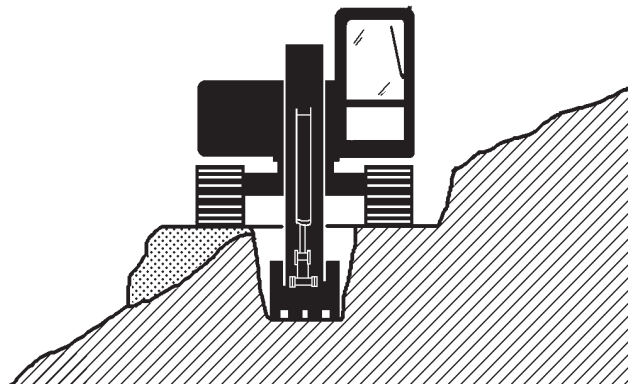
MACHINE WILL TIP OVER FASTER THAN YOU CAN JUMP FREE

FASTEN YOUR SEAT BELT

- 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-012



SA-440

025-E03B-0463

NEVER UNDERCUT A HIGH BANK

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



026-E01A-0519

SA-489

SAFETY

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.

027-E01A-0382



SA-382

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.

028-E01A-0389



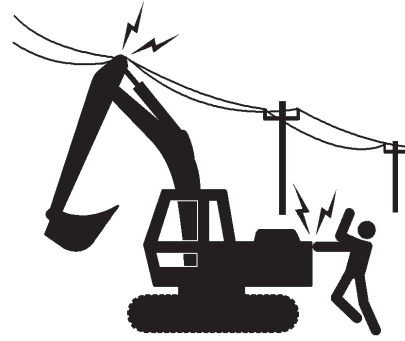
SA-389

SAFETY

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 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.

029-E01A-0381



SA-381

PRECAUTIONS FOR LIGHTENING

- The machine is vulnerable to lightning 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-1088

OBJECT HANDLING

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

032-E01A-0132

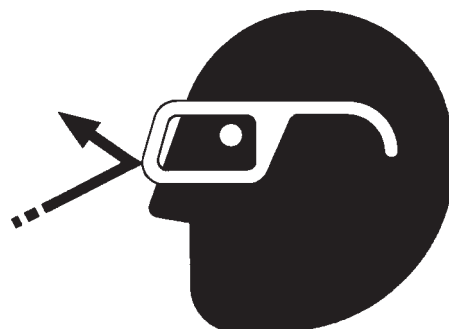


SA-014

SAFETY

PROTECT AGAINST FLYING DEBRIS

- If flying debris hit eyes or any other part of the body, serious injury may result.
 - Guard against injury from flying pieces of metal or debris; wear goggles or safety glasses.
 - Keep bystanders away from the working area before striking any object.



031-E01A-0432

SA-432

PARK MACHINE SAFELY

To avoid accidents:

- Park machine on a firm, level surface.
- Lower bucket to the ground.
- Turn auto-idle switch and H/P mode switch OFF.
- 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.
- Pull the pilot control shut-off lever to the LOCK position.
- Close windows, roof vent, and cab door.
- Lock all access doors and compartments.



SA-390

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

034-E01A-0496



SA-019

SAFETY

TRANSPORT SAFELY

- Take care the machine may turn over when loading or unloading the machine onto or off of a truck or trailer.
 - Observe the related regulations and rules for safe transportation.
 - Select an appropriate truck or trailer for the machine to be transported.
 - Be sure to use a signal person.
 - Always follow the following precautions for loading or unloading:
 1. Select solid and level ground.
 2. Always use a ramp or deck strong enough to support the machine weight.
 3. Turn auto-idle switch OFF.
 4. Always select the slow speed mode with the travel mode switch.
 5. Never load or unload the machine onto or off a truck or trailer using the front attachment functions when driving up or down the ramp.
 6. Never steer the machine while on the ramp. If the traveling direction must be changed while the ramp, unload the machine from the ramp, reposition the machine on the ground, then try loading again.
 7. The top end of the ramp where it meets the flatbed is a sudden bump. Take care when traveling over it.
 8. Place blocks in front of and behind the tracks. Securely hold the machine to the truck or trailer deck with wire ropes.



SA-395

Be sure to further follow the details described in the TRANSPORTING section.

035-E07A-0454

SAFETY

PRACTICE SAFE MAINTENANCE

To avoid accidents:

- Understand service procedures before starting work.
- Keep the work area clean and dry.
- Do not spray water or steam inside cab.
- Never lubricate or service the machine while it is moving.
- Keep hands, feet and clothing away from power-driven parts.

Before servicing the machine:

1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.
4. Run the engine at slow idle speed without load for 5 minutes.
5. Turn the key switch to OFF to stop engine.
6. Relieve the pressure in the hydraulic system by moving the control levers several times.
7. Remove the key from the switch.
8. Attach a "Do Not Operate" tag on the control lever.
9. Pull the pilot control shut-off lever to the LOCK position.
10. Allow the engine to cool.

- If a maintenance procedure must be performed with the engine running, do not leave machine unattended.
- If the machine must be raised, maintain a 90 to 100° angle between the boom and arm. Securely support any machine elements that must be raised for service work.
- Inspect certain parts periodically and repair or replace as necessary. Refer to the section discussing that part in the "MAINTENANCE" chapter of this manual.
- Keep all parts in good condition and properly installed.
- Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.
- When cleaning parts, always use nonflammable detergent oil. Never use highly flammable oil such as fuel oil and gasoline to clean parts or surfaces.
- Disconnect battery ground cable (–) before making adjustments to electrical systems or before performing welding on the machine.

500-E02C-0520



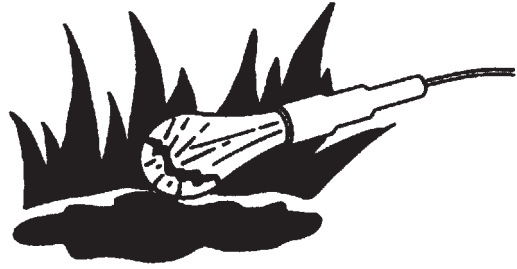
SA-028



SA-527

SAFETY

- 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.



SA-037

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 on the control lever.
- This tag is available from your authorized dealer.

501-E01A-0287



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. Do not support the machine on cinder blocks, hollow tires, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack.

519-E01A-0527

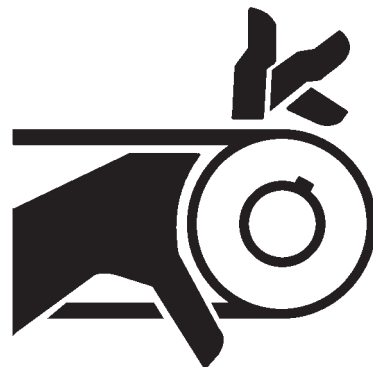


SA-527

STAY CLEAR OF MOVING PARTS

- Entanglement in moving parts can cause serious injury.
- 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.

502-E01A-0026



SA-026

SAFETY

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 FITTING or VALVE ASSEMBLY.
 - As pieces may fly off, be sure to keep body and face away from valve.
 - Never attempt to disassemble the track adjuster. Inadvertent disassembling of the track adjuster may cause the parts such as a spring to fly off, possibly resulting in severe personal injury or death.
- Travel reduction gears are under pressure.
 - As pieces 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 AIR RELEASE PLUG to release pressure.

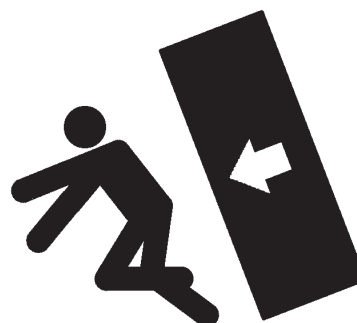


SA-344

503-E01B-0344

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. Keep children and bystanders away from storage areas.



504-E01A-0034

SA-034

SAFETY

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 avoid possible injury from hot spraying water. DO NOT remove the radiator cap until the engine is cool. When opening, turn the cap slowly to the stop. Allow all pressure to be released before removing the cap.
- The hydraulic oil tank is pressurized. Again, be sure to release all pressure before removing the cap.



SA-039

Hot fluids and surfaces:

- Engine oil, gear oil and hydraulic oil also become 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.

505-E01B-0498



SA-225

REPLACE RUBBER HOSES PERIODICALLY

- Rubber hoses that contain flammable fluids 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 inspection alone.
- Periodically replace the rubber hoses. (See the page of "Periodic replacement of parts" in the operator's manual.)
- 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.

S506-E01A-0019



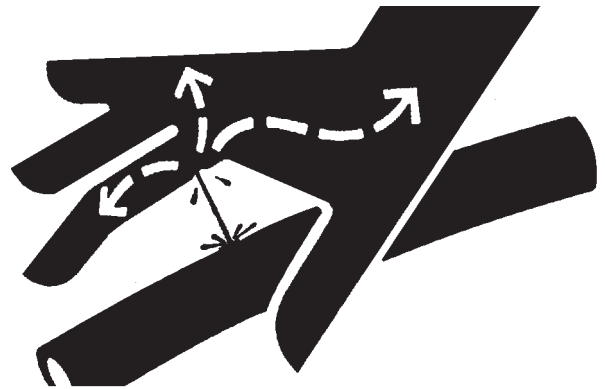
SA-019

SAFETY

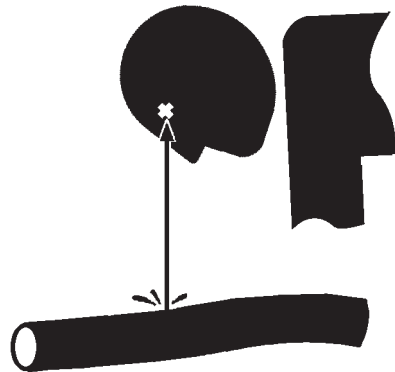
AVOID HIGH-PRESSURE FLUIDS

- 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.
- Tighten all connections 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.

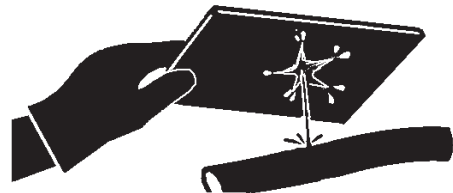
507-E03A-0499



SA-031



SA-292



SA-044

SAFETY

PREVENT FIRES

Check for Oil Leaks:

- Fuel, hydraulic oil and lubricant leaks can lead to fires.
 - Check for oil leaks due to 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.
 - 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..

Clean up 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.

Check Key Switch:

- If a 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 stops.
- If any abnormalities are found, be sure to repair them before operating the machine.

508-E02B-0019

Check Heat Shields:

- Damaged or missing heat shields may lead to fires.
 - Damaged or missing heat shields must be repaired or replaced before operating the machine.

508-E02A-0393

SAFETY

EVACUATING IN CASE OF FIRE

- If a fire breaks out, evacuate the machine in the following way:
 - Stop the engine by turning the key switch to the OFF position if there is time.
 - Use a fire extinguisher if there is time.
 - Exit the machine.
- 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 the explanation pages on the Emergency Evacuation Method.



SA-393

18-E02B-0393

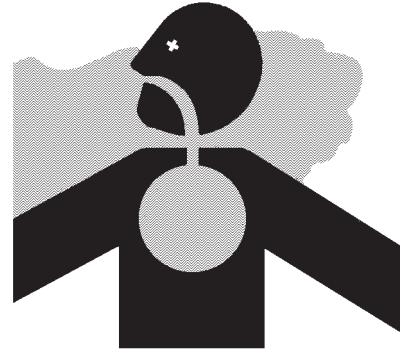


SS-1510

BEWARE OF EXHAUST FUMES

- Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.
- If you must operate 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.

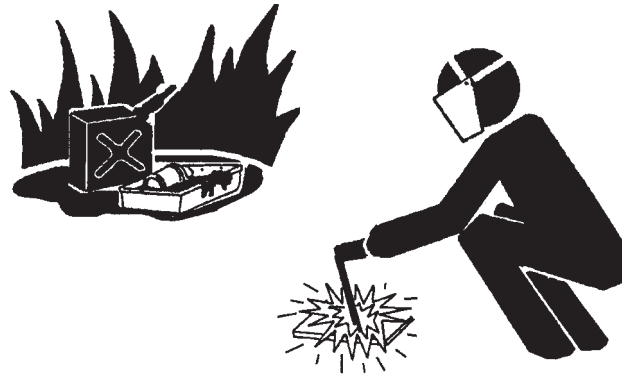
509-E01A-0016



SA-016

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 fire hazards. 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.



523-E01A-0818

SA-818

SAFETY

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.
- Clean them thoroughly with nonflammable solvent before welding or flame cutting them.

510-E01B-0030

REMOVE PAINT BEFORE WELDING OR HEATING

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



SA-029

511-E01A-0029

SAFETY

BEWARE OF ASBESTOS DUST

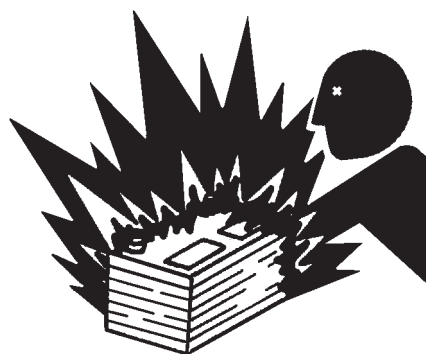
- Take care not to inhale dust produced in the work site. Inhalation of asbestos fibers may be the cause of lung cancer.
- Depending on the work site conditions, the risk of inhaling asbestos fiber may exist. Spray water to prevent asbestos from becoming airborne. Don't use compressed air.
- When operating 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

PREVENT BATTERY EXPLOSIONS

- Battery gas can explode.
 - Keep sparks, lighted matches, and flame away from the top of battery.
 - Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.
 - Do not charge a frozen battery; it may explode. Warm the battery to 16°C (60° F) first.
 - Do not continue to use or charge the battery when electrolyte level is lower than specified. Explosion of the battery may result.
 - Loose terminals may produce 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.
 - Be sure to wear eye protection when checking electrolyte specific gravity.



SA-032

512-E01B-0032

SERVICE AIR CONDITIONING SYSTEM SAFELY

- If spilled onto skin, refrigerant may cause a cold contact burn.
- Refer to the instructions described on the container for proper use when handling the refrigerant.
- Use a recovery and recycling system to avoid leaking refrigerant into the atmosphere.
- Never touch the refrigerant.



513-E01A-0405

SA-405

SAFETY

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, 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. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and use recommended equipment.
- See your authorized dealer for MSDS's (available only in English) on chemical products used with your machine.

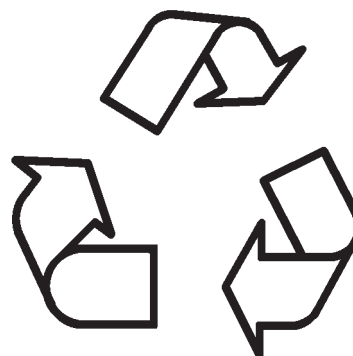


SA-309

515-E01A-0309

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.
- Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.
- Do not pour waste onto the ground, down a drain, or into any water source.
- Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.
- Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your authorized dealer.

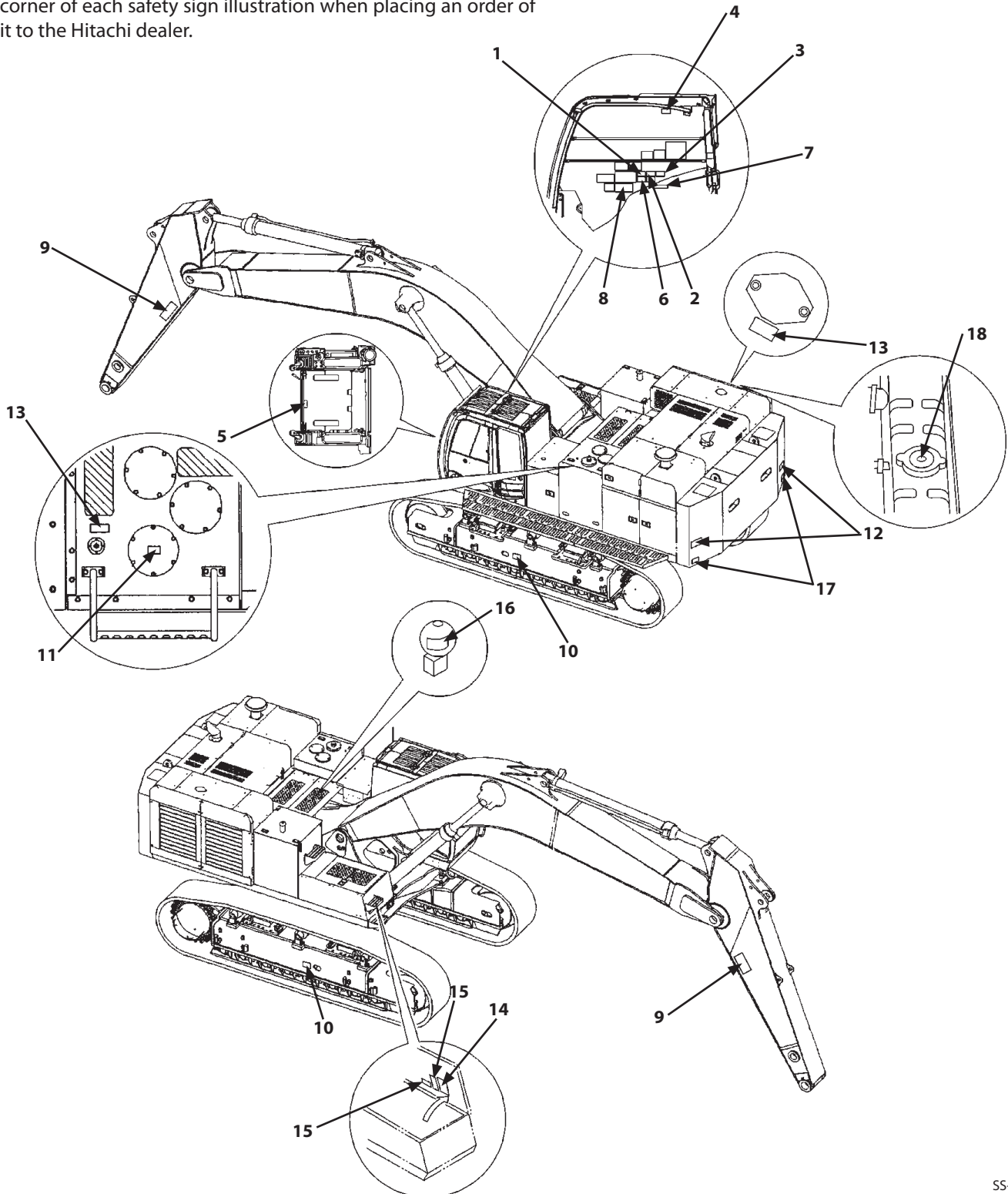


SA-226

516-E01A-0226

SAFETY SIGNS/Europe/Asia/Middle and Near East Model Only

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 the Hitachi dealer.



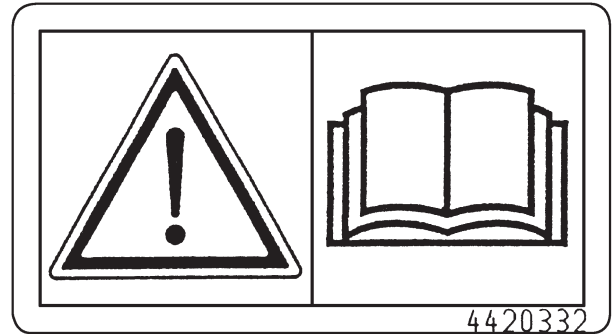
SS-2825

SAFETY SIGNS/Europe/Asia/Middle and Near East Model Only

1.

WARNING!

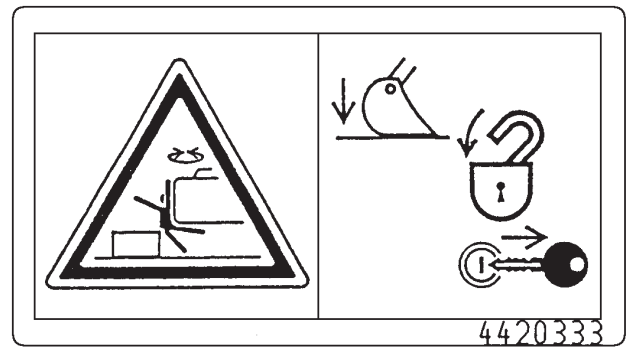
Prior to operation, maintenance, disassembling, and transportation of the machine, be sure to read and understand the Operator's Manual.



SS-1616

2.

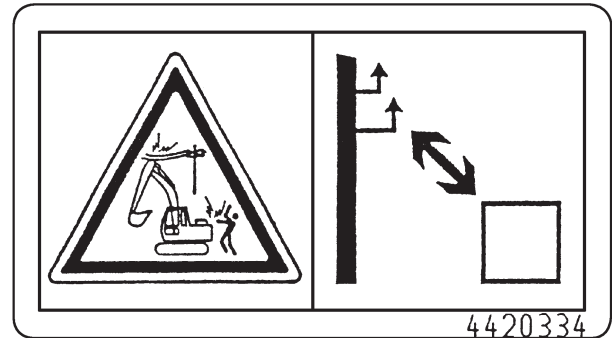
If the parked machine is unexpectedly moved, serious injury or death due to crushing may result. Be sure to lower the front attachment to the ground, lock the control levers, and remove the engine key before leaving the machine unattended.



SS4420333

3.

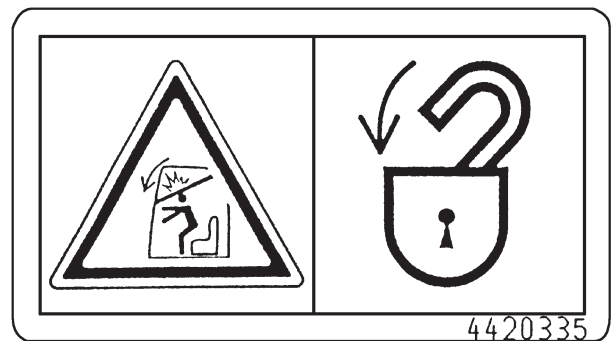
Sign indicates an electrocution hazard if machine is brought too near electric power lines. Keep a safe distance from electric power lines.



SS-1613

4.

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

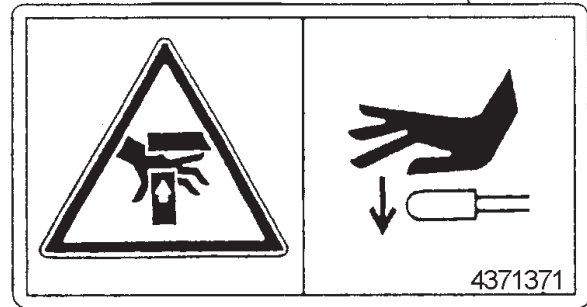


SS-1618

SAFETY SIGNS/Europe/Asia/Middle and Near East Model Only

5.

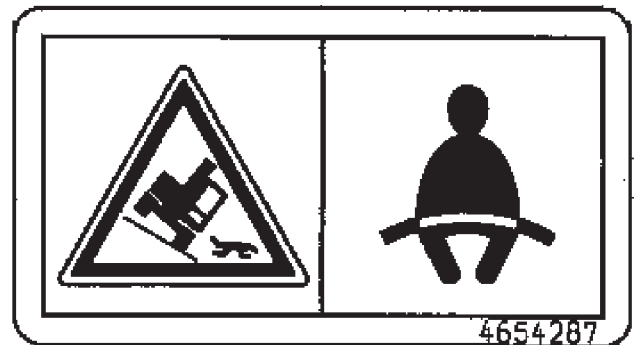
When moving the seat height/tilt lever downward, press the lever grip with a palm from the top side. Don't grasp the lever grip to operate the lever, possibly resulting in pinch of your fingers into the seat stand.



SS7371371

6.

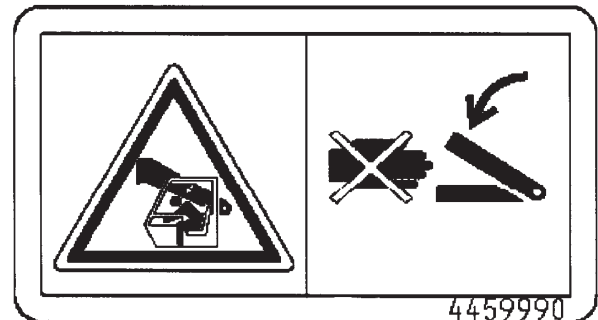
If the machine should overturn, the operator may become injured and/or thrown from the cab and/or crushed by the overturning machine.



SS4654287

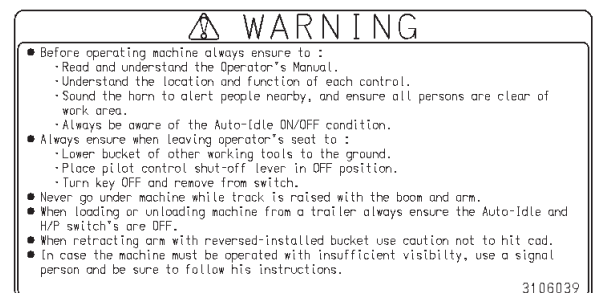
7.

Don't extend your hands or head from the window. Your hands or head may come in contact with the boom.



SS4459990

8.



SS3106039

SAFETY SIGNS/Europe/Asia/Middle and Near East Model Only

9.

Sign indicates a hazard of being hit by the working device of the machine.

Keep away from machine during operation.

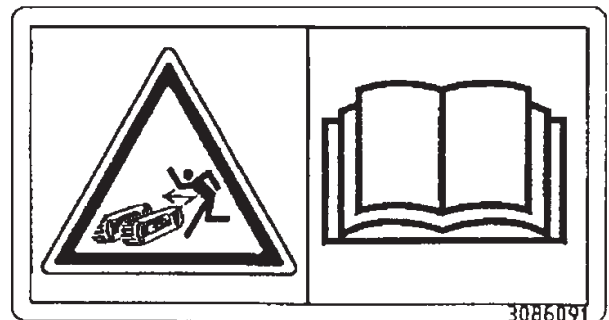


SS3089581

10.

Sign indicates a hazard of a flying plug from track adjuster that could cause injury.

Read manual before adjusting track for safe and proper handling.

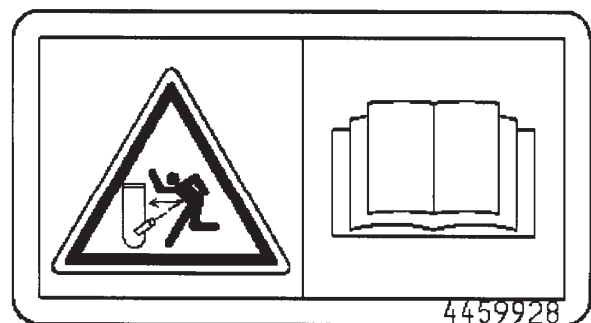


SS3086091

11.

Sign indicates a burn hazard from compressed air and spurt-ing hot oil if the oil inlet is uncapped during or right after operation.

Read manual for safe and proper handling.

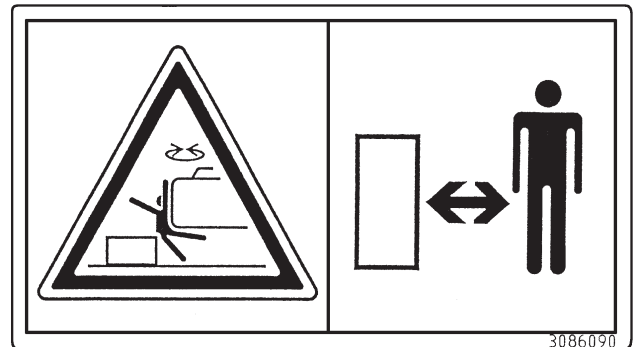


SS4459928

SAFETY SIGNS/Europe/Asia/Middle and Near East Model Only

12.

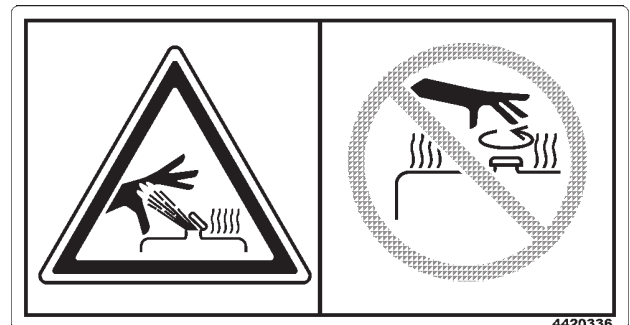
Sign indicates a crush hazard by rotation of upper structure of the machine. Keep away from swinging area of machine.



SS-1614

13.

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



SS4420336

14.

Sign indicates an explosion hazard.
Keep fire and open flames away from this area.

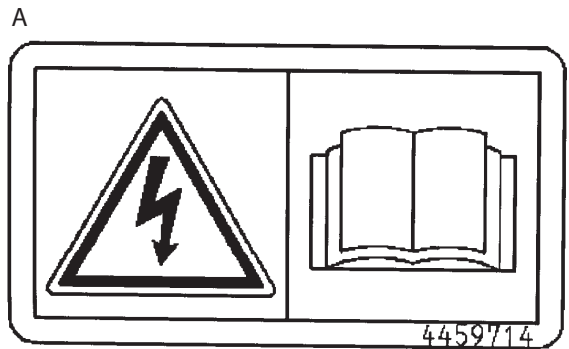


SS4460067

SAFETY SIGNS/Europe/Asia/Middle and Near East Model Only

15

Sign indicates an electrical hazard from handling the cable.
Read manual for safe and proper handling.



SS4459714

Skin contact with electrolyte will cause burns. Splashed electrolyte into eyes will cause blindness. Take care not to touch electrolyte.

B



SS4460056

SAFETY SIGNS/Europe/Asia/Middle and Near East Model Only

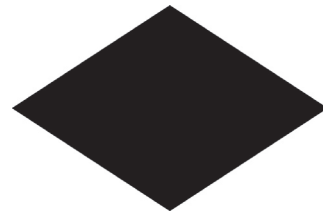
16.



SS-1022

17.

REFLECTOR (FOR EUROPEAN STANDARD)



SS-1988

18.

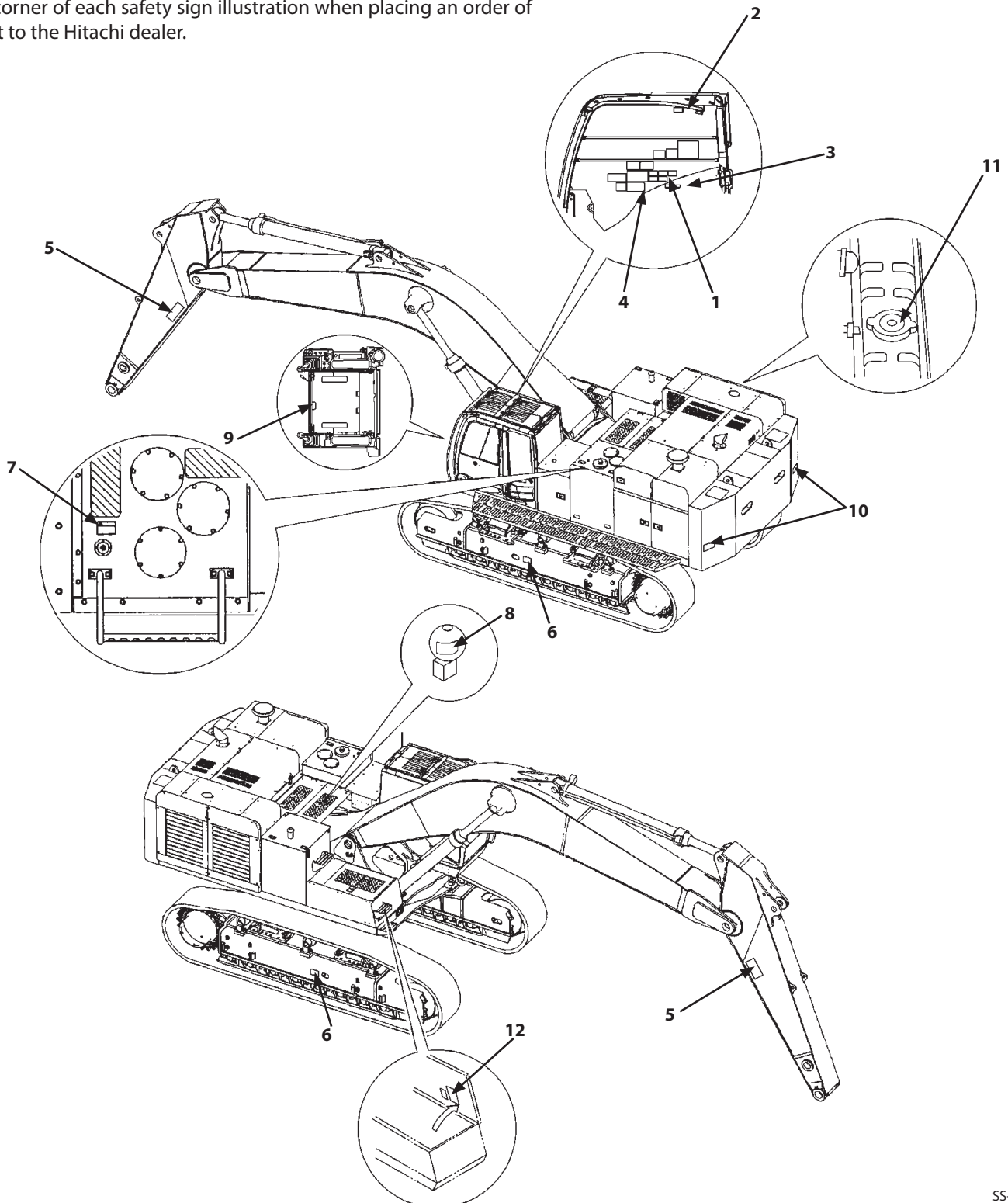
Asia/Middle and Near East Model only.



SS-710

SAFETY SIGNS/North America and Oceania Model Only

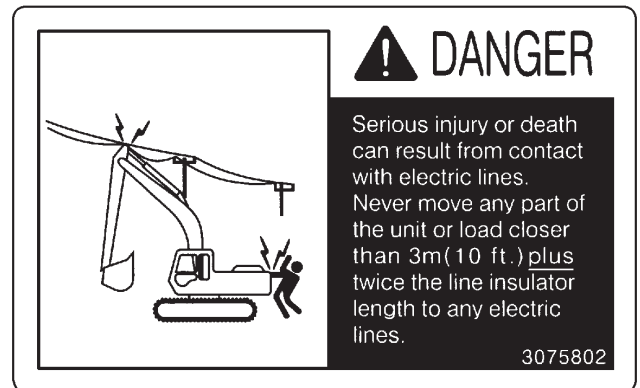
All safety signs and their locations affixed on the machine are illustrated in this group. Make sure of the contents described in the safety signs through reading actual ones affixed on the machine to ensure safe machine operation. Always keep the safety signs clean. In case a safety sign is broken or 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 the Hitachi dealer.



SS-2820

SAFETY SIGNS/North America and Oceania Model Only

1.



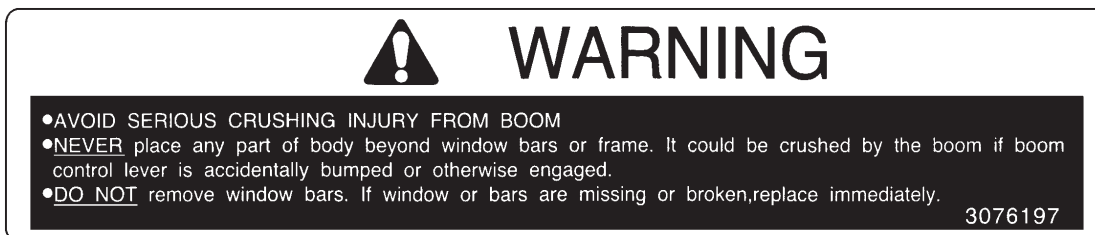
SS-862

2.



SS-863

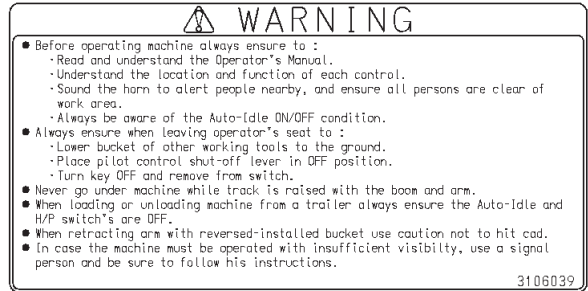
3.



SS-859

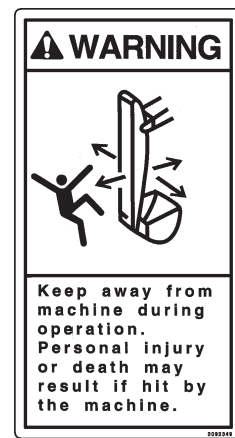
SAFETY SIGNS/North America and Oceania Model Only

4.



SS3106039

5.



SS3092349

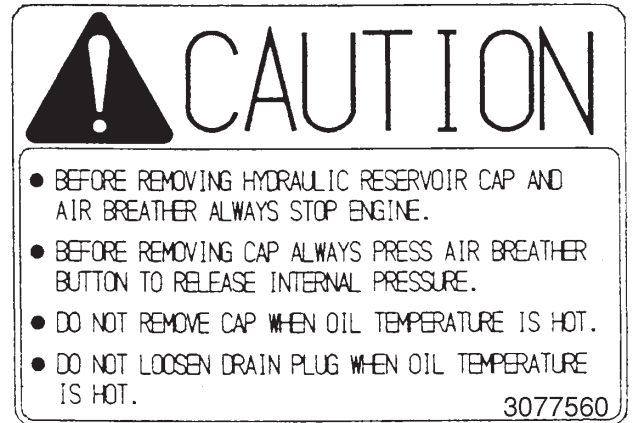
6.



SS-408

SAFETY SIGNS/North America and Oceania Model Only

7.



SS3077560

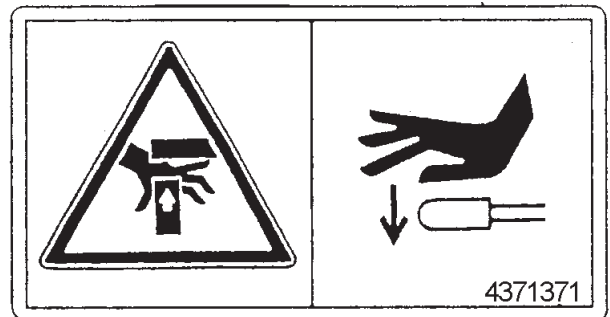
8.



SS-1022

9.

When moving the seat height/tilt lever downward, press the lever grip with a palm from the top side. Don't grasp the lever grip to operate the lever, possibly resulting in pinch of your fingers into the seat stand.



SS4371371

SAFETY SIGNS/North America and Oceania Model Only

10.



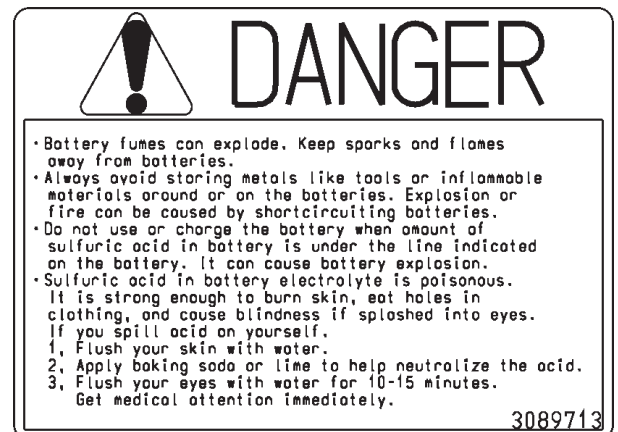
SS-024

11.



SS-710

12.

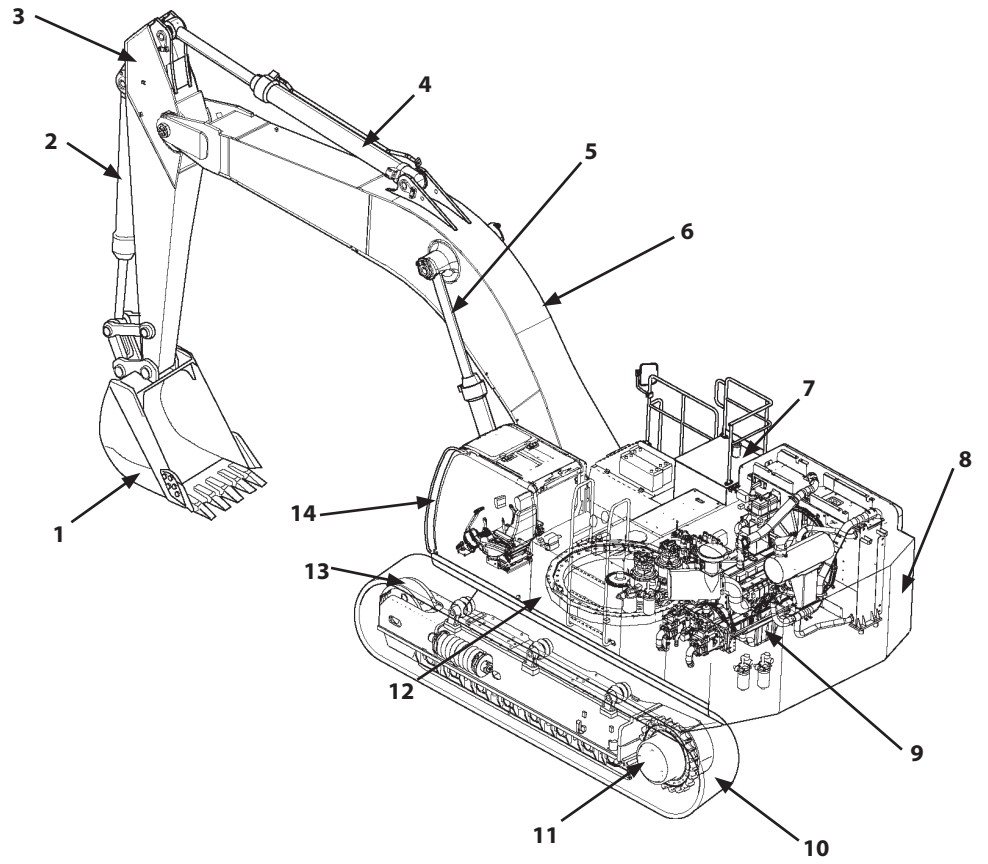


SS3089713

COMPONENTS NAME

COMPONENTS NAME

- 1- Bucket
- 2- Bucket Cylinder
- 3- Arm
- 4- Arm Cylinder
- 5- Boom Cylinder
- 6- Boom
- 7- Fuel Tank
- 8- Counterweight
- 9- Engine
- 10- Track
- 11- Travel Device
- 12- Hydraulic Oil Tank
- 13- Front Idler
- 14- Cab



T1J7-01-02-002

GETTING ON / OFF THE MACHINE

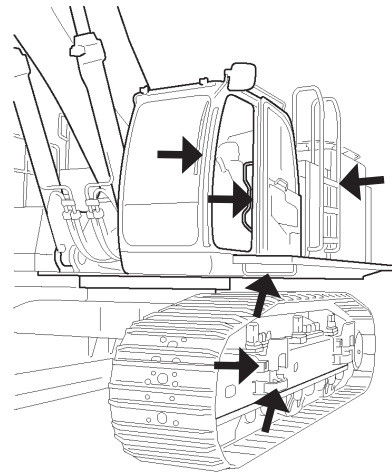
GETTING ON / OFF THE MACHINE

For safety, steps and handrails are provided at various places on the machine. Use them when getting on/off the machine and when inspecting/servicing.

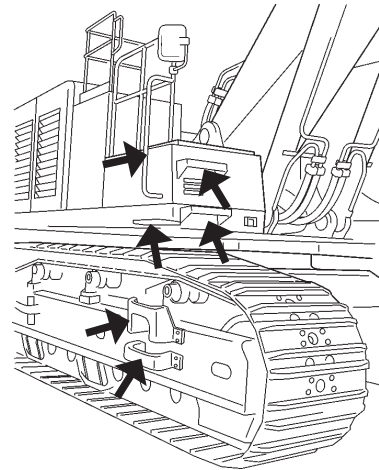


WARNING:

- When you get on and off the machine, always maintain a three point contact with the steps and handrails and face the machine. Never jump on or off the machine. Never mount or dismount a moving machine. Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.
- Never use the steps or handrails when slinging the cab and/or base machine, or when securing the machine on the track or trailer with wire ropes for the transportation. Doing so may break the steps or handrails, causing serious injury.



M1J7-01-001



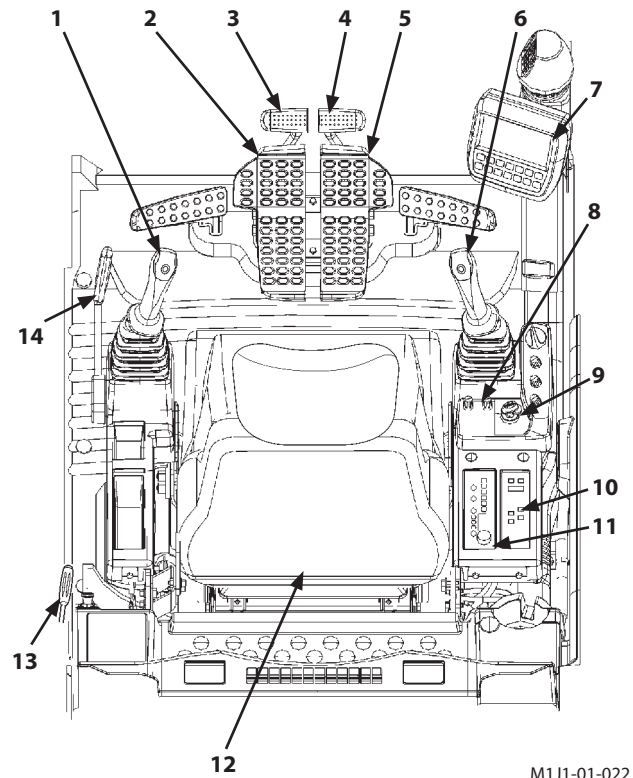
M1J7-01-002

OPERATOR'S STATION

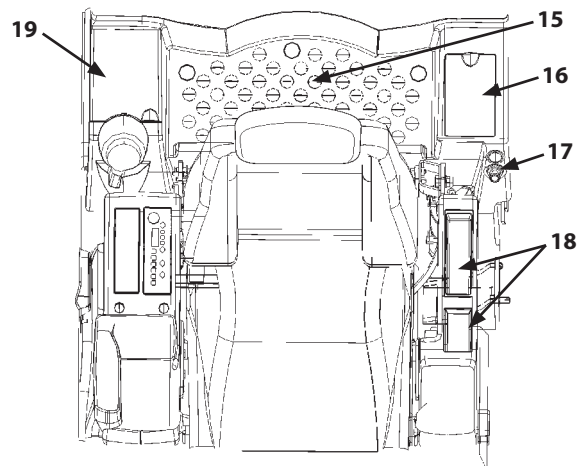
CAB FEATURES

Std. Model

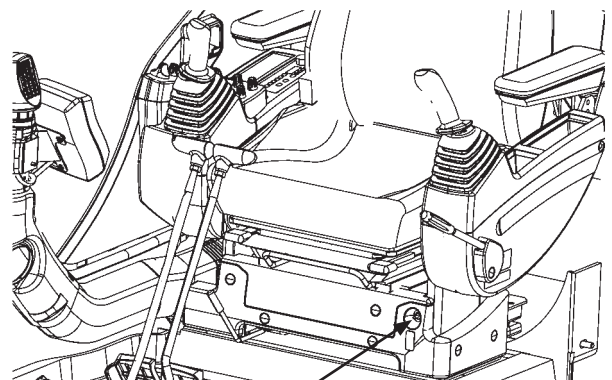
- 1- Left Control Lever/Horn Switch
(On Top of Lever)
- 2- Left Travel Pedal
- 3- Left Travel Lever
- 4- Right Travel Lever
- 5- Right Travel Pedal
- 6- Right Control Lever/Power Boost Switch
- 7- Multi Function Monitor Panel
- 8- Switch Panel
- 9- Key Switch
- 10- Air Conditioner Panel
- 11- Radio
- 12- Operator's Seat
- 13- Cab Door Release Lever
- 14- Pilot Control Shut-Off Lever
- 15- Glove Compartment
- 16- Fuse Box
- 17- Cigar Lighter
- 18- Switch Panel
- 19- Hot & Cool Box
- 20- Engine Stop Switch



M1J1-01-022



M1U1-01-002



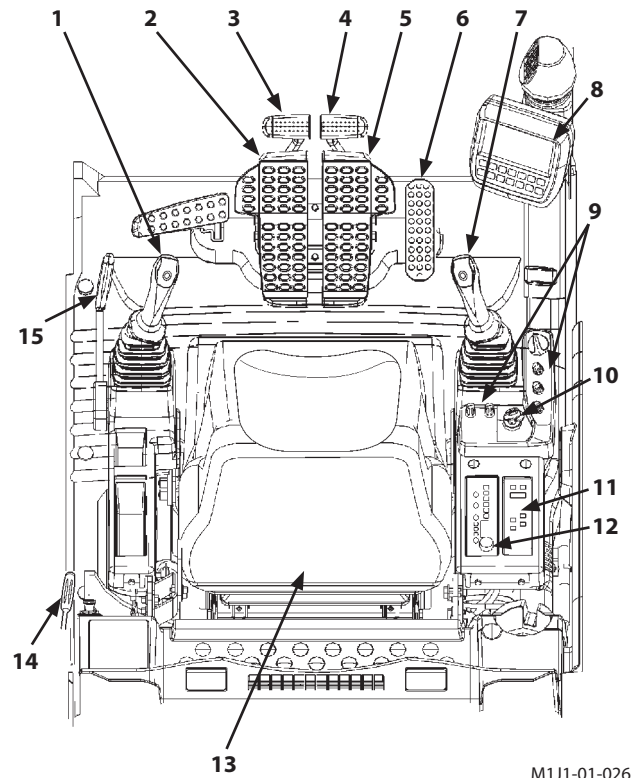
M1U1-01-029

OPERATOR'S STATION

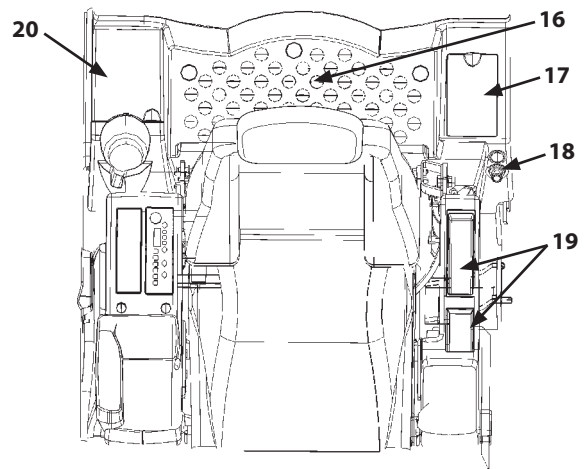
CAB FEATURES

Machines Equipped with Optional

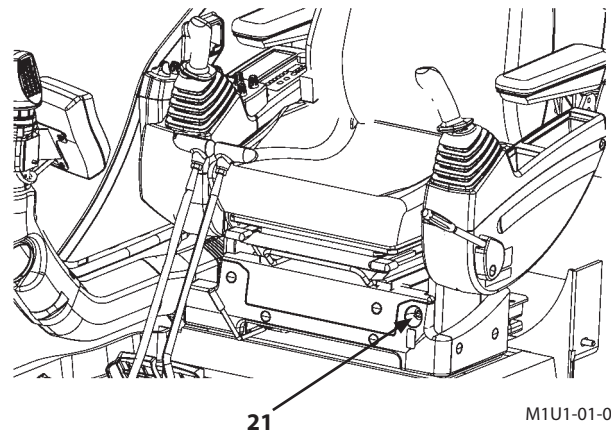
- 1- Left Control Lever/Horn Switch
(On Top of Lever)
- 2- Left Travel Pedal
- 3- Left Travel Lever
- 4- Right Travel Lever
- 5- Right Travel Pedal
- 6- Attachment Pedal (Optional)
- 7- Right Control Lever/Power Boost Switch
- 8- Multi Function Monitor Panel
- 9- Switch Panel
- 10- Key Switch
- 11- Air Conditioner Panel
- 12- Radio
- 13- Operator's Seat
- 14- Cab Door Release Lever
- 15- Pilot Control Shut-Off Lever
- 16- Glove Compartment
- 17- Fuse Box
- 18- Cigar Lighter
- 19- Switch Panel
- 20- Hot & Cool Box
- 21- Engine Stop Switch



M1U1-01-026



M1U1-01-002



M1U1-01-029

OPERATOR'S STATION

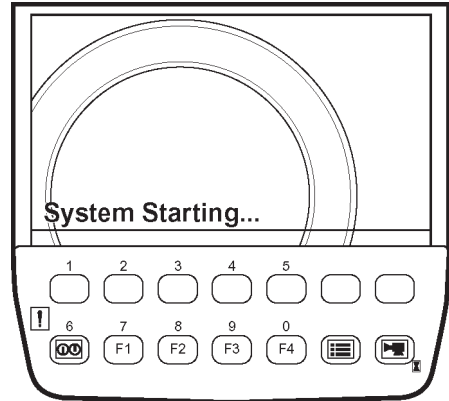
MULTI FUNCTION MONITOR

How To Use Screens

Displaying Basic Screen

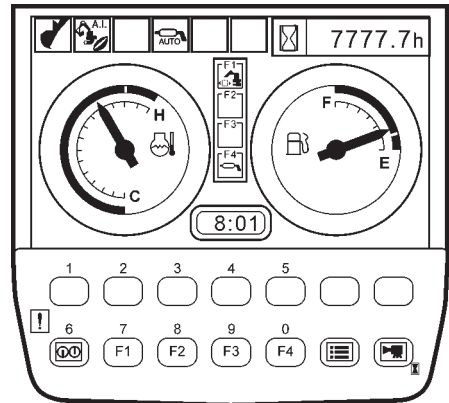
IMPORTANT: Start the engine after the basic screen is displayed.

When the key switch is turned to the ON position, the starting screen displays for about two seconds and the basic screen displays.



Key Switch: ON

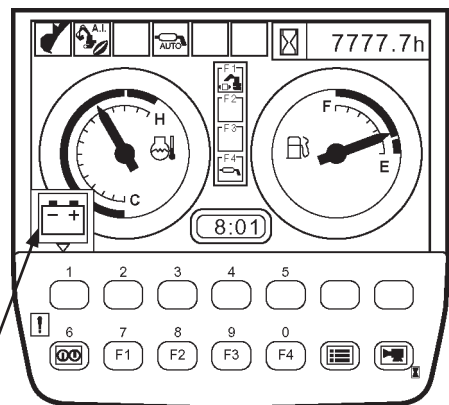
T1V1-05-01-115



Basic Screen

M1J1-01-002

IMPORTANT: After the engine starts and the alternator starts generating power. Alternator alarm is displayed on the basic screen.



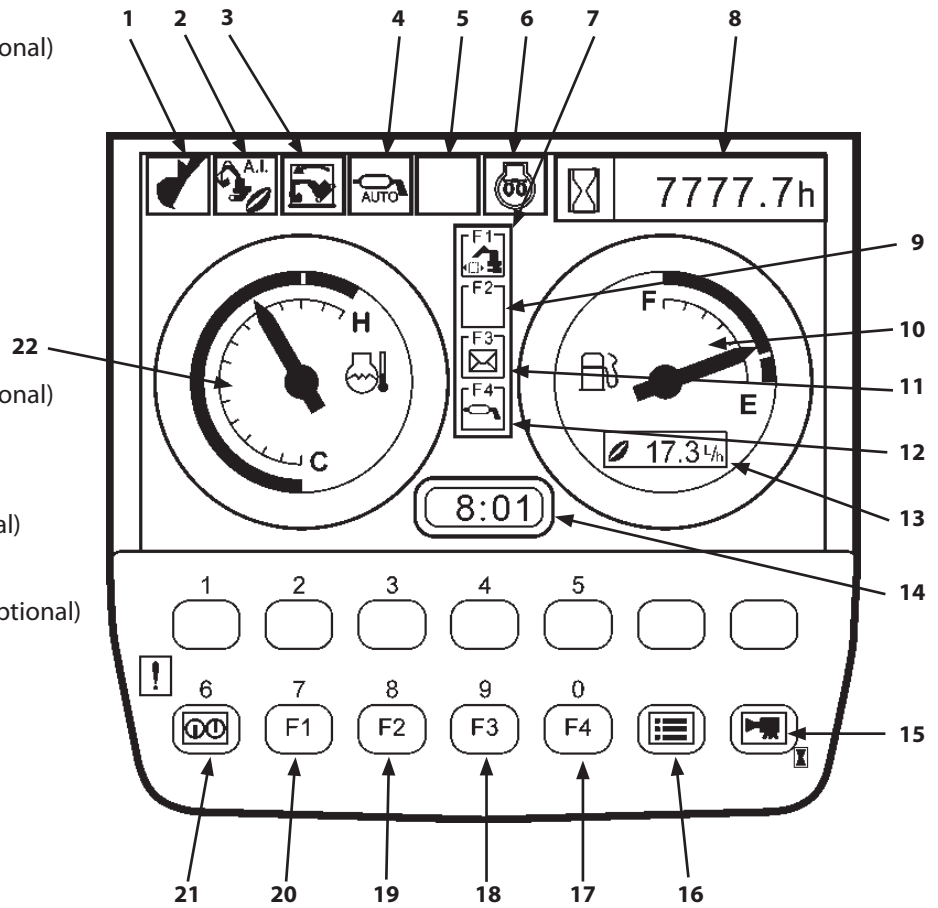
Alternator Alarm

M1J1-03-005

OPERATOR'S STATION

OUTLINE

- 1 - Work Mode Display
- 2 - Auto-Idle Display
- 3 - Overload Alarm Display (Optional)
- 4 - Auto-Lubrication Display (Optional)
- 5 - Auxiliary
- 6 - Preheat Display
- 7 - Work Mode Display
- 8 - Hour Meter
- 9 - Auxiliary
- 10 - Fuel Gauge
- 11 - Mail Display (Optional)
- 12 - Auto-Lubrication Display (Optional)
- 13 - Fuel Rate Display
- 14 - Clock
- 15 - Back Monitor Selector (Optional)
- 16 - Menu
- 17 - Auto-Lubrication Selection (Optional)
- 18 - Mail Selection (Optional)
- 19 - Auxiliary
- 20 - Work Mode Selection
- 21 - Return to Basic Screen Key
- 22 - Coolant Temperature Gauge



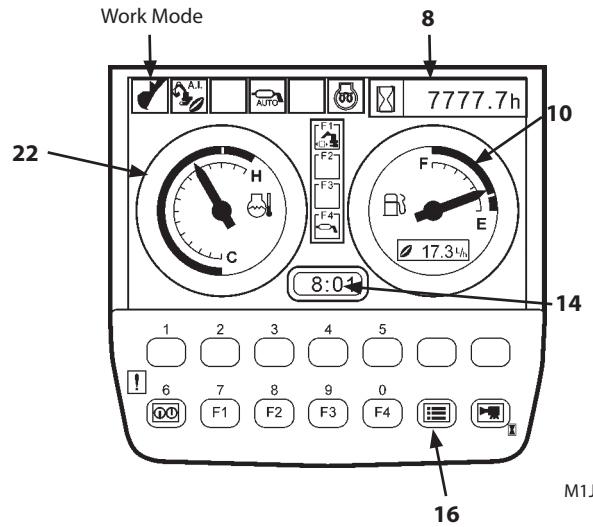
M1J1-01-003

OPERATOR'S STATION

- Display of Meters
Items to be displayed

- 8. Hour Meter
- 10. Fuel Consumption Gauge
- 14. Clock
- 16. Menu
- 22. Coolant Temperature Gauge

- Work Mode Display
The attachments being used are displayed.



M1J1-05-001

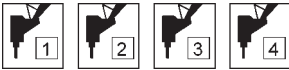
Digging Mode



T1V1-05-01-108

Attachment Mode

Breaker



M1J7-01-003

OPERATOR'S STATION

- Auto-Idle Display(2)

When selecting auto-idle from the switch panel, the auto-idle display (2) is displayed.

When the key is turned ON, the data blinks for 10 seconds.

- Overload Alarm Display (3) (optional)



T1V1-05-02-002

The system measures the load of suspended load from the bottom pressure of boom cylinder. When overload is detected, an alarm is displayed.

- Auto-Lubrication Display (4) (Optional)

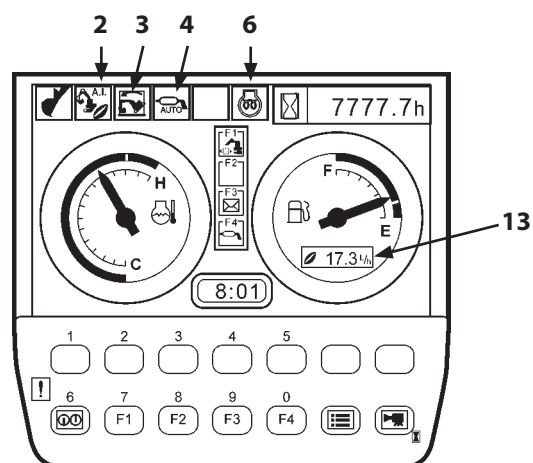
When selecting auto-lubrication from the switch panel, the auto-lubrication display (4) is displayed.

- Preheat Display (6)

While the current is supplying to the glow plug, the preheat display (6) is displayed.

- Fuel Rate Display (13)



Fuel consumption is displayed. (Reference value)

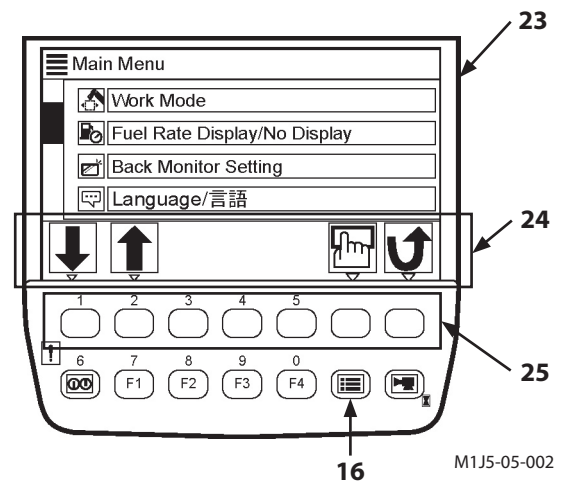


M1J1-01-003

OPERATOR'S STATION

Menu Screen (23)

Press menu key (16) on the basic screen to display main menu screen (23). Select the desired menu by operating key (25) located under   keys on icon display area (24).



OPERATOR'S STATION

Hour Meter

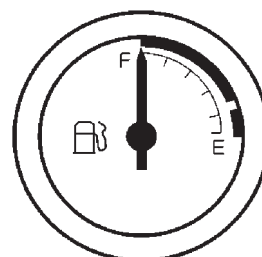
Total (accumulated) machine operation hours counted since the machine started working, are displayed in the unit of HOUR (h). One digit after the decimal point indicates the tenths of an hour (6 minutes).



M1U1-01-038

Fuel Gauge

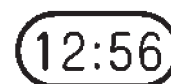
The fuel amount in the fuel tank is indicated. Refuel before the needle reaches "E".



M1U1-01-039

Clock

Indicates the present time.



M1U1-01-040

Back Monitor Selector

Shifts the monitor screen to the back view monitor screen and vice versa.



M1U1-01-041

 *NOTE: It is optional in some region.*

OPERATOR'S STATION

Menu Key

Shifts the basic screen to the menu screen.



M1U1-01-042

Optional Function Key

The desired preset optional function can be selected by operating these keys even though the menu key is not operated.

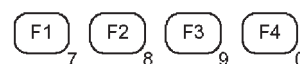
F1 : Work Mode Selection

F2 : Auxiliary

F3 : Mail (Optional)

F4: Auto-Lubrication (Optional)

are the fixed function keys.



M1U1-01-043

Return to Basic Screen Key

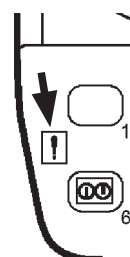
Allows any screen to return to the basic screen.



M1U1-01-044

Alarm Light

Comes ON when any abnormalty occurs.



M1U1-01-045

Optional Function Display

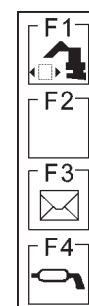
Displays the optional functions preset by the optional function key.

F1 : Work Mode Selection

F2 : Auxiliary

F3 : Mail (Optional)

F4: Auto-Lubrication (Optional)

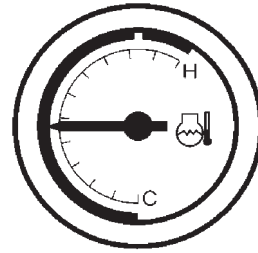


M1J1-01-005

OPERATOR'S STATION

Coolant Temperature Gauge

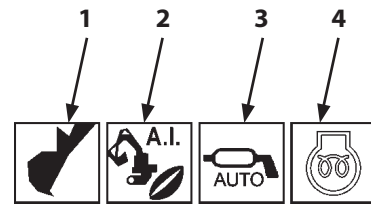
Indicates the engine coolant temperature. Normally the needle is around the center of the scale during operation.



M1U1-01-047

Operating Status Icon Display

Displays icons indicating the current status of the attachment (1) selected at the work mode selection screen and operation modes such as the auto-idle system (2) and the Auto-Lubrication (3) and preheat display (4), etc when these systems are activated.



M1J1-01-006

OPERATOR'S STATION

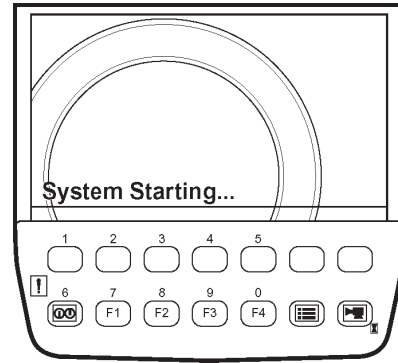
Displaying Basic Screen by Password Input (Optional)

IMPORTANT: When required to activate the TEN-key function (ignition block system), consult your nearest Hitachi dealer. If the password ever escapes the customer's memory, the machine must be modified. Be extra careful not to forget the password.

1. Turn the key switch ON. After the starting screen is displayed, the password input screen will be displayed.

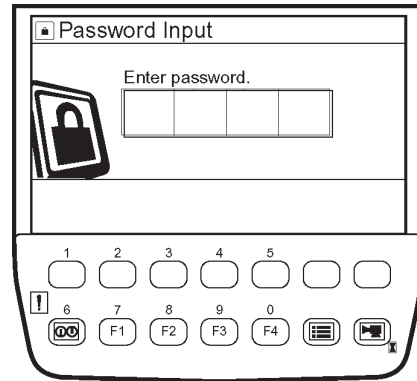
2. Input a password by using the keys located under the screen. If pushing the determination key, the monitor unit matches the input password to the registered one. If they match, the basic screen displays.

NOTE: When inputting the password again, the entered characters can be erased by pushing the delete key.



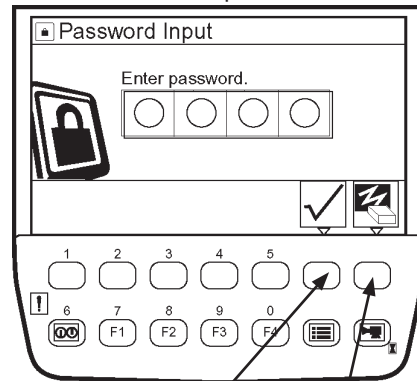
Starting Screen

T1V1-05-01-115



Password Input Screen

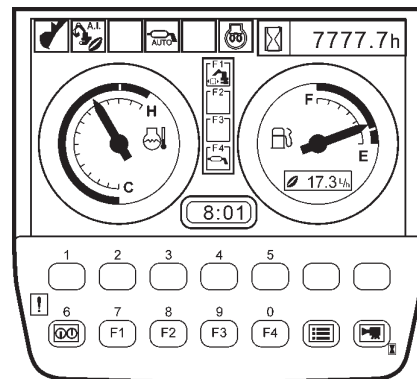
T1V5-05-01-093



Determination Key

Delete Key

T1V5-05-01-002



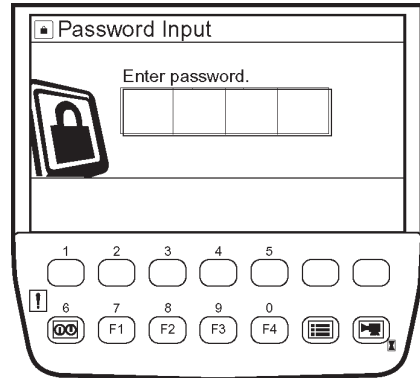
Basic Screen

M1J1-05-001

OPERATOR'S STATION

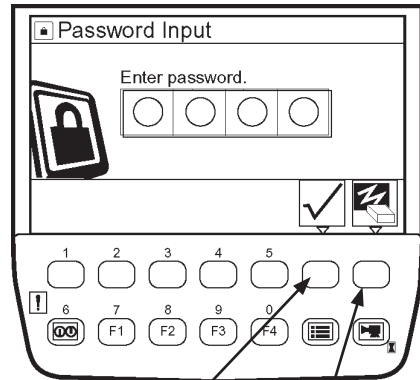
In Case of Inputting an Incorrect Password

1. If inputting an incorrect password, the message "Password is incorrect." displays by pushing the determination key.



Password Input Screen


T1V5-05-01-093

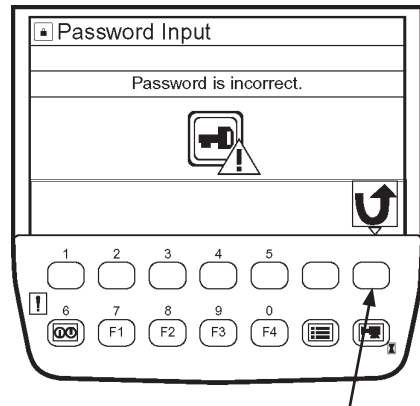


Determination Key Delete Key

T1V5-05-01-002

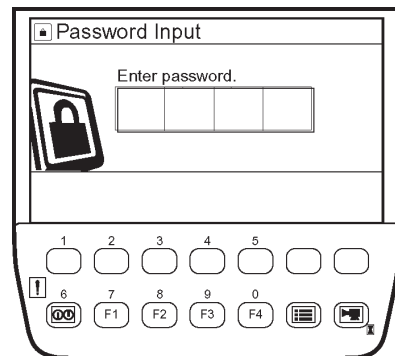
2. Return to the password input screen, by pushing the back key.

 **NOTE:** When inputting the password again, the entered characters can be erased by pushing the delete key.



Back key

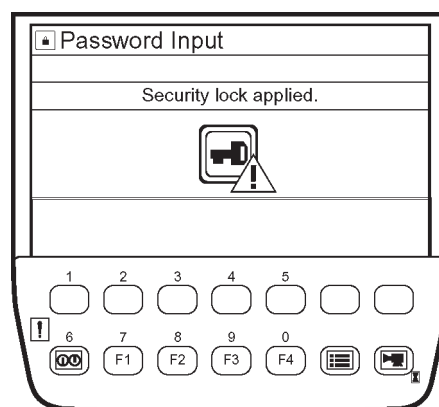
T1V5-05-01-004



T1V5-05-01-093

OPERATOR'S STATION

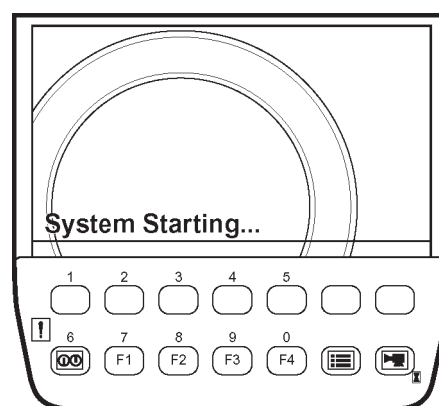
3. If inputting an incorrect password three times, a screen displays informing that the security lock has been applied, and a buzzer rings for thirty seconds. During that time, the buzzer does not stop ringing even if turning of the key switch ON/OFF.



Security Lock Screen

T1V5-05-01-005

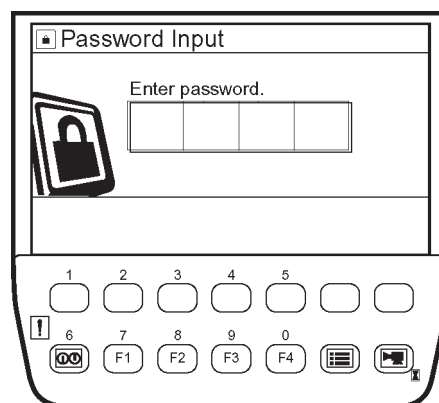
4. After thirty seconds, if the key switch is turned to the ON position, the starting screen displays and the password input screen displays again. Then a password can be input again. If inputting an incorrect password even once this time, the security lock screen displays again and a buzzer rings for thirty seconds. The buzzer does not stop ringing for thirty seconds even if turning the key switch ON/OFF.



Starting Screen

T1V1-05-01-115

5. After the buzzer stops ringing, a password can be input again. Turn the key switch to the ON position and input a password after the password input screen displays. (Refer to 1-13)
6. If inputting an incorrect password again, the security lock screen displays again. The buzzer does not stop ringing for thirty seconds even if turning the key switch ON/OFF.



Password Input Screen

T1V5-05-01-093


OPERATOR'S STATION

Extending Password Duration Time

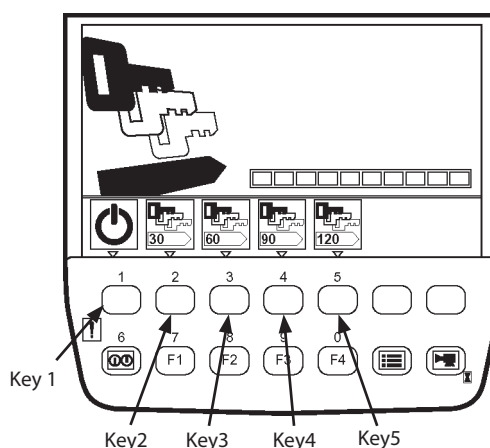
IMPORTANT: This operation is applicable only to those machines that display the basic screen based upon password input.

By using the password duration screen, password duration time can be set. When you restarting the machine, a password need not be input within that timeframe.

1. When turn the key switch to the OFF position, the monitor unit displays the password duration screen for ten seconds.
2. While the password duration screen is still displayed, push a relevant key, and password duration time is set. Duration time assigned to each key is as follows:
 - key 1: 0 minute
 - key 2: 30 minutes
 - key 3: 60 minutes
 - key 4: 90 minutes
 - key 5: 120 minutes

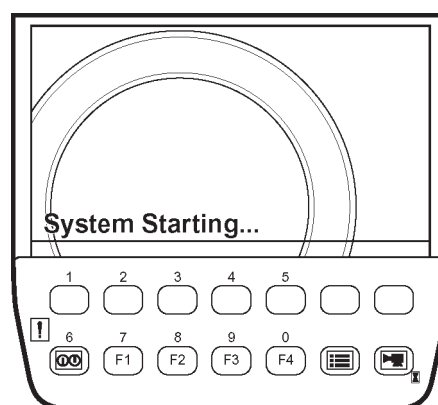
 **NOTE:** If password duration time is not set explicitly, 0 minute on duration time is assumed.

3. If turning the key switch to the ON position within password duration time, the monitor unit displays the basic screen after the starting screen.



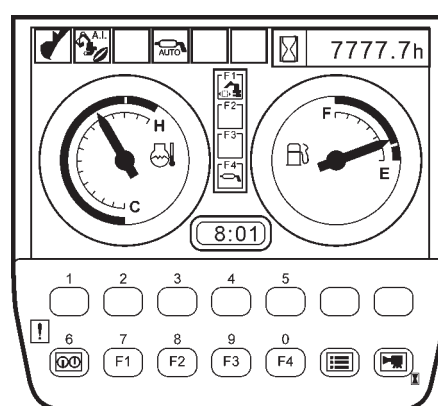
Password Duration Screen (Key Switch: OFF)

T1V1-05-01-012



Key Switch: ON

T1V1-05-01-115



Basic Screen

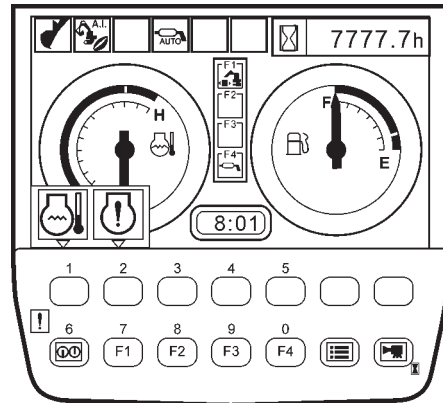
M1J1-01-002

OPERATOR'S STATION

ALARM OCCURRENCE SCREEN

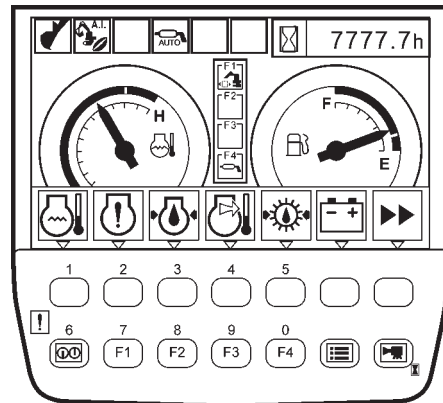
In case any abnormality occurs, the alarm marks are displayed on the basic screen.

- When the number of alarms is two or less



M1J1-01-007

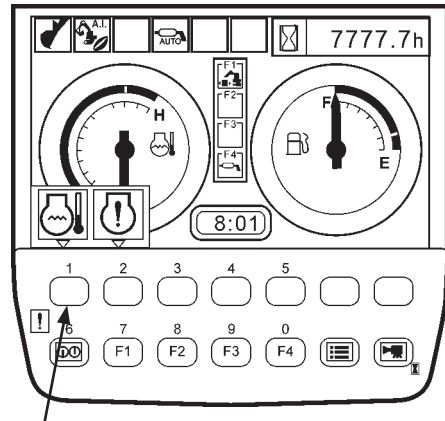
- When the number of alarms is three or more



M1J1-01-008

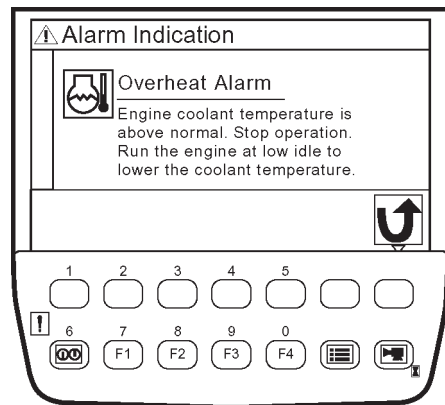
OPERATOR'S STATION

In case any abnormality occurs, push the key located under the alarm mark. The monitor displays the corrective action to the alarm situation.



Push a Relevant Key





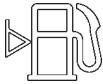



M1J1-01-007



T1V5-05-01-013

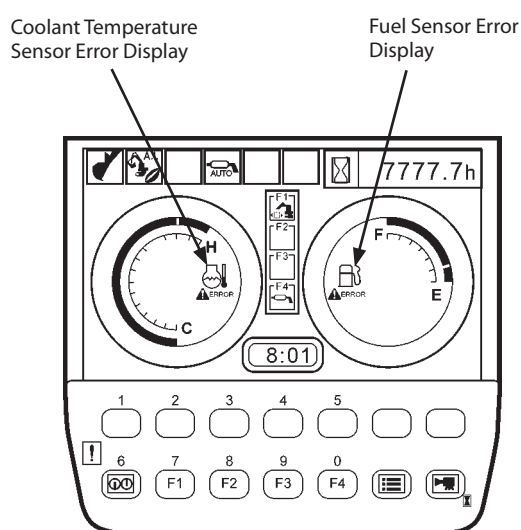
OPERATOR'S STATION

CONTENTS OF ALARMS

Display	Contents of Alarms	Remedy
 M178-01-036	Overheat Alarm	Engine coolant temperature has abnormally increased. Stop operation. Run the engine at slow idle speed o lower the coolant temperature.
 M183-01-080	Engine Warning Alarm	Engine or engine related parts are abnormal. Consult your nearest Hitachi dealer.
 M178-01-037	Engine Oil Pressure Alarm	Engine oil pressure has decreased. Immediately stop engine. Check engine oil system and oil level.
 M183-01-071	Alternator Alarm	Electical system is abnormal. Consult your nearest Hitachi dealer.
 M178-01-034	Remaining Fuel Alarm	Fuel level is low. Refill fuel as soon as possible.
 M183-01-067	Air Filter Clogged Alarm	Air filter elements are clogged. Clean or replace air filter elements.
 T1V1-05-01-102	Work Mode Alarm	Work Mode system is abnormal. Consult your nearest Hitachi dealer.
 T1V1-05-01-103	Pilot Control Shut-Off Lever Alarm	Pilot control shut-off lever system is abnormal. Consult your nearest Hitachi dealer.

OPERATOR'S STATION

- **Fuel Sensor Error Display**
When the fuel sensor is faulty or if the harness between fuel sensor and monitor unit is broken, the fuel sensor error display is displayed on the fuel gauge.
- **Coolant Temperature Sensor Error Display**
When the coolant temperature sensor is faulty or if the harness between coolant temperature sensor and monitor unit is broken, the coolant temperature sensor error display is displayed on the coolant temperature gauge.



M1J1-01-010

OPERATOR'S STATION

Clock Setting

Press menu key (2) on basic screen (1) to display main menu screen (3).

Select time set menu (4) by pressing the key located under

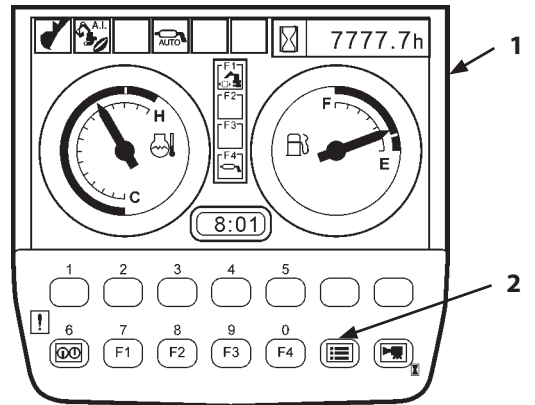


keys on icon display area and adjust the clock set.

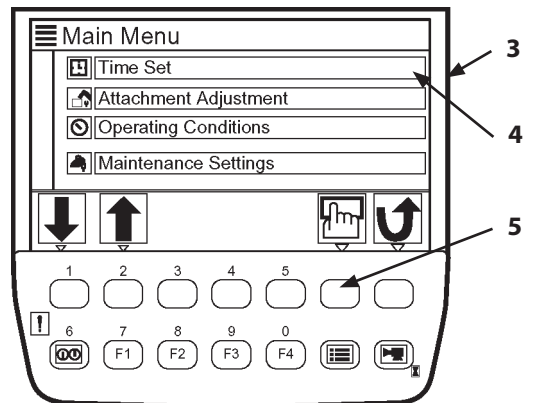
Time Adjustment

After selecting time set menu (4) by pressing the key located under keys on icon display area, press determination key (5).

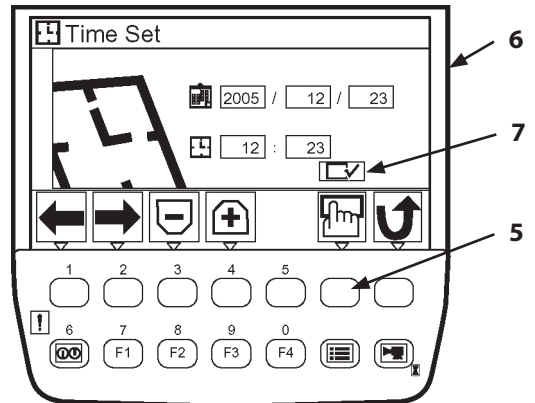
1. While pressing the key located under and keys on icon display area on time setting screen (6), select the figures for Year, Month, Day, and Time.
2. After moving the cursor to position by pressing the key located under key, press determination key (5) to define the setting



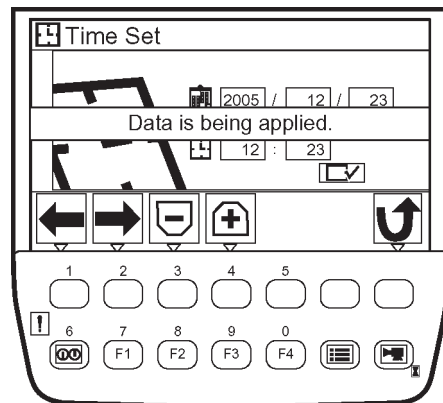
M1J1-01-002



T1V5-05-01-019



T1V5-05-01-021



T1V5-05-01-022

OPERATOR'S STATION

ATTACHMENT SELECTION (Only Machines Equipped with Optional Parts)

IMPORTANT: Select the attachments from the work mode screen.
In order to display the work mode screen, push key F1 after basic screen displays, or select from main menu.

Selecting an Attachment by Using Key F1

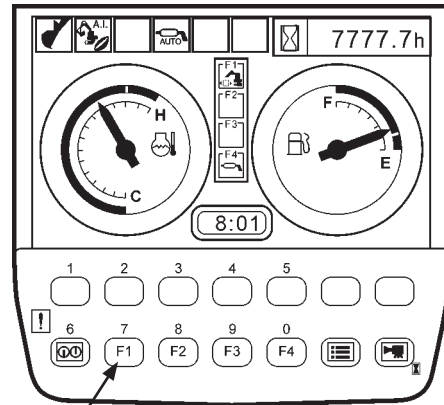
1. When the basic screen displays, push key F1 and display the work mode screen.
2. Push a key located under an attachment mark to be used in order to select the attachment.
(In the right example, Breaker 1 is selected.)

NOTE: When selecting Digging, return to the basic screen.

3. On the attachment specification screen, confirm if specification of the installed attachment agrees with that displayed on the screen.

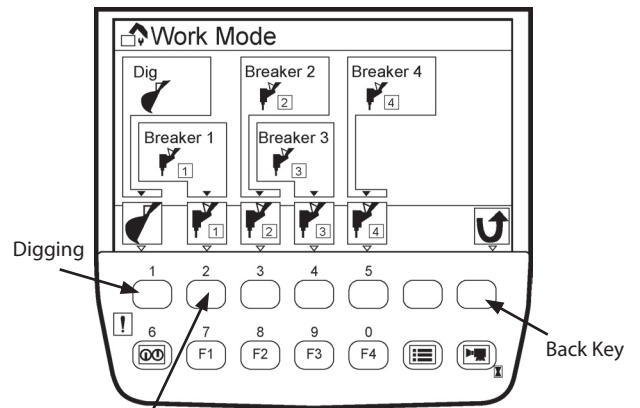
NOTE: When pushing the back key, return to the previous screen.

4. Push the determination key, and the basic screen displays.



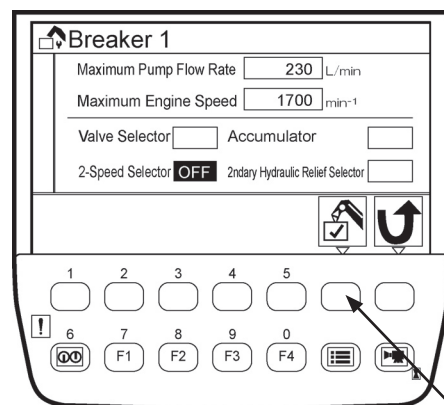
Key F1 Basic Screen

M1J1-01-002



Work Mode Screen
Select Breaker 1

T1J7-02-01-002E



Attachment Specification Screen

Determination key

T1J7-05-02-001E

OPERATOR'S STATION

Selecting an Attachment from Main Menu

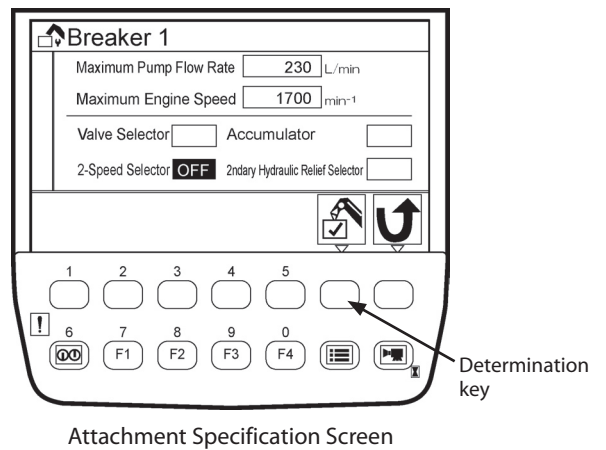
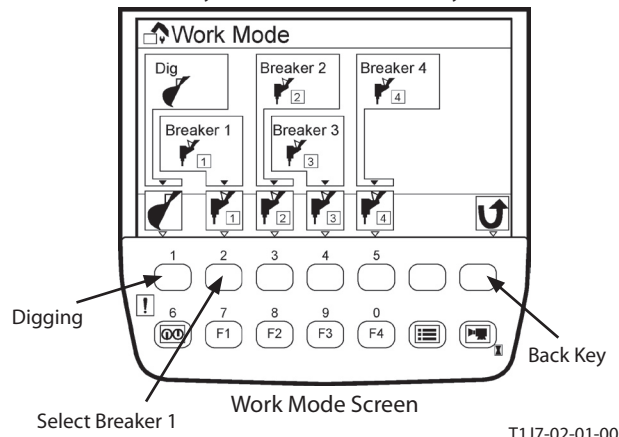
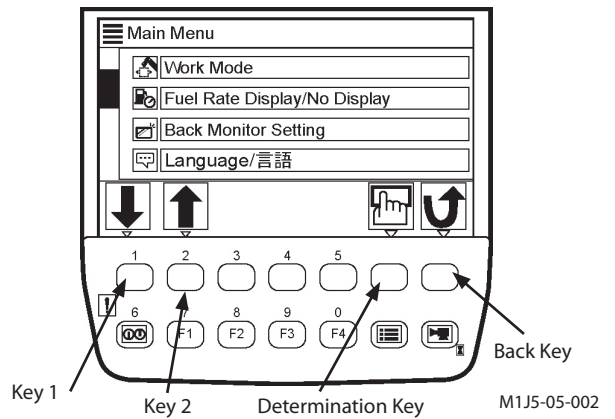
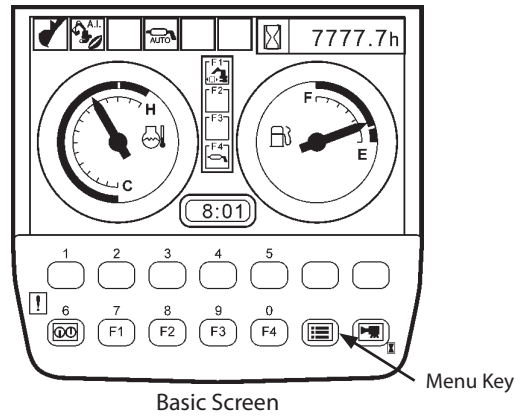
1. When the basic screen displays, push the menu key and display main menu.
2. Select work mode from main menu by using keys 1 and 2. Push determination key. Then, the work mode screen displays.
3. Push the key located under an attachment mark to be used in order to select the attachment.
(In the right example, Breaker 1 is selected.)

 **NOTE:** When selecting Digging, return to Main Menu.

4. On the attachment specification screen, confirm if specification of the installed attachment agrees with that displayed on the screen.

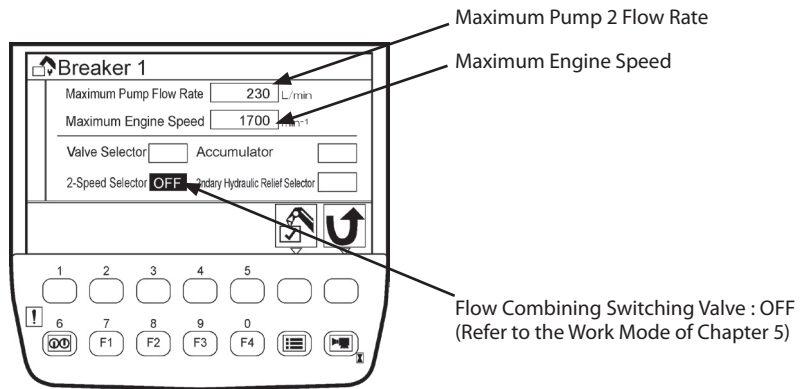
 **NOTE:** When pushing the back key, return to the basic screen.

5. Push the determination key, and the basic screen displays.

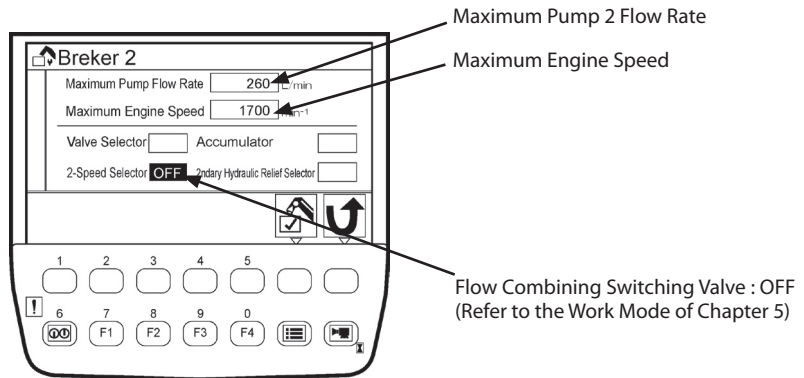


OPERATOR'S STATION

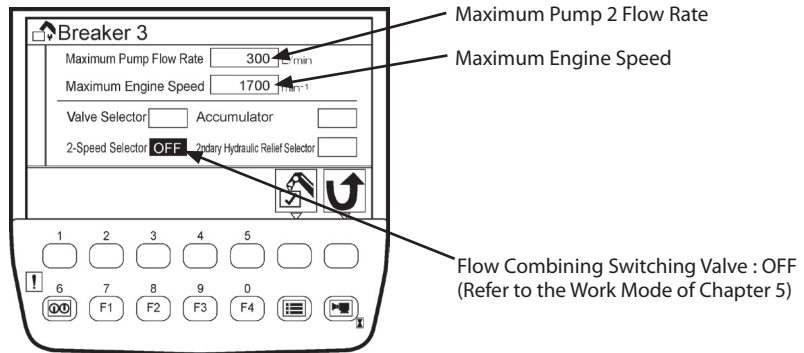
Attachment Specification Screen



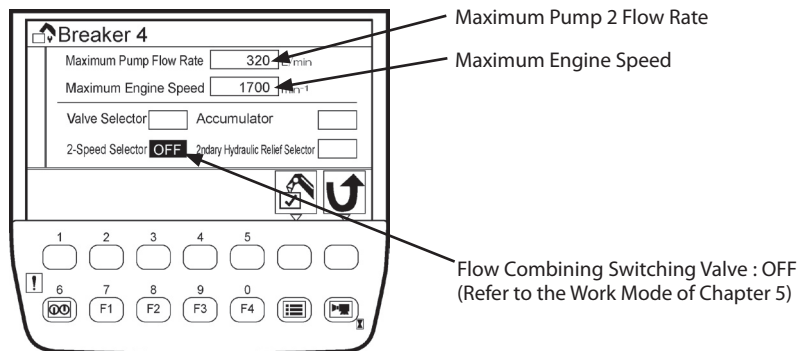
T1J7-05-02-001E



T1J7-05-02-002E



T1J7-05-02-003E



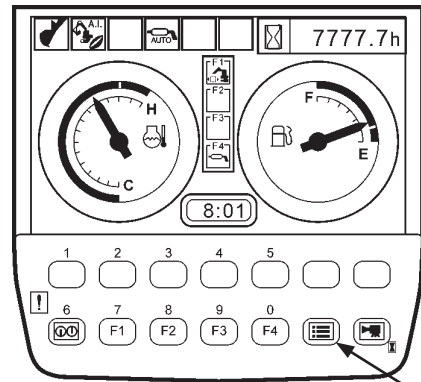
T1J7-05-02-004E

OPERATOR'S STATION

PUMP 2 FLOW RATE ADJUSTMENT (Only Machines Equipped with Optional Parts)

IMPORTANT: This operation is effective when attachments are used.

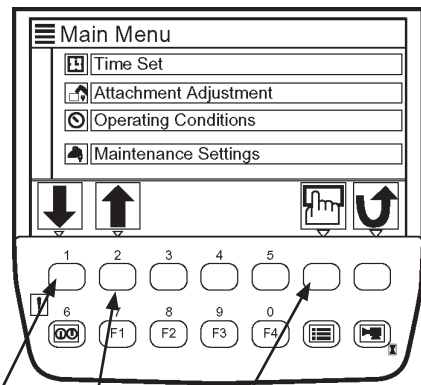
1. When the basic screen displays, push the menu key and display main menu.
2. Select attachment adjustment from main menu by using keys 1 and 2. Push determination key. Then, the attachment adjustment screen displays.
3. Push key 2. Then, the attachment adjustment screen for currently installed attachments displays.



Basic Screen

Menu Key

M1J1-01-002



Key 1

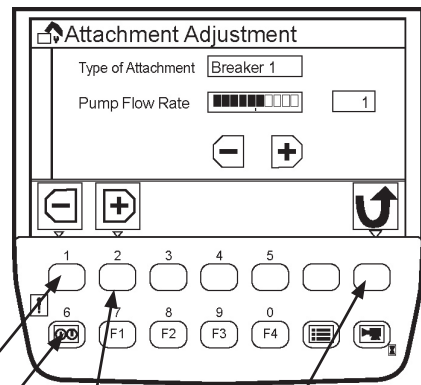
Key 2

Determination Key

T1V5-05-01-019

4. Adjust maximum flow rate of Pump 2 by using keys 1 and 2.

When using breaker 1, 2, 3 or 4, pushing key 1 will decrease Max flow rate of pump 2 and pushing key 2 will increase respectively.




Key 1

Key 6

Key 2

Back Key

M1J5-01-014

 **NOTE:** When pushing the back key, return to the previous screen.


5. Push key 6, and the basic screen displays.

After adjusting it, the maximum flow rate of pump 2 that has been described on the attachment specification screen is changed.

OPERATOR'S STATION

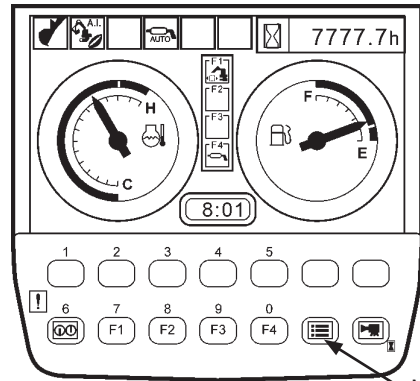
DISPLAYING OPERATING CONDITIONS

1. When the basic screen displayed, push the menu key and display main menu.
2. Select operating conditions from main menu by using keys 1 and 2. Push the determination key. Then, the operating conditions screen displays.
3. Push the reset key, and display the data reset confirm screen.
When reset the data, push the determination key.

 **NOTE:** When pushing the back key, return to the previous screen.

IMPORTANT: Total fuel consumption and fuel consumption rate depend on the operating environment and the operation method of machine. The values shown on the screen are just for reference. There could arise $\pm 20\%$ of differences between actual fuel consumption and fuel consumption which is displayed by the monitor unit.

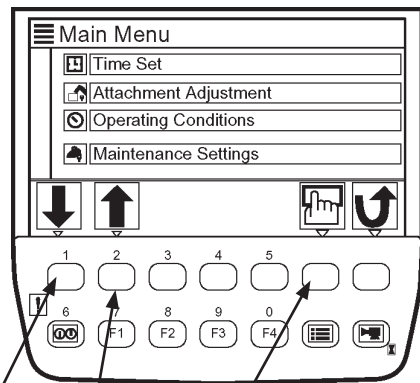
4. Push key 6, and the basic screen displays.



Basic Screen

Menu Key

M1J1-01-002

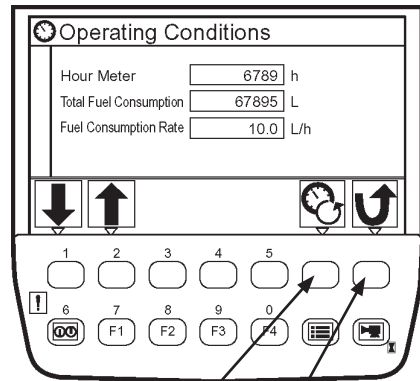


Key 1

Key 2

Determination Key

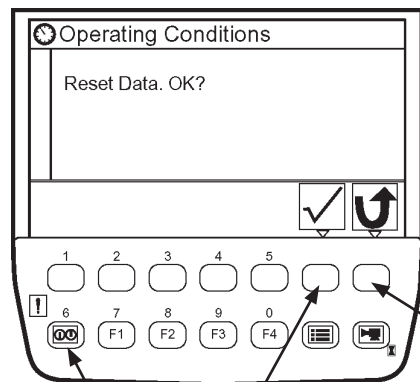
T1V5-05-01-019



Reset Key

Back Key

T1V5-05-01-025



Key 6

Determination Key

Back Key

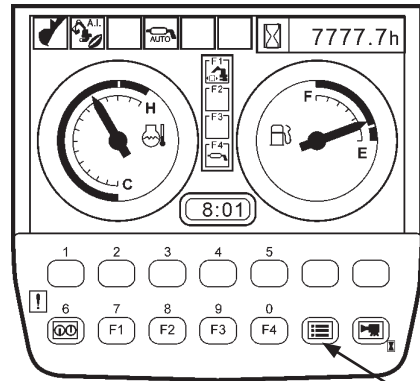
T1V5-05-01-026

OPERATOR'S STATION

FUEL RATE DISPLAY/NO DISPLAY

Fuel Rate Display

1. When the basic screen displays, push the menu key and display main menu.

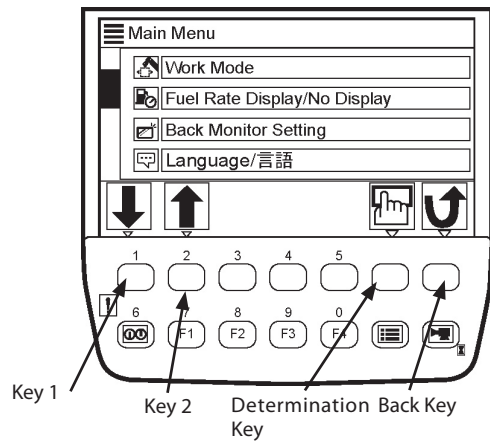


Basic Screen

Menu Key

M1J1-01-002

2. Select fuel rate display/No display from main menu by using keys 1 and 2. Push the determination key. Then, the fuel rate display/No display screen displays.




Key 1

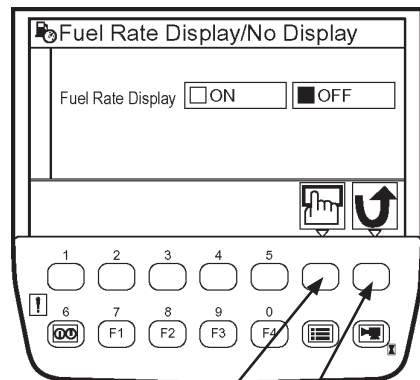
Key 2

Determination Back Key

M1J5-05-002

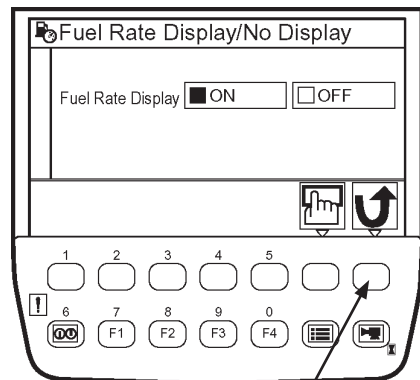
3. Push the determination key, and fuel rate display will be set to ON.

 **NOTE:** When pushing the back key, return to the previous screen.



Determination Key Back Key

T1V5-05-01-164

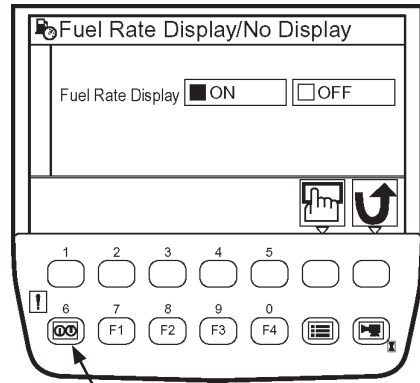


Back Key

T1V5-05-01-119

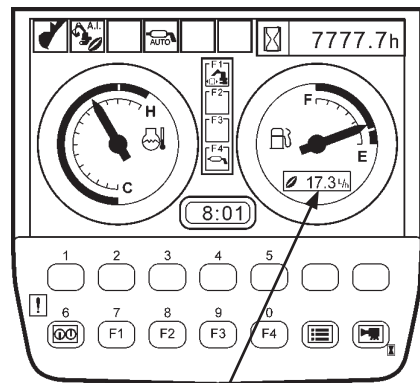
OPERATOR'S STATION

4. Push key 6, and the fuel rate display will be added to basic screen.



Key 6

T1V5-05-01-119



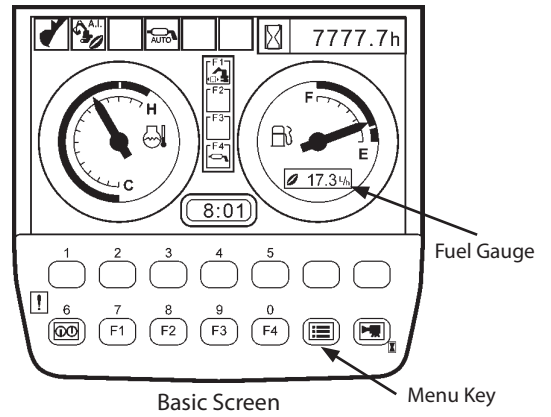
Fuel Rate

M1J1-01-015

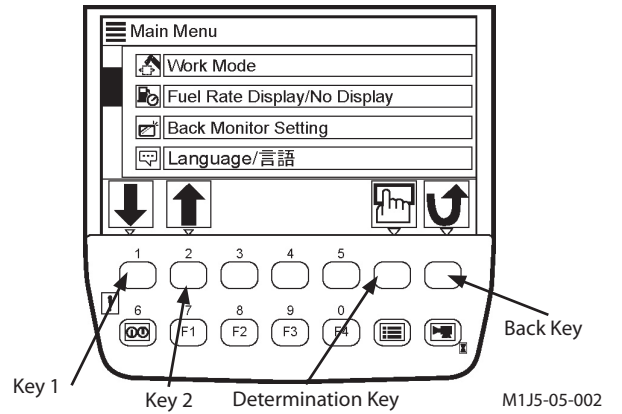
OPERATOR'S STATION

Fuel Rate No Display

1. When the basic screen displays, push the menu key and display main menu.

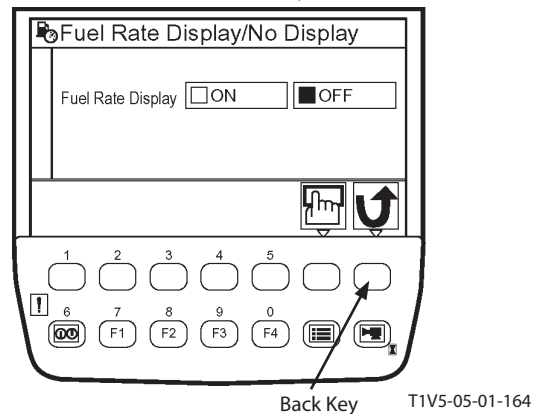
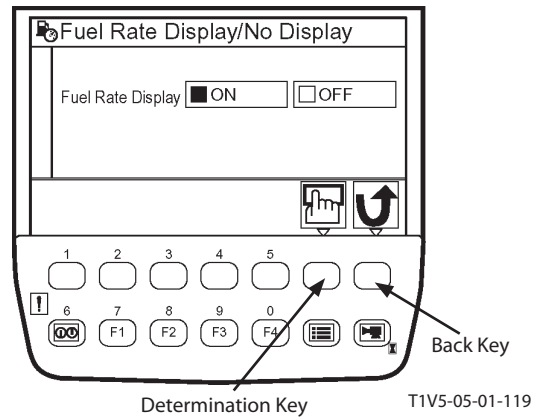


2. Select fuel rate display/No display from main menu by using keys 1 and 2. Push the determination key. Then, the fuel rate display/No display screen displays.



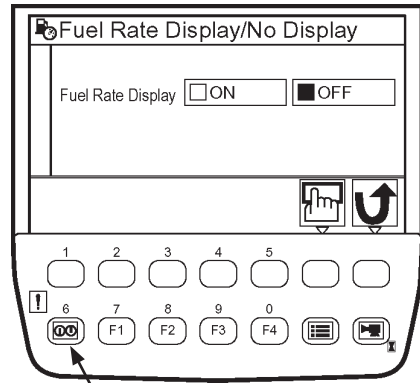
3. Push the determination key, and fuel rate display will be set to OFF.

NOTE: When pushing the back key, return to the previous screen.



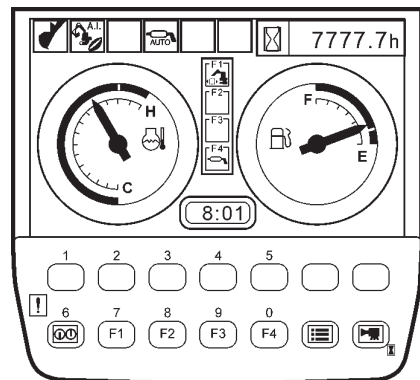
OPERATOR'S STATION

4. Push key 6, and return to the basic screen.



Key 6

T1V5-05-01-164



Basic Screen

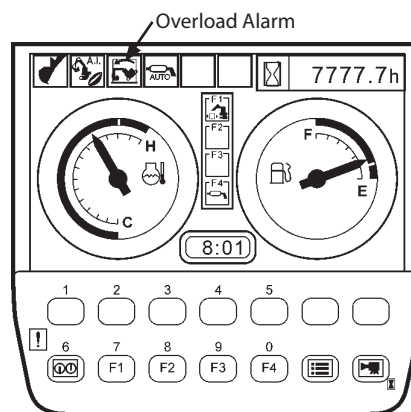
M1J1-01-002

OPERATOR'S STATION

- Overload Alarm
(Only machines equipped with optional parts)

IMPORTANT: When using overload alarm, consult your nearest Hitachi dealer.

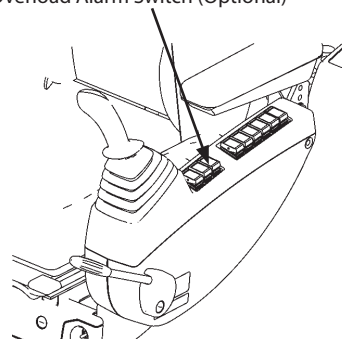
When the overload alarm switch is turned ON, the system measures load of the suspended load from bottom pressure of the boom cylinder. An alarm message is displayed and buzzer is rung, if overload is detected.



Basic Screen

M1J1-01-016

Overload Alarm Switch (Optional)

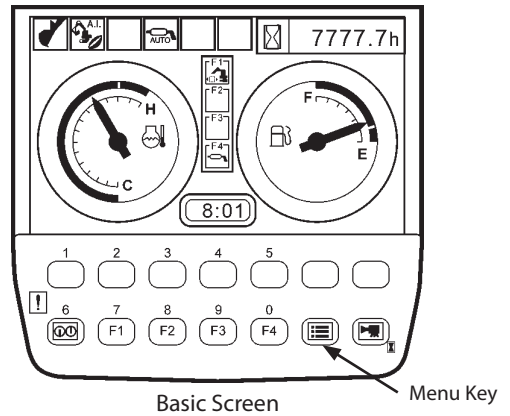


M1J1-03-001

OPERATOR'S STATION

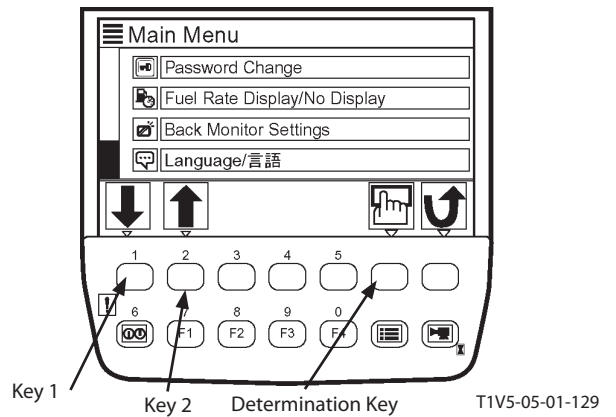
Password Change (Optional)

1. After the basic screen is displayed, push the menu key in order to display the main menu.

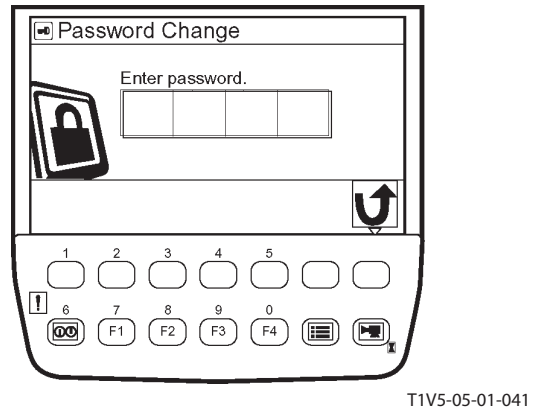


M1J1-01-002

2. Select password change from main menu by using keys 1 and 2. Push the determination key. Then, the password change screen displays.



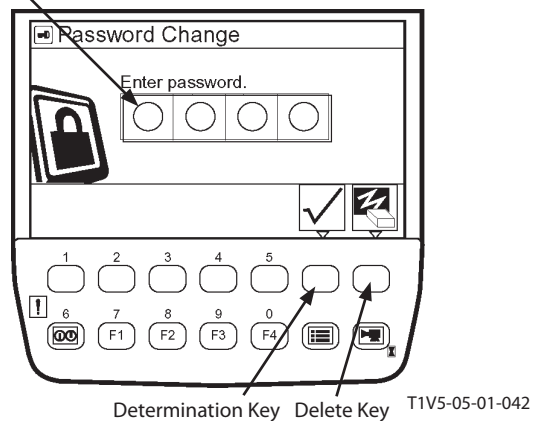
T1V5-05-01-129




3. Input the registered password and push the determination key.

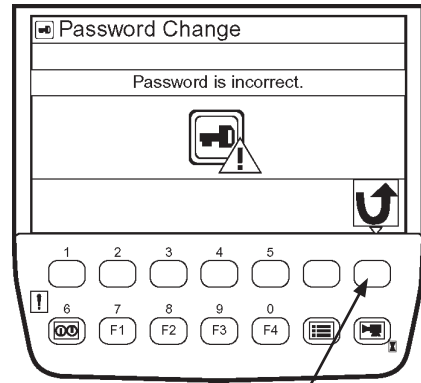
4. If inputting the password again, the entered characters can be erased. By pushing the delete key.

Registered Password



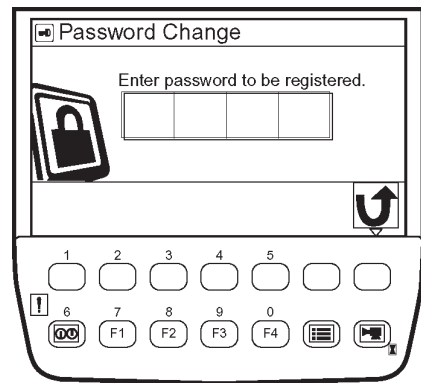
OPERATOR'S STATION

 **NOTE:** If inputting an incorrect password after pushing the determination key, the message "Password is incorrect." displays. Push the back key and go back to the previous screen, Input the password again.



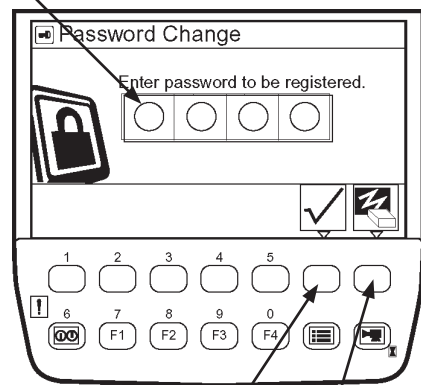
Back Key T1V5-05-01-044

5. The message "Enter password to be registered." displays. Then, input a new password with three or four digits and push the determination key.
6. If inputting the password again, push the delete key.



T1V5-05-01-130

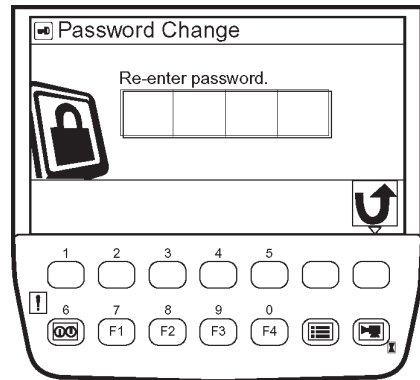
A New Password



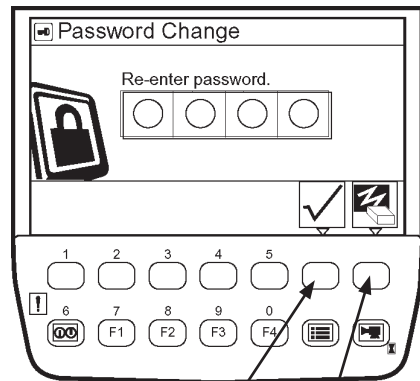
Determination Key Delete Key T1V5-05-01-131

OPERATOR'S STATION

7. The message "Re-enter password." displays. Then, input a new password again and push the determination key.
8. If inputting the password again, push the delete key in order to delete the entered characters.

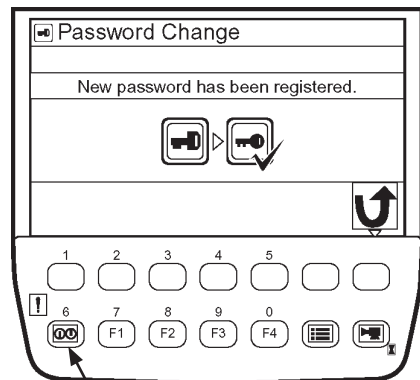


T1V5-05-01-132



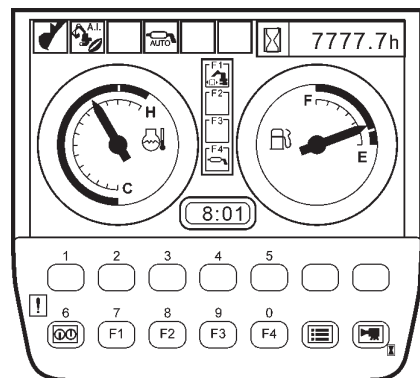
Determination Key Delete Key T1V5-05-01-133

9. The message "New password has been registered." displays. This completes the password change process.



Key 6 T1V5-05-01-043

10. Push key 6 and the basic screen displays.



Basic Screen

M1J1-01-002

OPERATOR'S STATION

BACK MONITOR SETTINGS

IMPORTANT: Image displayed on the back monitor is of auxiliary nature at best. When the machine is operated pay thorough attention to surrounding situation.

Auto-Control: ON

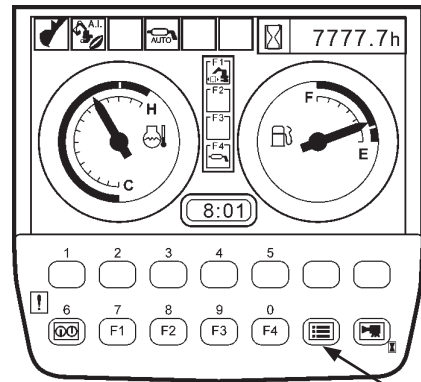
Image on the monitor unit when traveling is automatically switched to that of the back monitor.

1. When the basic screen displays, push the menu key and display main menu.
2. Select back monitor settings from main menu by using keys 1 and 2. Push the determination key. Then, the back monitor settings screen displays.

3. Select auto-control by using keys 1 and 2. Push the determination key. Then, auto-control is set to ON.

 **NOTE:** When pushing the back key, return to the basic screen.

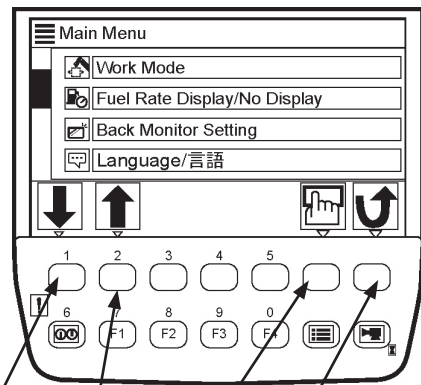
4. Push key 6, and return to the basic screen.
5. If travel operation is done, backward image is displayed on the screen of monitor unit.



Basic Screen

Menu Key

M1J1-01-002



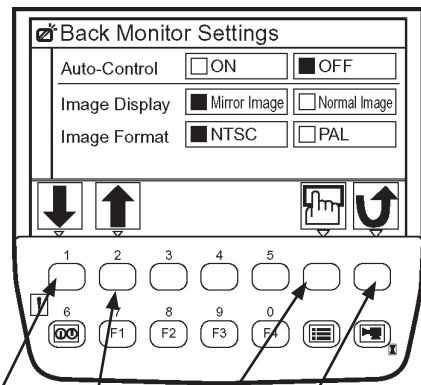
Key 1

Key 2

Determination Key

Back Key

M1J5-05-002



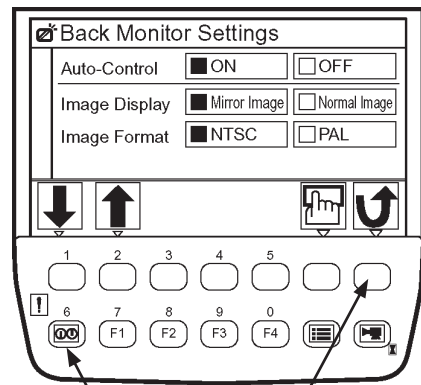
Key 1

Key 2

Determination Key

Back Key

T1V5-05-01-134



Key 6

Back Key

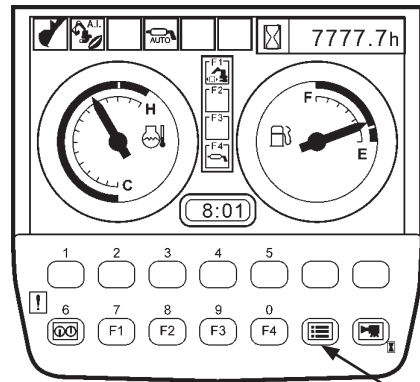
T1V5-05-01-120

OPERATOR'S STATION

Auto-Control: OFF

Set automatic switching function of images between monitor unit and back monitor when traveling to OFF.

1. When the basic screen displays, push the menu key and display main menu.

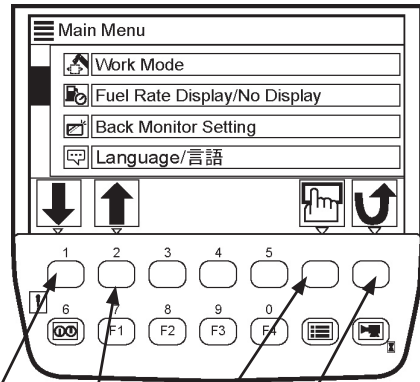


Basic Screen

Menu Key

M1J1-01-002

2. Select back monitor settings from main menu by using keys 1 and 2. Push the determination key. Then, the back monitor settings screen displays.



Key 1

Key 2

Determination Key

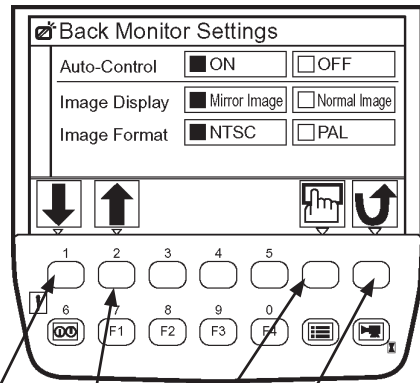
Back Key

M1J5-05-002

3. Select auto-control by using keys 1 and 2. Push the determination key. Then, auto-control is set to OFF.

NOTE: When pushing the back key, return to the previous screen.

4. Push key 6, and return to the basic screen.



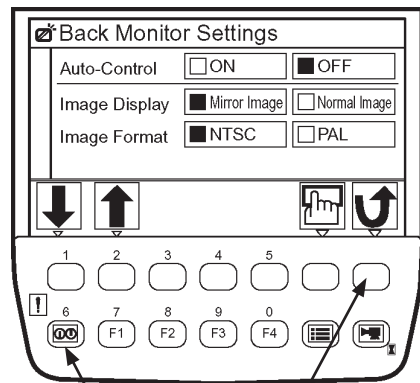
Key 1

Key 2

Determination Key

Back Key

T1V5-05-01-120



Key 6

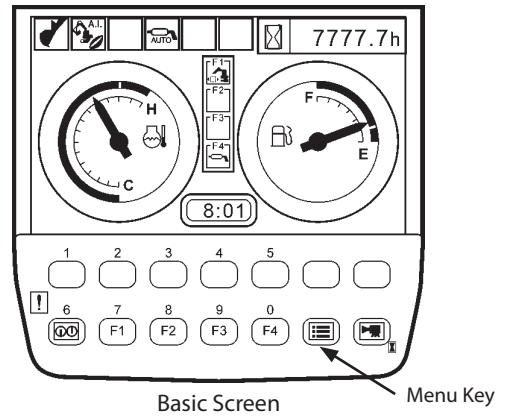
Back Key

T1V5-05-01-134

OPERATOR'S STATION

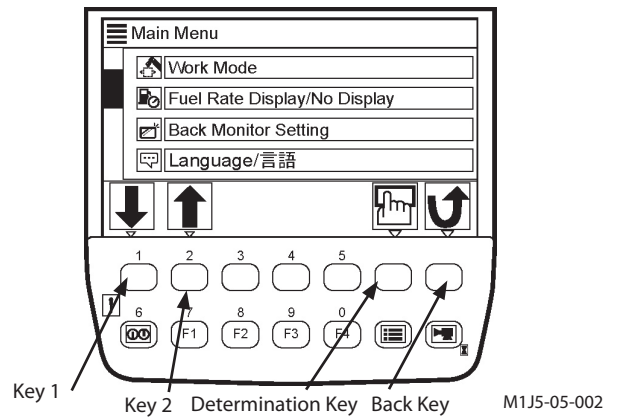
Switching Image Display

- From mirror Image to normal image
 - When the basic screen displays, push the menu key and display main menu.



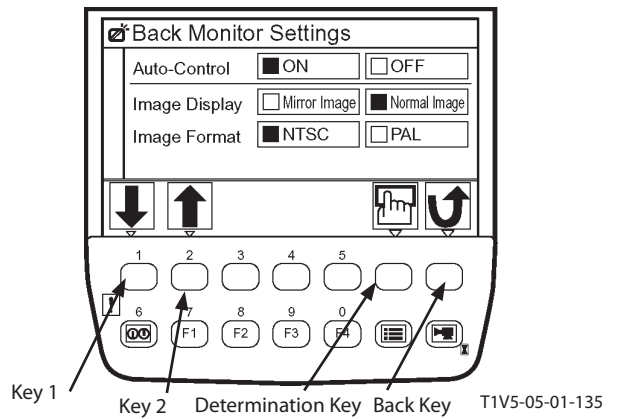
M1J1-01-002

- Select back monitor settings from main menu by using keys 1 and 2. Push the determination key. Then, the back monitor settings screen displays.



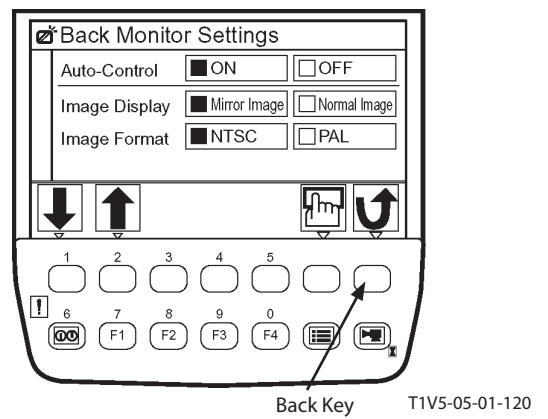
M1J5-05-002

- Select mirror image by using keys 1 and 2. Push the determination key. Then, the setting is switched to normal image.



T1V5-05-01-135

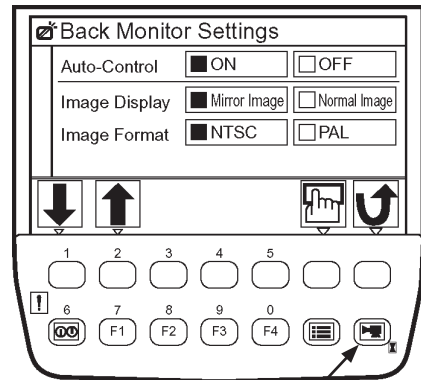
NOTE: When pushing the back key, return to the previous screen.



T1V5-05-01-120

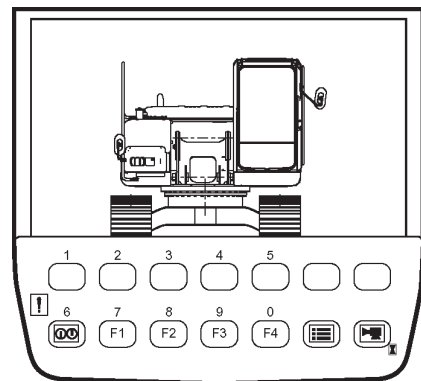
OPERATOR'S STATION

4. Push the back monitor switching key, and normal image is displayed on the screen.



Back Monitor Selector

T1V5-05-01-120



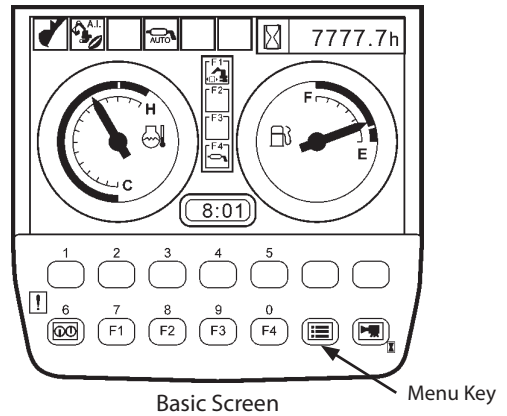
Normal Image

T1V1-05-01-126

OPERATOR'S STATION

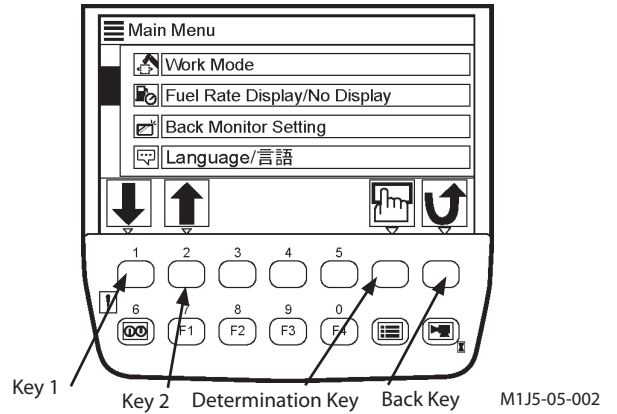
- From normal image to mirror image

1. When the basic screen displays, push the menu key and display main menu.



M1J1-01-002

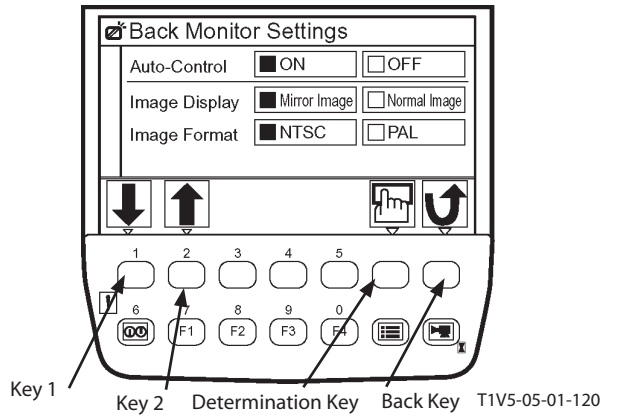
2. Select back monitor settings from main menu by using keys 1 and 2. Push the determination key. Then, the back monitor settings screen displays.



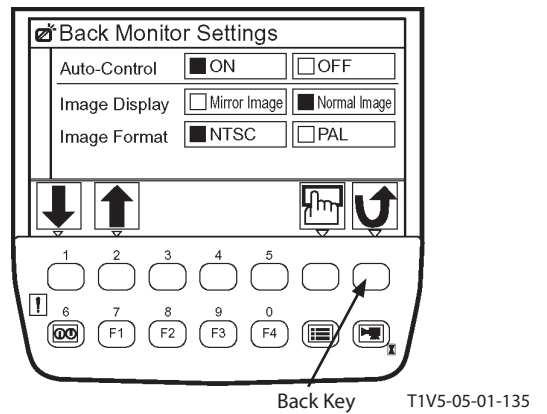
M1J5-05-002

3. Select normal image by using keys 1 and 2. Push the determination key. Then, the setting is switched to mirror image.

NOTE: When pushing the back key, return to the previous screen.



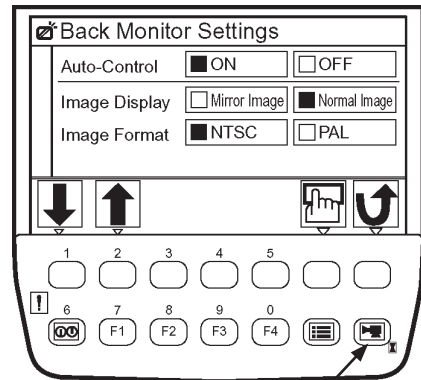
T1V5-05-01-120



T1V5-05-01-135

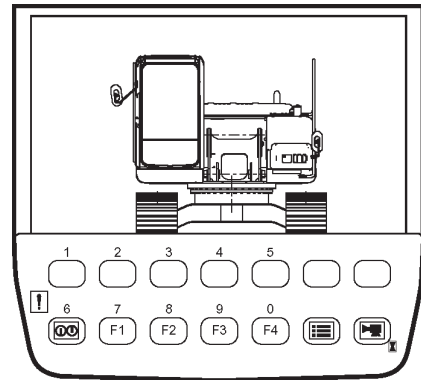
OPERATOR'S STATION

4. Push the back monitor switching key, and mirror image is displayed on the screen.



Back Monitor Selector

T1V5-05-01-135



Mirror Image


T1V1-05-01-127

OPERATOR'S STATION

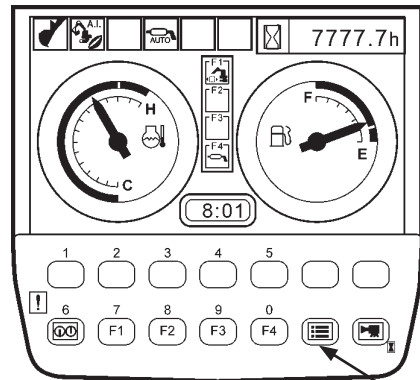
Switching Image Format

IMPORTANT: If changing the rear view camera to one with PAL image format, change the image format of the back monitor to PAL.

1. When the basic screen displays, push the menu key and display main menu.
2. Select back monitor settings from main menu by using keys 1 and 2. Push the determination key. Then, the back monitor settings screen displays.
3. Select "PAL" for image format by using keys 1 and 2. Push the determination key. Then, the setting of image format is switched to "PAL".

 **NOTE:** When pushing the back key, return to the previous screen.

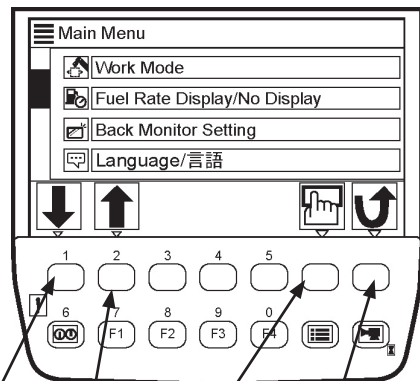
4. Push key 6, and return to the basic screen.



Basic Screen

Menu Key

M1J1-01-002



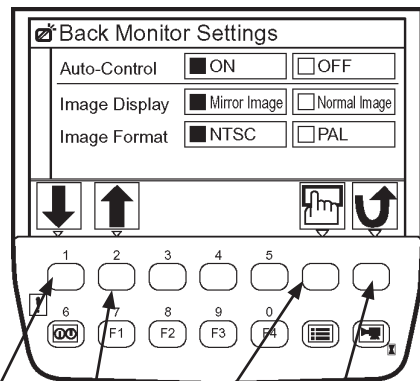
Key 1

Key 2

Determination Key

Back Key

M1J5-05-002



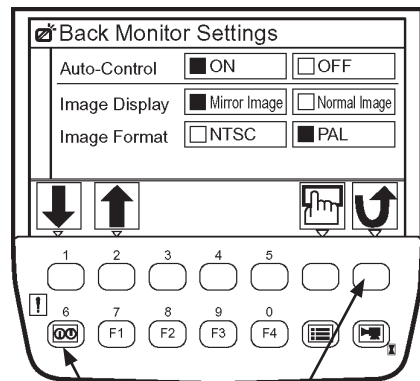
Key 1

Key 2

Determination Key

Back Key

T1V5-05-01-120



Key 6

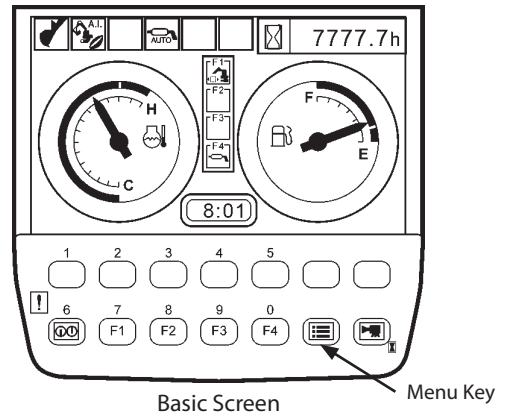
Back Key

T1V5-05-01-136

OPERATOR'S STATION

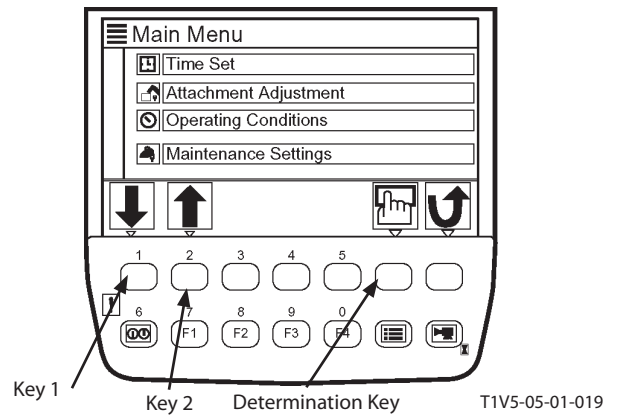
MAINTENANCE SETTINGS

1. When the basic screen displays, push the menu key and display main menu.

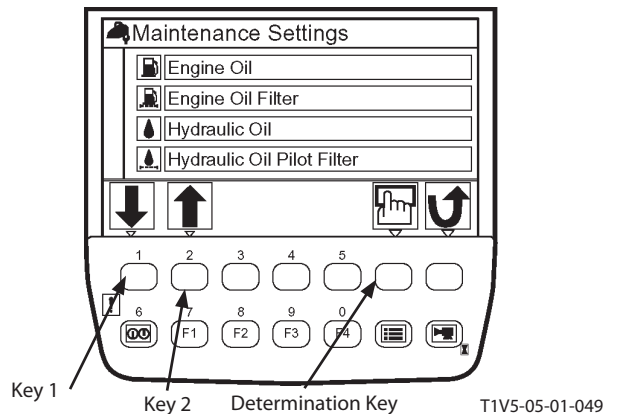


M1J1-01-002

2. Select maintenance settings from main menu by using keys 1 and 2. Push the determination key. Then, the maintenance settings screen displays.



3. Select an item to be set from among the list of maintenance settings screen by using keys 1 and 2. Push the determination key. Then, the Interval ON/OFF settings screen displays. (In the right example, Engine Oil is selected.)



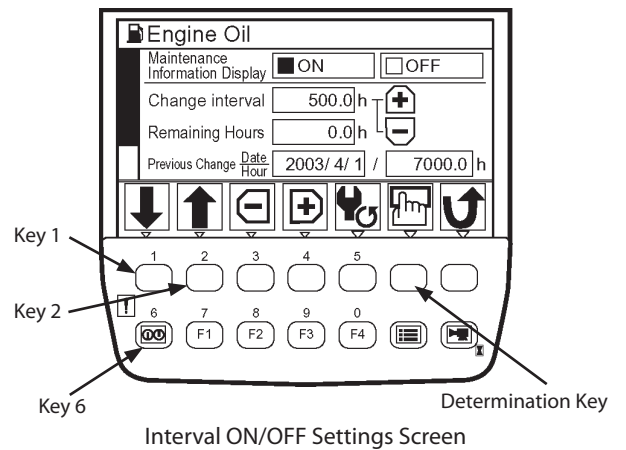
Maintenance Information Display ON/OFF

1. Select ON or OFF for maintenance information display by using keys 1 and 2. Push the determination key.

ON: When time comes to change, a information message is displayed on the screen.

OFF: No information message is displayed.

2. In order to complete setting, push key 6. Then, the basic screen displays.

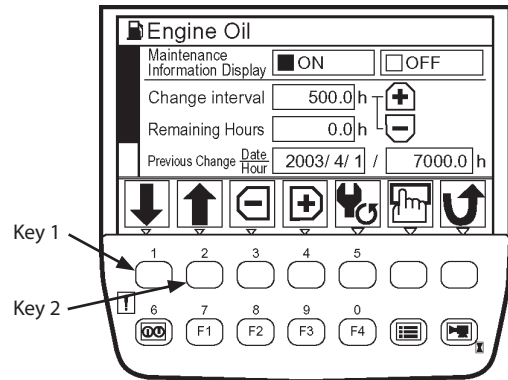


OPERATOR'S STATION

Change Interval Settings

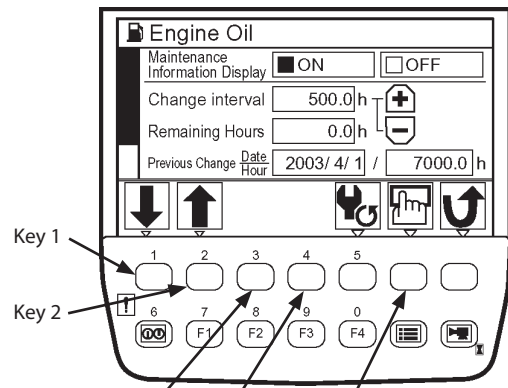
IMPORTANT: Change interval can only be set when maintenance information display is set to ON.

1. Select change interval by using keys 1 and 2.
2. Set time for change interval by using keys 3 and 4.
3. Select remaining hours by using keys 1 and 2, and push determination key.
4. The message "Adjust remaining hours to new change interval. OK?" displays. Then, push the determination key.
5. Push key 6, and the basic screen displays.



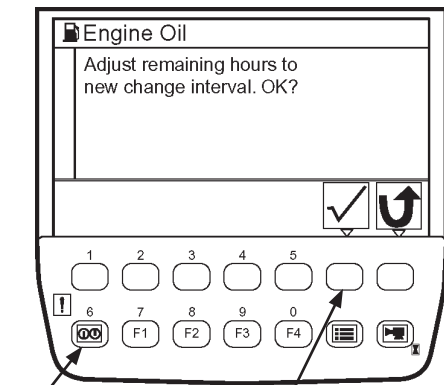
Interval ON/OFF Settings Screen

T1V5-05-01-052



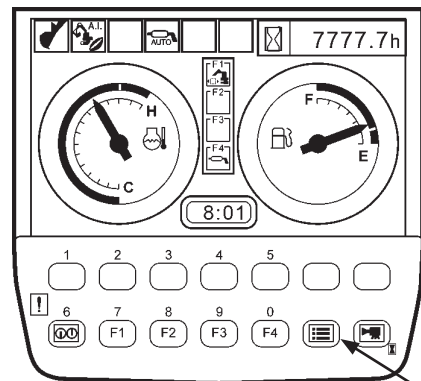
Key 3 Key 4 Determination Key

T1V5-05-01-138



Key 6 Determination Key

T1V5-05-01-139



Basic Screen

Menu Key

M1J1-01-002

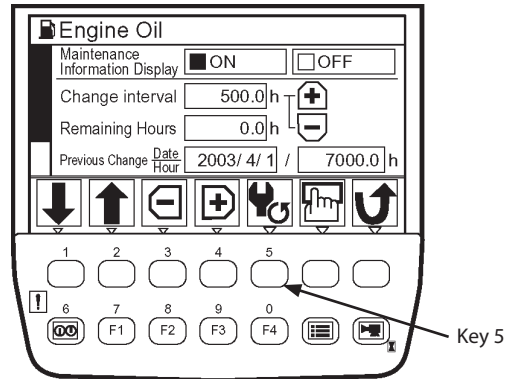
OPERATOR'S STATION

Resetting Data

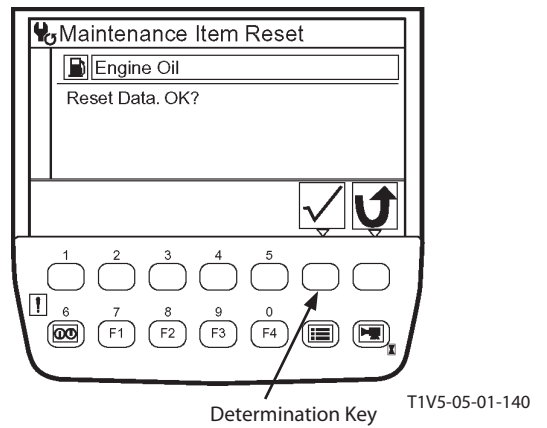
If data is reset, push key 5 on the Interval ON/OFF settings screen.

The message "Reset Data. OK?" displays. Then, push the determination key.

The value of remaining hours is reset to that of change interval. Previous change date/hour is updated with current date and time.



T1V5-05-01-052



T1V5-05-01-140

OPERATOR'S STATION

Screen Display when Maintenance Information Display is ON

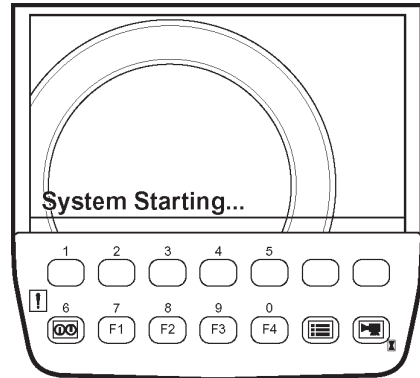
- When only one item displays
 1. If turning the key switch to the ON position, the starting screen displays. Then, the scheduled maintenance screen for the item whose change interval has expired displays for three to ten seconds. Finally the basic screen displays. (In the right example, Hydraulic Oil applies.)

NOTE: For a machine which the basic screen is displayed according to a password on, the scheduled maintenance screen for the item whose change interval has expired displays for three to ten seconds, after the password is input successfully and the determination key is pushed. And then the basic screen displays.

2. If data is reset, push the reset key while the scheduled maintenance screen is displayed. The message "Reset Data. OK?" displays. Then, push the determination key. The value of remaining hours is reset to that of change interval. Previous time change date/hour is updated with current date and time.

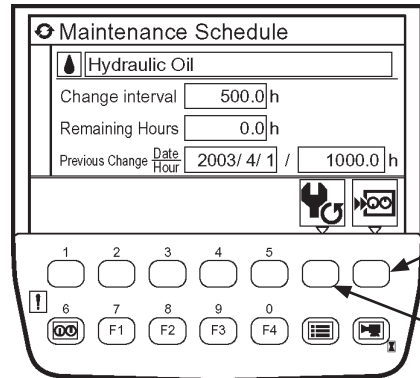
NOTE: When pushing the back key while the maintenance information display screen is displayed, return to the basic screen.

NOTE: When pushing the back key while reset screen is displayed, return to the maintenance information display screen.



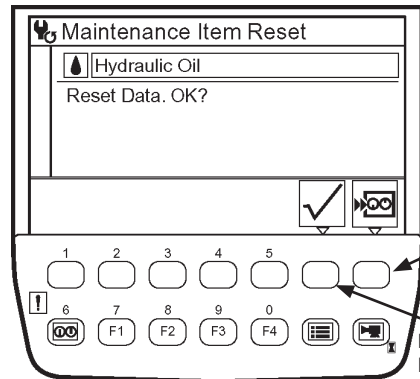
Starting Screen

T1V1-05-01-115



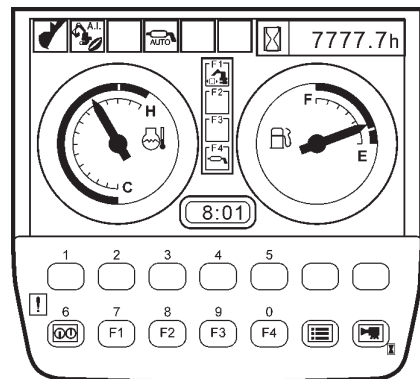
Maintenance Information Display Screen

T1V5-05-01-170



Reset Screen

T1V5-05-01-171



Basic Screen

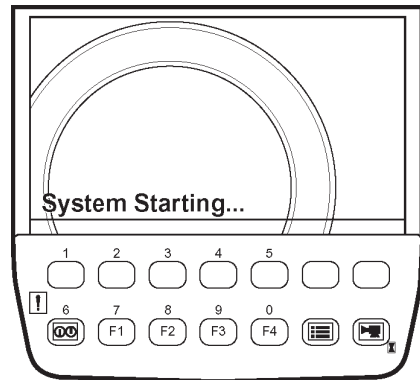
M1J1-01-002

OPERATOR'S STATION

- When more than two items apply

1. If turning the key switch to the ON position, the starting screen displays. Then, the scheduled maintenance screen for the items whose change interval has expired displays for three to ten seconds. Finally the basic screen displays.

NOTE: For a machine which the basic screen is displayed according to a password on, the scheduled maintenance screen for the items whose change interval has expired displays for three to ten seconds, after the password is input successfully and the determination key is pushed. And then the basic screen displays.

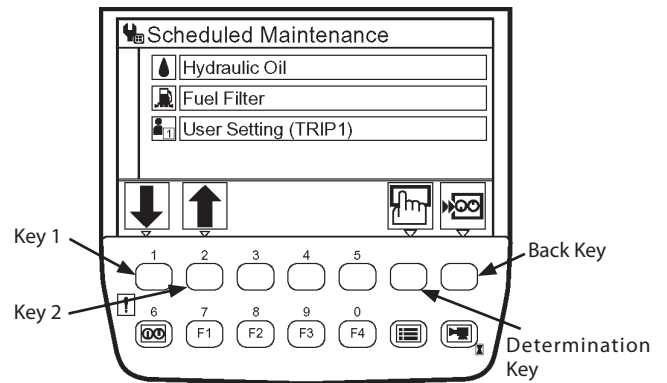


Starting Screen

T1V1-05-01-115

2. If data is reset, while the scheduled maintenance screen is displayed, select desired item by using keys 1 and 2. Push the determination key. Then, the maintenance information display screen for the selected item displays. (In the right example, Hydraulic Oil is selected.)

NOTE: When pushing the back key while the scheduled maintenance screen is displayed, the basic screen displays.



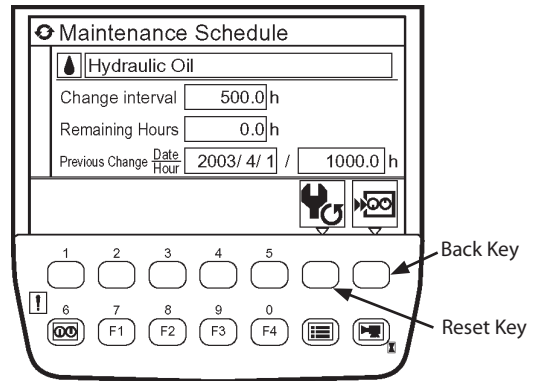
Scheduled Maintenance Screen

T1V5-05-01-169

3. Push the reset key while the maintenance information display screen is displayed. The message "Reset Data. OK?" displays. Then, push the determination key. The value of remaining hours is reset to that of change interval. Previous change date/hour is updated with current date and time.

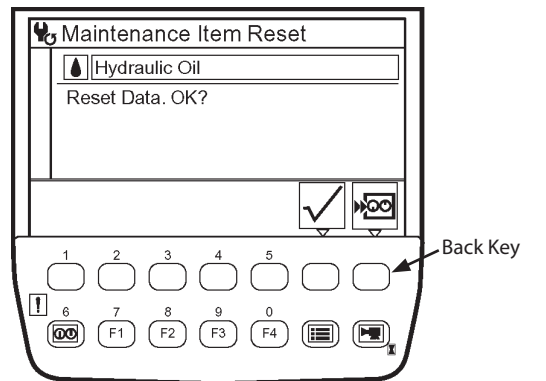
NOTE: When pushing the back key while the maintenance information display screen is displayed, return to the scheduled maintenance screen.

NOTE: When pushing the back key while the reset screen is displayed, return to the maintenance information display screen.



Maintenance Information Display Screen

T1V5-05-01-170



Reset Screen


T1V5-05-01-171

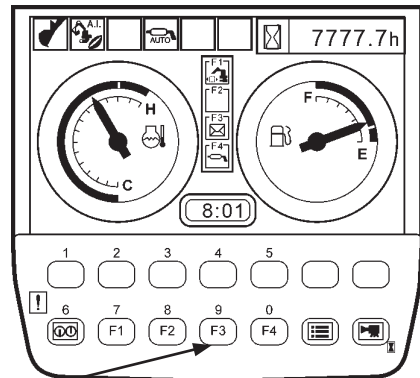
OPERATOR'S STATION

Mail (Optional)

IMPORTANT: This function is available only to a machine equipped with a satellite terminal. When using the mail function, consult your nearest Hitachi dealer.

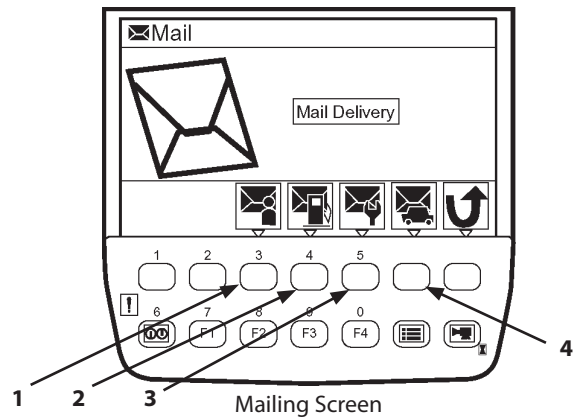
1. When the basic screen displays, push key F3 and display mail screen.
2. If pushing a relevant request key, mail information is sent to ICF.
 - 1 - General Request
 - 2 - Fuel Replenishment Request
 - 3 - Service Maintenance Request
 - 4 - Forwarding Request
3. While mail information is sent to ICF, the message "Mail is being delivered." is displayed on the screen.
4. When ICF completes receives mail information, the message "Mail delivery successful." is displayed on the screen. When pushing the back key, return to the mail screen.
5. Then, a mail is sent from the satellite terminal to the central server via the satellite.

 **NOTE:** Depending on machine's operating environment or position of the satellite on its orbit, the mail may not be sent.



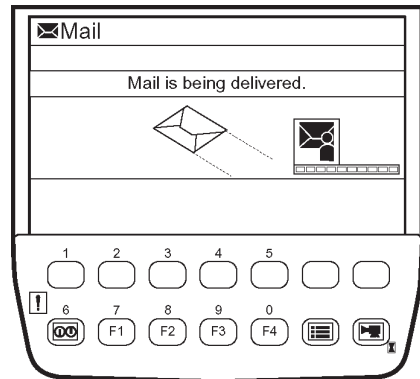
Key F3 Basic Screen

M1J1-01-017

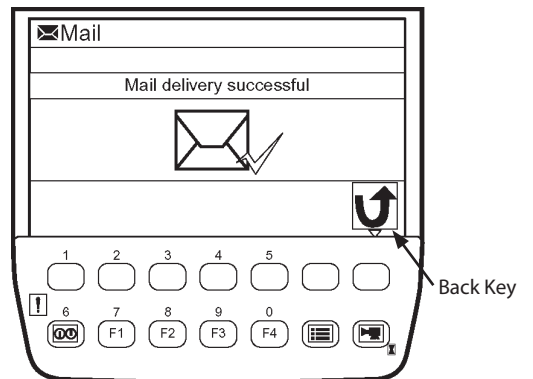


1 2 3 4 Mailing Screen

T1V5-05-01-037




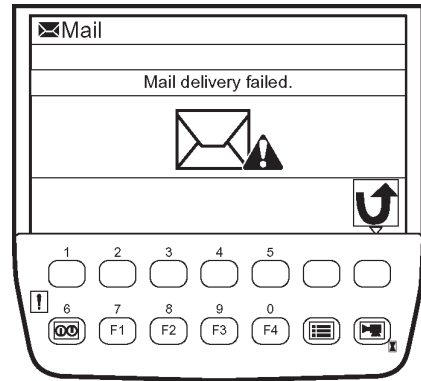
T1V5-05-01-038



T1V5-05-01-039

OPERATOR'S STATION

 **NOTE:** When satellite terminal could not receive the mail, the message "Mail delivery failed." is displayed on the screen.





T1V5-05-01-040

OPERATOR'S STATION

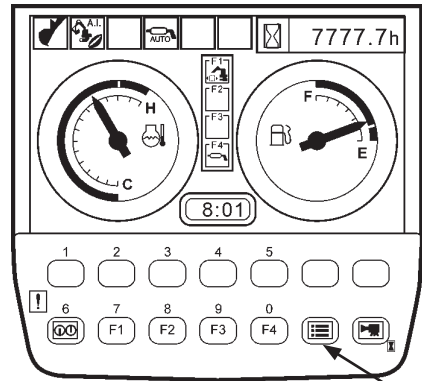
LANGUAGE SETTINGS

1. When the basic screen displayed, push the menu key and display main menu.
2. Select language from main menu by using keys 1 and 2. Push the determination key. Then, the language settings screen displays.
3. Select a desired language by using keys 1 and 2. Push the determination key.

 **REMARKS:** Languages to be displayed on the screen of monitor unit have been selected from twelve languages, namely display languages 1 or 2, at the time of shipping from the factory. (Refer to the next section)

 **NOTE:** When pushing the back key, return to the previous screen.

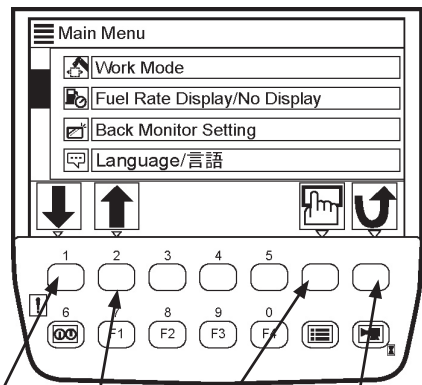
4. Push key 6, and the basic screen displays.



Basic Screen

Menu Key

M1J1-01-002



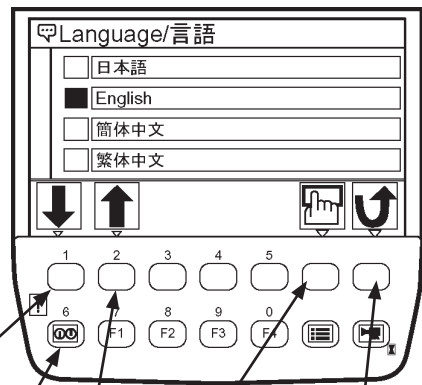
Key 1

Key 2

Determination Key

Back Key

M1J5-05-002



Key 1

Key 6

Key 2

Determination Key

Back Key

T1V5-05-01-137

OPERATOR'S STATION

Lists of Display Language

Display Languages 1

Language	Screen Display	
Japanese	日本語	TIV1-05-01-141
English	English	TIV1-05-01-142
Chinese (Simplified)	簡体中文	TIV1-05-01-143
Chinese (Traditional)	繁体中文	TIV1-05-01-144
Korean	한국어	TIV1-05-01-145
Indonesian	Bahasa Indonesia	TIV1-05-01-146
Thai	ภาษาไทย	TIV1-05-01-147
Vietnamese	Tiếng Việt	TIV1-05-01-148
Myanmarese	မြန်မာဘာသာ	TIV1-05-01-149
Arabic	اللغة العربية	TIV1-05-01-150
Persian	اللغة الفارسية	TIV1-05-01-151
Turkish	Türkçe	TIV1-05-01-152

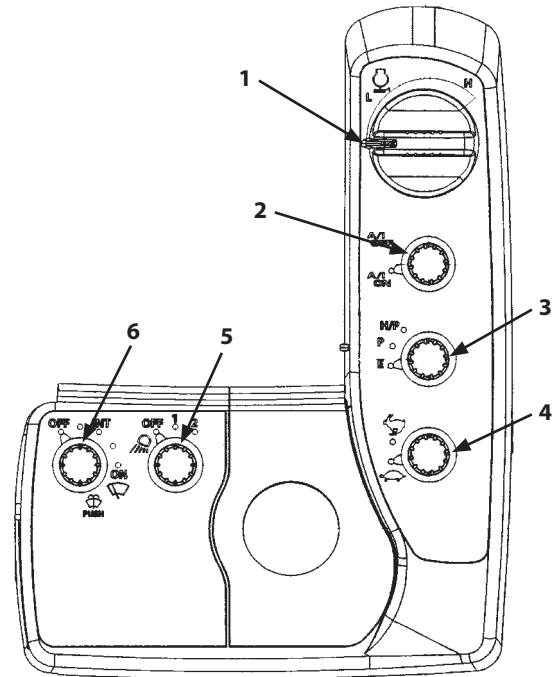
Display Languages 2

Language	Screen Display	
English	English	TIV1-05-01-142
Spanish	Español	TIV1-05-01-153
Italian	Italiano	TIV1-05-01-154
French	Français	TIV1-05-01-155
German	Deutsch	TIV1-05-01-156
Dutch	Nederlands	TIV1-05-01-157
Russian	Русский	TIV1-05-01-158
Portuguese	Português	TIV1-05-01-159
Finnish	Suomi	TIV1-05-01-160
Swedish	Svensk	TIV1-05-01-161
Norwegian	Norsk	TIV1-05-01-162
Danish	Dansk	TIV1-05-01-163

OPERATOR'S STATION

SWITCH PANEL

- 1-Engine Control Dial
- 2-Auto-Idle Switch
- 3-Power Mode Switch
- 4-Travel Mode Switch
- 5-Work Light Switch
- 6-Wiper/Washer Switch



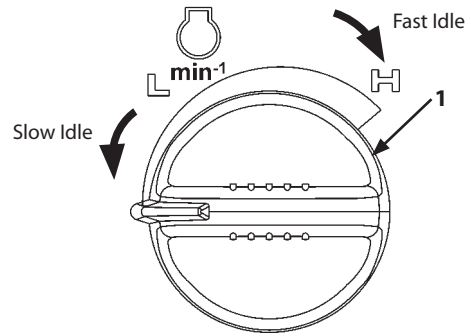
M1U1-01-015

OPERATOR'S STATION

ENGINE CONTROL DIAL

Use engine control dial (1) to adjust engine speed.
Turn it clockwise to increase engine speed or counterclockwise to decrease engine speed.

- The fully clockwise position : Fast idle
- The fully counterclockwise position : Slow idle



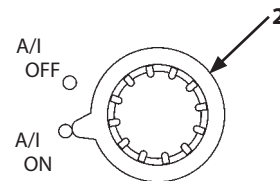
M1U1-01-033

AUTO-IDLE SWITCH

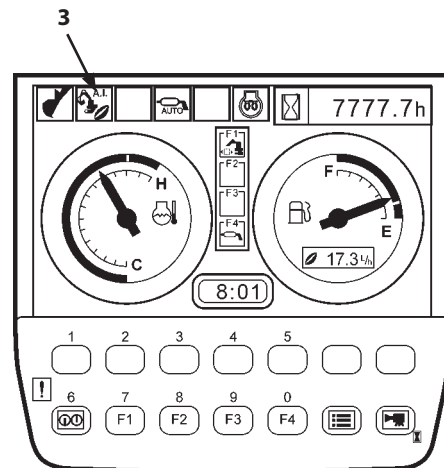
The auto-idle switch (2) sets the engine speed control mode to either Auto-Idle.

- Auto-Idle Mode

When the auto-idle is turned to the A/I ON position, the engine speed is reduced to slow idle speed 4 seconds after releasing all control levers (neutral), reducing the fuel consumption. When the auto-idle mode is selected, auto-idle indicator (3) on the monitor panel lights.



M1U1-01-017



M1J1-05-001

OPERATOR'S STATION

POWER MODE SWITCH

Three engine speed modes, E, P, and H/P modes, are selected by operating the power mode switch.

- E (Economy) Mode

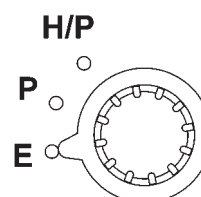
Although production is slightly reduced more than in the P mode, the fuel consumption and noise levels are reduced, allowing the machine to operate efficiently.

- P Mode

Use the P mode when general digging work is needed.

- H/P (High Power) Mode


Use the H/P mode when extra horsepower is needed, i.e. when rolling in the arm in excavation work, etc.



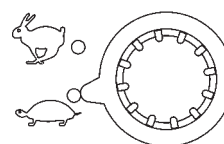
M178-01-013

TRAVEL MODE SWITCH

Two travel modes, FAST and SLOW, are selected by turning the travel mode switch to either position.

 Mark (Fast Speed Mode)

 Mark (Slow Speed Mode)



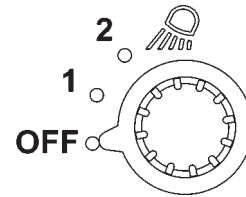
M178-01-096

OPERATOR'S STATION

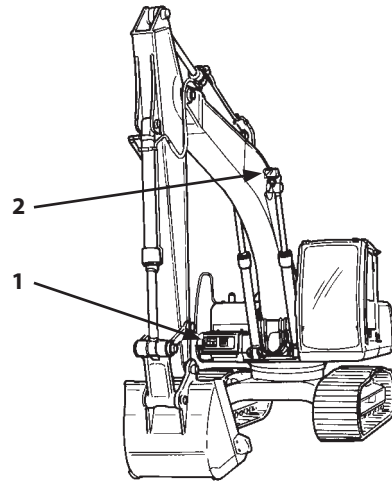
WORK LIGHT SWITCH

Work light switch has the following positions:

- 1 Position
Work light (1) on the base machine will light. Also, the instrument panel illumination will light.
- 2 Position
Work light (2) will light in addition.
- OFF Position
Work lights (1) and (2) and the instrument panel illumination will turn off.



M178-01-015



M157-01-146

OPERATOR'S STATION

WIPER/WASHER SWITCH

The wiper and the window washer are operated using the wiper/washer switch.

- Wiper

Turn the wiper/washer switch to the specified position to operate the wiper.

OFF Position: The wiper stops and is retracted.


INT Position: The wiper operates intermittently at the interval selected by the switch position as described below.

INT (Slow): The wiper operates at 8-second interval.

INT (Mid): The wiper operates at 6-second interval.

INT (Fast): The wiper operates at 3-second interval.

ON Position: The wiper operates continuously.

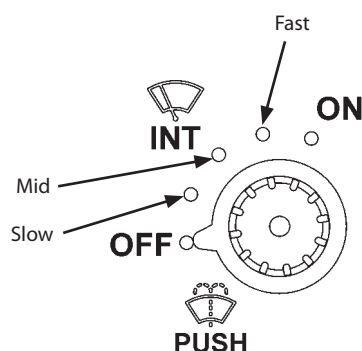
 **NOTE:** (1) When the front window (upper) is opened, the wiper and washer will not operate. Even if the front window (upper) is closed, the wiper and washer will not operate until the lock pin on the right side is placed in the lock position. If the front window is opened while during operating the wiper, the wiper will be retracted and the washer function is deactivated.

(2) In case either the wiper or washer is operated with the front window (upper) opened, or if front window (upper) is opened while operating either the wiper or washer, the front window opening alarm buzzer will sound intermittently at one-second intervals. Close the front window (upper).

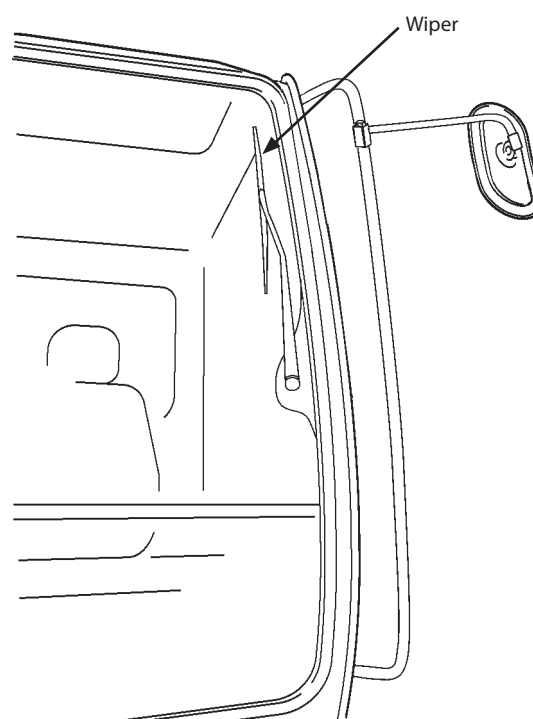
- Washer

Press and hold the wiper/washer switch to squirt washer fluid onto the front window. When the wiper/washer switch is pressed for more than 2 seconds, the wiper operates until the switch is released. When the wiper/washer switch is released, the wiper automatically retracts. While operating the wiper in the INT mode, when the wiper/washer switch is pressed, the wiper operation mode is changed to the continuous operation mode.

IMPORTANT: Washer motor may be damaged if wiper/washer switch is held for more than 20 seconds, or continually operated with no fluid in the washer tank.



M178-01-016



M1U1-01-018

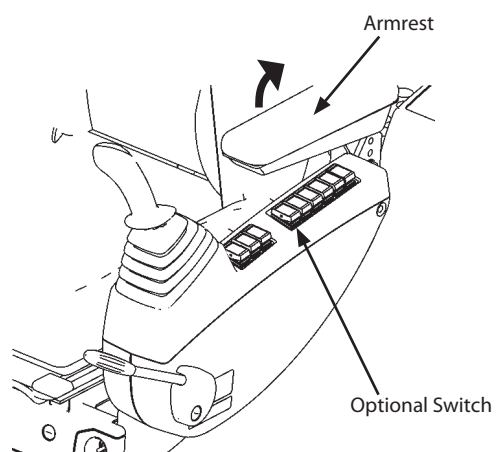
OPERATOR'S STATION

SWITCH PANEL (Optional included)

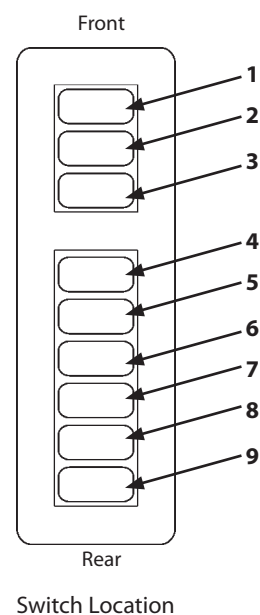
NOTE: • There are switches for the standard and option. Before using the switches on the switch panel, make sure what kind of optional devices are equipped.
• Raise the armrest when you operate the switch.

- Travel Alarm Deactivation Switch (Optional) (1)
- Seat Heat Switch (Optional) (2)
- Overload Alarm switch (Optional) (3)
- Boom Mode Switch (4)
- Engine Oil Level / Coolant Level Switch (5)
- Auto-Lubrication Switch (Optional) (6)
- Rear Light Switch (Optional) (7)
- Rotating Light Switch (Optional) (8)
- Fan Rotation Direction Switch (Optional) (9)

- Electric Type control lever Switch (Optional)
- Swing Alarm Deactivation Switch (Optional)



M1J1-03-001

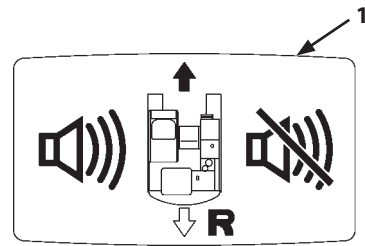


M1J1-01-027

OPERATOR'S STATION

Travel Alarm Deactivation Switch (Optional)

The travel alarm buzzer sounds during travel operation. When push the travel alarm deactivation switch (1), the travel alarm buzzer function is deactivated.



M1U1-01-035

Seat Heater Switch (Optional)

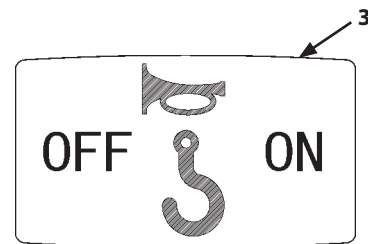
When seat heater switch (2) is turned ON, the seat surface is heated so that the seat section becomes warm. When the temperature of the seat section is raised to the specified temperature, heating is automatically stopped.



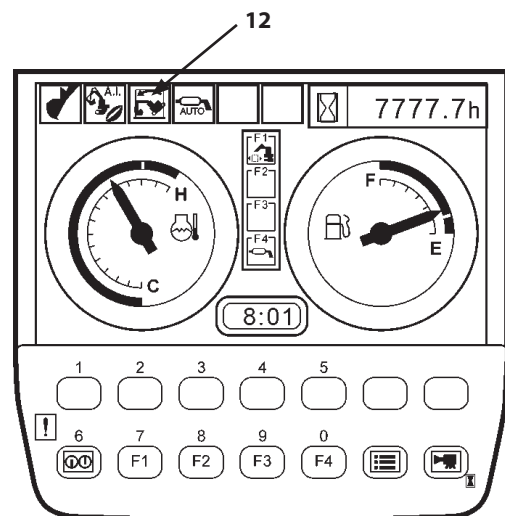
M1U1-01-011

Overload Alarm Switch (Optional)

During lifting load work with overload alarm switch (3) ON, if overloading is detected, the buzzer sounds and overload alarm indicator (12) on the multi-monitor comes ON. Turn the overload alarm switch OFF to deactivate the overload alarm system function.



M1U1-01-010



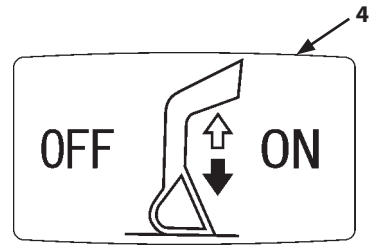
M1J1-01-016

OPERATOR'S STATION

Boom Mode Switch

When boom mode switch (4) is turned ON, the machine cannot be raised off the ground with the front attachment, reducing machine vibration to be developed during excavation.

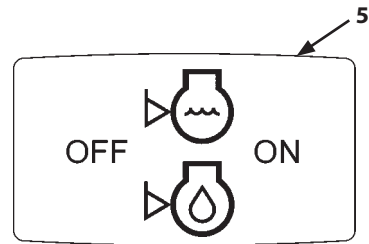
When turned OFF, the machine can be raised off the ground with the front attachment, allowing the machine to evacuate if the machine becomes stranded in a muddy area.



M1J1-01-020

Engine Oil Level / Coolant Level Switch

While engine oil level / coolant level switch (5) is turned ON, the engine oil level / coolant level indicator is displayed. When releasing the engine oil level / coolant level switch, the indicator comes OFF.

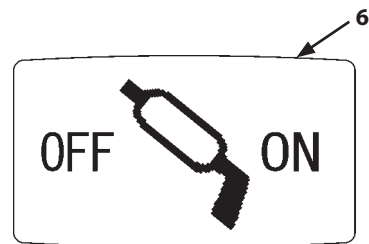


M1J1-03-002

Auto-Lubrication Switch (Optional)

When auto-lubrication switch (6) is turned ON, the auto-lubrication device is activated so that all greasing points except for the bucket joint pins, swing bearing and swing gear are automatically lubricated at regular intervals.

When the switch is turned OFF, the device is deactivated.



M1J1-01-018

Rear Light Switch (Optional)

When rear light switch (7) is turned ON. The rear light at the rear of the cab roof comes ON.

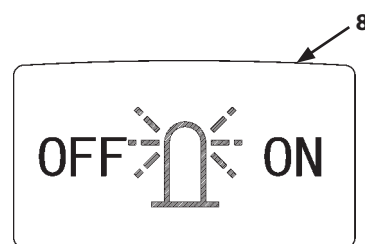


M1U1-01-009

OPERATOR'S STATION

Rotating Light Switch (Optional)

When the rotating light switch (8) is turned ON, the rotating light provided at the rear on the cab roof comes ON.



M1U1-01-012

Fan Rotating Direction Switch (Optional)

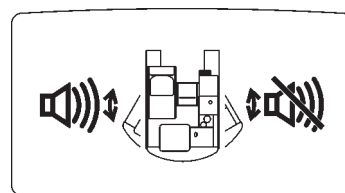
When fan rotating direction switch (9) is turned ON, the fan rotates in reverse, and the radiator, the oil cooler, and the inter cooler core can be cleaned.



M1J1-01-019

Swing Alarm Deactivation Switch (Optional)

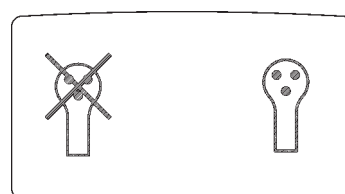
The swing alarm system sounds the buzzer and turns the beacon light ON during swing operation. When push the swing alarm deactivation switch is set to the OFF position, the swing alarm buzzer function is deactivated.



M1U1-01-036

Electrical Control Main Switch (Optional)

When the (⚡) mark side of electrical control main switch is pressed, the electrical control (grip switch) system becomes operable. When there is no need to use the electrical control (grip switch) system, press the (⊗) mark side of the main switch to avoid mis-operation.



M1U1-01-013

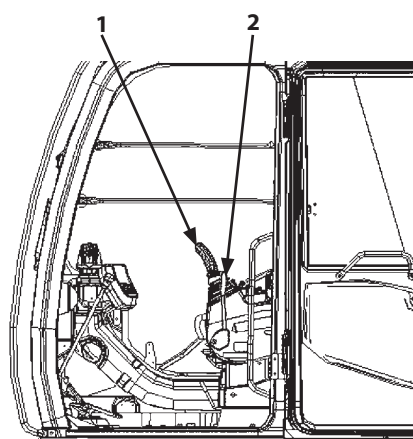
OPERATOR'S STATION

FAN ROTATING DIRECTION DEVICE(Optional)

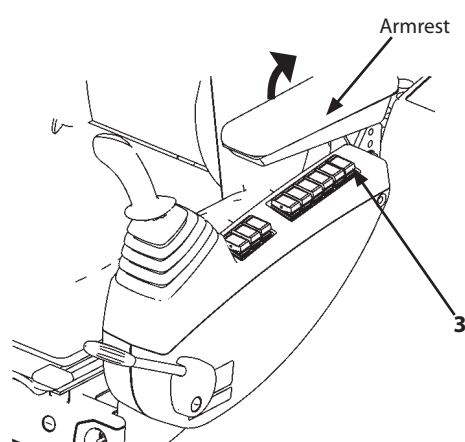
When fan rotating direction switch (3) is turned ON, the fan rotates in reverse, and the radiator, the oil cooler, and the inter cooler core can be cleaned.

1. Turn all control levers (1) to neutral with engine running. Then, pull the pilot control shut-off lever (2) up to the LOCK position.
2. Turn off the air conditioner switch.
3. Raise the armrest, press fan rotating direction switch (3) to down the engine speed. Then, after approx. 20 seconds, the fan rotates in reverse for approx. 60 seconds.
4. Then, after approx. 20 seconds, the fan rotating direction returns to normal.

IMPORTANT : In case the pilot control shut-off lever (2) is not in the LOCK position, the fan rotating direction switch device deactivates. Air conditioner may be damaged, if the fan rotating direction switch (3) is pressed with using air conditioner.



M1U1-01-025



M1J1-03-001

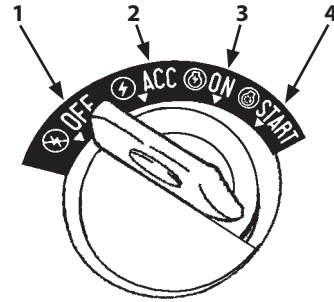


M1J1-01-019

OPERATOR'S STATION

KEY SWITCH

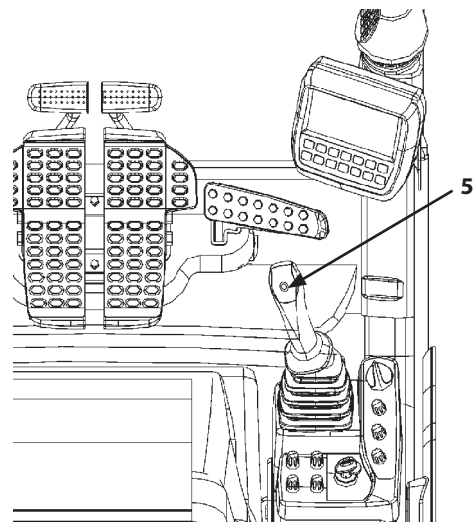
- 1- OFF (Engine Off)
- 2- ACC (Horn, Radio etc.)
- 3- ON (Engine On)
- 4- START (Engine Start)



M178-01-049

POWER BOOST SWITCH

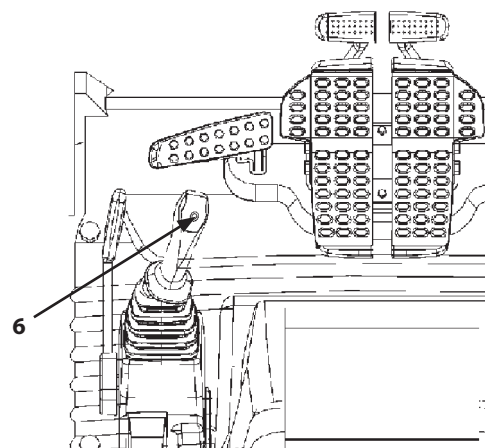
Power boost switch (5) is used to gain maximum digging power, and is located on the top of the right control lever.



M1J1-01-024

HORN SWITCH

Horn switch (6) is provided on the top of the left control lever. The horn continuously sounds as long as the switch is pressed.



M1J1-01-025

OPERATOR'S STATION

CIGAR LIGHTER

Operation

IMPORTANT: In case cigar lighter (2) does not pop out automatically 30 seconds after pushing cigar lighter (2) in, pull out cigar lighter (2) manually. Then, consult the your nearest Hitachi dealer.

1. Turn key switch (1) to the ACC or ON position.
2. Press and release lighter (2) knob.
3. Cigar lighter (2) knob will return to the original position when cigar lighter (2) becomes usable. Pull the cigar lighter out to use.
4. After using cigar lighter (2), insert cigar lighter (2) into the panel until the knob is seated in the original position.

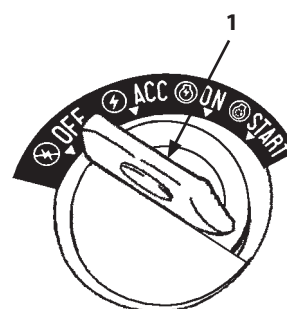
Using Cigar Lighter (2) Port as External Power Source

Use cigar lighter (2) port to supply power to lighting equipment for servicing the machine.

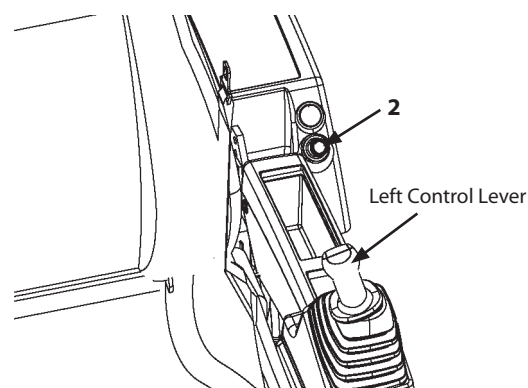
IMPORTANT: Only 24 V electric power is available from the cigar lighter port on this machine. Never connect accessories that use power other than 24 V. Damage to the batteries and accessories may result.

Don't supply power to accessories for a long time without running the engine. Failure to do so may discharge the batteries.

1. Pull cigar lighter (2) knob out.
2. Correctly insert the accessory socket into cigar lighter (2) port.
3. Turn key switch (1) to the ACC or ON position. Power is supplied to the connected accessory.
4. After using the accessory, disconnect the accessory socket and insert cigar lighter (2) into the port.



M178-01-049

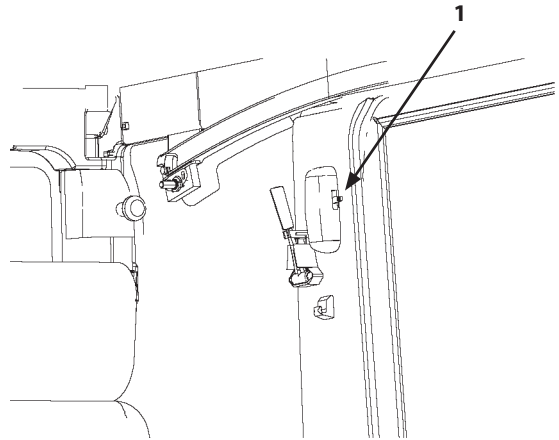


M1U1-01-021

OPERATOR'S STATION

CAB LIGHT

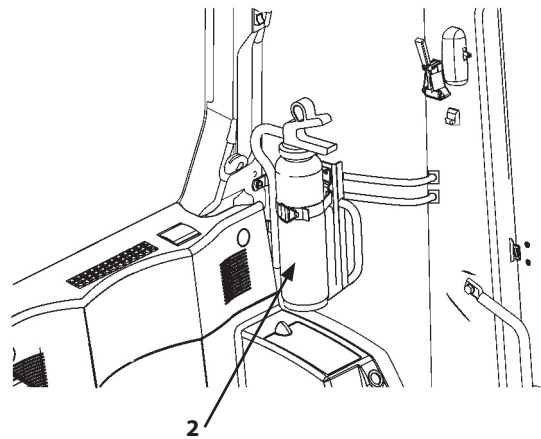
Turn the cab light ON or OFF by using switch (1).



M1U1-01-022

INSTALLING FIRE EXTINGUISHER (Optional)

A fire extinguisher (2) can be installed at the right rear corner inside the cab. Consult your nearest HITACHI dealer to install a fire extinguisher.



M1J1-01-029

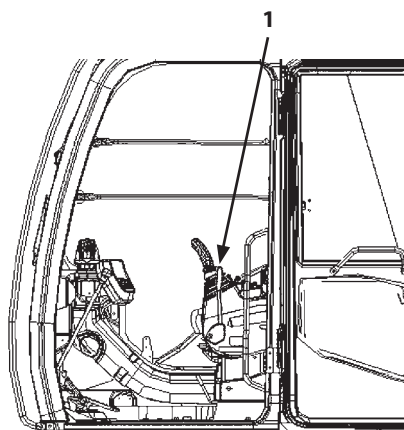
OPERATOR'S STATION

PILOT CONTROL SHUT-OFF LEVER

Pilot control shut-off lever (1) functions to prevent the machine from being mistakenly operated when the operator is getting on or off the machine.

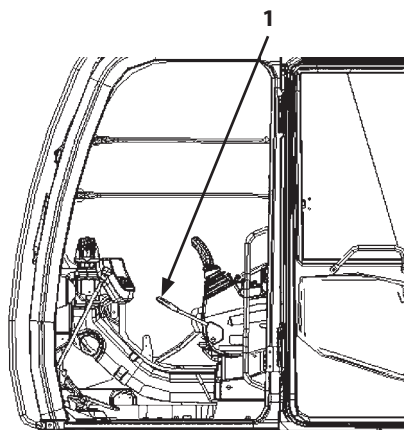
WARNING:

- Pilot control will not be shut-off unless pilot control shut-off lever (1) is completely pulled-up to the LOCK position.
- Before leaving the operator's seat, always stop the engine and pull the pilot control shut-off lever up to the LOCK position.
- Also, pull the pilot control shut-off lever up to the LOCK position when transporting the machine or when the day's work is complete.
- Confirm that the pilot control shut-off lever is in the LOCK position before starting the engine.



LOCK Position

M1U1-01-025

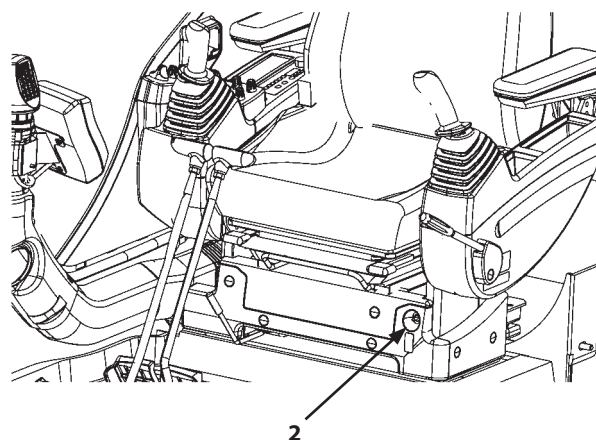


UNLOCK Position

M1U1-01-024

ENGINE STOP SWITCH

If the engine does not stop even if the key switch is turned OFF due to failure of the machine, move switch (2) located at the front-left side of the seat stand downward to stop the engine. After operating switch (2), be sure to return the switch back to the upward position.

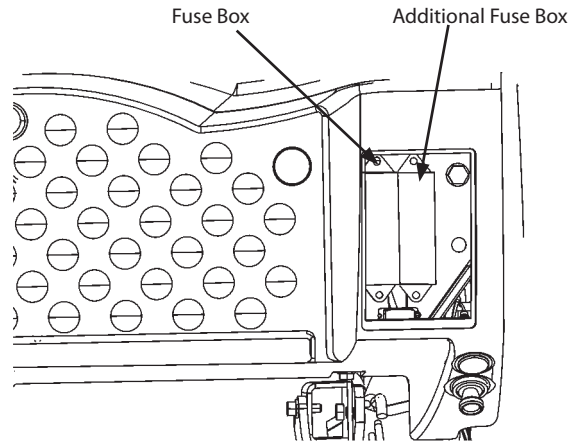


M1U1-01-029

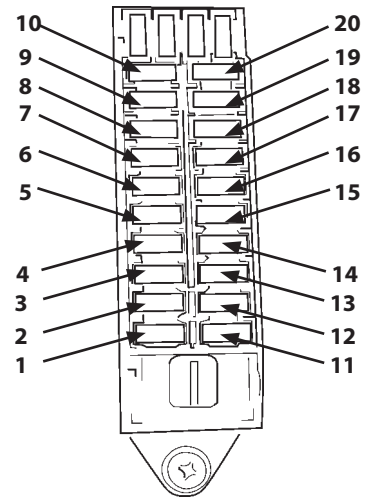
OPERATOR'S STATION

FUSE BOX

- | | |
|----------------------|---------------------------|
| 10- CONTROLLER
5A | 20- OPTION3
5A |
| 9- BACKUP
10A | 19- SW. BOX
5A |
| 8- ECM
30A | 18- POWER ON
5A |
| 7- LUBRICATOR
10A | 17- AIRCON
5A |
| 6- OPTION2
10A | 16- GLOW. R
5A |
| 5- OPTION1
5A | 15- AUXILIARY
10A |
| 4- SOLENOID
10A | 14- PCV
15A |
| 3- HEATER
20A | 13- LIGHTER
10A |
| 2- WIPER
10A | 12- ROOM LAMP/RADIO
5A |
| 1- LAMP
20A | 11- HORN
10A |



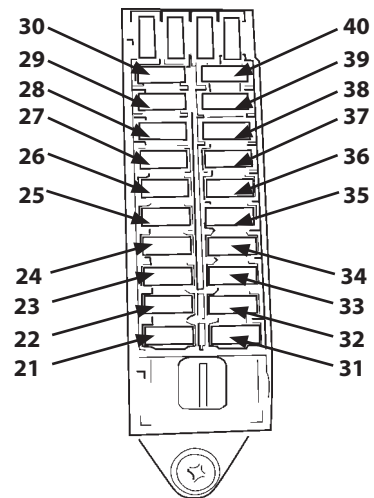
M1J1-01-021



M1GR-01-003

ADDITIONAL FUSE BOX

- | | |
|---------------------------|-----------------------------|
| 30- AUTO LUB.
10A | 40- SPARE |
| 29- LIGHT1
10A | 39- SPARE |
| 28- SPARE | 38- SPARE |
| 27- AUXILIARY3
5A | 37- SPARE |
| 26- QYICK HITCH
5A | 36- SPARE |
| 25- IMOBI
5A | 35- SPARE |
| 24- 12V UNIT
10A | 34- AUXILIARY2
10A |
| 23- CAB LAMP REAR
10A | 33- WARNING LAMP
10A |
| 22- CAB LAMP FRONT
10A | 32- CAB LAMP FRONT+2
10A |
| 21- SEAT HEATER
10A | 31- SEAT COMPR.
10A |



M1GR-01-003

OPERATOR'S STATION

AIR CONDITIONER OPERATION

Features:

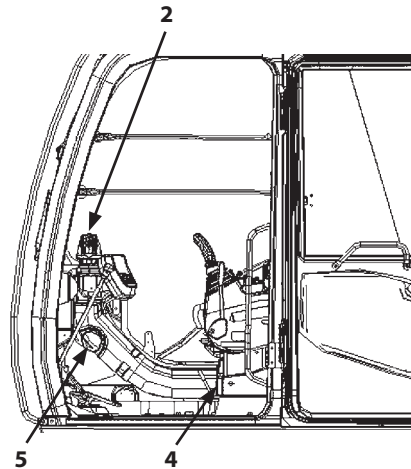
- Full-Automatic Control
Regardless of variations in atmospheric temperature and whether sun light is intense or not, the air temperature at the vent, blower speed, and air in/out vent locations are automatically controlled so that air temperature in the cab is maintained at the temperature set by the temperature control switch.
- Highest and Lowest Temperature Control
Highest or lowest air temperature in the cab is set by turning either the FH (Full-Heat) or FC (Full-Cool) indicator ON using the temperature control switch.
- Heater Start-Operation Control System
In winter or in cold weather, when starting the engine, the engine coolant is cool and air temperature inside the cab is low. Then, cool air is restricted not to flow in the cab to the minimum (LO) until the coolant is warmed when the front foot vent and /or foot vent is selected.

OPERATOR'S STATION

AUTO AIR CONDITIONER

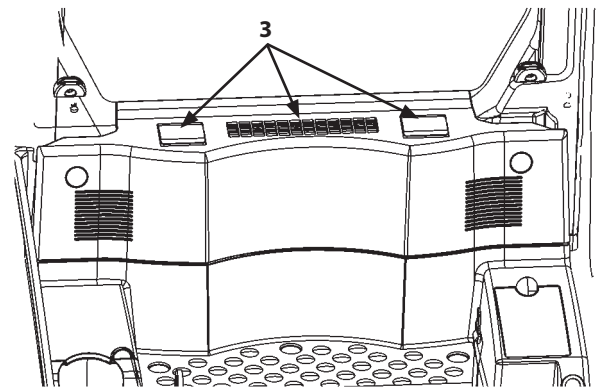
Distinctive Feature

- **Temperature Control:**
Automatically controls the cab temperature to maintain the temperature set by the temperature control switch regardless of outside air temperature and insolation.
- **Max. Cooling and Heating:**
Maximum cooling or heating can be obtained by moving the temperature control switch to the full right or left respectively.
- **Preheating:**
During preheating the cab in winter with the foot vent selected, the air volume is reduced to Low until the coolant temperature rises to prevent cool air from entering the cab.



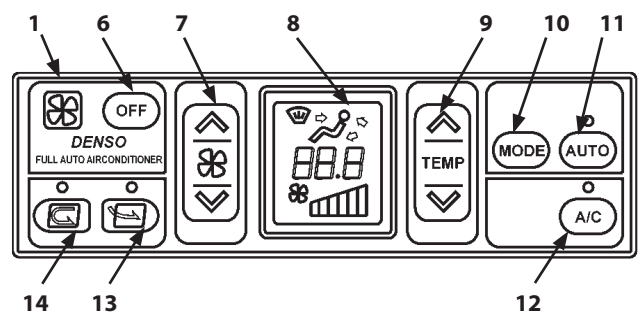
M1U1-01-025

- 1- Control Panel
- 2- Front Vent
- 3- Rear Vent
- 4- Foot Vent
- 5- Defroster Vent
- 6- Blower OFF Switch
- 7- Blower Switch
- 8- Liquid-Crystal Display (LCD)
- 9- Temperature Control Switch
- 10- Mode Switch
- 11- AUTO Switch
- 12- Air Conditioner Switch
- 13- Fresh Air Mode Switch
- 14- Circulation Mode Switch



M1U1-01-027

NOTE: Except for the foot vent, all vents are provided with louvers to adjust the air flow direction. In addition, the louvers on the front vent and defroster vent can be completely opened and closed by hand.

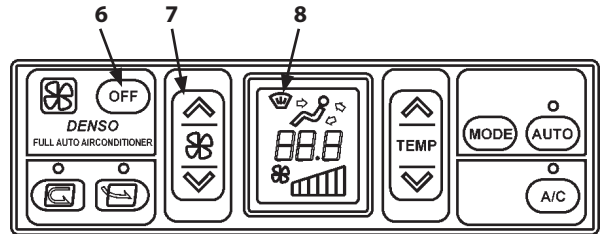


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OPERATOR'S STATION

Controller Part Name and Function

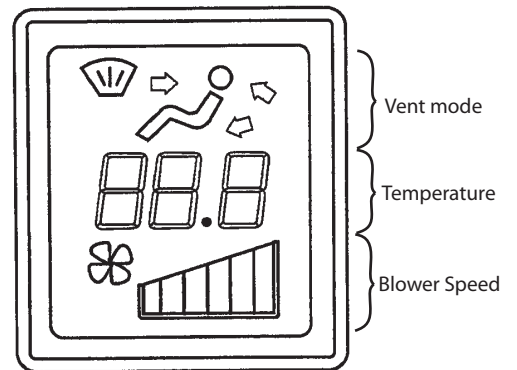
- Blower OFF Switch (6)
Stops the blower.
When the switch is pressed, all displays (vent mode, set-temperature, and blower speed) on the LCD (8) panel will disappear and the blower stops in both the auto and manual modes.
- Blower Switch (7)
Controls the blower speed from Low to High in 6 stages in the manual mode. The blower speed is displayed at the bottom on the LCD (8).
 - Increasing Blower Speed
Each time the top side mark “^” on blower switch (7) is pressed, the blower speed is increased by one increment.
 - Decreasing Blower Speed
Each time the bottom side mark “v” on blower switch (7) is pressed, the blower speed is decreased by one increment.



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NOTE: In the AUTO mode operation, the fan speed will be automatically controlled with the fan speed indicator flashing.

- LCD (8)
Displays the set-status of the air conditioner operating temperature, fan speed, and vent mode.
 - Temperature Display
Indicates the set-temperature (18 to 32.0 °C, 65 to 90 °F) by 0.5 °C (0.9 °F) increments at the panel center.
 - Blower Speed Display
Indicates the blower speed in 6 stages by lighting the segment at the panel bottom.
 - Vent Mode Display
Indicates the selected vent mode at the panel top.
The vent modes are as shown below:

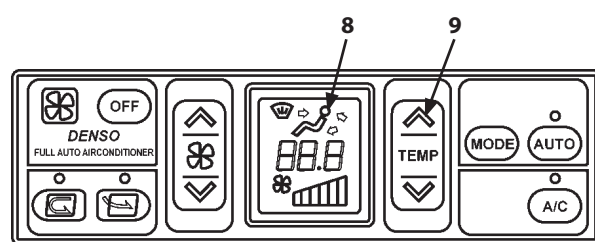


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- : Front/Defroster Vent Mode
- : Front/Rear/ Defroster Vent Mode
- : Front/Rear/Foot/ Defroster Vent Mode
- : Foot Vent Mode

OPERATOR'S STATION

- Temperature Control Switch (9)
Sets the air temperature in the range of 18 to 32.0 °C (65 to 90 °F) in the MANUAL and AUTO modes. Temperature can be set by 0.5 °C (0.9 °F) increments. The set-temperature is displayed on the LCD (8) center.
- Increasing Temperature
Each time the top side mark “^” on temperature control switch (9) is pressed, the set-temperature is increased by 0.5 °C (0.9 °F) increments.
- Decreasing Temperature
Each time the bottom side mark “v” on temperature control switch (9) is pressed, the set-temperature is decreased by 0.5 °C (0.9 °F) increments.
- Temperature Control Switch
 - Temperature Mode Change (Centigrade ↔ Fahrenheit)
Press both “^” and “v” marks on the temperature control switch for longer than 5 seconds at the same time to change the temperature mode (Centigrade ↔ Fahrenheit). (Unit in temperature mode is abbreviated.)



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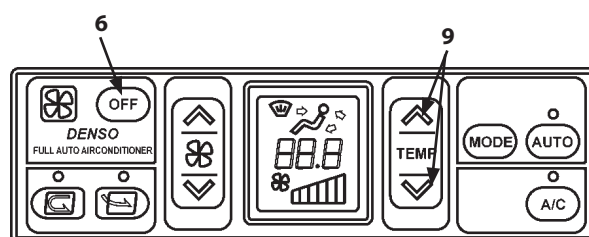
Temperature Mode	Display on LCD
Centigrade	18.0 to 32.0
Fahrenheit	63 to 91

OPERATOR'S STATION

- Diagnostic Function

Functions of each sensor for the A/C and the air vent damper can be diagnosed using this function.

Press both “^” and “v” marks on temperature control switch (9) for longer than 3 seconds at the same time with the fan turned OFF (no air flow) to display the operating conditions of the sensors and dampers as shown below.



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Displays on LCD and Trouble Mode





Displays on LCD	Trouble Mode
E—	No fault
E11	Broken re-circulation air sensor
E12	Short re-circuited circulation air sensor
E13	Broken fresh air sensor
E14	Short circuited fresh air sensor
E15	Broken coolant temperature sensor
E16	Short circuited coolant temperature sensor
E18	Short circuited insulation sensor
E21	Broken air vent sensor
E22	Short circuited air vent sensor
E43	Abnormal air vent damper
E44	Abnormal air mix damper
E45	Abnormal both re-circulation and fresh air damper
E51	Abnormal refrigerant pressure

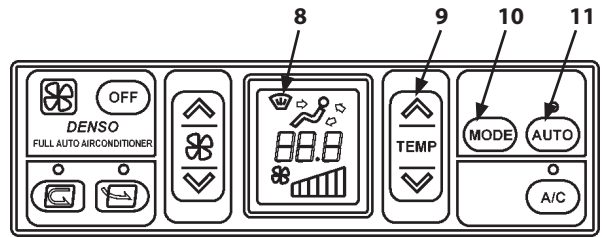
NOTE: In case more than one fault is detected, press either “^” or “v” mark on the temperature control switch button to change the fault code displayed on the LCD in order. Press fan OFF-switch (6) to complete the diagnosing function.

If any trouble has been found through operating the diagnostic function, contact your nearest Hitachi dealer for repair.

OPERATOR'S STATION

- Mode Switch (10)
Selects the air vent in the four modes as shown below:

-  : Front/Defroster Vent Mode
-  : Front/Rear/ Defroster Vent Mode
-  : Front/Rear/Foot/ Defroster Vent Mode
-  : Foot Vent Mode

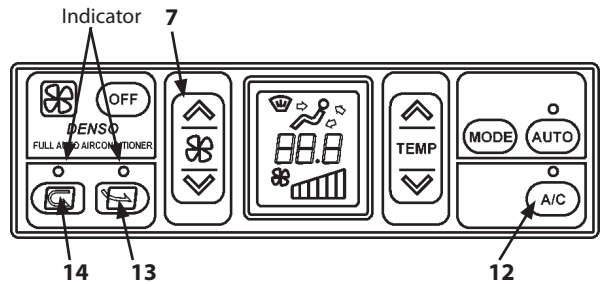


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- AUTO Switch (11)
Selects the air conditioner operation mode in either AUTO or MANUAL.
- AUTO Operation Mode
Press AUTO switch (11). When the indicator comes ON, the AUTO operation mode is selected. In response to the set-temperature, the blower speed, vent mode, and ventilation mode are automatically controlled.
- MANUAL Operation Mode
Press AUTO switch (11). When the indicator goes OFF, the MANUAL operation mode is selected. Air temperature, blower speed, vent mode, and ventilation mode can be selected as desired.

- Air Conditioner Switch (12)
The air conditioner will turn on and the air conditioner indicator will be lit when air conditioner switch (12) is pressed when blower switch (7) is also turned on (any of the blower indicators is ON).

- Fresh Air Mode Switch (13)
When fresh air mode switch (13) is pressed (indicator on), the fresh air vent will be opened and outside air will be routed into the cab.



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- Circulation Mode Switch (14)
When circulation mode switch (14) is pressed (indicator on), the fresh air vent will be closed.
Re-circulate the air inside the cab.

OPERATOR'S STATION

CAB HEATER OPERATION

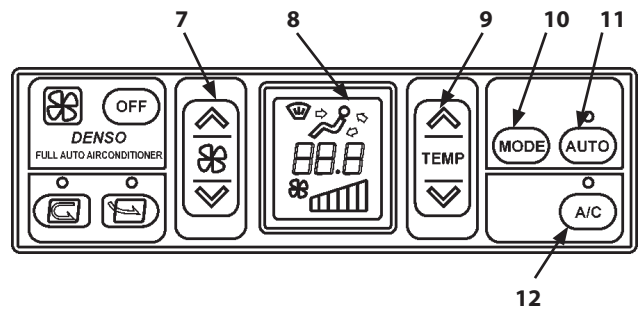
(Although warm air will flow out of the front/defroster vent, front/rear/defroster vent, or front/rear/foot/defroster vent, normally the foot vent is used for heating operation.)

After selecting the foot vent mode by operating mode switch (10), set the desired temperature using temperature control switch (9).

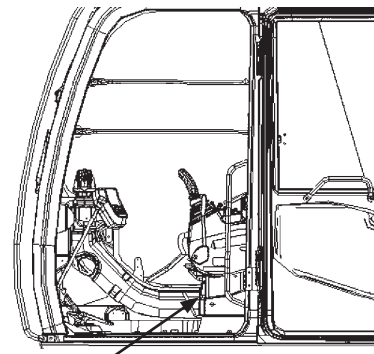
If AUTO switch (11) is pressed, warm air will blow out from foot vent (15).

The blower speed can be adjusted manually using blower switch (7).

In addition, if air conditioner switch (12) is turned on while using the cab heater, air in the cab will be also dehumidified.



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COOLING OPERATION

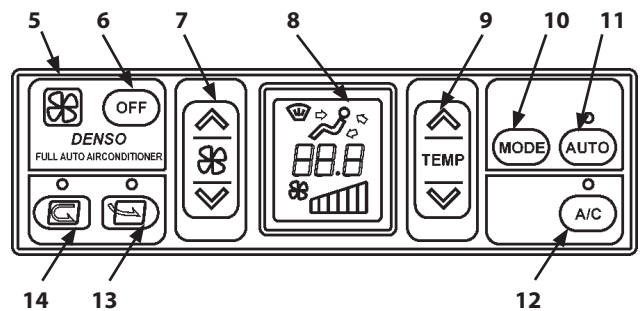
(Although cool air will flow out of the front/defroster vent, front/rear/defroster vent, or front/rear/foot/defroster vent, normally the front vent or front/rear/defroster vent is used for cooling operation.)

After selecting either the front/defroster vent mode or the front/rear/defroster vent mode by operating mode switch (10), set the desired temperature using temperature control switch (9).

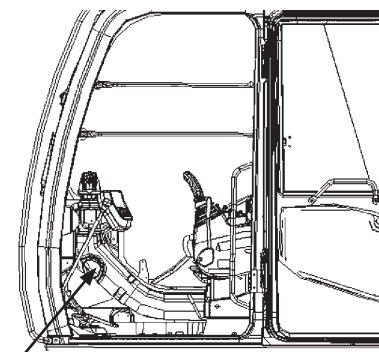
If AUTO switch (11) is pressed and air conditioner switch (12) is ON, cool air will blow out from front/defroster vent or front/rear/defroster vent.

The blower speed can be adjusted manually using blower switch (7).

In addition, if the outer surface of the lower front window becomes clouded, close defroster vent (3). (The louver on the defroster vent can be closed by hand.)





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OPERATOR'S STATION

DEFROSTER OPERATION

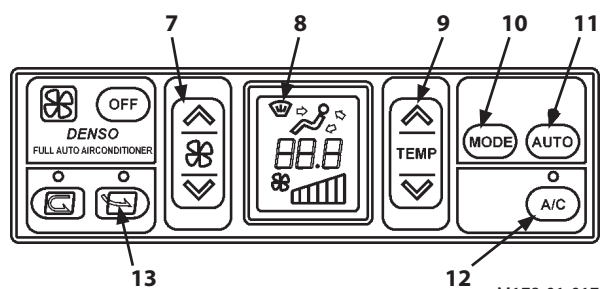
Select either the front/defroster vent mode  or the front/rear/defroster vent mode  by operating mode switch (10). Set the maximum heating temperature (32.0 °C, 90 °F) using temperature control switch (9). Press fresh air mode switch (13) to turn the indicator ON.

If AUTO switch (11) is pressed, air will blow out from front/defroster vent or front/rear/defroster vents.

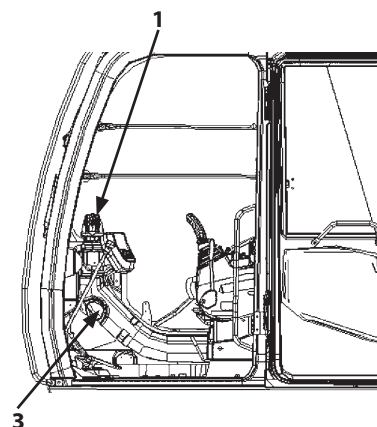
Adjust the louvers on front vent (1) and defroster vent (3) as required.

The blower speed can be adjusted manually using blower switch (7).

Turn on air conditioner switch (12) (indicator will light) if the windows become clouded or if dehumidifying is required.



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OPERATOR'S STATION

TIPS FOR OPTIMAL AIR CONDITIONER USAGE

For Rapid Cooling

Temperature in the cab may rise over 80°C (176°F) when the machine is exposed to sun light in the summer. For rapid cooling, ventilate air in the cab first.

After starting the engine, set the temperature control to maximum cooling (18°C, 65°F) using temperature control switch (9). Then turn circulation mode switch (14) ON (the indicator lights).

Select the front/rear/defroster  vent mode by operating mode switch (10). Set the blower speed to the maximum flow rate (6 segments lit) by operating blower switch (7). Then, turn air conditioner switch (12) ON (the indicator lights).

After running the engine at a little over 1000 min⁻¹ for a few minutes, press AUTO switch (11) and close the windows.

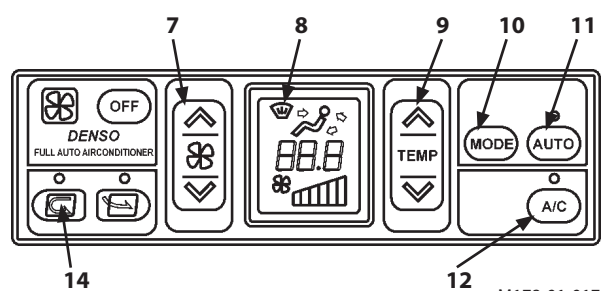
When Windows Become Clouded

If the insides of the windows become clouded during rainy weather or on humid days, operate the air conditioner to aid in keeping the windows clear. When the atmosphere is very damp, and if the air conditioner has run excessively, the outside of the windows may become clouded. If this happens, turn off the air conditioner to adjust the temperature in the cab.

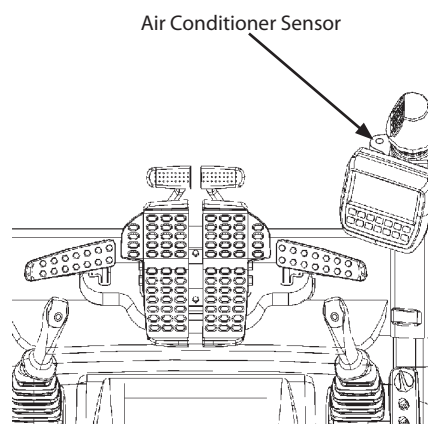
Off-Season Air Conditioner Maintenance

To protect each part of the compressor from a lack of lubricant, operate the air conditioner at least once a month for several minutes with the engine running at a slow speed during off-season. When the cab temperature is lower than 15°C (59°F), the air conditioner may not operate. If this happens, warm the cab using the heater first.

- IMPORTANT:**
- Do not suddenly increase the engine speed.
 - Keep any flames away from the control panel.
 - Refer to the item "Check Air Conditioner Filter" in the Maintenance Section for maintenance of the air conditioner filters.
 - Always clean the auto air conditioner sensor for effective air conditioner performance. Avoid placing any obstructions around the sensor.



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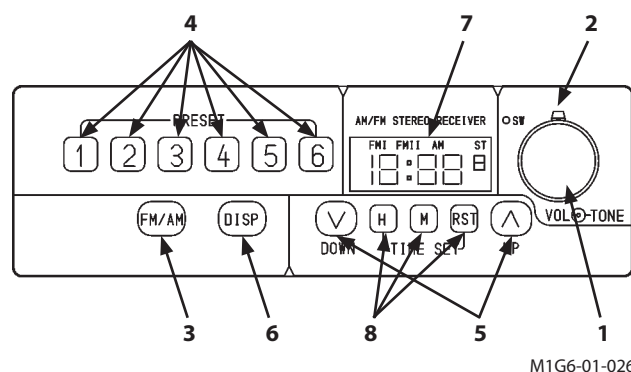
M1J1-01-028

OPERATOR'S STATION

AM/FM RADIO OPERATION

Controls on the radio


- 1- Power Switch/Volume Control Knob
- 2- Tone Adjustment Ring
- 3- AM/FM Switch
- 4- Station Presets
- 5- Tuning Switches
- 6- Display Mode Change Switch
- 7- Digital Display
- 8- Time Set Switches



M1G6-01-026


Tuning Procedure


- Manual Tuning Procedure
Repeatedly tap one of tuning switches (5) until the desired station is reached.
Each time the tuning switch is pressed, the frequency changes at an interval.

Tap the tuning switch [UP] () to increase the frequency.

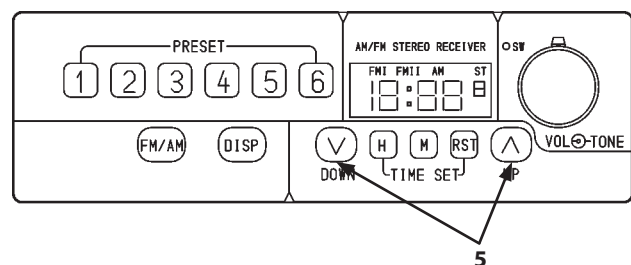
Tap the tuning switch [DOWN] () to decrease the frequency.

- Automatic Search Function
Press and hold one tuning switch (5) for more than half a second, then release. The frequency display will move up to the next higher frequency station.

To go up to the next higher frequency station, press and hold the tuning switch [UP] ().

To go down to the next lower frequency station, press and hold the tuning switch [DOWN] ().

In order to deactivate the automatic search function while it is operating (while searching the next available frequency station), simply tap tuning switch (5) again. If the receiving radio waves are weak, i. e. such as when the machine is located between high rising buildings, etc., use the manual tuning procedure to select the desired station.



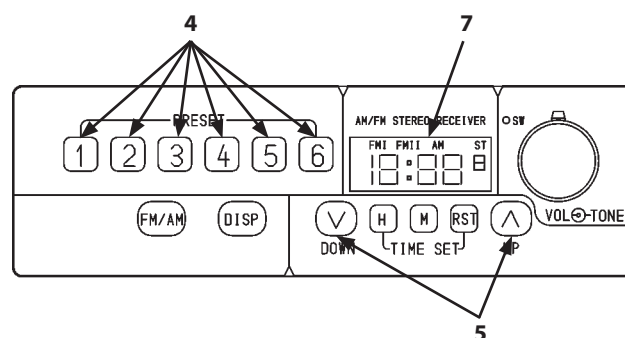
M1G6-01-026

OPERATOR'S STATION

Station Presetting Procedure


1. Select the desired station using tuning switches (5). (Refer to the "Tuning Procedure" section.)
2. Press and hold one station preset (4) for more than 1 second until an electronic tone is heard. Now, the selected station is preset for the selected station preset. The frequency of the preset station will be indicated on digital display (7).

Once the presetting is complete for a station preset (4), the radio will be tuned to the preset station when station preset (4) is pressed (for less than 1 second).



M1G6-01-026

DIGITAL CLOCK SETTING PROCEDURE

 **NOTE:** In order to set the clock, digital display (7) must be in the time display mode.

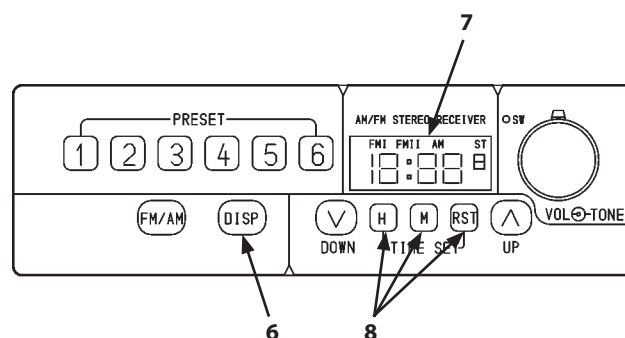
1. Press display mode button (6) to indicate the hour display on digital display (7).
2. Press and hold time set button (RST) (8) for longer than 1 second. The hour display will start flashing and the time set mode will be selected.
3. Press time set button (H or M) (8) to set the clock. Each time time set button (H or M) (8) is pressed, the time display will increase by one. If time set button (H or M) (8) is pressed and held, the time display will change continuously.

- When setting the hour, press time set button (H) (8).
- When setting the minute, press time set button (M) (8).

The time is displayed in 12 hour standard.

If either of the switches (H) or (M) is pressed and held, the hour or minute display will change continuously until the switch is released.

4. When the hour display is "12," if time set button (H) (8) is pressed, the hour display will be reset to "1." When the minute display is "59," if time set button (M)(8) is pressed, the minute display will be reset to "00." However, the hour display remains unchanged in this case.
5. After the clock setting is complete, press and hold time set button (RST)(8) again for longer than 1 second, or turn the radio switch OFF to end the clock time setting procedure. Digital display (7) stops flashing and changes to stay ON.



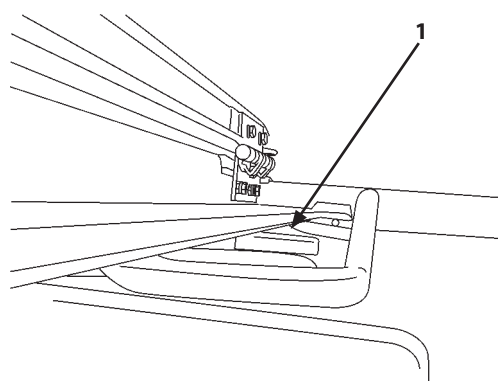
M1G6-01-026

OPERATOR'S STATION

CAB DOOR RELEASE LEVER

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

To unlock the door from this position, push down on lever (1).



OPENING UPPER FRONT WINDOW (ZAXIS650LC-3)

WARNING: Open or close the upper-front cab window only after pulling up the pilot control shut-off lever to the LOCK position. Failure to do so may allow the machine to move unexpectedly if a control lever is touched a part of the body by mistake, possibly resulting in personal injury or death.

1. Press lock release lever (3) at the upper center to release the upper front window lock.

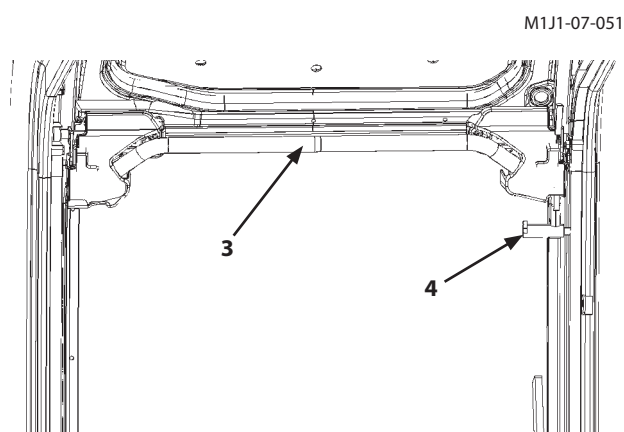
NOTE: Use caution when releasing the lock. The upper section of the upper front window will move approx. 10 cm inward.

2. Holding the upper and lower handles (one each) on the upper front window, pull the upper front window up and back until it securely catches into auto lock (2).

CAUTION: Always secure lock pin (4) in the lock position after the upper front window is opened.

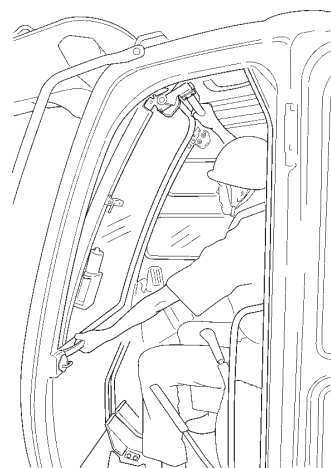
3. After confirming that the window securely catches into auto lock (2), slide lock pin (4) into the left bracket boss hole to lock the window in position.

NOTE: When the upper front window is opened, the wiper and washer are inoperable.

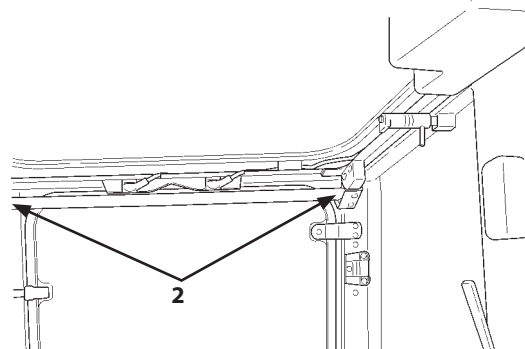


M1J1-07-051

M1U1-01-028



M1CC-01-020



M1CC-01-031

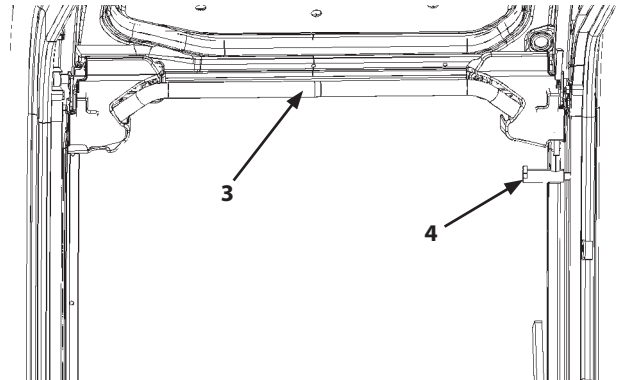
OPERATOR'S STATION

CLOSING UPPER FRONT WINDOW

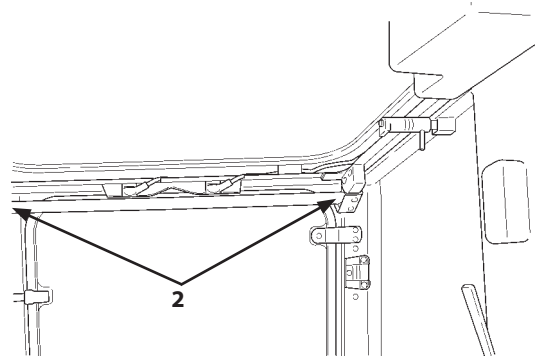
⚠ WARNING: Avoid possible injury while closing window. Upper front window comes down very forcefully. Close window only when sitting in the operator's seat. Guide window down slowly.

1. Pull out lock pin (4) to unlock window.
2. Slightly move the window forward while pushing lock release levers (3) to release auto lock (2).
3. Pull window down slowly until it securely catches into auto lock (2).

✎ NOTE: The wiper and washer won't operate until the upper front window is completely closed.



M1U1-01-028



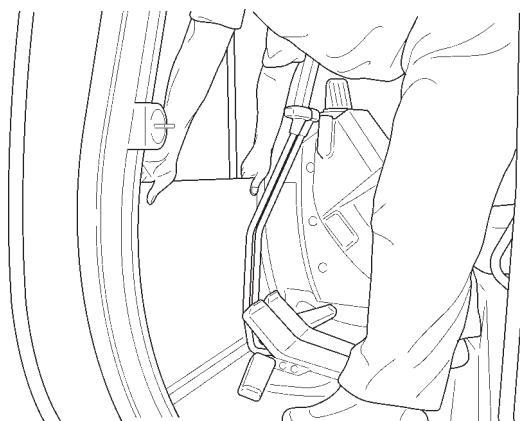
M1CC-01-031

OPERATOR'S STATION

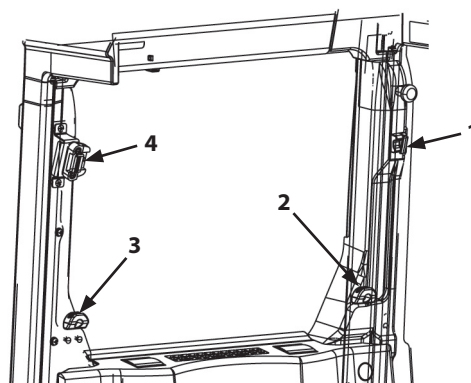
REMOVING AND STORING LOWER FRONT WINDOW (ZAXIS650LC-3)

! **WARNING:** Take care not to pinch your fingers when handling the lower front window.

1. Open the upper front window beforehand when removing the lower front window.
2. While pulling the lower front window inward, raise it to remove.
3. Store the removed windowpane in the storing position. After inserting the windowpane into rubbers (2 and 3), slide it sideways securely into rubber (1). Then, push fastener (4) to lock.



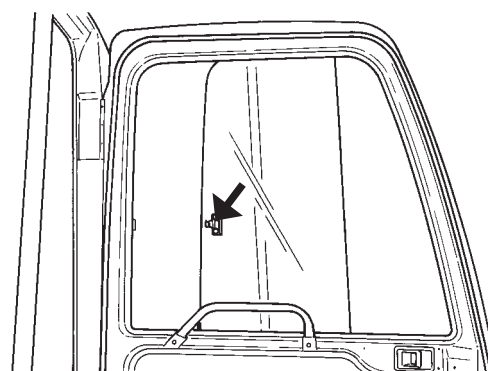
M1CC-01-022



1-49-001

OPENING SIDE WINDOWS

Opening Cab Door Window
Slide rear pane to the front.



Cab Door Window

M178-01-061

OPERATOR'S STATION

OPENING/CLOSING OVERHEAD WINDOW (ZAXIS650LC-3)

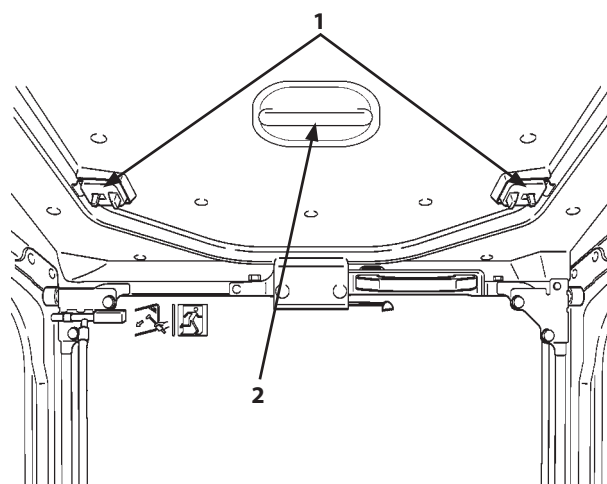
Opening

1. Move lock levers (1) toward center of window.
2. Hold handle (2) and lift window until it rises upright. With the window positioned upright, it will be secured in position by dampers (3).

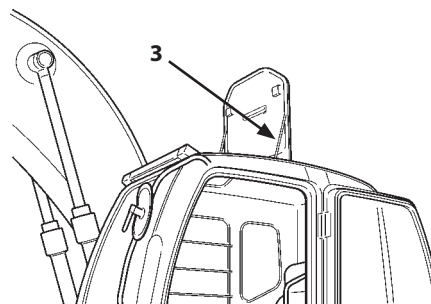
Closing

1. Hold handle (2) and pull window down until "click" sound is heard from locks (1).

Note that the overhead window can be used as an emergency exit.



1-51-001



1-51-002

OPENING/CLOSING OVERHEAD WINDOW (Clear Hatch: If Equipped)

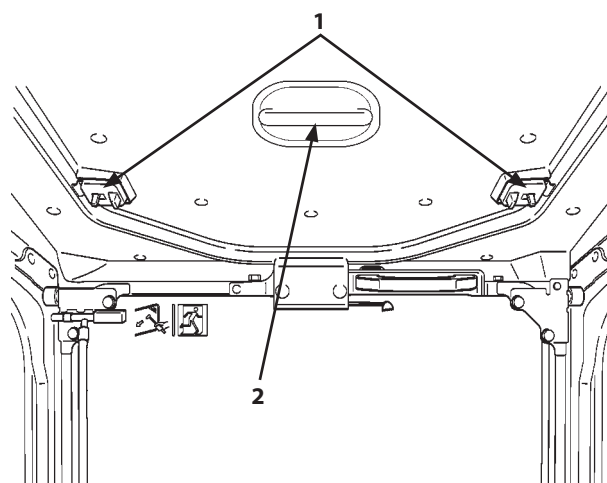
Opening

1. Move lock levers (1) toward center of window.
2. Hold handle (2) and lift window until it rises upright. With the window positioned upright, it will be secured in position by dampers (3).

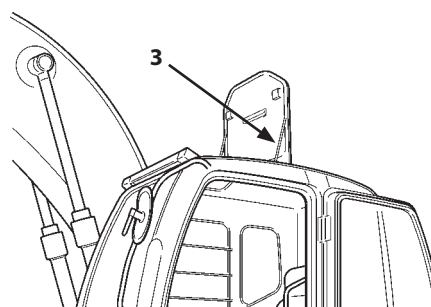
Closing

1. Hold handle (2) and pull window down until "click" sound is heard from locks (1).

Note that the overhead window can be used as an emergency exit.



1-51-001



1-51-002

IMPORTANT:


- Replace the clear hatch with a new one every 5 years even if undamaged. In case it was remarkably damaged or has received severe shock loads, replace it even if it has been not in use for 5 years.
- When cleaning the clear hatch, use a neutral detergent. If acidic or alkaline detergent is used, the clear hatch may become discolored or crack.
- Keep organic solvent away from the clear hatch. Failure to do so may cause the clear hatch to become discolored or crack.


OPERATOR'S STATION

EMERGENCY EXIT (ZAXIS650LC-3)


If the operator's cab door should not open in an emergency, escape in the following methods:

1. Open the front windows. Escape through the windows.

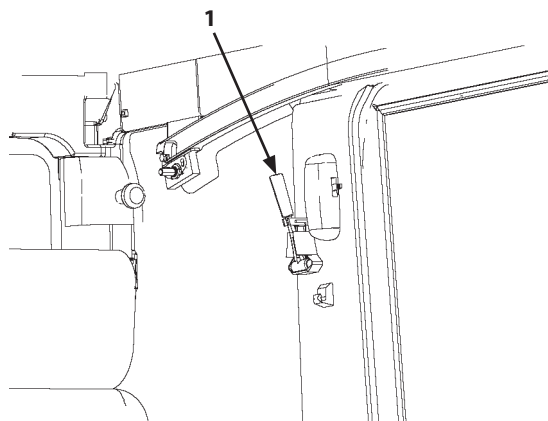
 **NOTE:** See page "OPENING UPPER FRONT WINDOWS" for the opening method of the front windows.

 **WARNING:** Take care not be injured with pieces of broken glass.

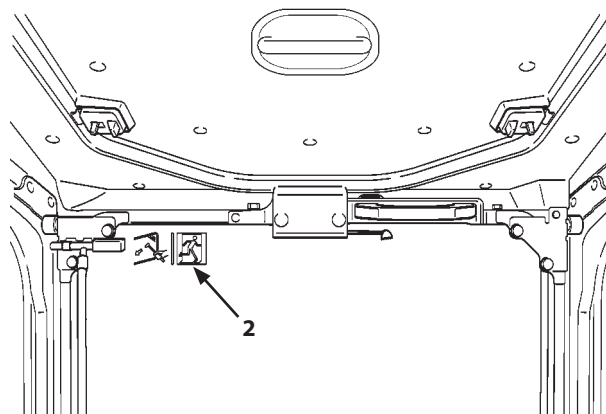
2. If the front window is difficult to open, break the front window glass using the emergency evacuation tool (1). Then, escape through the broken window.
3. If the front window is not available for escaping, break the rear window glass using the emergency evacuation tool. Then, escape through the broken window.

 **NOTE:** Emergency exit decals (2) are affixed to the front and rear windows.

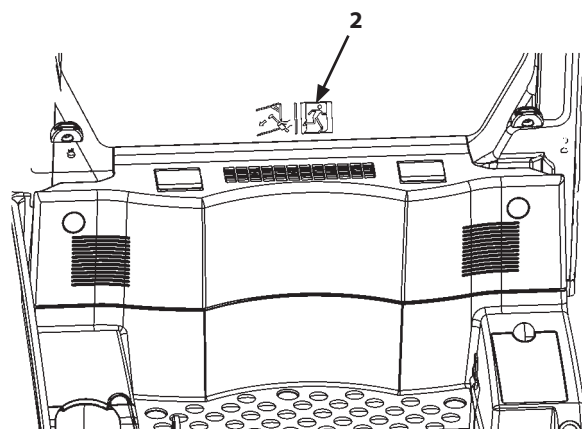
4. If neither of front and rear windows are available for emergency exit, open the overhead window to escape from the cab.



M1U1-01-022



1-51-001



1-52-001

OPERATOR'S STATION

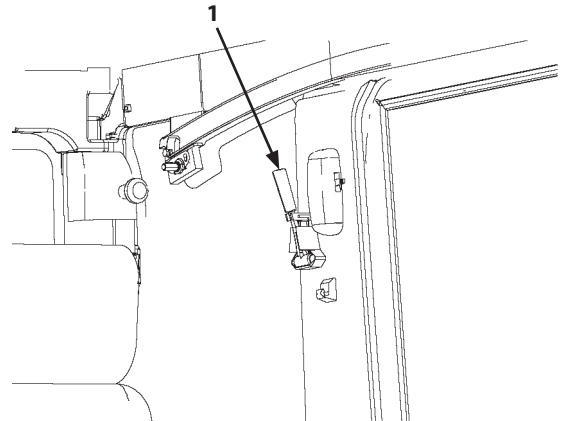
EMERGENCY EXIT (ZAXIS670LCH-3)

If the operator's cab door should not open in an emergency, escape in the following methods:

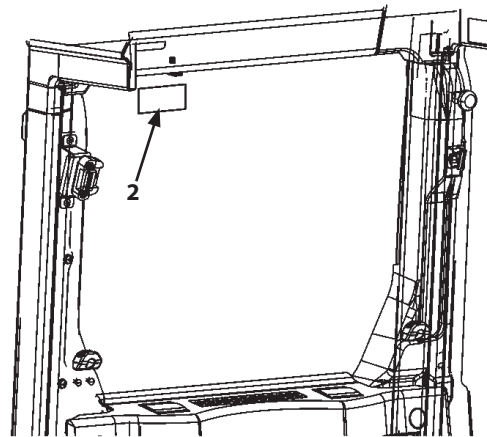
1. Break the rear window glass using the emergency evacuation tool (1). Then, escape through the broken window.

⚠ WARNING: Take care not be injured pieces of broken glass.

📌 NOTE: Emergency exit decals (2) are affixed to the rear windows.



M1U1-01-022



M1J1-01-023

OPERATOR'S STATION

ADJUSTING THE SEAT

Seat Height and Angle Adjustment

Seat height adjustment range is 60 mm (2.4 in) with steps every 15 mm (0.6 in) (5 positions in total). Moreover, the height of the front part and the rear part of the seat are adjusted independently, thus allowing the angle of the seat to be adjusted.

! WARNING: Avoid possible injury while operating lever (1). When pushing down lever (1), do not grab it. Fingers may be pinched between lever (1) and the seat stand. Be sure to push on the upper face of lever (1).

Use lever (1) to adjust the seat height and/or seat angle as follows:

- To adjust the front part of the seat:
Push down lever (1) while sitting on the seat, and apply or remove body weight to obtain the desired height. When the desired height is obtained, release lever (1).
- To adjust the rear part of the seat:
Pull up lever (1) while sitting on the seat, and apply or remove body weight to obtain the desired height. When the desired height is obtained, release lever (1).

Console and Seat Fore-aft Adjustment

Pull lever (2) to the right to adjust the seat and both right and left consoles to desired distance from the travel pedals and levers. Release lever to lock seat and consoles into position.

NOTE: Seat and console fore-aft adjustment range is 120 mm (4.7 in) with steps every 20 mm (0.8 in).

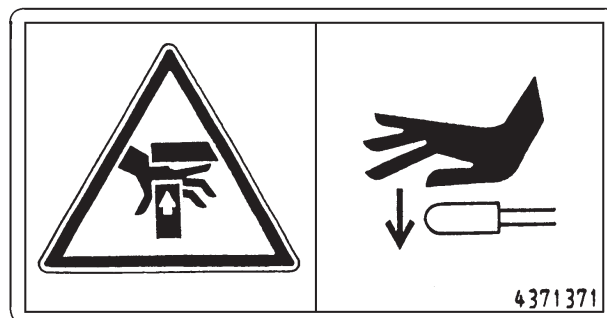
Seat Fore-Aft Adjustment

Pull lever (3) to unlock the seat from both consoles. With lever (3), slide the seat to the desired distance from pilot control levers. Release the lever.

NOTE: Seat fore-aft adjustment range is 160 mm (6.3 in) with steps every 16 mm (0.8 in).

Backrest Adjustment

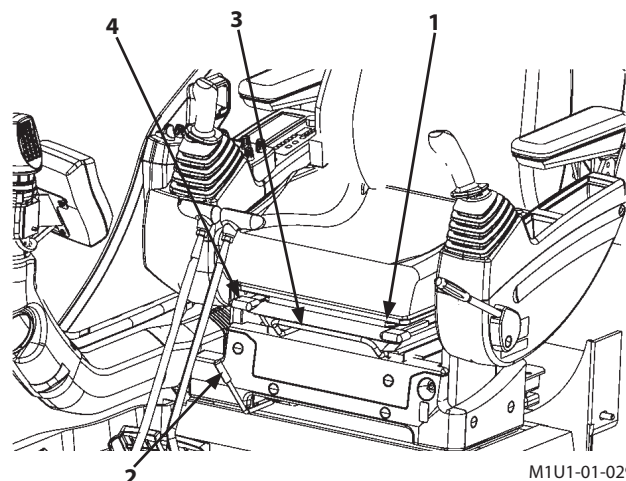
Pull up lever (4) to release backrest lock. Move backrest to the desired position and release the lever.



Warning: Possibility of pinched fingers

Push down with the palm.

SS-955



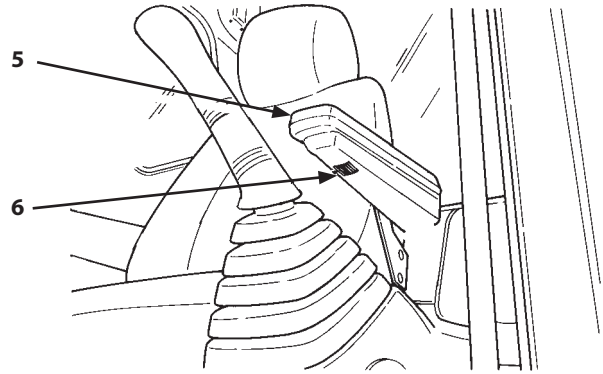
M1U1-01-029

OPERATOR'S STATION

Armrest Adjustment

Armrest (5) can be pulled upright by hand to get on and off the machine easily.

The angle of armrest (5) can be adjusted to the desired position by turning adjusting dial (6) located on the bottom of armrest (5).



M1G6-01-017

OPERATOR'S STATION

ADJUSTING THE SEAT (HEATER SEAT OPTIONAL)

Seat Height and Angle Adjustment

Seat height adjustment range is 60 mm (2.4 in) with steps every 15 mm (0.6 in) (5 positions in total). Moreover, the height of the front part and the rear part of the seat are adjusted independently, thus allowing the angle of the seat to be adjusted.

! WARNING: Avoid possible injury while operating lever (1). When pushing down lever (1), do not grab it. Fingers may be pinched between lever (1) and the seat stand. Be sure to push on the upper face of lever (1).

Use lever (1) to adjust the seat height and/or seat angle as follows:

- To adjust the front part of the seat:
Push down lever (1) while sitting on the seat, and apply or remove body weight to obtain the desired height. When the desired height is obtained, release lever (1).
- To adjust the rear part of the seat:
Pull up lever (1) while sitting on the seat, and apply or remove body weight to obtain the desired height. When the desired height is obtained, release lever (1).

Console and Seat Fore-aft Adjustment

Pull lever (2) to the right to adjust the seat and both right and left consoles to desired distance from the travel pedals and levers. Release lever to lock seat and consoles into position.

NOTE: Seat and console fore-aft adjustment range is 120 mm (4.8 in) with steps every 20 mm (0.8 in).

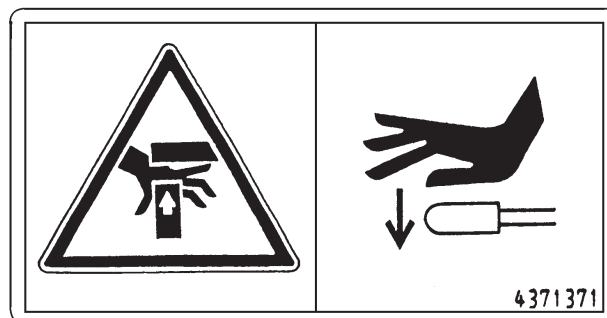
Seat Fore-Aft Adjustment

Pull lever (3) to unlock the seat from both consoles. With lever (3), slide the seat to the desired distance from pilot control levers. Release the lever.

NOTE: Seat fore-aft adjustment range is 160 mm (6.3 in) with steps every 16 mm (0.8 in).

Backrest Adjustment

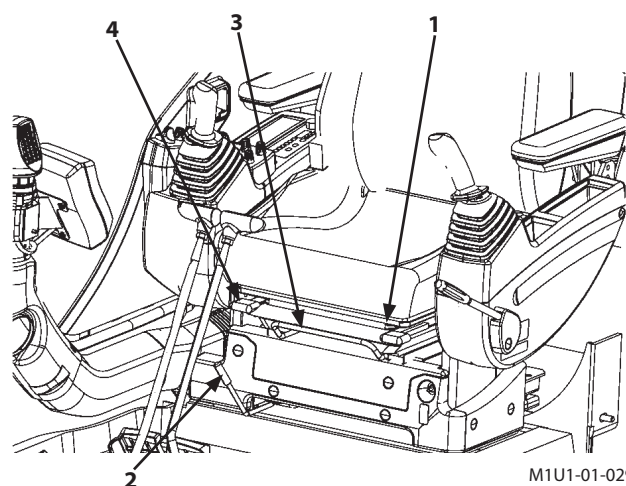
Pull up lever (4) to release backrest lock. Move backrest to the desired position and release the lever.



Warning: Possibility of pinched fingers

Push down with the palm.

SS-955

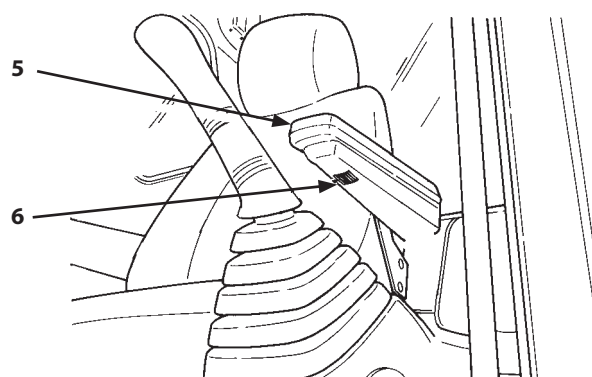


OPERATOR'S STATION

Armrest Adjustment

Armrest (5) can be pulled upright by hand to get on and off the machine easily.

The angle of armrest (5) can be adjusted to the desired position by turning adjusting dial (6) located on the bottom of armrest (5).




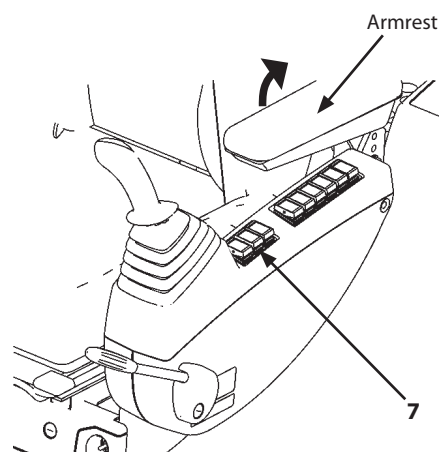
M1G6-01-017

SEAT WITH A BUILT-IN HEATER

Raise the armrest, the heater installed inside the seat activates by operating seat heater switch (7) on the optional equipment control switch panel.

When seat heater switch (7) is turned ON, the seat surface is heated so that the seat section becomes warm. When the temperature of the seat section is raised to the specified temperature, heating is automatically stopped.

 **NOTE:** Depending on what kinds of optional equipments are installed, the switch button function may differ. Use the switch only after confirming the kinds of the installed optional equipment.



M1J1-03-001



M1U1-01-011

OPERATOR'S STATION

ADJUSTING THE AIR-SUSPENSION SEAT (Optional)

Seat Height and Angle Adjustment

Seat height adjustment range is 60 mm (2.4 in) with steps every 15 mm (0.6 in) (5 positions in total). Moreover, the height of the front part and the rear part of the seat are adjusted independently, thus allowing the angle of the seat to be adjusted.

! WARNING: Avoid possible injury while operating lever (1). When pushing down lever (1), do not grab it. Fingers may be pinched between lever (1) and the seat stand. Be sure to push on the upper face of lever (1).

Use lever (1) to adjust the seat height and/or seat angle as follows:

- To adjust the front part of the seat:
Push down lever (1) while sitting on the seat, and apply or remove body weight to obtain the desired height. When the desired height is obtained, release lever (1).
- To adjust the rear part of the seat:
Pull up lever (1) while sitting on the seat, and apply or remove body weight to obtain the desired height. When the desired height is obtained, release lever (1).

Console and Seat Fore-aft Adjustment

Pull lever (2) to the right to adjust the seat and both right and left consoles to desired distance from the travel pedals and levers. Release lever to lock seat and consoles into position.

NOTE: Seat and console fore-aft adjustment range is 120 mm (4.8 in) with steps every 20 mm (0.8 in).

Seat Fore-Aft Adjustment

Pull lever (3) to unlock the seat from both consoles. With lever (3), slide the seat to the desired distance from pilot control levers. Release the lever.

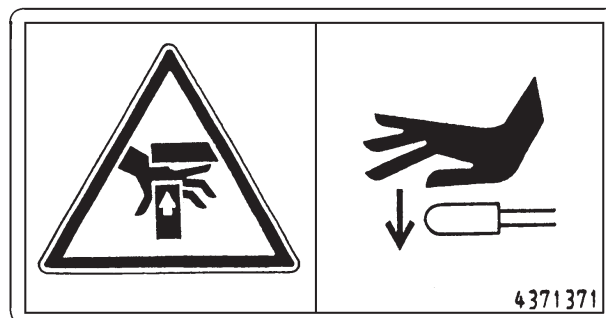
NOTE: Seat fore-aft adjustment range is 160 mm (6.3 in) with steps every 16 mm (0.8 in).

Suspension Adjustment

Push knob (4) to increase suspension stiffness.
Pull knob (4) to decrease suspension stiffness.

Backrest Adjustment

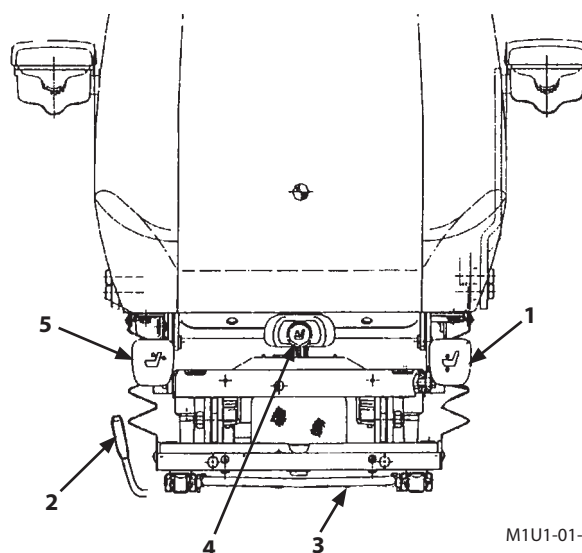
Pull up lever (5) to release backrest lock. Move backrest to the desired position and release the lever.



Warning: Possibility of pinched fingers

Push down with the palm.

SS-955



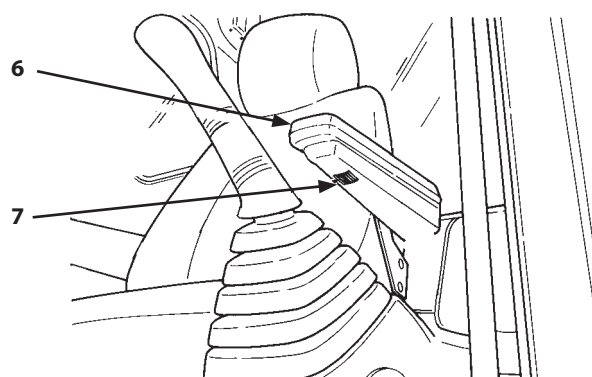
M1U1-01-014

OPERATOR'S STATION

Armrest Adjustment

Armrest (6) can be pulled upright by hand to get on and off the machine easily.

The angle of armrest (6) can be adjusted to the desired position by turning adjusting dial (7) located on the bottom of armrest (6).




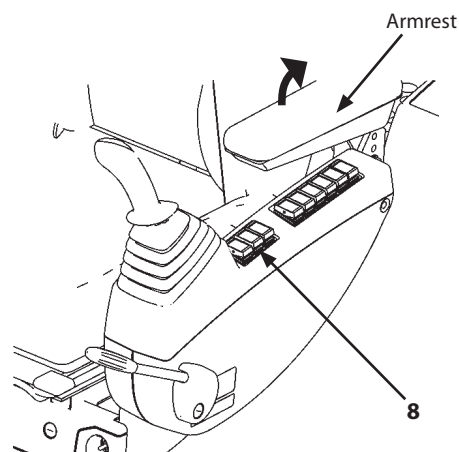
M1G6-01-017

SEAT WITH A BUILT-IN HEATER

Raise the armrest, the heater installed inside the seat activates by operating seat heater switch (8) on the optional equipment control switch panel.

When seat heater switch (8) is turned ON, the seat surface is heated so that the seat section becomes warm. When the temperature of the seat section is raised to the specified temperature, heating is automatically stopped.

 **NOTE:** Depending on what kinds of optional equipments are installed, the switch button function may differ. Use the switch only after confirming the kinds of the installed optional equipment.



M1J1-03-001



M1U1-01-011

OPERATOR'S STATION

ADJUSTING CONSOLE HEIGHT

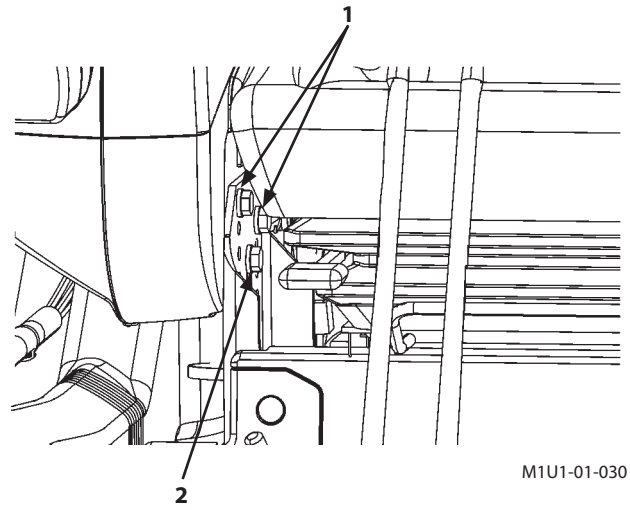
Adjust the console height to the operator's comfort and/or work conditions. Adjusting console height can be achieved using three positions provided vertically at 20 mm intervals.

⚠ WARNING: Before loosening the console, support the console. Otherwise, the console may suddenly drop, possibly causing personal injury.

Adjusting Procedures

1. Lower the bucket to the ground. Stop the engine.
2. Move the pilot control shut-off lever to the LOCK position.
3. Remove left and right console holding bolts (1). Loosen bolts (2) to adjust the console height.
4. After adjusting, tighten bolts (1) and (2).

Tightening Torque: 49N·m (5 kgf·m)



M1U1-01-030

OPERATOR'S STATION

SEAT BELT

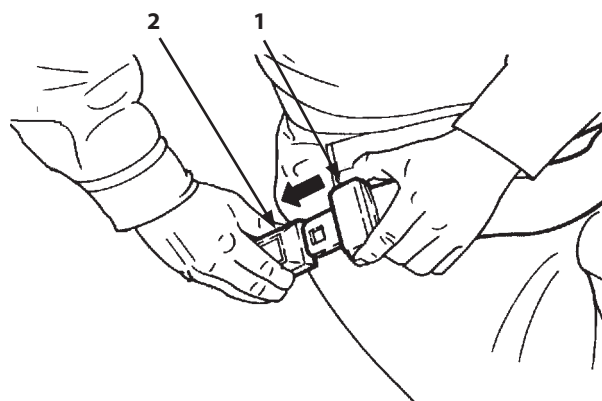
⚠ WARNING: Be sure to use the seat belt when operating the machine.

Before operating the machine, be sure to examine seat belt (1), buckle (2), and attaching hardware. Replace seat belt (1), buckle (2), or attaching hardware if they are damaged, or worn.

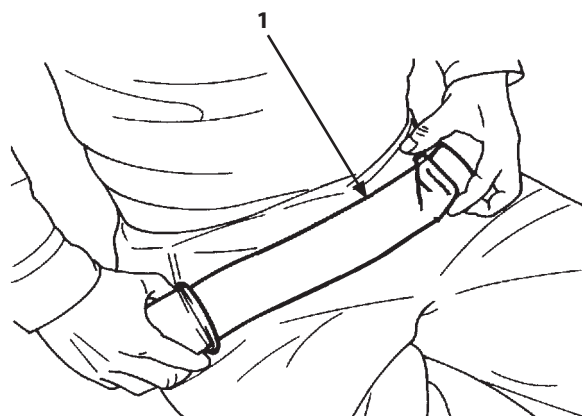
Replace seat belt (1) every three years, regardless of appearance.

Seat Belt

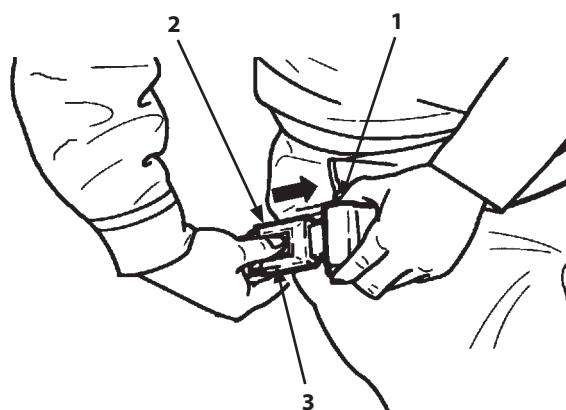
1. Confirm that seat belt (1) is not twisted. Securely insert the end of seat belt (1) into buckle (2). Lightly pull on the belt to confirm that the buckle latches securely.
2. Adjust seat belt (1) so that the belt is snug but comfortable.
3. Push button (3) on buckle (2) to unfasten seat belt (1).



M1U1-01-031



M1U1-01-037



M1U1-01-032

BREAK-IN

OBSERVE ENGINE OPERATION CLOSELY

IMPORTANT: Be extra cautious during the first 50 hours, until you become thoroughly familiar with the sound and feel of your new machine.

1. Operate the machine only in economy (E) mode and limit the engine horsepower up to about 80 % of full load.
2. Avoid excess engine idling.
3. Check indicator lights and gauges frequently during operation.

EVERY 8 HOURS OR DAILY

1. Perform 8-hour or daily service. (See Maintenance guide -- 8 hours.)
2. Watch for fluid leaks.
3. Lubricate working tool pivots every 8 hours for the first 50 hours, and every 8 hours when working in mud and water.

AFTER THE FIRST 50 HOURS

1. Perform 50-hour service. (See Maintenance guide -- 50 hours.)
2. Check accessible hardware torque. (See Hardware Torque Specifications in Maintenance chapter.)

AFTER THE FIRST 100 HOURS

Perform 50-hour and 100-hour service. (See Maintenance Guide -- 50 hours and 100 hours.)

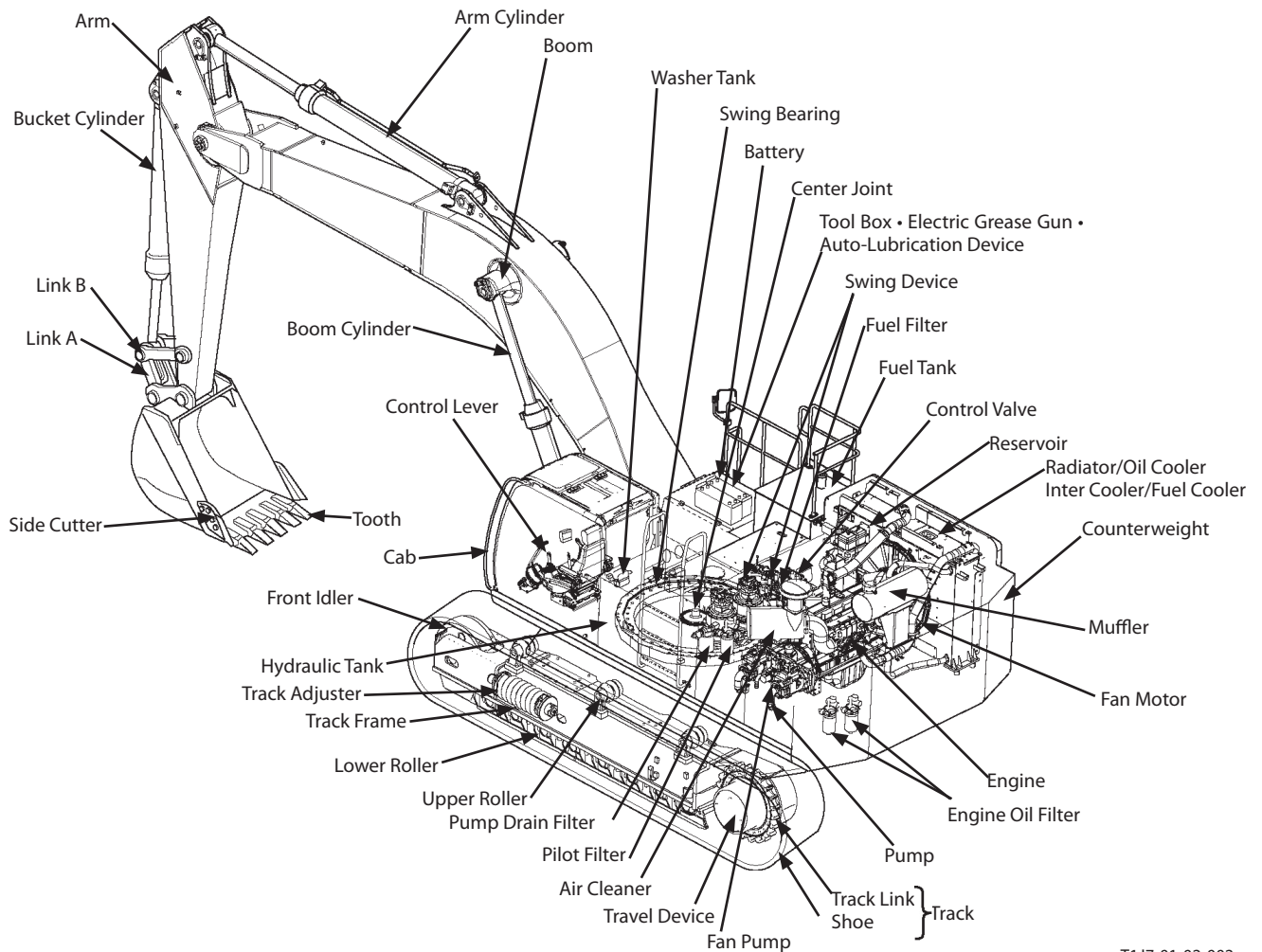
BREAK-IN

MEMO

A series of horizontal dotted lines for taking notes.

OPERATING THE ENGINE

INSPECT MACHINE DAILY BEFORE STARTING



T1J7-01-02-002

ELECTRICAL SYSTEM

Check for worn or frayed wires and loose connections.

BOOM, BUCKET, SHEET METAL, TRACKS

Check for bent, broken or missing parts.

HARDWARE

Check for loose or missing parts.

FUEL SYSTEM

Drain water and deposits from fuel tank.

HYDRAULIC SYSTEM

Check for leaks, kinked hoses, and lines or hoses that rub against each other or other parts.

LUBRICATION

Check lubrication points on the Periodic Service Chart.

PROTECTIVE DEVICES

Check guards, fenders.


SAFETY

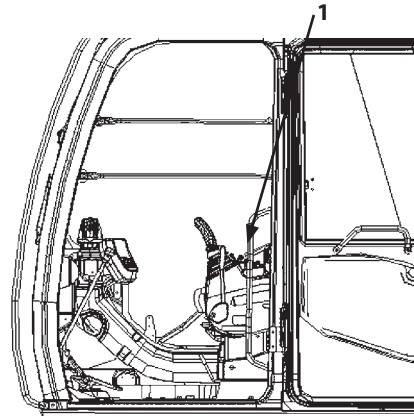
Walk around machine to clear all bystanders/obstacles from machine area.

OPERATING THE ENGINE

BEFORE STARTING ENGINE

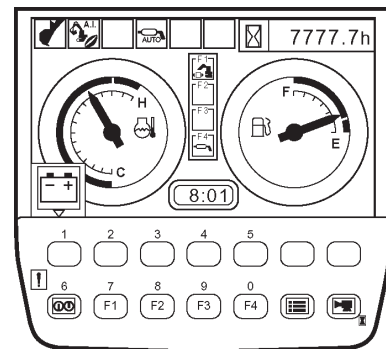
1. Confirm that pilot control shut-off lever (1) is in the LOCK position.
2. Confirm that all control levers are placed in neutral.
3. Adjust the seat to allow full pedal and control levers stroke with operator's back against the backrest. Fasten the seat belt.

 **NOTE:** Use a wet cloth when wiping dust off monitor or switch panels to prevent damaging the panel face. Rubber is used on the switch parts. Take care not to tear the rubber-made parts with sharp-edged tool, such as a screwdriver.




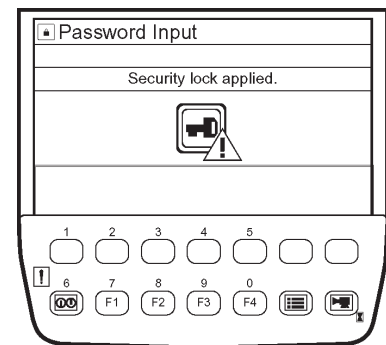
LOCK Position

M1U1-01-025



M1J1-03-005

 **CAUTION:** If the security lock screen is displayed when turn the key switch to ON position, return key switch to OFF. Wait for more than 30 seconds (the buzzer stopped), then try again. If the security lock screen is displayed again, contact your nearest HITACHI dealer.



Security Lock Screen

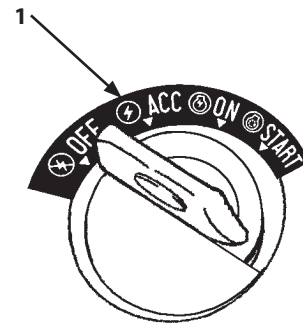
T1V5-05-01-005

OPERATING THE ENGINE

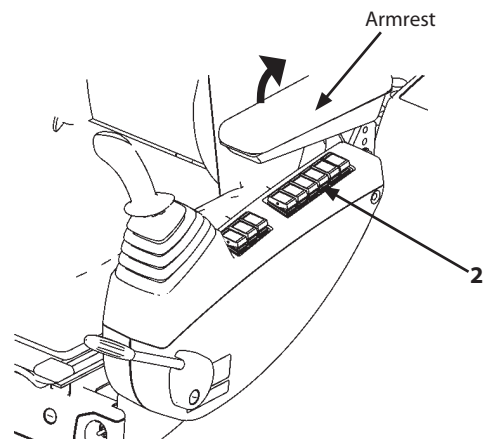
LEVEL CHECK

1. Stop machine on firm and surface level ground
2. Turn key switch (1) to the ON position.
3. Raise the armrest, while press and hold engine oil / coolant level switch (2), engine oil level indicator (4) / coolant level indicator (5) are displayed on monitor (3). Green indicator will light when engine oil /coolant level is adequate. Red indicator will light when engine oil level is inadequate for operation. Check engine oil / coolant level and replenish it if necessary.
When release engine oil / coolant level switch (2), engine oil level indicator (4) / coolant level indicator (5) are not displayed on monitor (3).

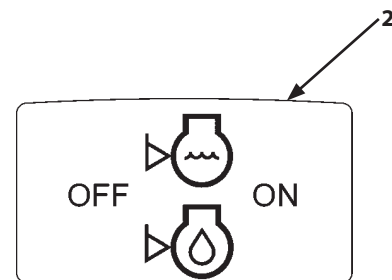
IMPORTANT: Prevent possible machine damage. Check fluid levels individually. The level check does not take the place of daily inspection at hydraulic oil level window, engine coolant reserve tank and engine oil level dipstick.



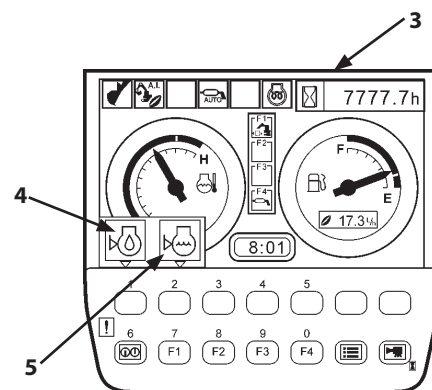
M178-01-049



M1J1-03-001



M1J1-03-002



M1J1-03-003

OPERATING THE ENGINE

STARTING THE ENGINE IN ORDINARY TEMPERATURE

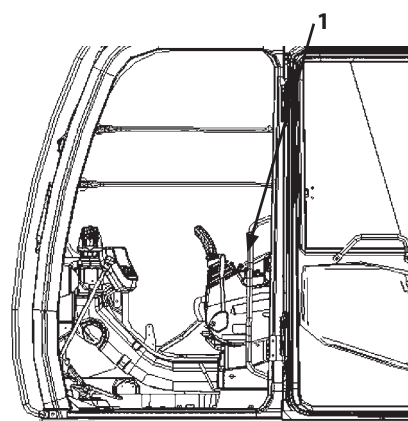
1. Pull the pilot control shut-off lever (1) up to the LOCK position.
2. Turn engine control dial (3) to the slow idle position.
3. Sound horn to alert bystanders.
4. Insert key switch (2). Turn it ON position.
5. "Wait-screen (nothing is displayed)" is displayed on the monitor for 2 seconds. Regardless of the pilot control shut-off lever position, the engine can not be cranked during this duration.
6. When the password input screen is displayed on the monitor, input the password. Unless the TEN-key function (ignition block system) is activated, this screen is not displayed.

IMPORTANT: When required to activate the TEN-key function (ignition block system), consult your nearest Hitachi dealer.

7. The basic screen will be displayed on the monitor. Check that the preheat indicator (4) is OFF at this time.
8. Turn key switch (2) to start engine.

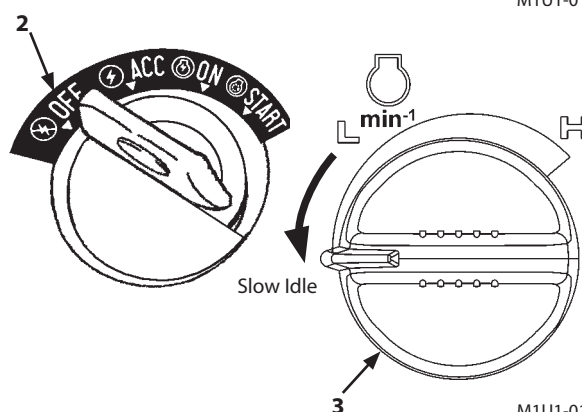
IMPORTANT: Prevent starter damage. Never operate starter motor for more than 10 seconds at a time. If engine fails to start, return key switch to OFF. Wait for more than 30 seconds, then try again. After a false start, do not turn key switch until engine stops or starter may be damaged.

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



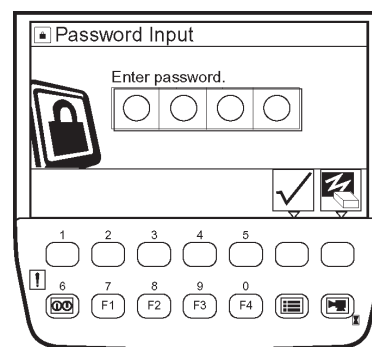
LOCK Position

M1U1-01-025



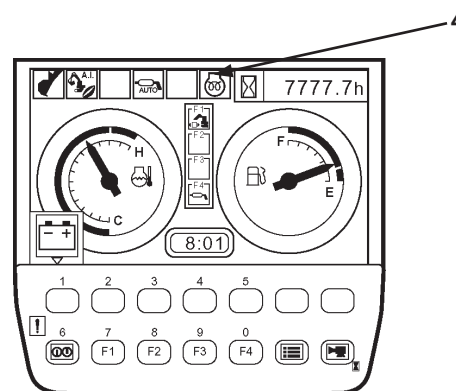
M178-01-049

M1U1-01-033



Password Input Screen

T1V5-05-01-002



Basic Screen

M1J1-03-004

OPERATING THE ENGINE

STARTING IN COLD WEATHER

Preheating

1. Pull the pilot control shut-off lever (1) up to the LOCK position.
2. Turn engine control dial (3) to around the middle between the L and H positions.
3. Sound horn to alert bystanders.
4. Insert key switch (2). Turn it ON position.
5. "Wait-screen (nothing is displayed)" is displayed on the monitor for 2 seconds. Regardless of the pilot control shut-off lever position, the engine can not be cranked during this duration.
6. When the password input screen is displayed on the monitor, input the password. Unless the TEN-key function (ignition block system) is activated, this screen is not displayed.

IMPORTANT: When required to activate the TEN-key function (ignition block system), consult your nearest Hitachi dealer.

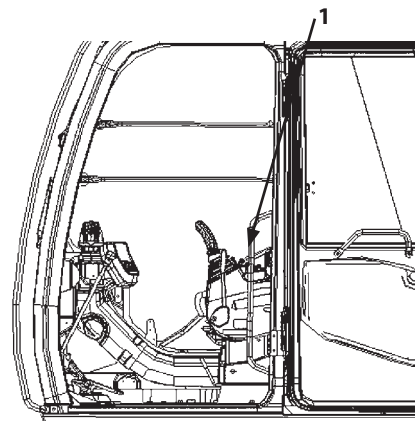
7. The basic screen will be displayed on the monitor. The machine will automatically check if preheating is required or not. When preheating is required, preheat indicator (4) is lit for automatically.

NOTE: In case, preheat indicator (4) does not come ON, preheating is not required.

8. As soon as preheat indicator (4) goes OFF, turn the key switch (2) to the START position to rotate the starter.

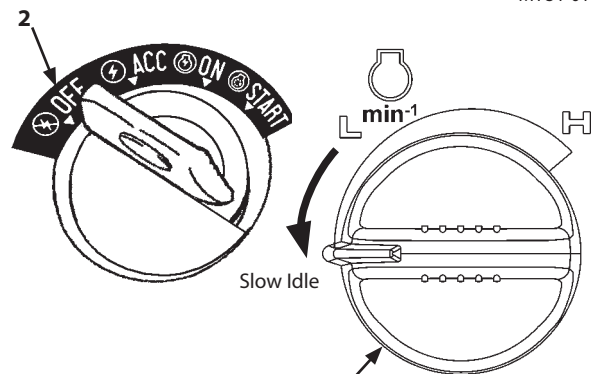
IMPORTANT: Prevent starter damage.
Never operate starter motor for more than 10 seconds at a time. If engine fails to start, return key switch to OFF. Wait for more than 30 seconds, then try again. After a false start, do not turn key switch until engine stops or starter may be damaged.

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



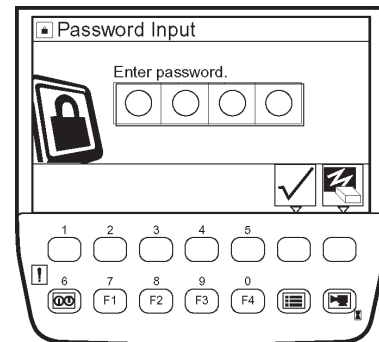
LOCK Position

M1U1-01-025



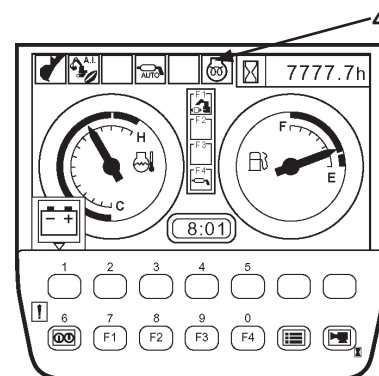
M178-01-049

M1U1-01-033



Password Input Screen

T1V5-05-01-002



Basic Screen

M1J1-03-004

OPERATING THE ENGINE

CHECK INSTRUMENTS AFTER STARTING

Checking Instruments through Monitor Functions.

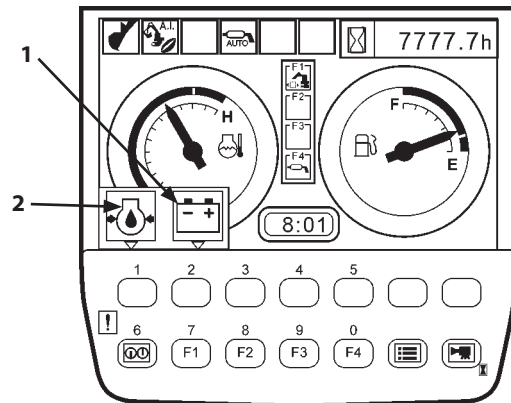
After starting the engine, check the following points through the monitor functions.

Check that

1. Alternator indicator (1) is off.
2. Engine oil pressure indicator (2) is off.
3. Engine noise and exhaust gas are normal.

IMPORTANT: Prevent possible damage to engine. If indicator lights do not go out after starting engine, IMMEDIATELY STOP THE ENGINE and correct the cause.

Operate machine at less-than-normal loads and speeds until engine is at normal operating temperature.



M1J1-03-006

OPERATING THE ENGINE

USING BOOSTER BATTERIES



WARNING:

- An explosive gas is produced while batteries are in use or being charged. Keep flames or sparks away from the battery area. Charge the batteries in a well ventilated area.
Do not continue to use or charge the battery when electrolyte level is lower than specified. Explosion of the battery may result.
Park the machine on a dry, firm or concrete surface, not on steel plates, if the machine is parked on steel plates, dangerous sparks may be unexpectedly created on the machine.
Never connect a positive terminal to a negative terminal, as a dangerous short circuit will occur.
- The operator must be in the operator's seat so that the machine will be under control when the engine starts. Jump starting is a two-person operation.



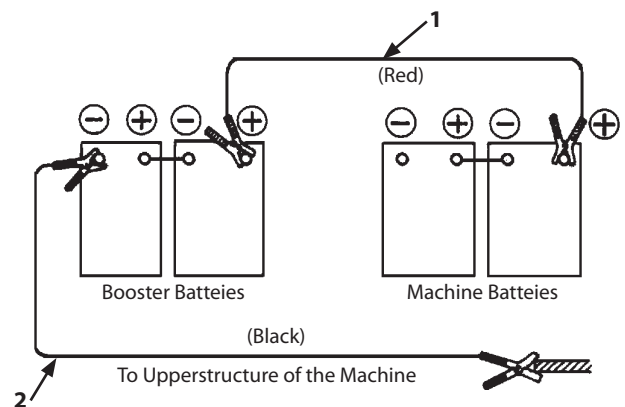
SA-032

IMPORTANT: The machine electrical system is a 24 volt negative (-) ground. Use only 24 volt booster batteries.

When the machine batteries are exhausted, start the engine using booster batteries as shown below.

Connecting the booster batteries

1. Stop the engine of the machine on which booster batteries are mounted.
2. Connect one end of red cable (1) to the positive (+) terminal of the machine batteries, and the other end to the positive (+) terminal of the booster batteries.
3. Connect one end of black cable (2) to the negative (-) terminal of the booster batteries, and then make ground connection to the frame of the machine to be started with the other end of black (-) cable (2). In the last connection to frame, be sure to connect the cable end as far away from the machine batteries as possible.
4. Start the engine of the machine on which booster batteries are mounted.
5. Start the engine of the troubling machine.
6. After the engine starts, disconnect cables (2) and (1), following the procedure below.

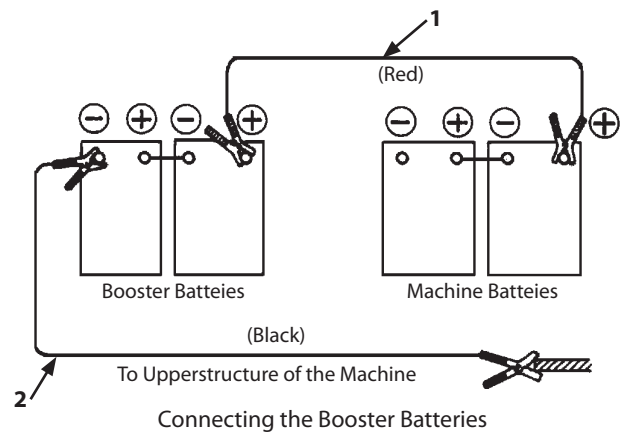


M104-03-002

OPERATING THE ENGINE

Disconnecting the booster batteries

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



M104-03-002

OPERATING THE ENGINE

STOPPING THE ENGINE

Engine stop procedure

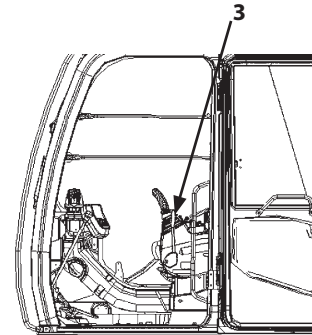
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn engine control dial (1) to the slow idle position and run the engine for 5 minutes to cool the engine.



SA-390

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

4. Turn key switch (2) OFF. Remove the key from the key switch.
5. Pull pilot control shut-off lever (3) to the LOCK position.

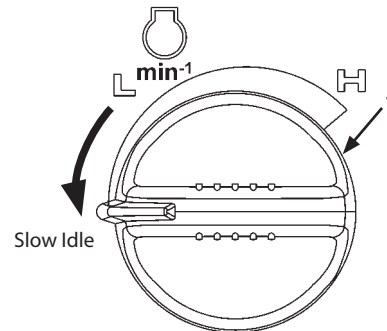


M1U1-01-025

If the engine does not stop with the key switch turned in the OFF position

In case the engine does not stop even if the key switch is turned OFF due to failure of the machine, move emergency stop switch (4) downward to stop the engine.

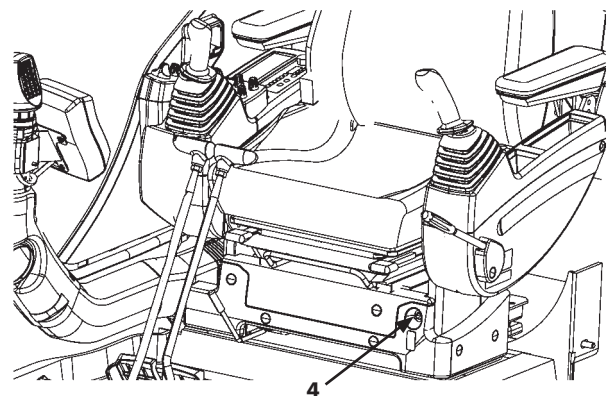
CAUTION: Do not use the emergency stop switch, except when unavoidable. Moreover, Do not operate the machine until repair is completed when stopping the engine with the failure of the machine.



M1U1-01-033



M178-01-049



M1U1-01-029

OPERATING THE ENGINE

MEMO

A series of horizontal dotted lines for taking notes.

DRIVING THE MACHINE


DRIVE THE MACHINE CAREFULLY

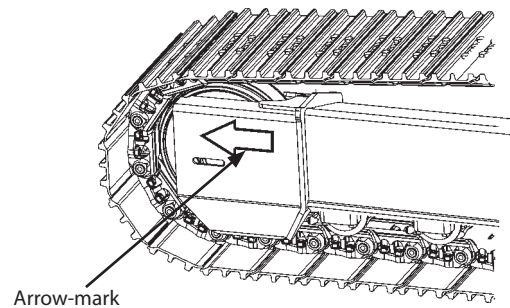
IMPORTANT: During freezing weather, park machine on a hard surface to prevent tracks from freezing to the ground. Clean debris from tracks and track frame.

If tracks are frozen to the ground, raise tracks using boom, move machine carefully to prevent damage to drive train and tracks.

Select a route that is as flat as possible. Steer machine as straight as possible making small, gradual changes in direction.

When driving over rough terrain, reduce engine speed to lessen possibility of undercarriage damage.

 **NOTE:** An arrow-mark seal is stuck on the inside surface of the side frame to indicate the machine front direction.



M178-03-001

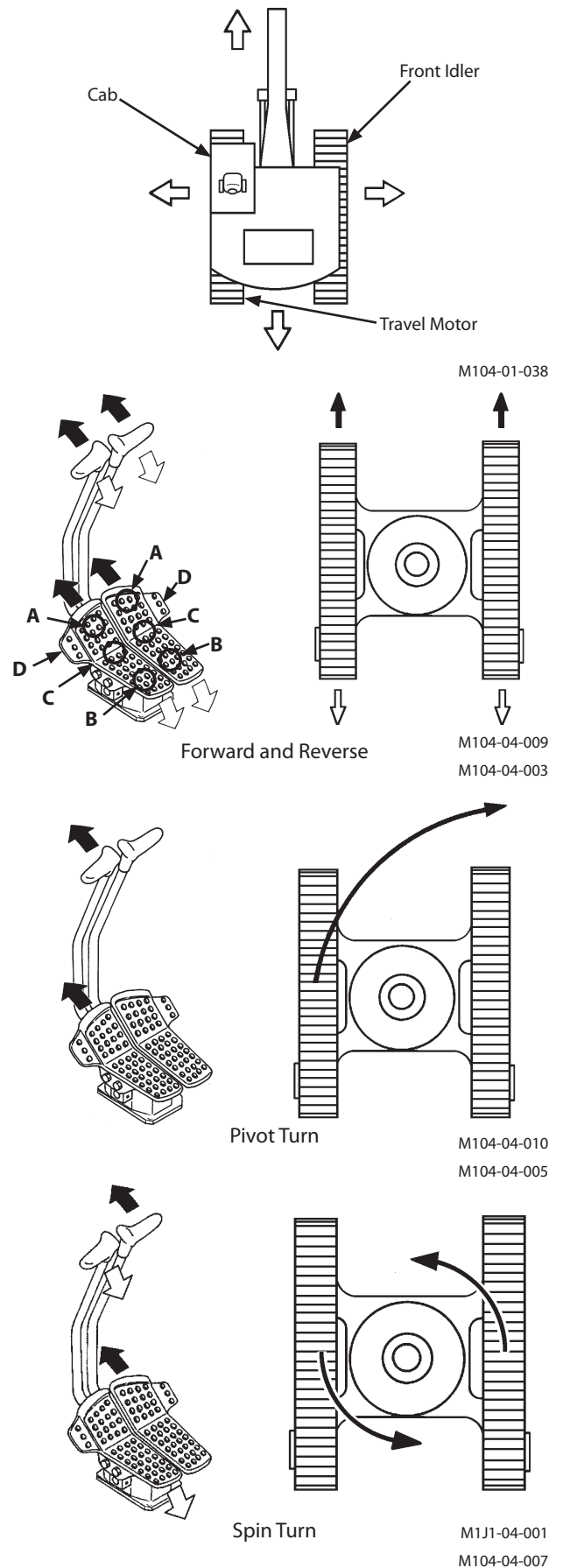
DRIVING THE MACHINE

STEERING THE MACHINE USING PEDALS

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

- FORWARD TRAVEL
Push down on front (A) of both pedals.
- REVERSE TRAVEL
Push down on rear (B) of both pedals.
- NEUTRAL POSITION (C)
When the travel pedals are placed in neutral, travel brakes automatically will stop and/or hold the machine.
- RIGHT TURN
Push down on front of left pedal.
- LEFT TURN
Push down on front of right pedal.
- SHORT TURN (Spin turn)
Push down the front of one pedal and the rear of the other.

📝 NOTE: For long-term traveling, push down on pedal tabs (D) and rest feet on footrests.



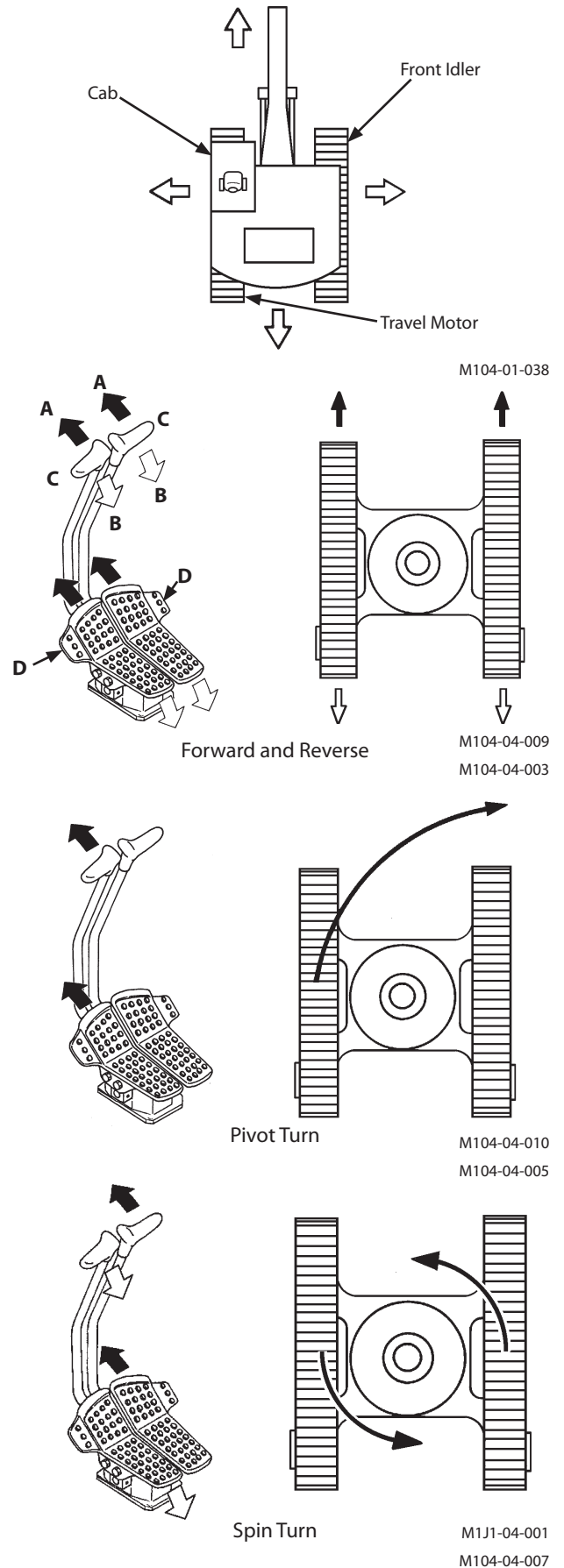
DRIVING THE MACHINE

STEERING THE MACHINE USING LEVERS

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

- FORWARD TRAVEL
Push both levers forward (A).
- REVERSE TRAVEL
Pull both levers rearward (B).
- NEUTRAL POSITION (C)
When the travel levers are placed in neutral, travel brakes automatically will stop and/or hold the machine.
- RIGHT TURN
Push left lever forward.
- LEFT TURN
Push right lever forward.
- SHORT TURN (Spin turn)
Push one lever forward and pull the other rearward.

NOTE: For long-term traveling, push down on pedal tabs (D) and rest feet on footrests.





DRIVING THE MACHINE

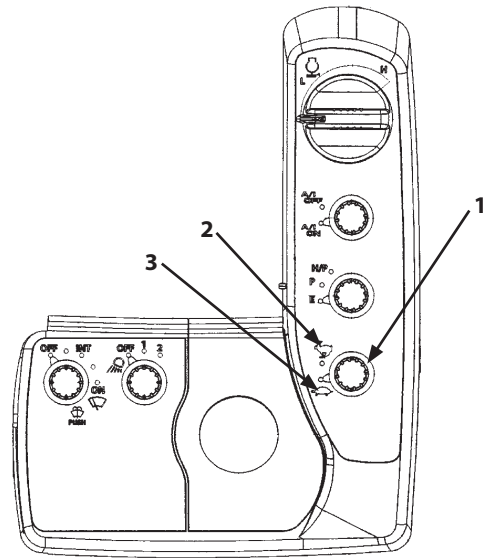
TRAVEL MODE SWITCH

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

Turn travel mode switch (1) on the switch panel to the specified position to select the travel mode (Fast/Slow).

- Fast Mode: Turn travel mode switch (1) to  mark (2) position.
- Slow Mode: Turn travel mode switch (1) to  mark (3) position.

-  Mark (Fast Speed Mode)
-  Mark (Slow Speed Mode)



M1U1-01-015

TRAVEL ALARM (Optional)

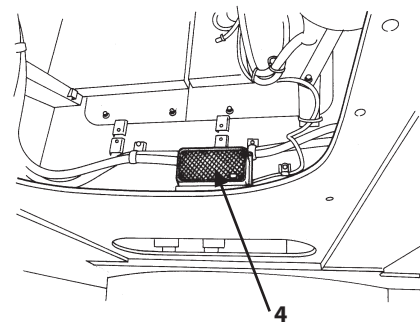
During travel operation, the travel alarm (4) sounds the buzzer to warn the people near the machine that the machine is traveling.

Deactivating Travel Alarm

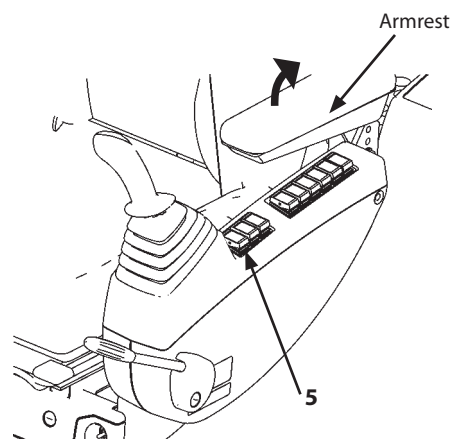
More than 15 seconds after starting to travel the machine, raise the armrest and push the travel alarm deactivation switch (5) to stop the travel alarm. (Within 15 seconds, the travel alarm deactivation switch is inoperable.)

Once the machine stops traveling and when restarting to travel, the travel alarm will sound again. If desired to stop the alarm, operate the deactivation switch (5) once more.

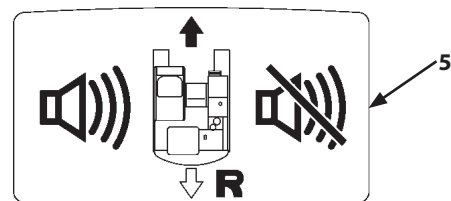
✎ NOTE: The optional switch locations differ depending on what kinds of optional devices are equipped. Before using the switches, make sure what kinds of optional devices are equipped.



M162-01-016



M1J1-03-001

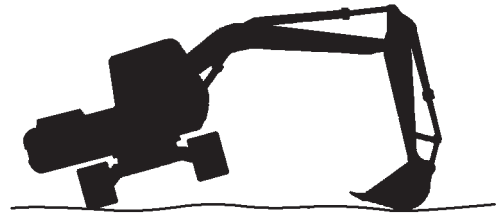


M1U1-01-035


DRIVING THE MACHINE

OPERATING ON SOFT GROUND


- Avoid traveling on very soft ground that does not have sufficient strength to firmly support the machine.
- If the machine is operated on very soft ground or becomes stuck, it may be necessary to clean the track frame area.
- Swing the upperstructure 90° and lower the bucket to raise one track off the ground. Make sure to keep the angle between the boom and arm 90 to 110° and position the bucket's round side on the ground.
- Rotate the raised track back and forth to remove mud and dirt.
- After lowering the track to the ground, select slow travel speed. Carefully move the machine to firm ground.
- Utilize the boom and arm functions to pull the machine toward firm ground.
- Tow the machine if the machine becomes stuck but only if the engine is still operating. Be sure to attach a tow line correctly. (Refer to the "TOWING MACHINE A SHORT DISTANCE" section on the next page.)



M104-05-012

 **NOTE:** When raising the machine off the ground with the front attachment, turn the boom mode switch OFF.

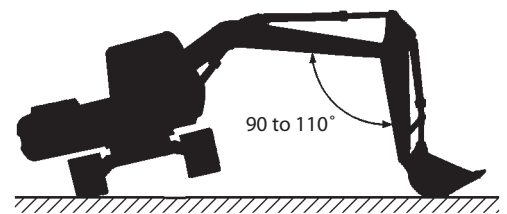
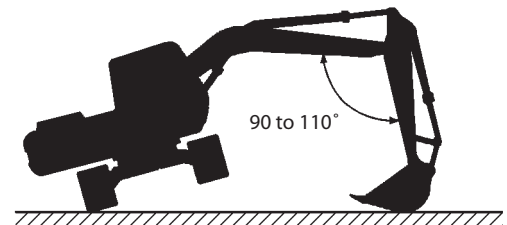
RAISE ONE TRACK USING BOOM AND ARM

 **WARNING:** Keep the angle between boom and arm 90 to 110° and position the bucket's round side on the ground.

Swing the upperstructure 90° and lower the bucket to raise track off ground. Do not dig bucket teeth into the ground when using the hoe bucket reversed.

Place blocks under machine frame to support the machine.

IMPORTANT: When the machine is modified as a face shovel by installing the hoe bucket in reverse, avoid raising the machine above the ground using the front attachment with the bucket cylinder fully extended. Excessive loads will be applied to the pins around the bucket and the bucket cylinder, resulting in breakage of the pins.



M104-05-013

WRONG



SA-817

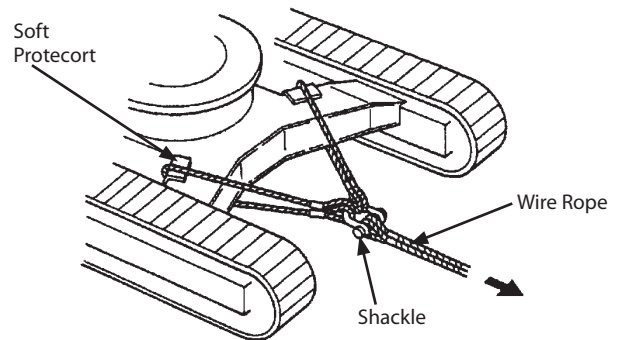
DRIVING THE MACHINE

TOWING MACHINE A SHORT DISTANCE



CAUTION:

- Cables, straps, or ropes can break causing serious injury. Do not tow machine with damaged chains, frayed cables, slings, straps, or wire ropes.
- Always wear gloves when handling cable, straps or wire ropes.
- Be sure to check that the travel mode switch is in the TURTLE position.
- Be sure to turn the auto idle/acceleration switch OFF.
- Always slowly drive the machine.
- Do not apply shock loads to the towing rope.
- Never allow anyone to enter between the towing machine and the towed machine while towing.



M1U1-05-001

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

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

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

Max. Traction Force: 480 kN (48960 kgf, 10800 lbf)

- IMPORTANT:**
- Attach a wire tow line around the machine frame as shown to the frame shackle hole using a suitable clevis.
 - Slowly tow, keeping the tow line horizontal and in a straight line with the tracks.
 - When the machine is towed, release parking brakes by operating the travel levers.

DRIVING THE MACHINE

OPERATING IN WATER OR MUD

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

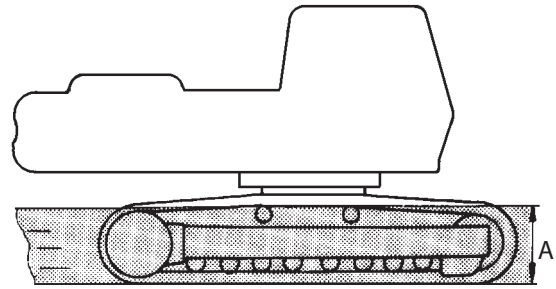
When operating in such conditions, check the machine's position often. Reposition the machine if necessary.

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

If the swing bearing, swing gears and center joint are submerged, remove the drain plug to drain mud and water. Clean swing area. Install plug. Lubricate swing internal gear and swing bearing.

Swing Internal Gear Capacity: 16 to 18 liter (4.2 to 4.8 US gal)

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



M104-05-009

Model	A
ZAXIS650LC-3	1350 mm (53 in)
ZAXIS670LCH-3	

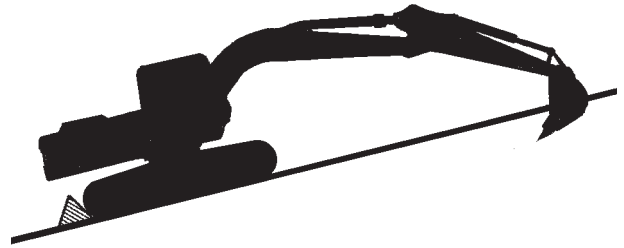
DRIVING THE MACHINE

PARKING THE MACHINE ON SLOPES

WARNING: Avoid parking machine on slopes. The machine may tip over, possibly resulting in personal injury.

If parking the machine on a slope is unavoidable:

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



M104-05-014

PARKING THE MACHINE

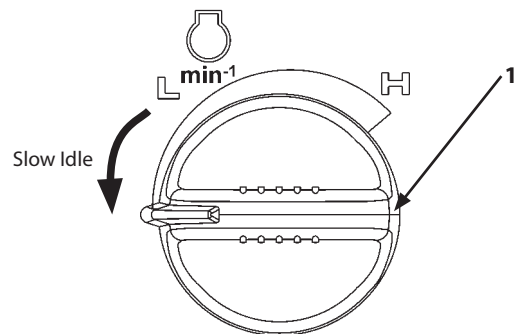
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

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

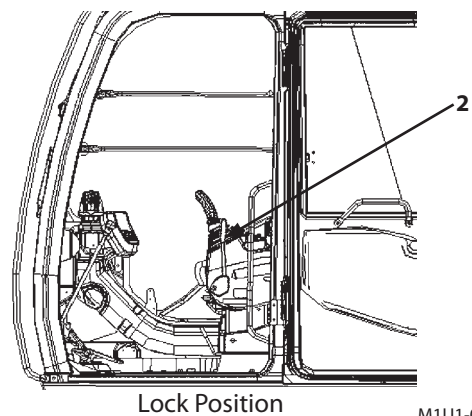
4. Turn engine control dial (1) counterclockwise to the stop (the slow idle position).
Run the engine approximately 5 minutes to cool the engine.
5. Turn the key switch to OFF. Remove the key from the key switch.
6. Pull pilot control shut-off lever (2) to the LOCK position.

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

7. Close windows, roof vent, and cab door.
8. Lock all access doors and compartments.



M1U1-01-033



M1U1-01-025

OPERATING THE MACHINE

CONTROL LEVER (ISO PATTERN)

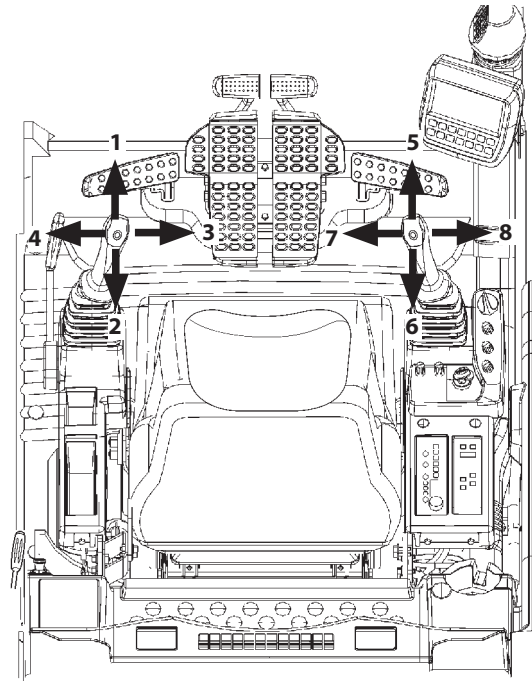
- ⚠ WARNING:** Never place any part of body beyond window frame. It could be crushed by the boom if boom control lever is accidentally bumped or otherwise engaged. If window is missing or broken, replace immediately.
- Prevent possible injury from unexpected machine movement.
- Make sure you know the location and function of each control before operating.

The machine is equipped with a label showing the control patterns of the levers and pedals.

IMPORTANT: When digging, avoid hitting tracks with boom cylinders. When digging over the end of the tracks, travel motors should be at the rear to maximize machine stability and lift capacity.

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

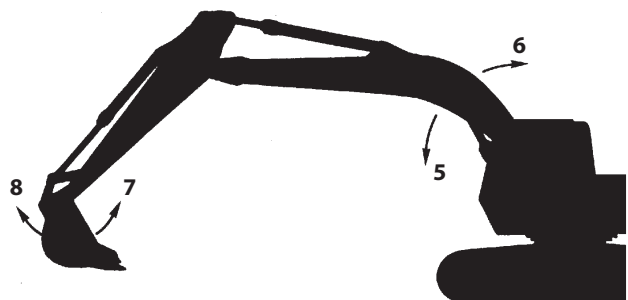
- 1- Arm Roll-Out
- 2- Arm Roll-In
- 3- Swing Right
- 4- Swing Left
- 5- Boom Lower
- 6- Boom Raise
- 7- Bucket Roll-In.
- 8- Bucket Roll-Out.



M1J1-01-022



M104-05-001



M104-05-002

OPERATING THE MACHINE

CONTROL LEVER (HITACHI PATTERN)

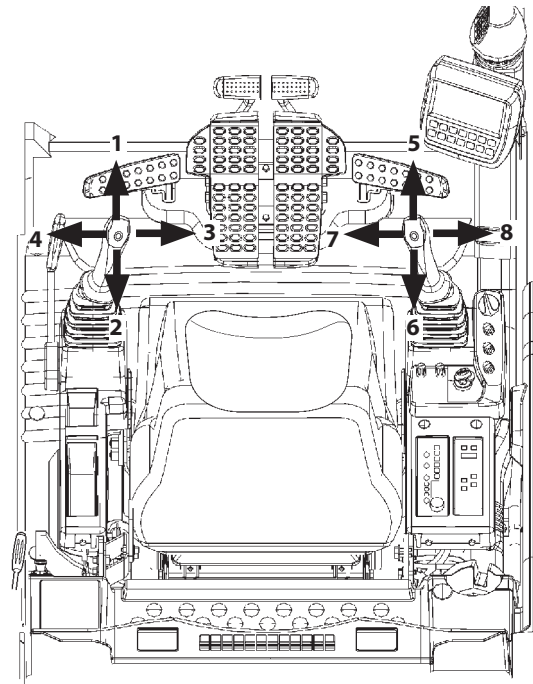
- ⚠ WARNING:** Never place any part of body beyond window frame. It could be crushed by the boom if boom control lever is accidentally bumped or otherwise engaged. If window is missing or broken, replace immediately.
- Prevent possible injury from unexpected machine movement.
- Make sure you know the location and function of each control before operating.

The machine is equipped with a label showing the control patterns of the levers and pedals.

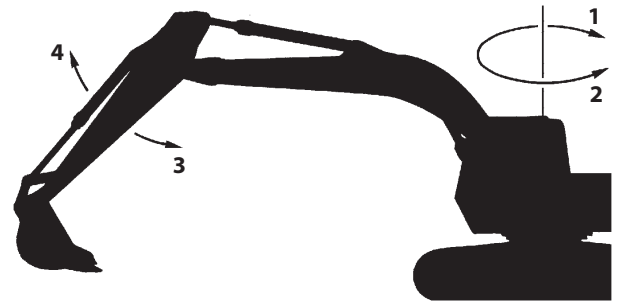
- IMPORTANT:** When digging, avoid hitting tracks with boom cylinders.
- When digging over the end of the tracks, travel motors should be at the rear to maximize machine stability and lift capacity.

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

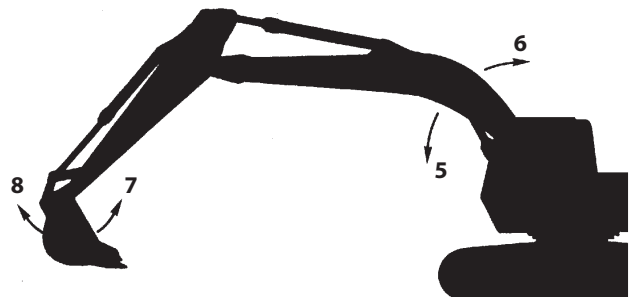
- 1- Swing Right
- 2- Swing Left
- 3- Arm Roll-In
- 4- Arm Roll-Out
- 5- Boom Lower
- 6- Boom Raise
- 7- Bucket Roll-In.
- 8- Bucket Roll-Out.



M1J1-01-022



M104-05-001



M104-05-002

OPERATING THE MACHINE

PILOT CONTROL SHUT-OFF LEVER

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

⚠ WARNING:

- **Always pull pilot control shut-off lever (1) into the full LOCK position. The pilot control shut-off function will not be activated otherwise.**
- **When leaving the machine:**
 - **Stop the engine.**
 - **Then, pull the pilot control shut-off lever up to the LOCK position.**
- **Always check to be sure that the pilot control lever is pulled up to the LOCK position before:**
 - **Transporting the machine.**
 - **Leaving the machine at the end of the shift.**

Pilot Control Shut-Off Lever Operation

Before Leaving the Machine:

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

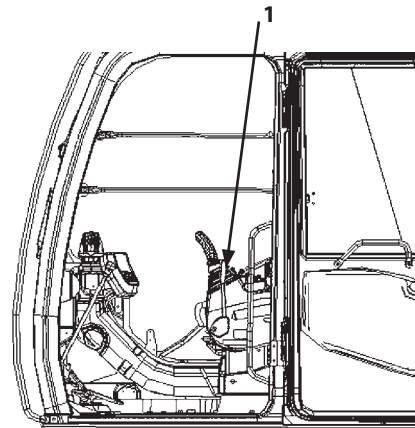
Before Starting Operation:

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

After starting the engine:

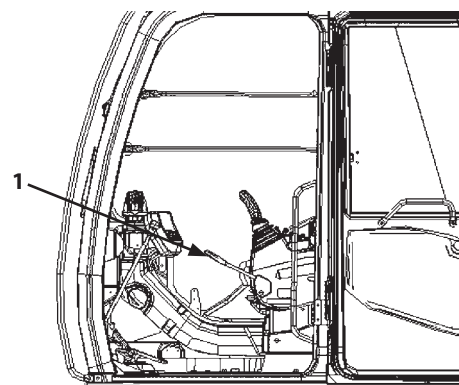
1. Confirm that all control levers and pedals are in neutral and that no part of the machine is in motion.
2. Lower pilot control shut-off lever (1) to the UNLOCK position.

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



LOCK Position

M1U1-01-025



UNLOCK Position

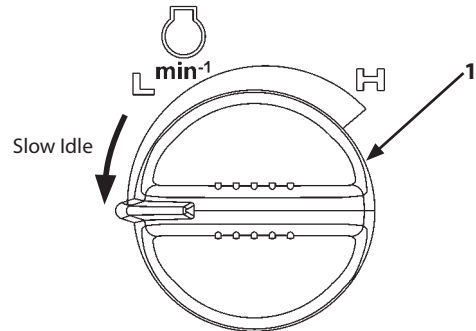
M1U1-01-024

OPERATING THE MACHINE

Warming-up Operation

Warm up the engine coolant as follows:

1. Run the engine with engine control dial (1) turned to the slow idle position.




M1U1-01-033

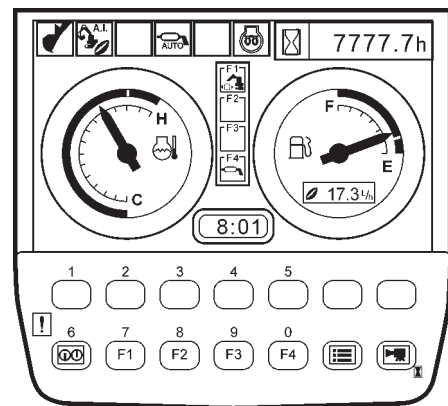
Hydraulic Oil Warm-Up Operation

IMPORTANT: Hydraulic components may be seriously damaged if the machine is operated with hydraulic oil temperature below 30°C (86°F). Always warm hydraulic oil to specifications before operating the machine.

In case the hydraulic oil temperature is lower than 0 °C when starting the engine, the engine speed is automatically increased for approx. 12 minutes to quickly warm up the hydraulic oil.

 **NOTE:** As soon as the hydraulic oil is warmed up to 0 °C even though it is still shorter than 12 minutes, the warm-up operation is automatically complete so that the engine runs at an idle speed.

During auto warm-up operation, if the engine speed is increased more than that of the auto warm-up operation by operating engine control dial (1), the engine runs at the speed set by engine control dial (1).

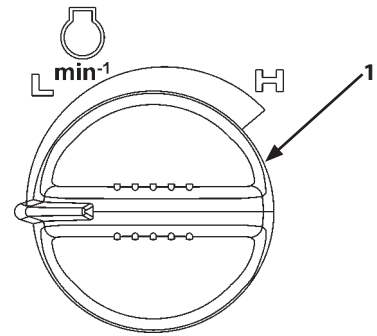


M1J1-05-001

OPERATING THE MACHINE

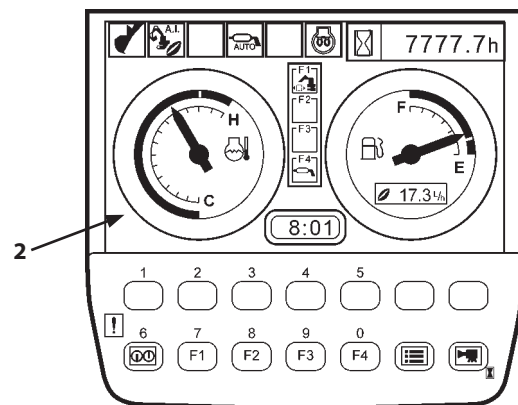
Warming-up the Motor and the Cylinders

- IMPORTANT:**
- In cold weather, be sure to thoroughly warm-up the motors and cylinders.
 - If the hydraulic circuit is continuously relieved for a certain amount of time, the temperature in the control valve would rise excessively. Never operate to stroke end more than 15 seconds. After relieving any function, up to 15 seconds, be sure to have a 5–10 second intermission.



M1U1-01-033

1. Check that the needle of coolant temperature gauge (2) starts moving so that engine coolant warm-up operation is complete.
2. Turn engine control dial (1) to the medium position.
3. Operate the boom, arm and bucket cylinders slowly to each stroke end several times.
4. Operate travel and swing functions slowly, initially moving only short distances.
5. Continue to repeat steps 3 and 4 until bucket cycle time is normal.



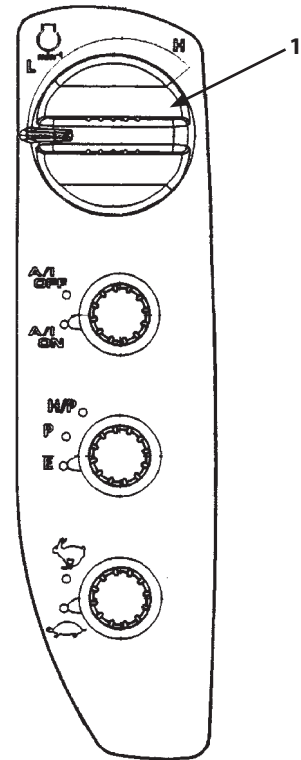
M1J1-05-001

OPERATING THE MACHINE

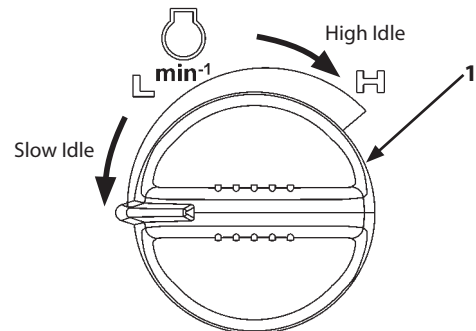
ENGINE SPEED CONTROL

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

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



M1V1-01-001



M1U1-01-033

OPERATING THE MACHINE

AUTO-IDLE

With auto-idle selector (3) turned to the A/I ON position, approximately 4 seconds after all control levers are returned to neutral, the engine speed decreases to the auto-idle setting to save fuel consumption. The engine speed will immediately increase to the speed set by engine control dial (2) when any control lever is operated.

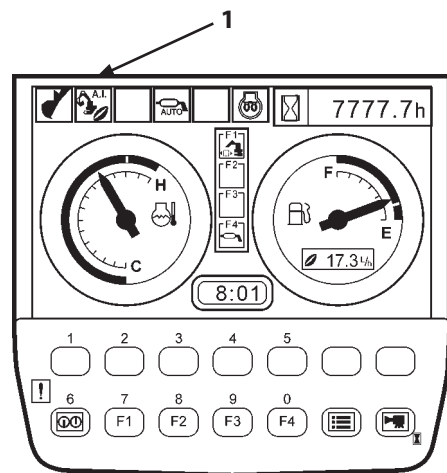
- IMPORTANT:**
- Always check if auto-idle indicator (1) is turned on or off before starting operation. If the indicator is on, the auto-idle function will be activated.
 - Always be aware of engine control dial setting when auto-idle selector (3) turned to the A/I ON position. If the engine speed is set high with engine control dial (2), and if the operator is not aware of the high engine speed setting, the engine speed will unexpectedly increase when any control lever is operated, causing unexpected machine movement, thus possibly resulting in serious personal injury.

WARNING: Prevent the machine from unexpected movement. Be sure to turn off auto-idle selector (3) when unexpected machine movement is undesirable, especially when loading/unloading the machine for transportation.

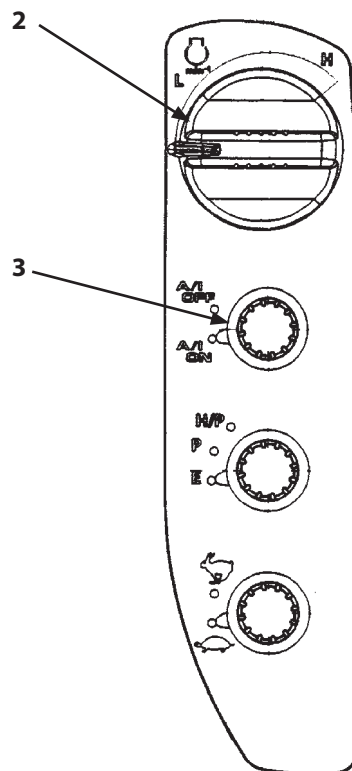
Note that auto-idle function can be turned on or off only when the key switch is in ON position. Always check if the auto-idle function is turned on or off with auto-idle indicator (1).

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

- When auto-idle selector (3) is turned OFF with auto-idle indicator (1) ON, indicator (1) will go OFF and the auto-idle system is deactivated.
- Even if the engine is stopped by turning the key switch with auto-idle selector (3) in the A/I ON position [indicator (1) ON], the auto-idle system is not deactivated. When the engine is restarted, the auto-idle system remains activated, allowing auto-idle indicator (1) to flash for 5 seconds and stay ON later.



M1J1-05-001



M1V1-01-001

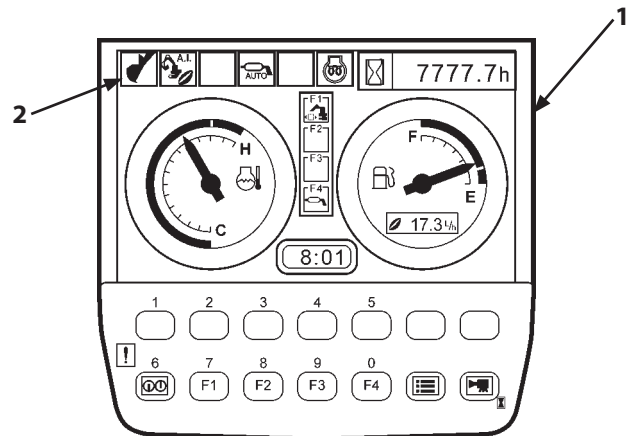
OPERATING THE MACHINE

WORK MODE

Five work modes can be selected for most appropriate front and swing speeds for the work to be performed.

When the engine is started, the digging mode is automatically set. Each time work mode switch is pressed, the five following modes are selected alternately.

- Digging Mode
- Breaker 1
- Breaker 2
- Breaker 3
- Breaker 4



M1J1-05-001

The selected work mode is indicated by attachment mode indicator (2) of basic screen (1). Select the work mode corresponding to the work in which the machine is engaged while referring to the table below.

	Work Mode	Description
	Digging Mode	Designed for general digging and truck loading.
	Breaker 1 Mode ※1 (Initial Setting Flow Rate 230L/min)	Select this mode switch when using FURUKAWA HB40G.
	Breaker 2 Mode ※1 (Initial Setting Flow Rate 260L/min)	Select this mode switch when using NPK E-235 or OKADA OUB 324 respectively.
	Breaker 3 Mode ※1 (Initial Setting Flow Rate 300L/min)	Select this mode switch when using FURUKAWA F70.
	Breaker 4 Mode ※1 (Initial Setting Flow Rate 320L/min)	Select this mode switch when using FURUKAWA HB50G.

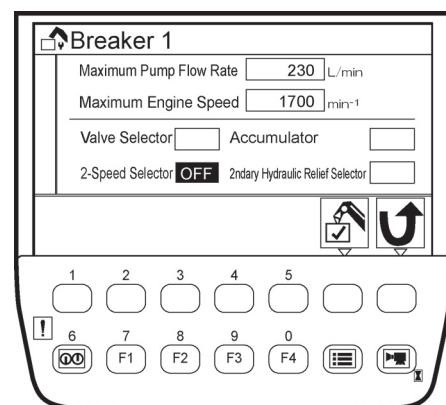
※1 When using hydraulic crusher, select the breaker mode 1, 2, 3, or 4 when the flow rate of the crusher corresponds to the breaker mode 1, 2, 3, or 4.

NOTE: Five work modes shown above are designated as the standard specifications. Up to four attachment modes other than the digging mode can be designated. Consult your nearest Hitachi dealer for adding or changing the designation of the attachment modes.

As for the machine equipped with the flow combined piping, when the flow combining valve is set to two pump combined, flow rate becomes the flow rate of selected breaker mode + pump 1.

When using hydraulic breaker or crusher, if required setting flow rate is insufficient, see your nearest authorized dealer for correct information.

As for the machine equipped with the flow combined piping, switch the flow combining valve to the suitable position for the usage. (Refer to the flow combining valve operation of Chapter 13 in detail.)

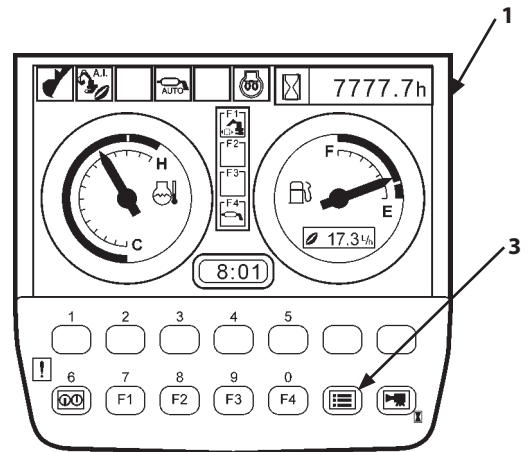


T1J7-05-02-001E

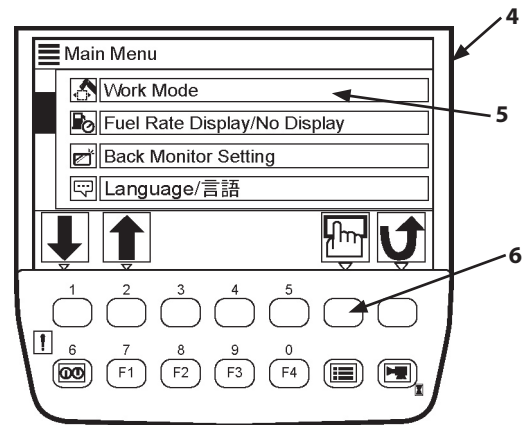
OPERATING THE MACHINE

WORK MODE SELECT

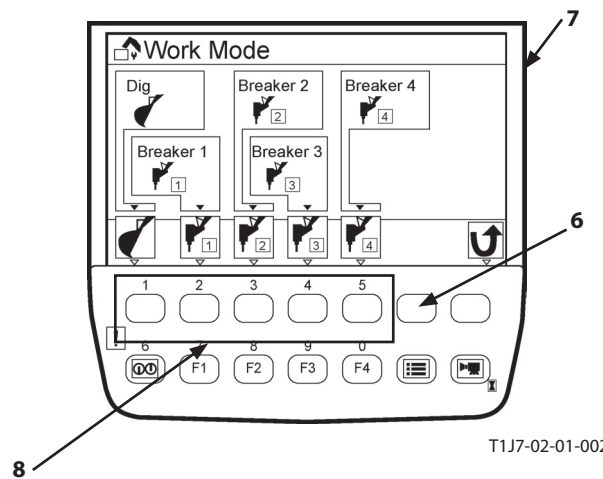
Press menu key (3) on basic screen (1) to display main menu screen (4). Select work mode (5) by operating \downarrow \uparrow key on menu screen (4). Then, press determination key (6). Select the work mode matching the work to be done by pressing bottom key (8) on work mode selection screen (7). Then, press determination key (6).



M1J1-05-001



M1J5-05-002



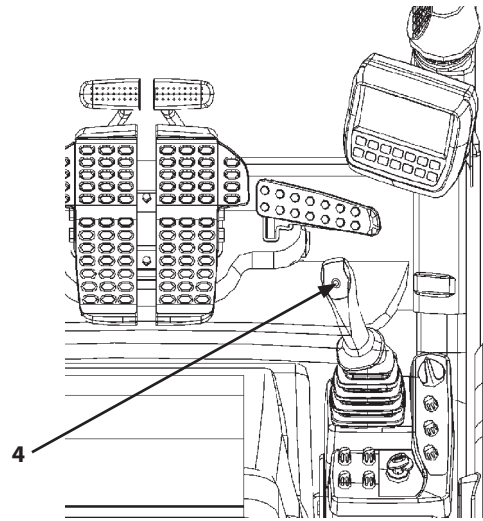
T1J7-02-01-002E

OPERATING THE MACHINE

POWER BOOST

The power boost switch (4) is used to gain maximum digging power, and is located on the top of the right control lever.

When the power boost switch (4) is pushed, increased front attachment power will be supplied for about 8 seconds.



M1J1-01-024

OPERATING THE MACHINE

POWER MODE

One of three engine speed modes, E, P or H/P mode, can be selected using power mode switch (1).

- E (Economy) Mode

Even if the engine speed is reduced in the E mode, digging force remains unchanged from that in the P mode. Although production is reduced slightly more than in the P mode, the fuel consumption and noise levels are reduced, allowing the machine to operate most efficiently.

- P Mode

Operate the machine in this mode when performing normal work.

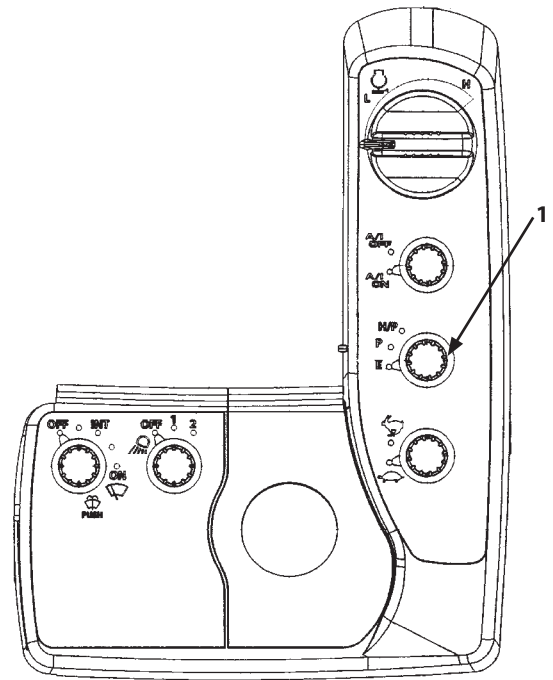
- H/P (High Power) Mode

⚠ WARNING: In the H/P mode, the engine speed will change quickly. To ensure safety, be sure to turn power mode switch (1) to the P or E mode position before starting such works as loading the machine on or off a trailer or lifting a load with the front attachment, which may result in personal accidents if the engine speed is suddenly changed.

When rolling in the arm while digging deep trenches for example, more power may be required. In such cases, use the H/P mode. The maximum power of the machine can be utilized in this mode, increasing work efficiency when more power is required than in the P mode.

The H/P mode is activated and the engine speed is increased when the boom raise or the arm rolled-in operation is made with the engine fast idle speed set at $1650 \text{ min}^{-1} \pm 50$.

✎ NOTE: In the H/P mode, the engine speed changes depending on load applied to the machine.

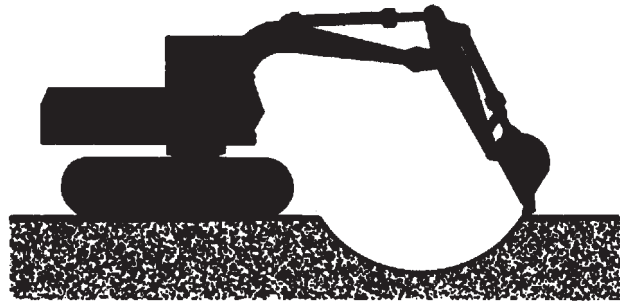


M1U1-01-015

OPERATING THE MACHINE

OPERATING BACKHOE

1. Place the bucket teeth on the ground with the bottom of the bucket at a 45 degree angle to the ground.
2. Pull the bucket toward the machine using the arm as the main digging force.
3. When soil sticks to the bucket, remove it by moving the arm and/or bucket rapidly back and forth.
4. When trenching a straight line, position the tracks parallel to the trench. After digging to the desired depth, move the machine as required to continue the trench.



M107-05-037

IMPORTANT: When lowering the boom, avoid sudden stops that may cause shock load damage to the machine.

When operating the arm, avoid bottoming the cylinder to prevent cylinder damage.

When digging at an angle, avoid striking the tracks with the bucket teeth.

When digging a deep excavation, avoid striking the boom or bucket cylinder hoses against the ground.

GRADING OPERATION

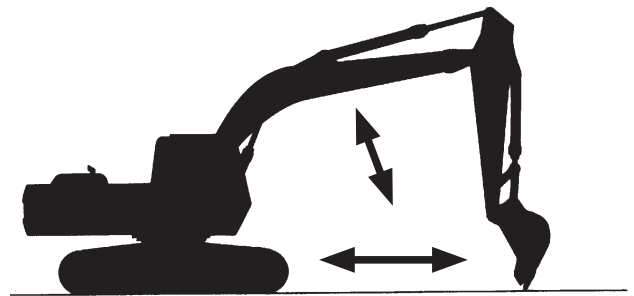
WARNING: Do not pull or push dirt with the bucket when traveling.

Select grading mode when finishing work is required.

Position the arm slightly forward of the vertical position with bucket rolled back, as shown.

Operate arm roll-in function while slowly raising the boom. Once the arm moves past, the vertical position slowly lower the boom to allow the bucket to maintain a smooth surface.

Grading operation can be more precisely done by operating the boom, arm and bucket simultaneously.



M104-05-017

OPERATING THE MACHINE

PRECAUTION FOR ARM ROLL-IN/ BUCKET ROLL-IN COMBINED OPERATION

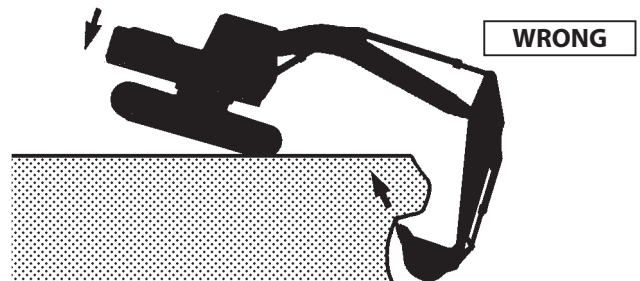
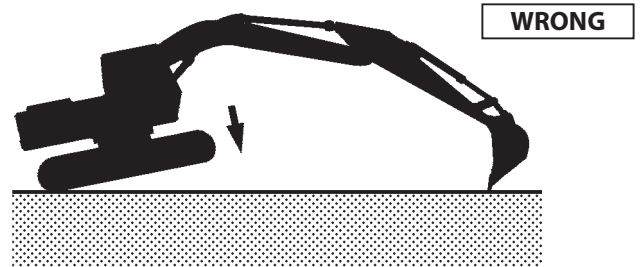
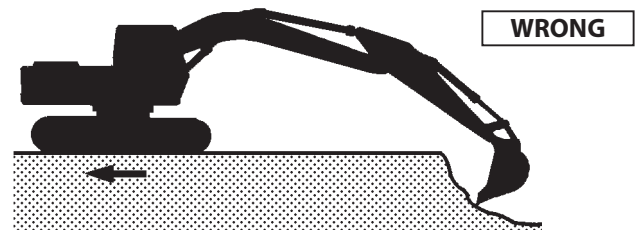
- ⚠ WARNING:** The bucket teeth will hit the boom if the bucket is rolled in with the arm fully rolled in, as illustrated.
- When performing combined operation of arm roll-in/bucket roll-in or when rolling in the bucket with the arm fully retracted, be careful not to hit the boom with the bucket teeth.



M111-05-002

AVOID ABUSIVE OPERATION

- ⚠ WARNING:** Do not use travel as an additional digging force. Severe machine damage may result.
- Do not raise rear of machine to use the machine's weight as additional digging force. Severe machine damage may result.



M104-05-018

OPERATING THE MACHINE

OPERATING TIPS

Do not hit the track with the bucket when digging. Whenever possible, position your machine on a level surface. Do not use the bucket as a hammer or pile driver. Do not attempt to shift rocks and break walls using swing motion.

! WARNING: To avoid damaging cylinders, do not strike the ground with the bucket nor use the bucket for tamping with the bucket cylinder fully extended (the bucket completely curled under).

Adjust the length and depth of each cut to produce a full bucket with every pass. Full loads on every pass is more productive than a faster cycle with a partially filled bucket. Full load should be the first objective, followed by speed, to increase productivity.

! WARNING: Do not attempt to break ledge rock by extending the arm to maximum reach and dropping the front of the bucket on the bucket teeth for penetration. Serious damage to the machine can result.

Once the trench is open, ledge rock can be broken by pulling the bucket up under the layers. The top layers are pulled out first, with one or two layers being lifted at a time. Do not side load the bucket. For example, do not swing the bucket to level material or do not strike objects from the side with the bucket.

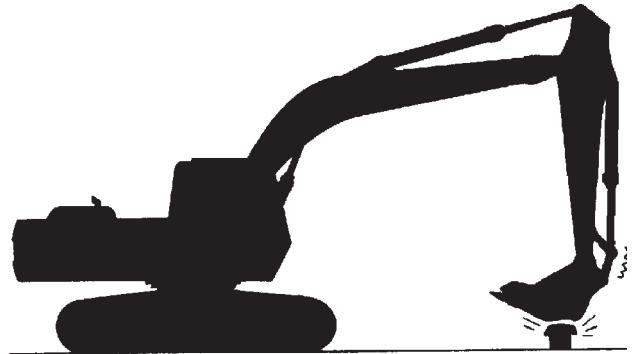
SELECT CORRECT TRACK SHOES

IMPORTANT: Using wide track shoes on rough ground may result in shoe bending and/or loosening, and may damage other undercarriage components.

Never use wide track shoes on rough ground such as rocks, sand or gravel. Wide track shoes are designed for soft ground.

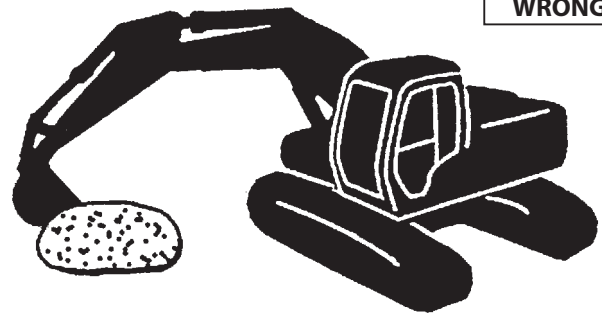
Track shoe bolts should be checked periodically for tightness.

WRONG



M104-05-019

WRONG



M161-05-006

OPERATING THE MACHINE

OBJECT HANDLING --- IF EQUIPPED

WARNING: When using machine for object handling operation, be sure to comply with EN 474-5, which prescribes that the machine must be equipped with the rated lifting-load table, lifting hook, overload alarm device, and hose rupture safety valve when applied to object handling.

Lifting hook, cables, straps, or ropes can break, causing serious injury. Do not use damaged chains, lifting hook, frayed cables, slings, straps, or ropes to crane.

Never move the load suddenly. Never move load over a person's head. Do not allow any persons near load.

Keep all persons away from raised load until blocks are supporting it or load is sitting on the ground.

Position upperstructure so that the travel motors are at the rear.

Do not attach sling/chain to the bucket teeth.

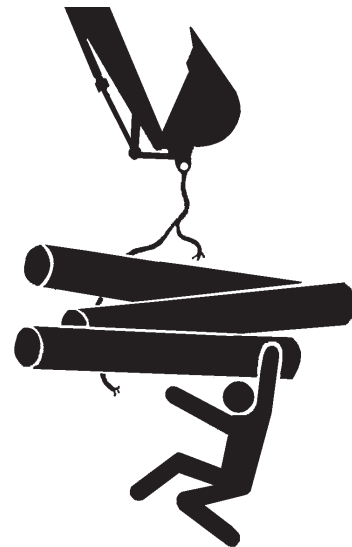
Be sure that the maximum lifting load does not exceed the rated load as shown in the lifting load table plate or operator's manual.

The overload alarm device warns the operator with a buzzer sound when the lifting load exceeds the lifting capacity. If the buzzer sounds, immediately move the load into the safety range, or lower the load on the ground.

Be sure to turn the overload alarm device switch ON while the machine is used for object handling.

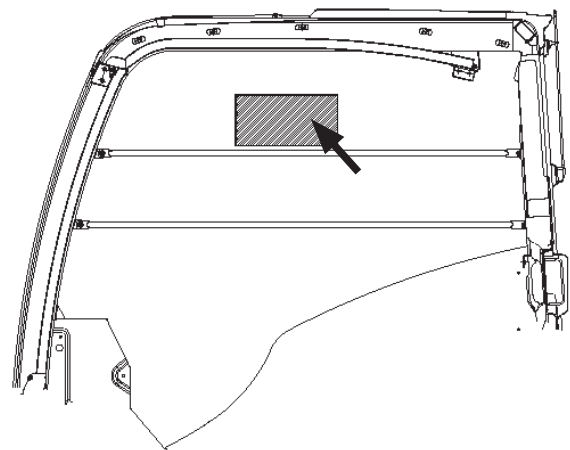
When the machine specifications are modified from the original specifications of the machine delivered, for example, changing the front attachment or track shoes, changing or new installing the overload alarm device may be require. Be sure to consult your authorized Hitachi dealer.

Check that the specifications of the front and machine to be used meet the specifications shown on the rated lifting load table. If any discrepancies between them are found, replace the rated lifting load table so that no discrepancy is found.

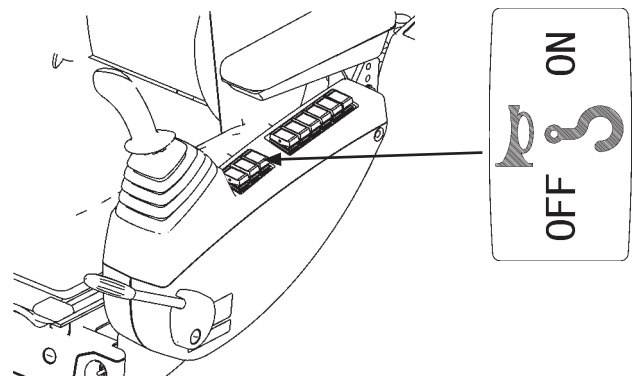


Rated lifting load table

SA-014



M1U1-05-004



M1J1-03-001

M1U1-01-010

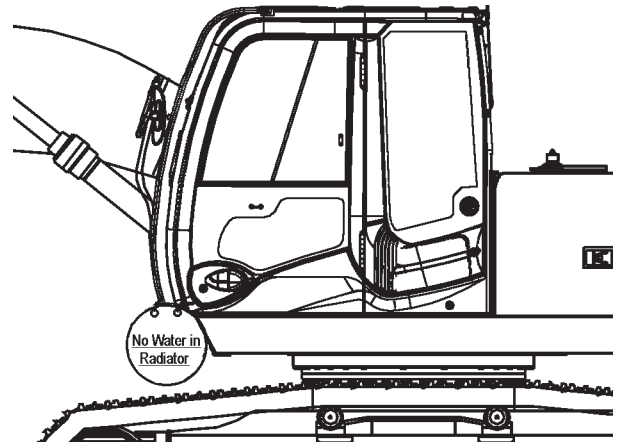
OPERATING THE MACHINE

1. Secure sling/chain tightly to the load being lifted. Wear gloves when securing sling/chain.
2. Fasten sling/chain to bucket loop, with the bucket curled and arm retracted.
3. Coordinate hand signals with your signal man before starting.
4. Be aware of the location of all persons in the working area.
5. Attach a hand line to load and make sure person holding it is well away from load.
6. Before lifting, test your load.
 - Park your machine close to load.
 - Attach load to the machine.
 - Raise load 50 mm above the ground.
 - Swing the load all the way to one side.
 - While keeping load close to the ground, move it away from machine.
 - If there is any indication of reduced stability of your machine, lower load to the ground.
7. Lift load only as high as necessary.

OPERATING THE MACHINE

OVERNIGHT STORAGE INSTRUCTIONS

1. After finishing the day's operation, drive the machine to a firm, level ground where no possibility of falling stones, ground collapse, or floods.
Park the machine referring to the "PARKING THE MACHINE" in the "DRIVING THE MACHINE" section.
2. Fill the fuel tank with fuel.
3. Clean the machine.
4. If anti-freeze or long life coolant is not used in cold weather, be sure to drain coolant from the radiator and the engine jacket. Also, be sure to put a tag in a visible place if the coolant has been drained.



M1J5-05-004

OPERATING THE MACHINE

MEMO

A series of horizontal dotted lines for taking notes.

ASSEMBLING

PRECAUTIONS FOR ASSEMBLING

- Worker's Clothing
 - (1) Wear clothing appropriate for the job.
 - (2) Wear safety equipment such as a hard hat, and safety shoes.
- Conferring Work Process
Thoroughly confer with all related personnel on the entire work process, the role assigned to each, and precautions to ensure safety.
- Coordinating Signal System, and Appointing Signal Person
Before starting, be sure to coordinate the signal system to be used.
Appoint one qualified signal person (if a multiple number of signal persons are used, different signals may confuse the workers, possibly causing an accident). All workers should obey the signals only from one signal person.
- Secure flat space more than 10 m (11 yd) square enough to assemble the machine.
- Check that footing is strong enough to support the machine weight. If required, repair the footing sufficiently so that the machine can be kept in a horizontal position.
- Assembly work may cause the potential for personal injury. Before starting, be sure to prepare completely, including arranging all necessary tools. Never fail to prepare the following equipment and tools.

Essential Equipments and Tools

- A 25-ton class lifting capacity crane
- Wire ropes to sling the machine
- Shackles
- Slings protectors (Soft Pads)
- 100 mm (4 in) square lumber
- 10 pound hammer
- Standard tools
- Grease

ASSEMBLING

- Bolt Tightening Torque Specifications

Bolt Location	Bolt Size	Torque		
		N•m	(kgf•m)	(lbf•ft)
Counterweight mounting bolt	M45	2800	(280)	(2030)
Counterweight lock plate securing bolt	M24	700	(70)	(505)
Pin lock securing bolt	M20	400	(40)	(290)
Hose connecting bolt	M14	180	(18)	(130)

- Precautions for Tightening Bolts

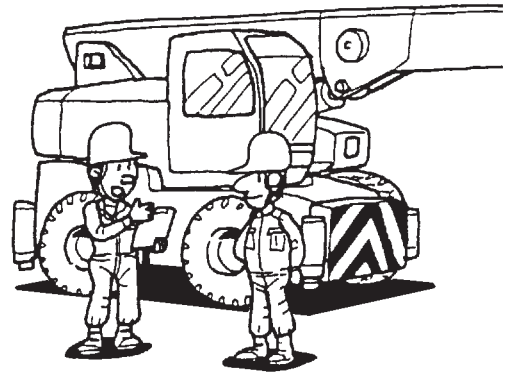
Use a torque wrench to tighten bolts to specifications. After tightening bolts to specification, mark the tightened bolt head to ensure that all the bolts have been tightened.

Be sure to use Hitachi original bolts. If the bolt length is too long or short, the bolt will not be tightened correctly, possibly inducing an accident

ASSEMBLING

PRECAUTIONS FOR SLINGING WORK

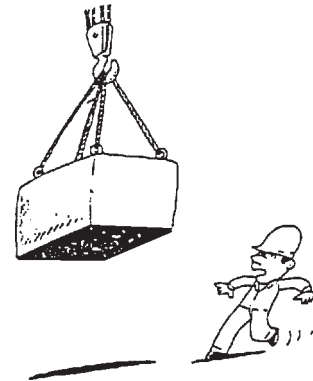
- Coordinating Signal System, and Appointing Signal Person
Before starting, be sure to coordinate signal system to be used. Appoint one qualified signal person only (if a multiple number of signal persons are used, different signals may confuse the workers, possibly causing an accident). All workers should obey signals only from one signal person.



M324-07-171

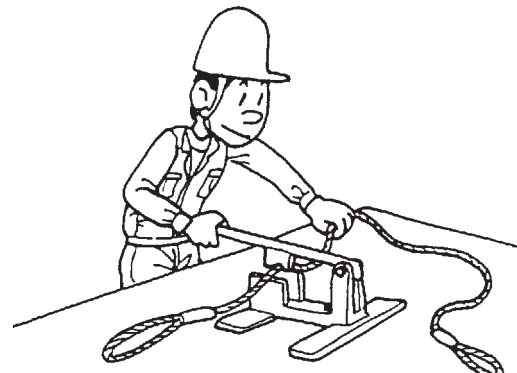
- When attaching a wire rope to the lifting parts/components, always use slinging protectors between the wire rope and the lifting parts/components to prevent damage.

- Precautions for Lifting
 - Always use a hook with a latch.
 - Use only slinging wire ropes and chains that are strong enough.
 - Never allow the lifted load to pass over any persons.
 - Never allow anyone under the lifted load.



M324-07-173

- Rectifying Twisted Wire Rope
Rectify the twist or bend of the wire ropes after the work. Store the wire ropes in a specified place.



M324-07-174

ASSEMBLING

PRECAUTIONS FOR OPERATING MACHINE

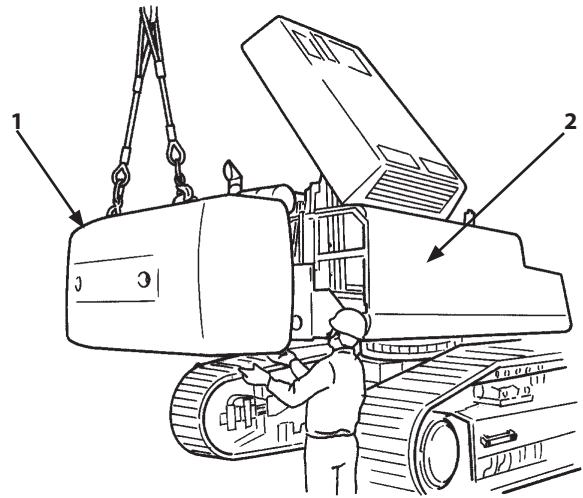
- General Precautions for Operating Machine
 - Always be seated in the operator's station when operating the machine.
 - Before starting the engine, or driving or swinging the machine, check that there are no bystanders or obstructions around the machine. Use the horn or other signals to warn the bystanders.
 - If visual sight is obstructed, be sure to use a signal/guide person. Always keep the signal/guide person in view.
 - Thoroughly learn and coordinate the meanings of all signs and signals. Appoint one qualified signal/guide person.
 - Keep bystanders or obstructions away from the operating area of the machine.
- Driving the Machine Safely
 - Always be alert for the safety of bystanders.
 - Before driving the machine, find out which way to move the travel levers for the direction you want to drive the machine.
- Avoid Injury from Back-Over and Swing Accident
 - During swing or backing up operation, operator's visual sight is obstructed, leading to a potential accident. If visual sight is obstructed, use a signal/guide person.
 - Always check that everyone is kept away from the operating area of the machine before swinging or backing up the machine.
 - Use the horn or signals to warn bystanders not to enter into the operating area of the machine.

ASSEMBLING

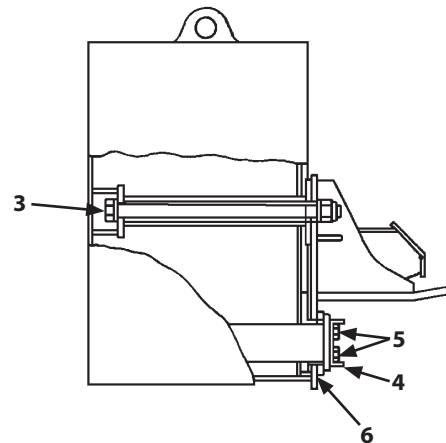
INSTALLING COUNTERWEIGHT

WARNING: Never allow anyone to enter into the area under the lifted counterweight.

1. Lift counterweight (1) using a crane.
2. Insert the convex bosses of counterweight (1) into holes on the back face of base machine (2). Tighten bolts (3).
Tightening torque: 2800 N·m (280 kgf·m, 2030 lbf·ft)
3. Install plates (6) and lock plates (4) onto the convex boss surfaces, and tighten them with bolts (5).
Tightening torque: 700 N·m (70 kgf·m, 510 lbf·ft)
4. Bend the corners of lock plates (4) to prevent bolts (5) from loosening.



M116-07-024



M116-07-020

ASSEMBLING

INSTALLING BOOM CYLINDER

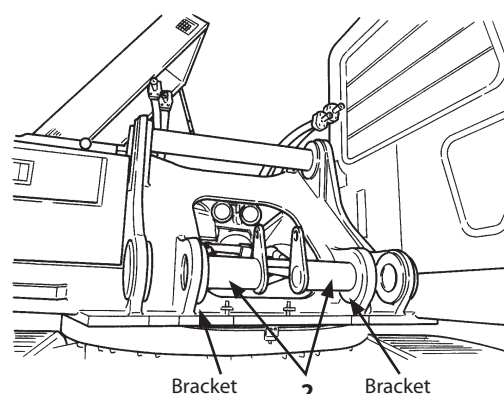
IMPORTANT: Take care not to mix up the right and left cylinders. Install the cylinder with the cylinder piping positioned downward.

1. Pull out the boom foot pin (2) until the end of the pin is flush with the inside end of the bracket.
2. Apply a film of grease to pin (2).
3. Lift up left-hand boom cylinder (3) with a crane.

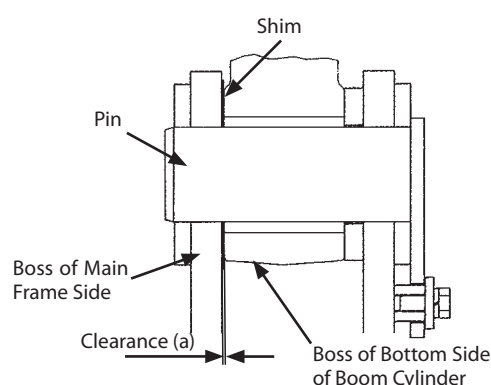


WARNING:

- When aligning the centers of the pin and pin hole, never put fingers into the pin hole.
 - When using a hammer, wear safety equipment such as safety glasses or a hard hat to protect against injury from flying pieces of metal.
 - When inserting the pin, never enter into the area under the boom cylinder.
4. Align the boom cylinder bottom hole with the boss hole on the frame. Measure clearance "a." If clearance "a" is 4 mm (0.16 in) or more, remove the shim on the pin and install it, as illustrated.

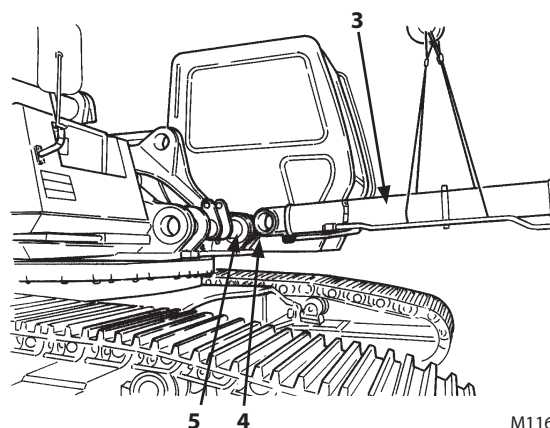


M116-07-025



M1J1-06-017

5. Align pin hole (4) on the bottom side of the boom cylinder with pin hole (5) on the main frame to drive pin (2). Take care not to damage the seal at this time.
6. Tighten bolt (6) to secure pin lock plate (1). Tightening torque: 400 N·m (40 kgf·m, 290 lbf·ft)
7. After installing the bottom side of the left-hand boom cylinder to the main frame, lay the rod side of the boom cylinder onto supporting stand (7).
8. Install the right-hand boom cylinder in the same procedure as taken in the steps 2 to 5 above.

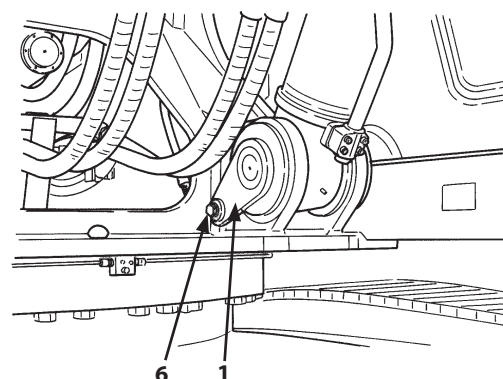


M116-07-026



WARNING:

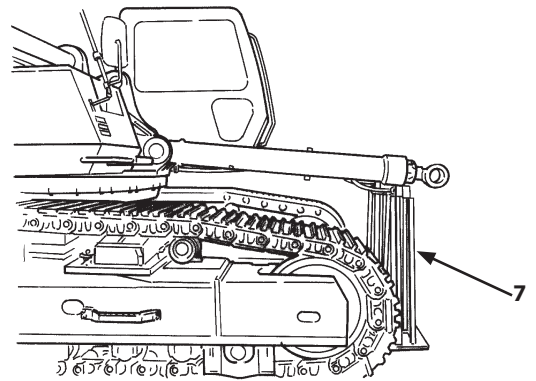
- Stop the engine. Move the control levers back and forth, and right and left several times to release the remaining pressure in the hydraulic line.
 - Before connecting hoses between the boom cylinder and the machine, gradually loosen bolts securing the covers to the ends of the hydraulic piping on the machine to release the trapped oil pressure in the piping.
9. Gradually loosen bolts securing the covers to the ends of the hydraulic piping on the machine to release the trapped oil pressure in the piping. Then, remove the covers.



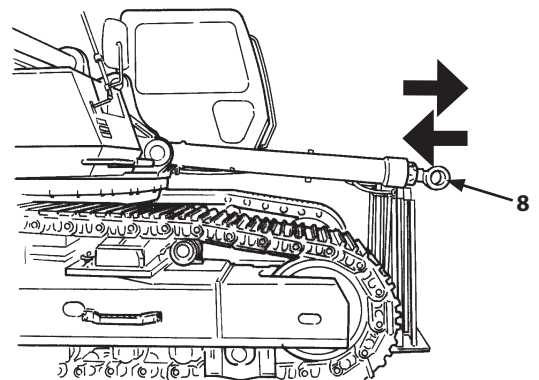
M116-07-027

ASSEMBLING

10. Connect four hoses between both the right and left boom cylinders and the machine.
Tightening torque: 180 N·m (18kgf·m, 130 lbf·ft)
11. To prevent the seal from damage, bleed the air from the boom cylinder in the following procedures:
 - (1) Run the engine at slow speed.
 - (2) Slowly extend or retract boom cylinder rod (8).
 - (3) Repeat the same operation of the step 2 above until cylinder rod (8) moves smoothly.



M116-07-028



M116-07-028

ASSEMBLING

INSTALLING BOOM

WARNING: Never allow anyone to enter into the area under a lifted boom (2).

1. Pull out the boom foot pin (1) until the end of the pin is flush with the inside end of the right side bracket.
2. Apply a film of grease to pin (1).
3. Lift up boom (2) with a crane.

NOTE: Connect a chain block to one side wire rope (3) to adjust the wire rope length to position the boom easily.

4. Make a mark appointing the outer fringe of the boom foot boss on the inside surface of the boom mounting bracket of the mainframe, so that the boom can be easily installed on the mainframe.

WARNING:

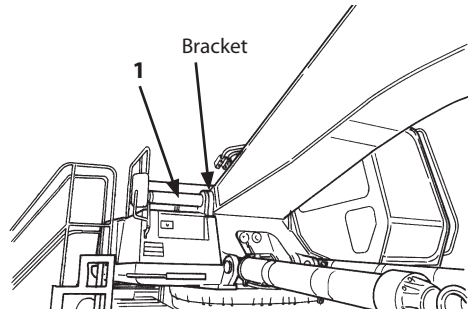
- When aligning the center of the pin and pin hole, never put fingers into the pin hole.
- When using a hammer, wear safety equipment such as safety glasses or a hard hat to protect against injury from flying pieces of metal.
- When inserting the pin, never enter into the area under the boom.

5. Align the boom bottom hole with the boss hole on the frame. Measure clearance "a." If clearance "a" is 1 mm or more, remove the shim on the pin and install it on the cab side, as illustrated

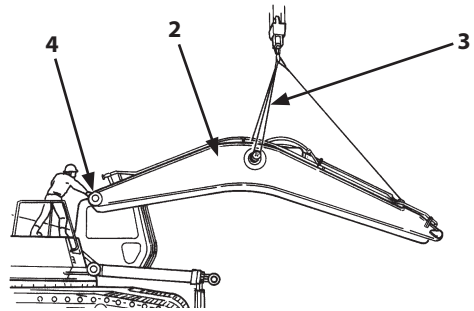
6. Push boom foot pin (1) in. (Refrain from driving the pin in with a hammer if possible. The pin can be easily inserted by hand if alignment, of the pin and pin hole, is correct.)

7. Secure boom foot pin (1) with plate (5) and bolts (6).
- Bolt tightening torque: 400 N·m (40 kgf·m, 290 lbf·ft)

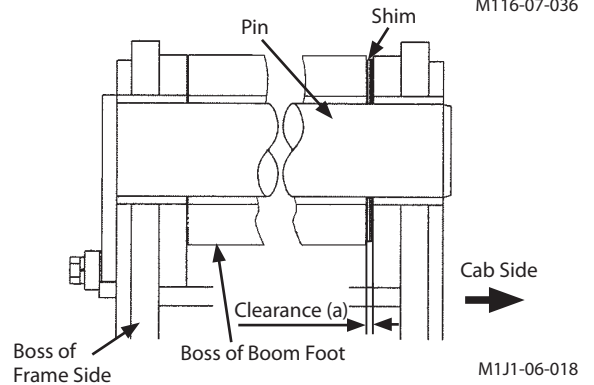
8. Lower the boom tip to the ground.



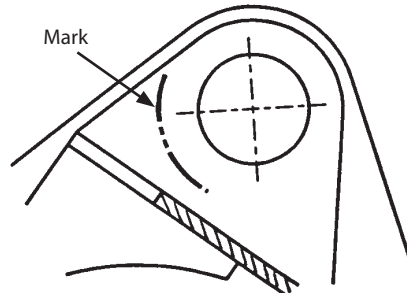
M116-07-113



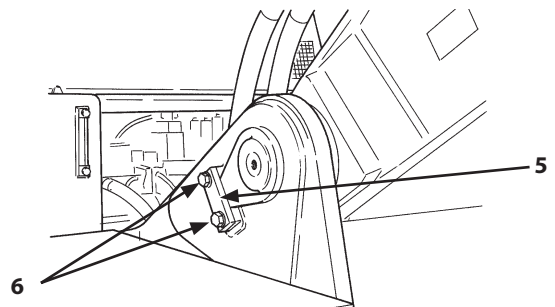
M116-07-036



M1J1-06-018



M116-07-121



M116-07-030

ASSEMBLING

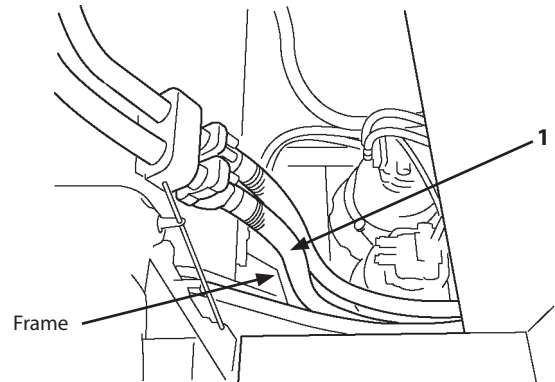
CONNECTING HOSES BETWEEN BOOM CYLINDER AND MACHINE



WARNING:

- Stop the engine. Move the control levers back and forth, and right and left several times to release the remaining pressure in the hydraulic line.
- Before connecting hoses between the boom cylinder and the machine, gradually loosen bolts securing the covers to the ends of the hydraulic piping on the machine to release the trapped oil pressure in the piping.

1. Gradually loosen bolts securing the covers to the ends of the hydraulic piping on the machine to release the trapped oil pressure in the piping. Then, remove the covers.
2. Connect four hoses between both the right and left boom cylinders and the machine.
3. Check that hose (1) does not come into contact with the area on the frame. Hose (1) may come into contact with the swing device when the boom cylinder is extended most



M1J7-06-002

ASSEMBLING

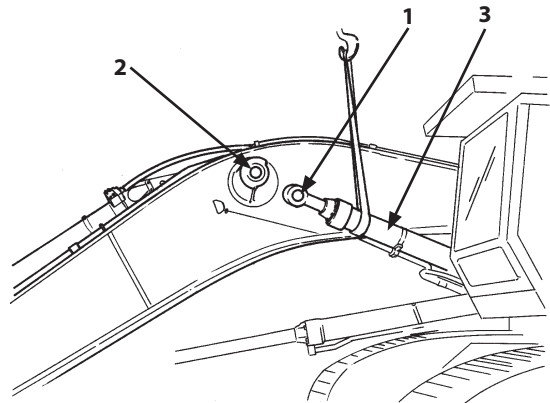
INSTALLING BOOM CYLINDER ROD

1. Sling left-hand boom cylinder (3) with a crane.
2. Align the rod-pin bore of the boom cylinder (3) with that of boom (2) by moving the boom cylinder up and down while extending or retracting cylinder rod (1).

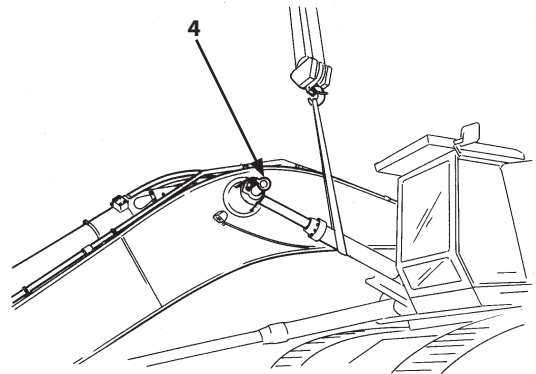


WARNING:

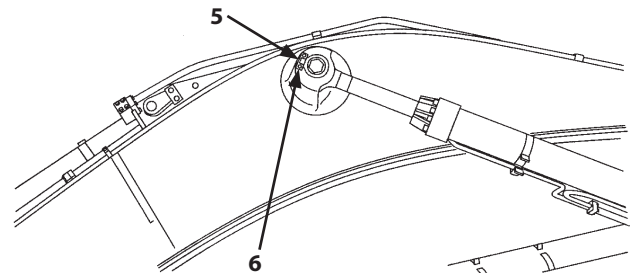
- When aligning the centers of the pin and pin hole, never put fingers into the pin hole.
 - When using a hammer, wear safety equipment such as safety glasses or a hard hat to protect against injury from flying pieces of metal.
 - When inserting the pin, never enter into the area under the boom cylinder rod.
3. After driving pin(4) into the pin bore, install pin lock plate (5) onto the left end (the side to which the cylinder rod has been installed) of the pin with bolts (6).
Tightening torque: 400 N·m (40 kgf·m, 290 lbf·ft)
 4. Install the right-hand boom cylinder rod in the same procedure used in the steps 2 to 3.



M162-06-022



M162-06-021



M162-06-033

ASSEMBLING

INSTALLING ARM

WARNING: Never allow anyone to enter into the area under the lifted arm (2).

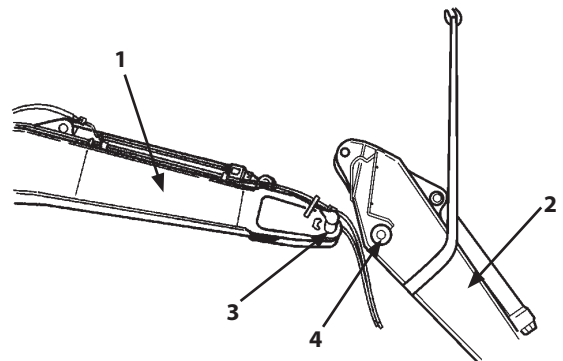
1. Apply grease to boom (1) and arm (2) connecting pin (3).
2. While slinging arm (2) with a crane, align pin hole (4) of arm (2) with that of boom (1).
3. Install the plate between boom (1) and arm (2). Align the boom (1) bottom hole with the boss hole on the arm (2). Measure clearance "a." If clearance "a" is 1 mm (0.04 in) or more, remove the shim on the pin and install it, as illustrated



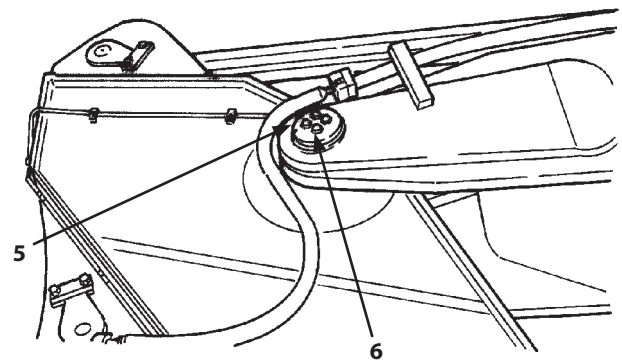
WARNING:

- When aligning the centers of the pin and pin hole, never put fingers into the pin hole.
- When using a hammer, wear safety equipment such as safety glasses or a hard hat to protect against injury from flying pieces of metal.
- When inserting the pin, never enter into the area under the arm.

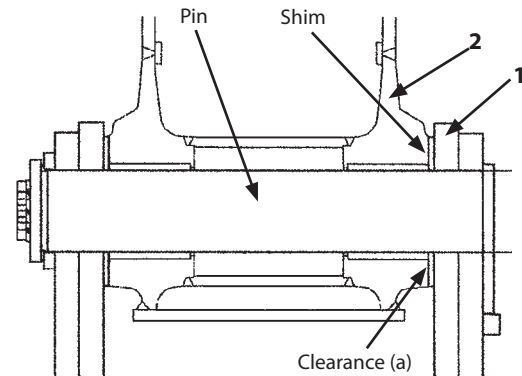
4. Drive the pin into the arm and boom holes.
5. Insert pin lock plate (5) with bolts (6).
Tightening torque: 400 N·m (40 kgf·m, 290 lbf·ft)



M1J1-06-019



M1J1-06-020



M1J1-06-021

ASSEMBLING

CONNECTING ARM CYLINDER ROD

1. To prevent seals from damage, bleed the air from the arm cylinder according to the following procedures.
 - (1) Start the engine and run it at slow speed.
 - (2) Sling arm cylinder (2) with a crane. Slowly extend and retract rod (1).
 - (3) Repeat operation in step 2 until cylinder rod (1) moves smoothly.
2. Align rod-pin bore (3) of the arm cylinder (2) with pin (4) on the arm by moving the arm cylinder (2) up and down while extending or retracting the cylinder rod.

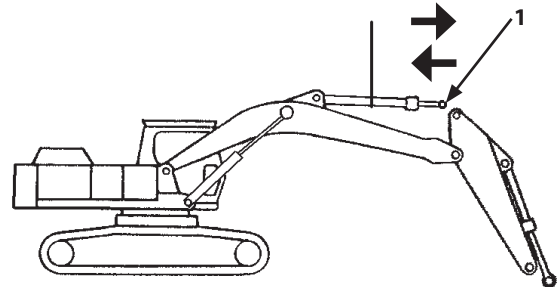


WARNING:

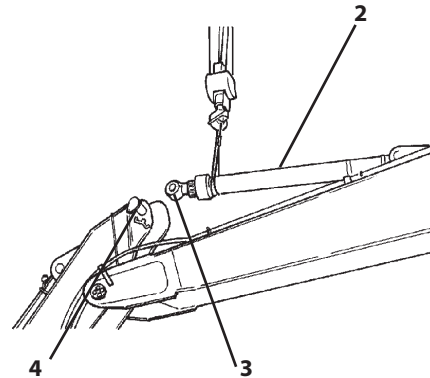
- When aligning the centers of the pin and pin hole, never put fingers into the pin hole.
- When using a hammer, wear safety equipment such as safety glasses or a hard hat to protect against injury from flying pieces of metal.
- When inserting the pin, never enter into the area under the arm cylinder.

3. After driving the pin into the pin holes, install pin lock plate (5) with bolts (6).

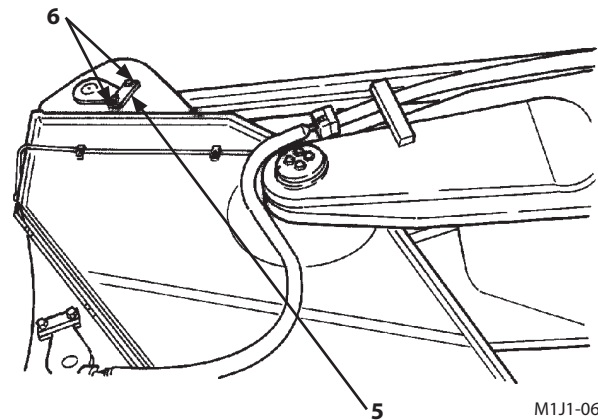
Tightening torque: 400 N·m (40 kgf·m, 290 lbf·ft)
4. When connecting the arm-cylinder-rod greasing hose to the arm cylinder rod, install adaptor (7) with angle (A) of 10 to 30° so that the hose does not come into contact with the arm cylinder mounting bracket.



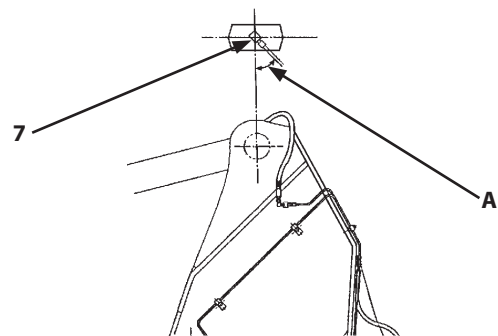
M167-07-017



M1J1-06-022



M1J1-06-020



M1J1-06-023

ASSEMBLING

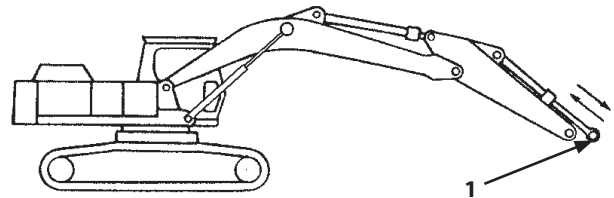
CONNECTING BUCKET CYLINDER HOSES



WARNING:

- **Stop the engine. Move the control levers back and forth, and right and left several times to release the remaining pressure in the hydraulic line.**
- **Before connecting the bucket cylinder and the pipes on the boom with the hoses, loosen bolts securing the covers to the pipes on the boom to gradually release the trapped oil pressure in the pipings. Then, remove the covers.**

1. Gradually loosen bolts securing the covers to the ends of the hydraulic pipings on the boom to release the trapped oil pressure in the pipings. Then, remove the covers.
2. Connect two hoses between the hydraulic pipings on the boom and bucket cylinder.
3. To prevent seals from damage, bleed the air from the bucket cylinder according to the following procedures.
 - (1) Start the engine and run it at slow speed.
 - (2) Slowly extend and retract cylinder rod (1).
 - (3) Repeat operation in step 2 until cylinder rod (1) moves smoothly.



M167-07-018

ASSEMBLING

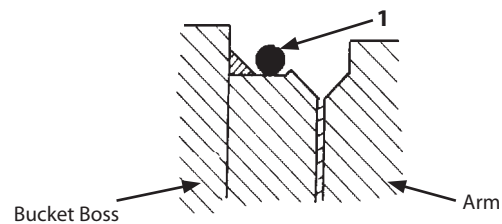
INSTALLING BUCKET

1. Install the Unit Type O-rings (only Long Arm Spec) around the bucket bosses at the arm connecting section. (In case using Separate Type O-rings, refer to "O-ring Installation Method" in the maintenance.)
2. Start the engine. Raise the arm (2) tip approximately 2.5 m (2.7 yd) above the ground.
3. Sling bucket (6) with a crane. Align pin (5) hole of the bucket with pin hole (4) of the arm.
4. While the top of the bucket boss contacts the arm, adjust the clearance between arm and bucket to become from 0.5mm to 1mm (0.02 in to 0.04 in) by Shims. Refer to the page for "Adjust the Bucket Linkage" in the maintenance section.)

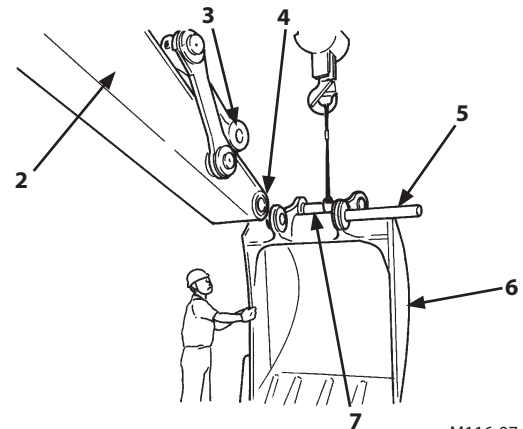
WARNING:

- When aligning the centers of the pin and pin hole, never put fingers into the pin hole.
- When using a hammer, wear safety equipment such as safety glasses or a hard hat to protect against injury from flying pieces of metal.
- While installing the bucket pin, never allow anyone to enter into the area under the bucket.

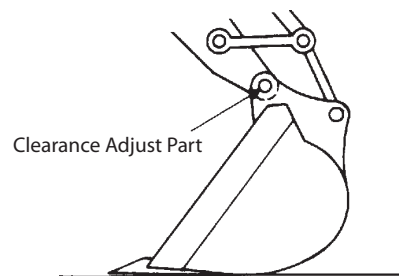
5. Drive pin (5) into the pin bosses. Secure pin (5) and pin lock stopper (10) with bolt (11).
Tightening torque: 400 N·m (40 kgf·m, 290 lbf·ft)
6. While extending or retracting the bucket cylinder, align pin hole (3) of the link with that of bucket (6).
7. Drive the pin (7) into the bucket and link. Secure the pin (7) and pin lock stopper (8) with bolt (9).
Tightening torque: 400 N·m (40 kgf·m, 290 lbf·ft)
8. Slide the O-ring onto the boss end gap between the bucket and arm. (Refer to the page for "Change Bucket " in the maintenance section.)



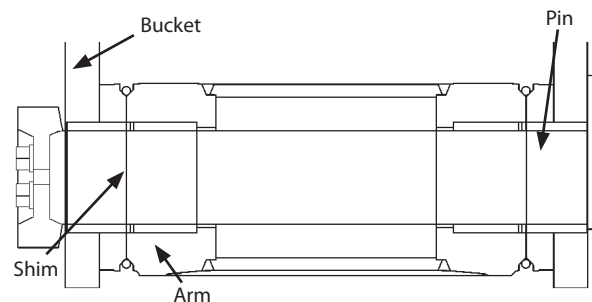
M1J1-06-024



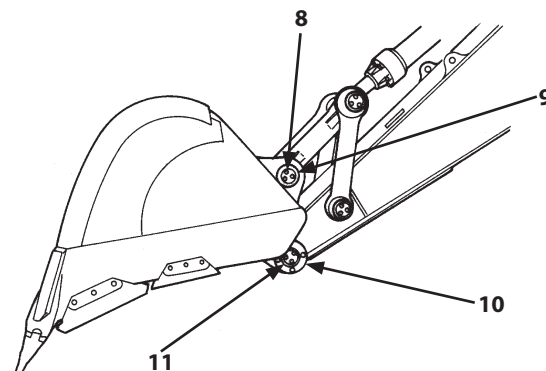
M116-07-038



M503-07-056



M1JB-07-057



M1JB-07-058

ASSEMBLING

FINAL INSPECTION



WARNING:

- **Air may be trapped in the hydraulic circuit after assembling. Avoid excessively quick operation to prevent the hydraulic components from damage.**
 - **Bleed the air trapped in the hydraulic circuit by operating each cylinder several times. (Refer to the page for “Change Hydraulic Oil” in the maintenance section.)**
1. Check that no oil leaks from each cylinder, piping, and hose, and that all bolts are securely tightened.
 2. Check that the following pin locks are securely tightened.
 - Boom foot pin
 - Boom cylinder rod and bottom pins
 - Boom and arm joint pin
 - Arm cylinder rod pin
 - Bucket cylinder rod pin
 - Bucket and link joint pins
 3. Check hydraulic oil level in the hydraulic oil tank. (Refer to the page for “Check Hydraulic Oil Level” in the maintenance section.)
 4. Check track sag. (Refer to the page for “Check Track Sag” in the maintenance section.)
 5. Check that all equipment is correctly functioning.

If any abnormality is found, contact your authorized Hitachi dealer.

TRANSPORTING

TRANSPORTING BY ROAD

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

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



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

TRANSPORTING THE MACHINE BY TRAILER

When using a trailer, the machine can be transported as one unit. Provide an appropriate trailer, referring to the dimensions of the machine in the transport position, as shown in the Transporting section.

As for the ZAXIS650LC-3 excavator, be sure to retract the side frame before loading the machine onto trailer bed for transportation. (Refer to the section for "Extension and contraction of track frame" in this section.)



M111-06-029

LOADING/UNLOADING ON A TRAILER

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

⚠ WARNING: Be sure to use a loading dock or a ramp for loading/unloading.

Ramp/Loading Dock:

1. Before loading, thoroughly clean the ramp and flatbed. Dirty ramps or flatbeds with oil, mud, or ice on them are slippery and dangerous.
2. Place blocks against the truck and trailer wheels while using a ramp or loading dock.
3. Ramps must be sufficient in width, length, and strength. Be sure that the incline of the ramp is less than 15 degrees.
4. Loading docks must be sufficient in width and strength to support the machine and have an incline of less than 15 degrees.

TRANSPORTING

Loading/Unloading

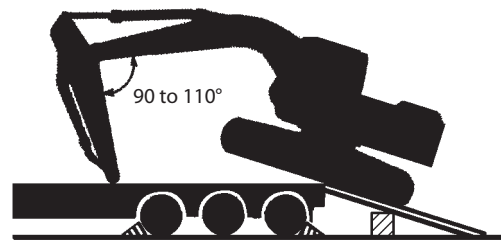


WARNING:

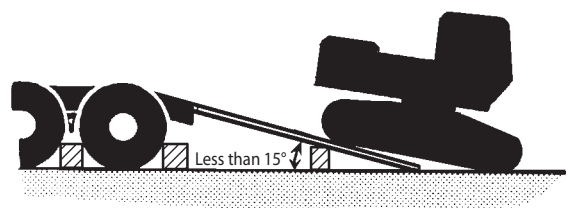
- Always turn the auto-idle/acceleration switch OFF and power mode switch (E) or (P) when loading or unloading the machine, to avoid unexpected speed increase due to unintentional operation of a control lever.
- Always select the medium or slow speed mode with the travel mode switch.
- NEVER steer while driving up or down a ramp as it is extremely dangerous. If repositioning is necessary, first move back to the ground or flatbed, modify traveling direction, and begin to drive again.
- The top end of the ramp where it meets the flatbed is a sudden bump. Take care when traveling over it.
- Prevent possible injury from machine tipping while the upperstructure is rotating. Keep the arm tucked under and rotate the upperstructure slowly for best stability.

Loading

1. The machine direction should be as follows:
With the front attachment: Travel forward with the front attachment at the front.
Without the front attachment: Travel in reverse, as illustrated.
2. The centerline of the machine should be over the centerline of the trailer.
3. Drive the machine onto the ramp slowly.
With the front attachment:
 - Position the tip of arm with its flat surface resting on the trailer. Angle of the arm to boom should be 90 to 110°.
 - Rest the tip of arm on the trailer just before the machine begins to tip forward onto the trailer. Slowly travel forward until the tracks are firmly on the trailer.
 - Slightly raise the arm. Keeping the arm tucked under, slowly rotate the upperstructure 180°.Without the front attachment:
 - Slowly rotate the upperstructure 180°.
 - Lower the tip of arm onto blocks.



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TRANSPORTING

4. Stop the engine. Remove the key from the key switch.
5. Move the control levers several times until hydraulic pressure in the cylinders is released.
6. Pull the pilot control shut-off lever to the LOCK position.
7. Close cab windows, roof vent and door, and cover the exhaust opening, to prevent entry of wind and water.

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

Transporting

 **WARNING: Fasten chains or cables to the machine frame. Do not place chains or cables over or against the hydraulic lines or hoses.**

1. Place blocks in front of and behind the tracks.
2. Fasten each corner of the machine and front attachment to the trailer with a chain or cable.



M1V1-06-001

TRANSPORTING

Unloading

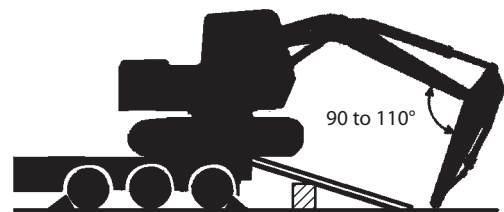
! **WARNING:** The rear end of the flatbed where it meets the ramp is a sudden bump. Take care when traveling over it.

IMPORTANT: Prevent possible damage to the front attachment. Always position the arm at 90° to the boom when unloading the machine. Unloading the machine with the arm tucked in may cause machine damage.

1. To move the machine over end of the trailer onto the ramp, rest the flat surface of the tip of arm on the ground. Angle of the arm to the boom should be 90 to 110°.

IMPORTANT: Prevent possible damage to the hydraulic cylinders. Do not allow the machine to hit the ground hard with the arm.

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



M111-06-034



M111-06-035

TRANSPORTING

RETRACTING OR EXTENDING THE SIDE FRAME



WARNING:

- Thoroughly remove dirt or pebbles stuck to contact areas of the track frame and side frame. Otherwise, mounting bolts may be loosened.
- Always extend the side frames when operating the excavator at job sites. Retraction of the side frames is designed only for easy transportation of the excavator by trailer. Operate the excavator with the side frames retracted only when loading or unloading the excavator onto and/or from a trailer. When the side frames are retracted overside, balance of the excavator will be reduced, potentially causing damage to the track frame, side frames, and bolts.

TRANSPORTING

RETRACTING THE SIDE FRAME

WARNING: Do not loosen side frame guide bolts (2)

IMPORTANT: Remove and clean mud and gravel from contact area of track frame (3) and side frame (4) using compressed air.

Required Tools: Power Boost Wrench (including accessories)
Torque Wrench (width across flats: 55 mm)
Air Compressor (slide surface cleaning)

1. Remove 22 mounting bolts (1) (11 used for each side) from the retracting side frames.
2. Retracting Side Frame (Track Gauge)
Turn the boom mode switch OFF so that the machine can be raised off the ground with front attachment.
3. Raise track (6) to be retracted using the front attachment, as illustrated.
Slowly rotate raised track (6) back and forth. The side frame will be retracted with its own weight and stop when it comes into contact with guide (2).

CAUTION: Maintain a 90 to 110° angle; never make an acute angle between the boom and the arm.

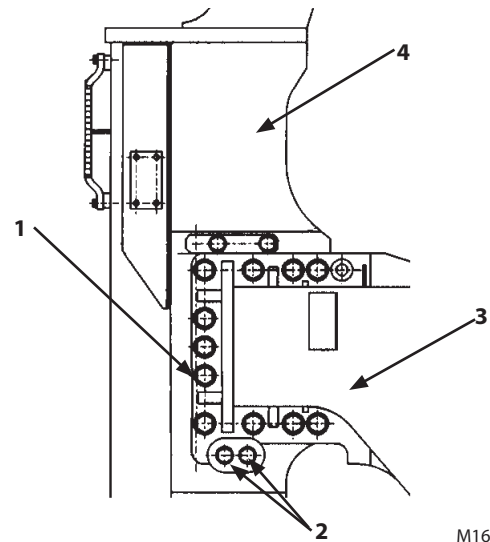
If side frame (4) does not retract completely, lower the undercarriage and turn the upperstructure 180°. Raise the opposite side track about 15° from the ground using the front attachment. Slowly push the arm out, to retract side frame (4).

IMPORTANT: Do not raise track (6) excessively high or operate the arm-control lever abruptly. Damage to the track frame may result.

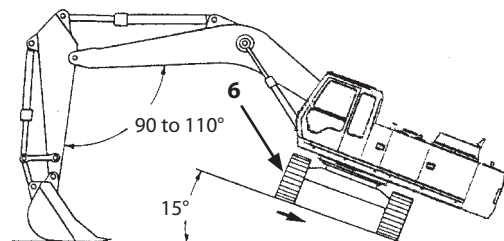
4. Slowly lower track (6) to the ground. Tighten 8 mounting bolts (5) (4 used for each side) to the specification.

Tightening Torque: 2800 N·m (280 kgf·m, 2030 lbf·ft)

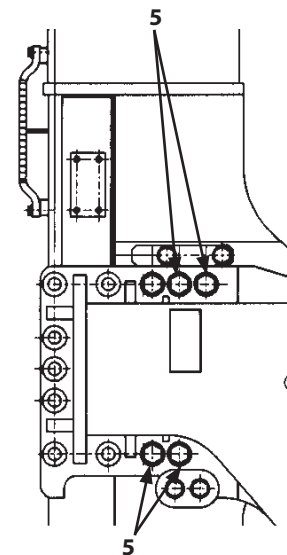
5. Retract the opposite side, following procedures 1 to 4 above.



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M111-06-009



M162-06-001

TRANSPORTING

EXTENDING THE SIDE FRAME

Required Tools

- Slings Rope (20 mm dia.×8 m, 6×37 Ordinary Z lay Class A, Applicable Max. Load: 3 tons)..... 6 Used
 - * Before slinging, make sure no broken wire strands and/or kinks exist.
- Lever Block (JIS B8819 equivalent to L3.2T)..... 2 Used
 - * Check that there is no damage on the lever block.
- Power Boost Wrench (including accessories), width across flats of the torque wrench: 55 mm
- Air Compressor (slide surface cleaning)
- Soft Protectors



WARNING:

- **Group work is required. Before starting work, coordinate work procedures with co-workers.**
- **Damage to the lever block and/or wire rope may result along with severe personal injury. When extending the side frame using the front attachment, do not allow any personnel to enter the vicinity of the machine.**



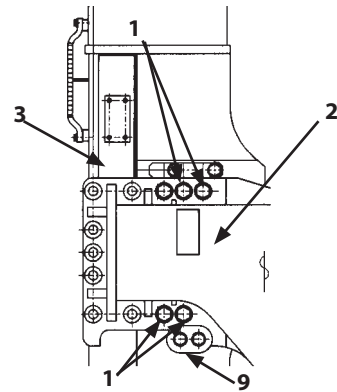
WARNING: Do not loosen side frame guide bolts (9).

IMPORTANT: When the machine is shipped from the factory, all side frame tightening bolts are not installed. Therefore, unbolted screw holes on the side frame are coated with rust-inhibitor so that they may be clogged with dust or soil. Before installing the tightening bolts, clean the thread surface thoroughly. If the bolts are difficult to tighten, tap the screw holes again.

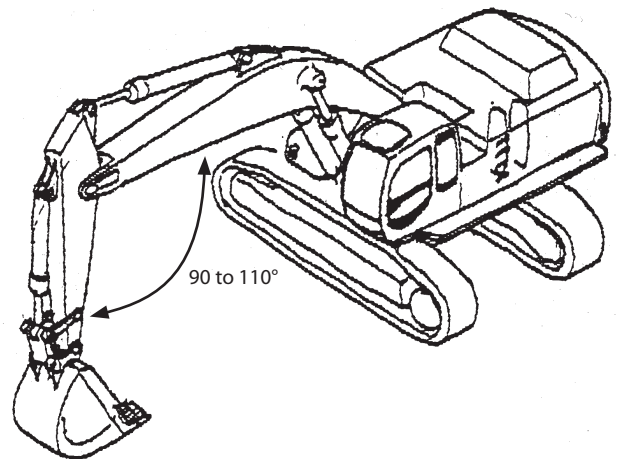
Tap: M36, Pitch: 3 mm

IMPORTANT: Before working, completely clean the side frame slide surfaces using compressed air. If mud and/or gravel is stuck on the contact areas of track frame (2) and side frame (3), the work may be interrupted and loose mounting bolts (1) may result.

1. Remove side frame mounting bolts (1) (8 used, 4 bolts in two places) from the extending side frame.
2. Rotate the upper structure to the side of the extending side frame until the front attachment faces the side frame perpendicularly.
3. Set the arm and boom angle between 90° to 110°. Then, lower the bucket bottom to the ground.



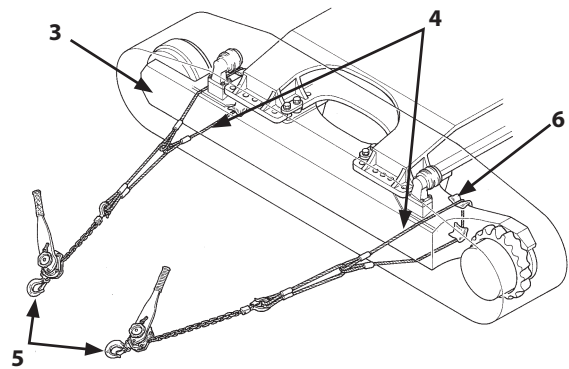
M162-06-001



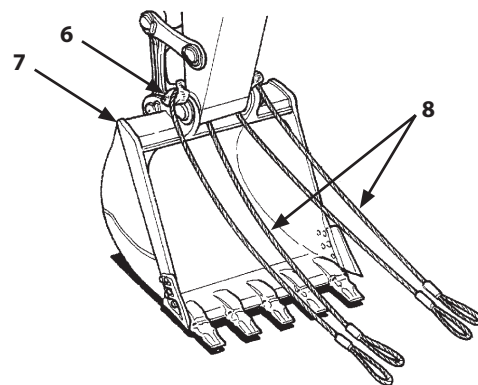
M166-01-233

TRANSPORTING

4. Wind two wire ropes (4) around the front and rear sections (one wire rope on each section) of the side frame. Connect lever block (5) to the ends of each wire rope. Attach soft protectors (6) between the side frame (3) corners and wire ropes (4) to prevent damage to side frame (3) and wire ropes (4).
5. Wind two wire ropes (8) around the arm near the bracket of bucket (7). Connect each rope ends to lever blocks (5). Then, slowly extend the front attachment so that sag on wire ropes is removed. Attach soft protectors (6) between the bucket bracket corners and wire rope to prevent damage to wire ropes.
6. Retracting Side Frame (Track Gauge)
Turn the boom mode switch OFF so that the machine can be raised off the ground with front attachment.
7. While lowering the boom, raise the extending side frame approx. 50 mm (2 in) above the ground. If the side frame is raised too much, extending force increases.
8. Operate lever blocks (5) so that the rear (travel device side) and front (front idler side) of the side frame is equally extended until side frame guide (9) comes in contact with the track frame stopper.



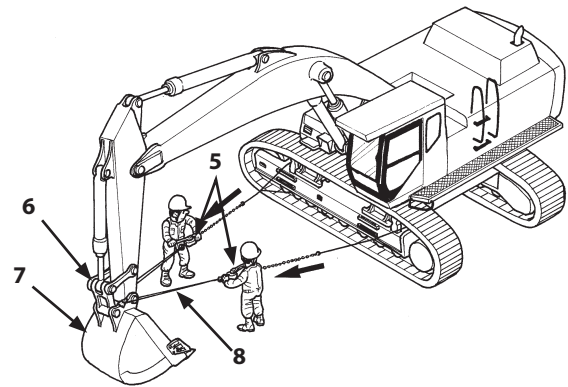
M166-01-244



M162-06-062

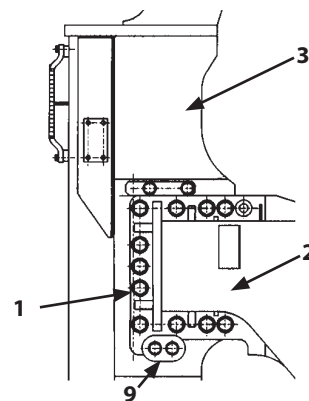
- ! WARNING: When the lever block becomes inoperable, it is because too much resistance exists against the extending force. Avoid working by force. Otherwise, lever block and/or wire rope may be damaged and/or fly away possibly resulting in severe personal injury. Stop the work and check if the front and rear of the side frame are equally extended or if the side frame is raised to the proper height. Take corrective measures as necessary.**

- ! WARNING: After raising the side frame above the ground, never operate the arm to extend the side frame. If the arm is operated, the wire ropes are pulled with excessive tension force. Damage to the lever block or wire rope may result, possibly causing severe personal injury.**



M166-01-255

9. When side frame guide (9) comes in contact with the track frame stopper, install side frame tightening bolts (1) (22 used) (11 used in two places) and tighten temporarily by hand. In case it is difficult to tighten with hand, bolt and screw hole centers may not be correctly aligned. Realign bolt and screw hole centers by operating the lever blocks.



M162-06-002

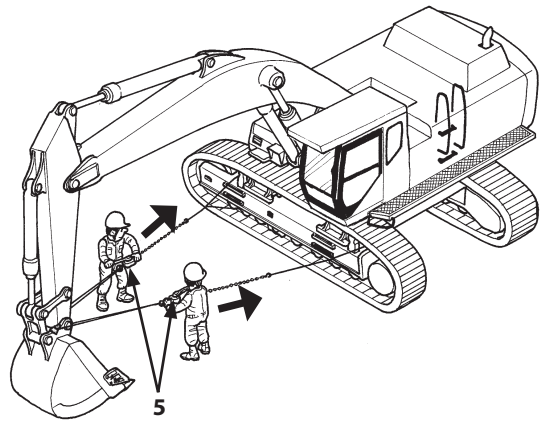
TRANSPORTING

⚠ WARNING: Be sure to slowly operate the boom. If quickly operated, the lever block and/or wire rope may be damaged and/or fly away, possibly causing severe personal injury. Stay away from the machine when operating the boom.

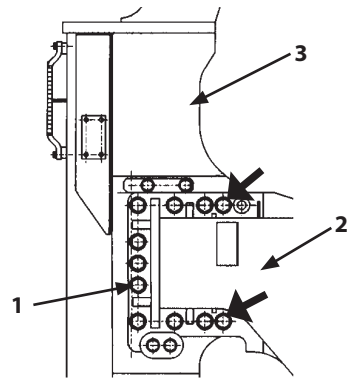
10. Slightly slacken wire rope tension by operating lever blocks (5) and raise the boom to slightly lower the track frame. Don't slacken wire rope tension excessively. Also, take care not to lower the track frame excessively. If excessively slackened or lowered, side frame (3) will retract making re-tightening (by hand) of bolts difficult.
11. After slightly lowering track frame (2), re-tighten bolts (1) by hand.
12. Repeat steps 10 and 11 three to four times until the track frame is completely lowered to the ground.
13. Slacken the lever blocks. Remove the lever blocks and wire ropes.
14. Tighten bolts (1) with the power boost wrench and torque wrench to specification.
Tightening Torque: 2800 N•m (280 kgf•m, 2030 lbf•ft)

IMPORTANT: Be sure to apply a film of lubricant to the bolt threads.

15. Extend the side frame on the opposite side in the same procedure.



M166-01-255



M162-06-002

TRANSPORTING

TYPES OF PACKINGS FOR TRANSPORTATION

<Type 1>	<Type 2>
Base Machine without Front Attachment Counterweight	Base Machine without Front Attachment and Side Frames
Boom	Two Side Frames
Arm	Counterweight
Bucket	Boom
Two Boom Cylinders	Arm
Four Hydraulic Hoses	Bucket
Two Side Steps	Two Boom Cylinders
	Four Hydraulic Hoses
	Two Side Steps

Part Groups Other Than Sub-Unit Assemblies

The following part groups required re-connection or re-installation of the sub-unit assemblies to prepare for shipping.

Part Group	Type 1		Type 2	
	Weight		Weight	
	kg	(lb)	kg	(lb)
Counterweight Installation Parts	28	(66)	28	(66)
Track Frame Installation Parts	48	(106)	83	(183)
Hand Rails and Related Parts	61	(134)	61	(134)

TRANSPORTING

PACKING DIMENSIONS AND WEIGHTS FOR TRANSPORTATION-1 (BACKHOE)

Base Machine (Without front attachment)

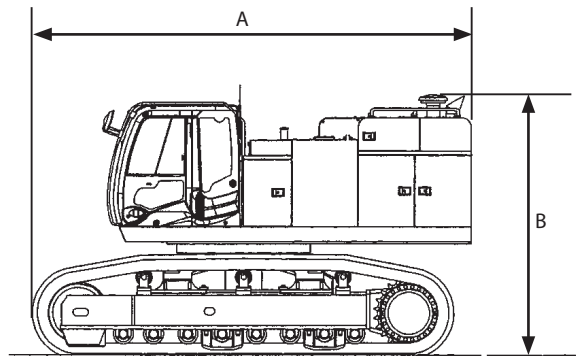
⚠ WARNING: When performing combined operation of arm roll-in/bucket roll-in or when rolling in the bucket with the arm fully retracted, be careful not to hit the boom with the bucket teeth.

Weight : ZX650LC-3 40500 kg (89300 lb)
 ZX670LCH-3 41100 kg (90600 lb)

Model	Shoe Width mm (in)	A mm (ft·in)	B mm (ft·in)
ZX650LC-3	650 (26)	6100(20'0")	3630 (11'3")
	750 (30)	6100(20'0")	3630 (11'3")
ZX670LCH-3	650 (26)	6100(20'0")	3640 (11'11")
	750 (30)	6100(20'0")	3640 (11'11")

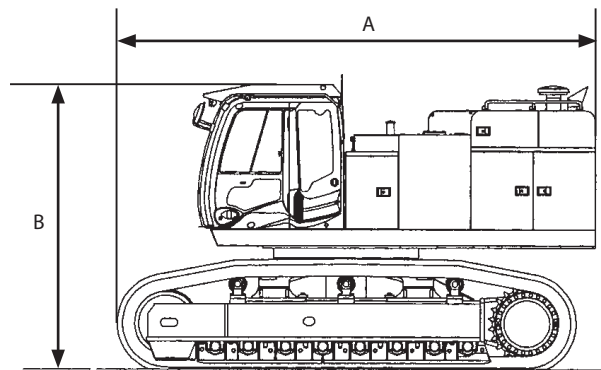
Model	Shoe Width mm (in)	Overall Width mm (ft·in)	Weight kg (lb)
ZX650LC-3	650 (26)	3480(11'5")	40500 (89300)
	750 (30)	3580(11'9")	41100 (90600)
ZX670LCH-3	650 (26)	3480(11'5")	41100 (90600)
	750 (30)	3580(11'9")	41700 (90600)

✎ NOTE: Steps on the track frame and the side hydraulic oil tank, hand rails on the upper battery box, upper fuel tank, and the side hydraulic oil tank must be removed to comply with the overall width dimensions above.



ZAXIS650LC-3

M1J7-06-006



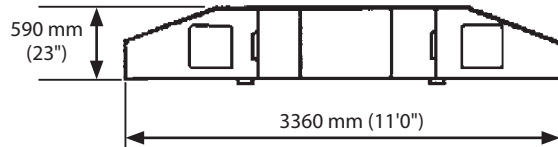
ZAXIS670LCH-3

M1J7-06-007

Counterweight

Weight : 11100 kg (24500 lb)

Height : 1550mm (5'1")

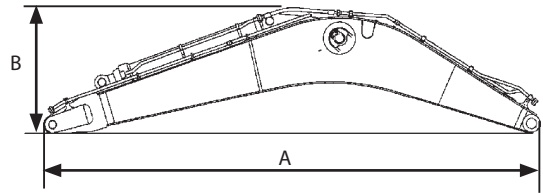


M1J7-06-004

TRANSPORTING

Boom

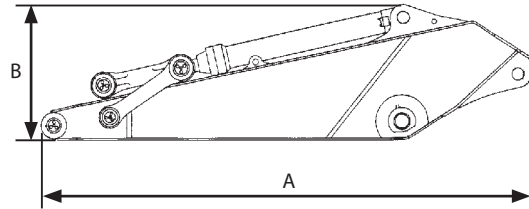
Boom Length m (ft·in)	A mm (ft·in)	B mm (ft·in)	Overall Width mm (ft·in)	Weight kg (lb)
6.80 (23'4") BE-Boom	7140 (23'5")	2510 (8'3")	1390 (4'7")	6110 (13470)
7.80 (27'1") Standard Boom	8130 (26'8")	2330 (7'8")	1390 (4'7")	6550 (14450)
7.80 (26'11") H-Boom	8130 (26'8")	2330 (7'8")	1390 (4'7")	6560 (14460)



M17V-06-023

Arm

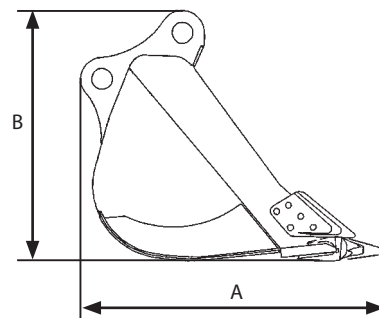
Arm Length m (ft·in)	A mm (ft·in)	B mm (ft·in)	Overall Width mm (ft·in)	Weight kg (lb)
2.90 (9'8") BE-Arm	4370 (14'4")	1690 (5'7")	800 (31")	3820 (8400)
3.60 (11'10")	5110 (16'9")	1440 (4'9")	800 (31")	3620 (8000)
3.60 (11'10") H-Arm	5110 (16'9")	1440 (4'9")	800 (31")	3750 (8270)
4.20 (14'5") Semi-Long Arm	5710 (18'9")	1390 (4'7")	800 (31")	3930 (8650)



M17V-06-024

Bucket

Bucket Capacity (PCSA Heaped) m ³ (yd ³)	A mm (ft·in)	B mm (ft·in)	Overall Width mm (ft·in)	Weight kg (lb)
2.5 (3.3)	2220 (7'3")	1810 (5'11")	1620 (5'4")	2150 (4750)
2.9 (3.8)	2220 (7'3")	1810 (5'11")	1820 (5'12")	2310 (5100)
3.5 (4.6)	2250 (7'5")	1890 (6'2")	1990 (6'6")	2980 (6570)
2.9 (3.8) Rock	2290 (7'6")	1770 (5'10")	1680 (5'6")	2850 (6280)
3.3 (4.3) Rock	2250 (7'5")	1890 (6'2")	1790 (5'11")	3120 (6880)

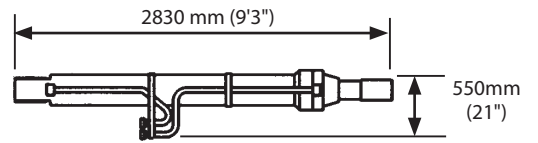


M1J7-06-005

TRANSPORTING

Boom Cylinder

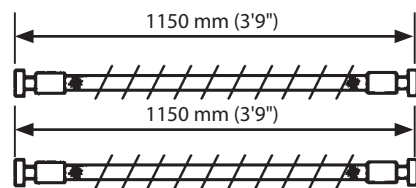
Weight: 550 kg × 2 (1210 lb × 2)



M17V-06-026

Hose

Weight: 7 kg × 2 (15 lb × 2)
10 kg × 2 (22 lb × 2)

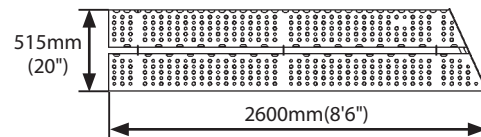


M17V-06-027

Side Step (Front)

Weight: 48 kg (105 lb)

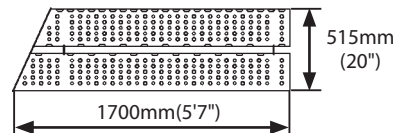
Height: 150mm (6")



Side Step (Rear)

Weight: 30 kg (66 lb)

Height: 150mm (6")

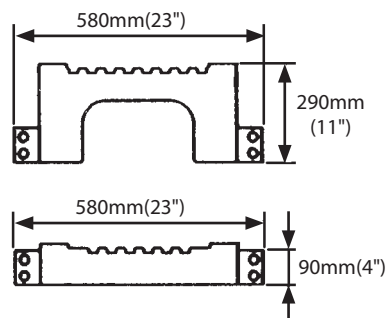


M1J1-06-002

Side Step on the Track Frame

Weight: 29 kg × 4 (64 lb × 4)
13 kg × 4 (29 lb × 4)

Height: 125 mm (5")



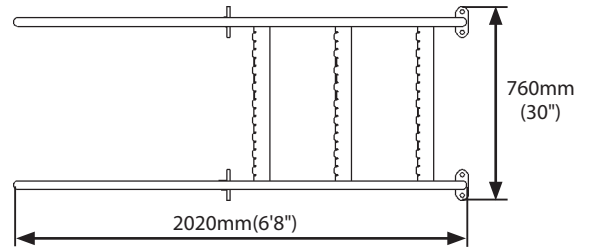
M162-06-014

TRANSPORTING

Handrail on the Side Hydraulic Oil Tank

Weight: 24 kg (53 lb)

Height: 400 mm (16")

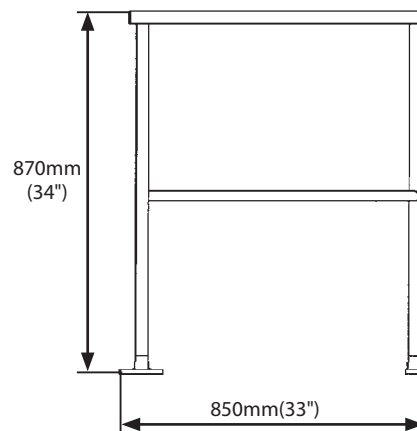


M1J1-06-003

Handrail on the Fuel Tank

Weight: 19 kg (42 lb)

Height: 1040 mm (3' 5")

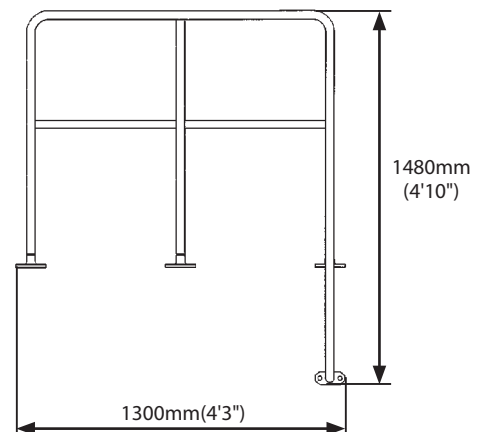


M1J7-06-008

Handrail on the Battery Box

Weight: 18 kg (40 lb)

Height: 270 mm (11")



M1J7-06-009

TRANSPORTING


PACKING DIMENSIONS AND WEIGHTS FOR TRANSPORTATION-2 (BACKHOE)

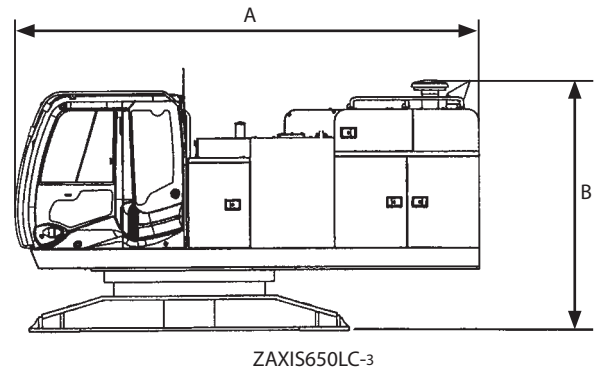
Base Machine (Without front attachment, side frame)

Weight : ZX650LC-3 19900 kg (43900 lb)
 ZX670LCH-3 20100 kg (44300 lb)

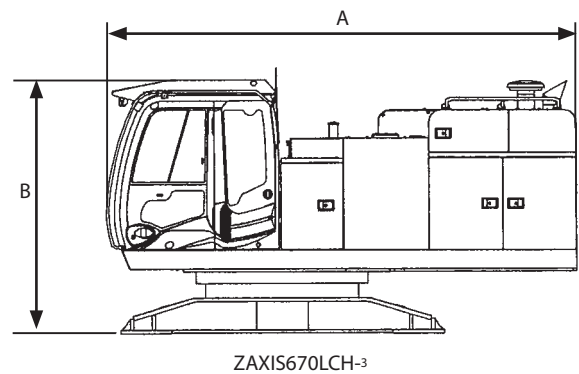
Model	A mm (ft·in)	B mm (ft·in)
ZX650LC-3	5060 (16'7")	2720 (8'11")
ZX670LCH-3	5060 (16'7")	2740 (8'12")

Model	Overall Width mm (ft·in)	Weight kg (lb)
ZX650LC-3	3470 (11'5")	19900 (43900)
ZX670LCH-3	3470 (11'5")	20100 (44300)

 **NOTE:** Steps on the track frame and the side hydraulic oil tank, hand rails on the upper battery box, upper fuel tank, and the side hydraulic oil tank must be removed to comply with the overall width dimensions above.



M1J7-06-010




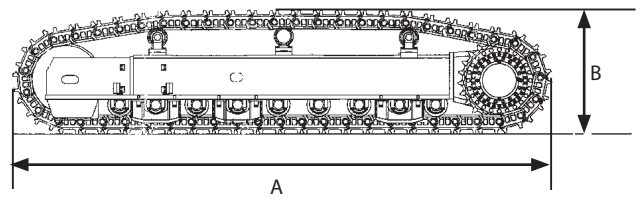
M1J7-06-011

Side Frame

Model	Shoe Width mm (ft·in)	A mm (ft·in)	B mm (ft·in)
ZX650LC-3	650 (26)	5840 (19'2")	1450 (4'9")
	750 (30)	5840 (19'2")	1450 (4'9")
ZX670LCH-3	650 (26)	5840 (19'2")	1450 (4'9")
	750 (30)	5840 (19'2")	1450 (4'9")

Model	Shoe Width mm (ft·in)	Overall Width mm (ft·in)	Weight kg (lb)
ZX650LC-3	650 (26)	1190 (3'1")	10300 (22700)
	750 (30)	1240 (4'1")	10600 (23600)
ZX670LCH-3	650 (26)	1190 (3'1")	10500(23150)
	750 (30)	1240 (4'1")	10800(23800)

 **NOTE:** The dimensions and the weights indicate those of one side frame.



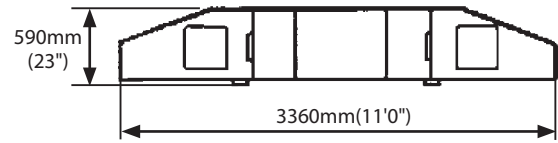
M17V-06-031

TRANSPORTING

Counterweight

Weight: 11100 kg (24500 lb)

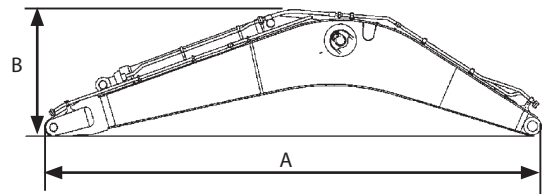
Height: 1550 mm (5'1")



M1J7-06-004

Boom

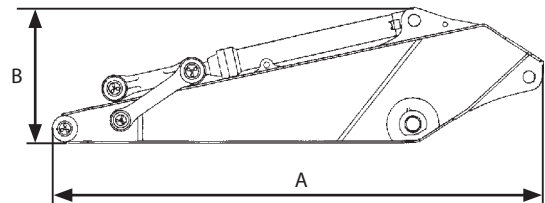
Boom Length m (ft·in)	A mm (ft·in)	B mm (ft·in)	Overall Width mm (ft·in)	Weight kg (lb)
6.80 (22'4") BE-Boom	7140 (23'5")	2510 (8'3")	1390 (4'7")	6110 (13500)
7.80 (25'7") Standard Boom	8130 (26'8")	2330 (7'8")	1390 (4'7")	6550 (14450)
7.80 (25'7") H-Boom	8130 (26'8")	2330 (7'8")	1390 (4'7")	6560 (14450)



M17V-06-023

Arm

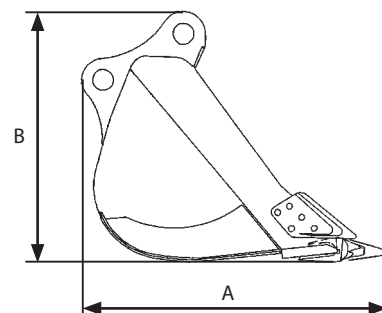
Arm Length m (ft·in)	A mm (ft·in)	B mm (ft·in)	Overall Width mm (ft·in)	Weight kg (lb)
2.90 (9'6") BE-Arm	4370 (14'4")	1690 (5'7")	800 (31")	3820 (8420)
3.60 (11'10") Standard Arm	5110 (16'9")	1440 (4'9")	800 (31")	3620 (7980)
3.60 (11'10") H-Arm	5110 (16'9")	1440 (4'9")	800 (31")	3750 (8270)
4.20 (13'9") Semi-Long Arm	5710 (18'9")	1390 (4'7")	800 (31")	3930 (8660)



M17V-06-024

Bucket

Bucket Capacity (PCSA Heaped) m ³ (yd ³)	A mm (ft·in)	B mm (ft·in)	Overall Width mm (ft·in)	Weight kg (lb)
2.5 (3.3)	2220 (7'3")	1810 (5'11")	1620 (5'4")	2150 (4740)
2.9 (3.8)	2220 (7'3")	1810 (5'11")	1820 (5'12")	2310 (5100)
3.5 (4.6)	2250 (7'5")	1890 (6'2")	1990 (6'6")	2980 (6570)
2.9 (3.8) Rock	2290 (7'6")	1770 (5'10")	1680 (5'6")	2850 (6280)
3.3 (4.3) Rock (BE)	2250 (7'5")	1890 (6'2")	1790 (5'11")	3120 (6880)

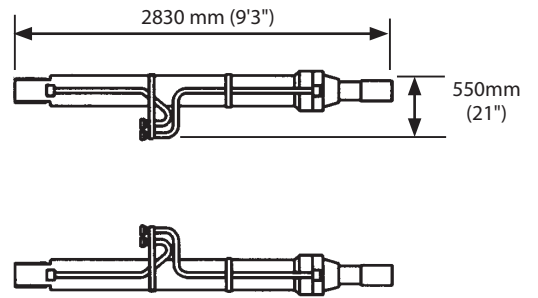


M1J7-06-005

TRANSPORTING

Boom Cylinder

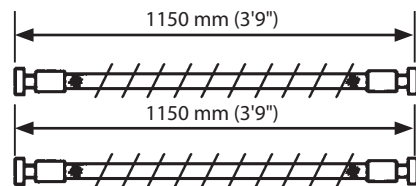
Weight: 550 kg × 2 (1210 lb × 2)



M17V-06-026

Hose

Weight: 7 kg × 2 (15 lb × 2)
10 kg × 2 (22 lb × 2)

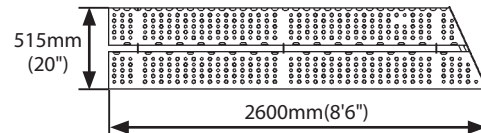


M17V-06-027

Side Step (Front)

Weight: 48 kg (105 lb)

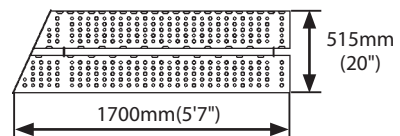
Height: 150 mm (6")



Side Step (Rear)

Weight: 30 kg (66 lb)

Height: 150 mm (6")



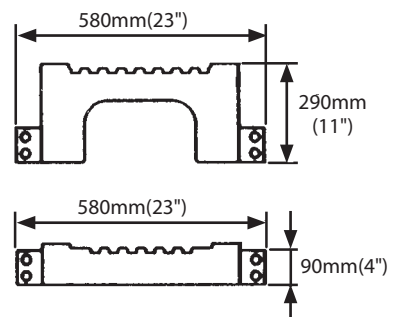
M1J1-06-002

Side Step on the Track Frame

Weight: 29 kg × 4 (64 lb × 4)

13 kg × 4 (29 lb × 4)

Height: 125 mm (5")



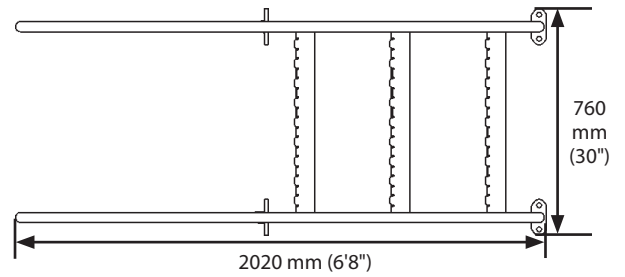
M162-06-014

TRANSPORTING

Handrail on the Side Hydraulic Oil Tank

Weight: 24 kg (53 lb)

Height: 400 mm (16")

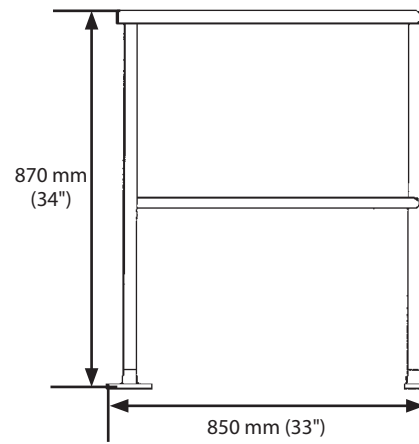


M1J1-06-003

Handrail on the Fuel Tank

Weight: 19 kg (42 lb)

Height: 1040 mm (3' 5")

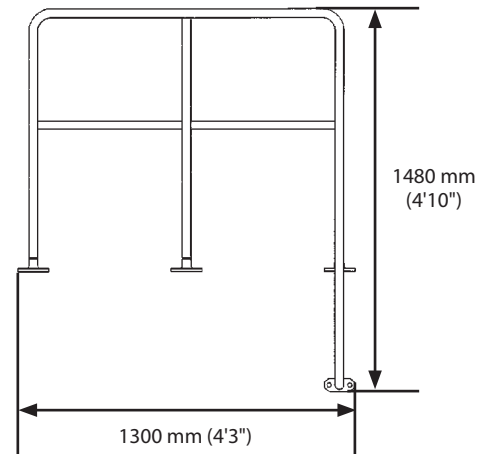


M1J7-06-008

Handrail on the Battery Box

Weight: 18 kg (40 lb)

Height: 270 mm (11")



M1J7-06-009

MAINTENANCE

CORRECT MAINTENANCE AND INSPECTION PROCEDURES

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

Inspect machine daily before starting.

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

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

- IMPORTANT:**
- **Use only recommended fuel and lubricants.**
 - **Be sure to use only genuine Hitachi parts. Failure to do so may result in serious injury or death and/or machine breakdown.**
 - **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 main controller, sensors, etc.**



SA-005

MAINTENANCE

CHECK THE HOUR METER REGULARLY

- Intervals on the periodic maintenance chart are for operating in normal conditions. If you operate your machine in more adverse conditions, you should service it at SHORTER INTERVALS.
- Lubricate, make service checks and adjustments at intervals shown on periodic maintenance guide table. (See page 7-6)

USE CORRECT FUELS AND LUBRICANTS

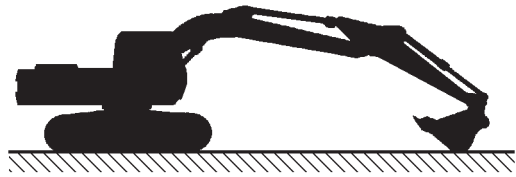
**IMPORTANT: Always use recommended fuels and lubricants.
Failure to do so will result in machine damage and loss of Hitachi product warranty.**

MAINTENANCE

PREPARE MACHINE FOR MAINTENANCE

Before performing the maintenance procedures given in the following chapters, park the machine as described below, unless otherwise specified.

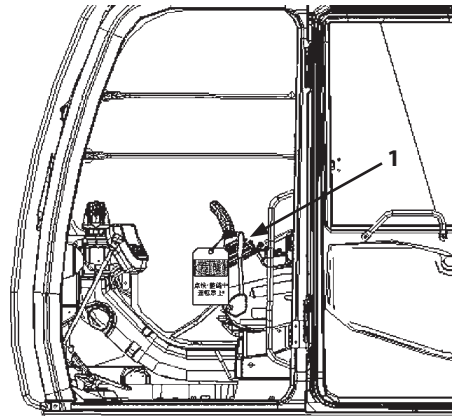
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.



M104-07-021

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Turn the key switch OFF. Remove the key from the key switch. (If maintenance must be performed with engine running, do not leave machine unattended.)
6. Pull the pilot control shut-off lever (1) to the LOCK position.
7. Before performing any work on the machine, attach a "Do Not Operate" tag on the right control lever.



M1U1-07-059



SS2045102

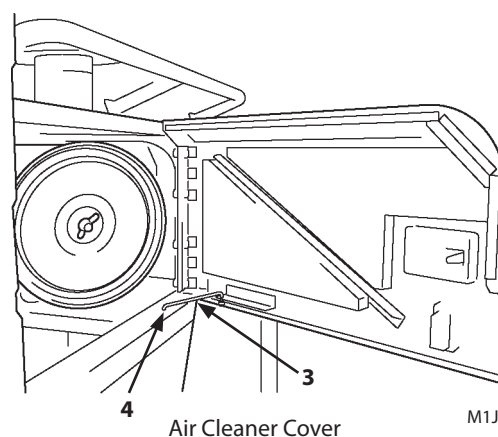
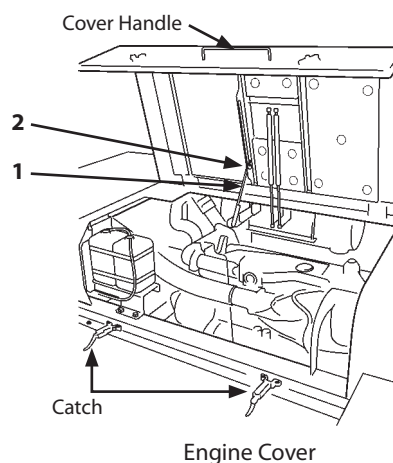
MAINTENANCE

HOOD AND ACCESS COVERS

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

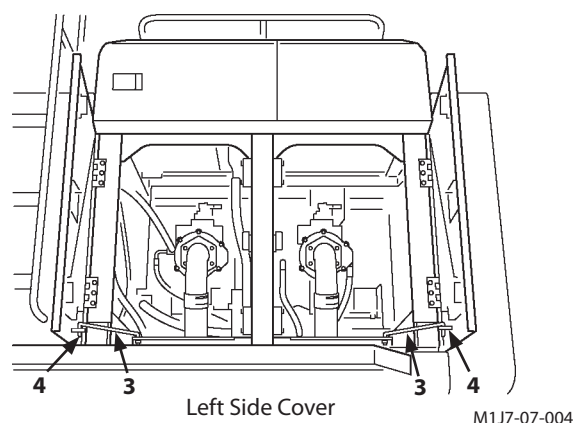
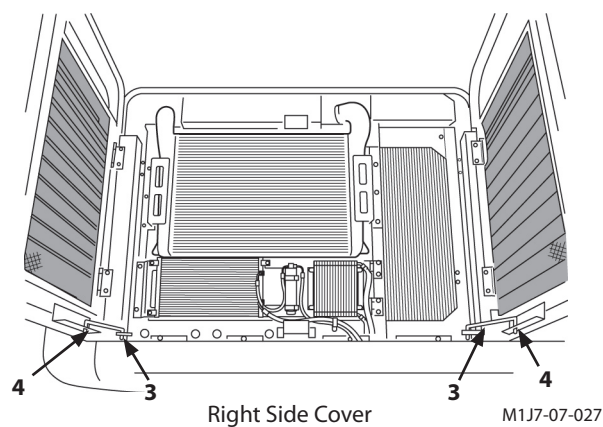
Secure Engine Hood in Position

When opening the engine access cover, unlatch the cover in 2 places, and hold the cover handle. Then, raise the cover until stay (1) lock completely engages with lock groove (2) inside the cover.



Secure Access Covers in Position

Open each access cover and air cleaner access cover. Insert the end of rod (3) into locking hole (4) to lock the access cover in position.



MAINTENANCE

PERIODIC REPLACEMENT OF PARTS

To ensure safe operation, be sure to conduct periodic inspection of the machine. In addition, the parts listed below, if defective, may pose serious safety/fire hazards. It is very difficult to gauge the extent of deterioration, fatigue, or weakening of the parts listed below simply by visual inspection alone. For this reason, replace these parts at the intervals shown in the table below. However, if any of these parts are found to be defective, replace before starting operation, regardless of the interval.

Also, when replacing hoses, check the clamps for deformation, cracks, or other deterioration, and replace as necessary.

Be sure to perform periodic inspection of all hoses, as shown below, and replace or retighten any defective parts found, as necessary.

Consult your authorized dealer for correct replacement.

Periodic Replacement Parts		Replacement Intervals	
Engine	Fuel hose (Fuel tank to filter)	Every 2 years or Every 6000 hours	
	Fuel hose (Fuel tank to injection pump)	Every 2 years or Every 6000 hours	
	Heater hose (Heater to engine)	Every 2 years or Every 6000 hours	
Hydraulic System	Base Machine	Pump suction hose	Every 2 years or Every 6000 hours
		Pump delivery hose	Every 2 years or Every 6000 hours
		Swing hose	Every 2 years or Every 6000 hours
		Travel hose	Every 2 years or Every 6000 hours
	Front-End Attachment	Boom cylinder line hose	Every 2 years or Every 6000 hours
		Arm cylinder line hose	Every 2 years or Every 6000 hours
		Bucket cylinder line hose	Every 2 years or Every 6000 hours
	Pilot hose	Every 2 years or Every 6000 hours	
Other	Seat belt	Every 3 years	


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


MAINTENANCE

MAINTENANCE GUIDE

A. GREASING (See Page 7-9)

Parts		Quantity		Interval (hours)						
				10	50	100	250	500	1000	2000
1. Front Joint Pins	Boom Pivot Boom Cylinder Bottom End	4		★						
	Bucket and Link Pins	Backhoe	9	★★						
	Others	Backhoe	7	★						
2. Swing Bearing		3								
3. Swing Internal Gear		1								

 **NOTE:** ★ Grease every 10 hours for first 100 hours.
★★ Maintenance required when operating in water or mud.

 **NOTE:** Grease the bucket joint pins, swing bearing, and swing gear only using a grease gun even if the auto-lubrication device is kept activated.

B. ENGINE OIL (See Page 7-20)

Parts		Quantity		Interval (hours)						
				10	50	100	250	500	1000	2000
1. Engine oil	Oil Level Check	—								
2. Engine oil	Change	57 L (15.1 US gal)								
3. Engine oil Filter	Replacement	2								


C. TRANSMISSION OIL (See Page 7-24)

Parts		Quantity		Interval (hours)						
				10	50	100	250	500	1000	2000
1. Pump Transmission	Oil Level Check	—								
	Change	6.2 L (1.6 US gal)								
	Clean Air Breather	1								
2. Swing Reduction Gear	Oil Level Check	—								
	Change	10.5 Lx2 (2.8 US galx2)								
3. Travel Reduction Gear	Oil Level Check	—								
	Change	16 Lx2 (4.2 US galx2)								

MAINTENANCE

D. HYDRAULIC SYSTEM (See Page 7-30)

Parts	Quantity	Interval (hours)								
		10	50	100	250	500	1000	1500	2500	4000
1. Check Hydraulic Oil Level	1									
2. Drain Hydraulic Oil Tank Sump	1									
3. Change Hydraulic Oil	720 L (190 US gal)							*	*	*
4. Suction Filter Cleaning	1	When changing hydraulic oil								
5. Replace Hydraulic Oil Tank Filter	2									
6. Replace Pump Drain Filter	1									
7. Replace Pilot Oil Filter	1									
8. Replace Air Breather Filter	1									
9. Check Hoses and Lines	for leaks	—								
	for cracks, bend, etc.	—								

 **NOTE:** * Hydraulic oil changing interval differs according to the kind of hydraulic oil used.
See recommended oil chart.

E. FUEL SYSTEM (See Page 7-47)

Tank capacity 900 liter (238 US gal)


Parts	Quantity	Interval (hours)						
		10	50	100	250	500	1000	2000
1. Drain Fuel Tank Sump	1							
2. Check Water Separator	3							
3. Replace Fuel Main Filter	2							
4. Replace Fuel Pre-Filter	1							
5. Clean Feed Pump Strainer	1							
6. Check Fuel Hoses	for leaks	—						
	for cracks, bend, etc.	—						

F. AIR CLEANER (See Page 7-56)

Parts	Quantity	Interval (hours)								
		10	50	100	250	500	1000	2000		
1. Air Cleaner Outer Element	Cleaning	1					(Or when indicator lit) After cleaning 6 times or 1 year			
	Replacement	1								
2. Air Cleaner Inner Element	Replacement	1	When outer element is replaced							

G. COOLING SYSTEM (See Page 7-58)

Parts	Quantity	Interval (hours)						
		10	50	100	250	500	1000	2000
1. Check Coolant Level	1							
2. Change Coolant	57 L (15.1 US gal)	Twice a year *						
3. Clean Radiator, Oil Cooler, Inter Cooler, Fuel Cooler Core	Outside	1						
	Inside	1	Once a year					
4. Clean Oil Cooler Front Screen	1					*		

 **NOTE:** ★ Shorten maintenance interval when the machine is operated in dusty areas.
* When genuine Hitachi coolant is used, replace every two years or 4000 operating hours, whichever comes first.

MAINTENANCE

H. AIR CONDITIONER (See Page 7-63)

Parts		Quantity	Interval (hours)						
			10	50	100	250	500	1000	2000
1. Circulating Air Filter	Cleaning	1							
	Replacement	1	When excessively restricted						
Fresh Air Filter	Cleaning	1							
	Replacement	1							
2. Check Refrigerant (Gas) Quantity		1							
3. Check Compressor Belt Tension		1							
4. Clean Condenser Core		1							
5. Check Looseness at each of Fastened Areas		—							
6. Check In-Season and Off-Season		—	Twice a year						

I. ELECTRICAL SYSTEM (See Page 7-69)

Parts		Quantity	Interval (hours)					
			10	50	100	250	500	1000
1. Battery	Level Check	2	Every month					
	Specific Gravity	2	Every month					
2. Replace Fuse		—	As required					

J. MISCELLANEOUS (See Page 7-76)

Parts		Quantity	Interval (hours)							
			10	50	100	250	500	1000	2000	4000
1. Check Bucket Teeth for Wear and Looseness		—								
2. Change Bucket		—	As required							
3. Adjust Bucket Linkage		1	As required							
4. Remove Travel Levers		2	As required							
5. Check and Replace Seat Belt		1		Every 3 years (Replace)						
6. Check Windshield Washer Fluid Level		1	As required							
7. Check Track Sag		2								
8. Clean Cab Floor		—	As required							
9. Check Tightening Torque of Bolts and Nuts		—		★★★						
10. Check O-rings in Bucket Joints		—								
11. Retighten Cylinder Head Bolt		—	*As required							
12. Inspect and Adjust Valve Clearance		—						*		
13. Check fuel Injection Timing		—	*As required							
14. Measure Engine Compression Pressure		—						*		
15. Check Starter and Alternator		—						*		
16. Check Water Pump		—								*

 NOTE: ★★★ Maintenance required only during first time check.

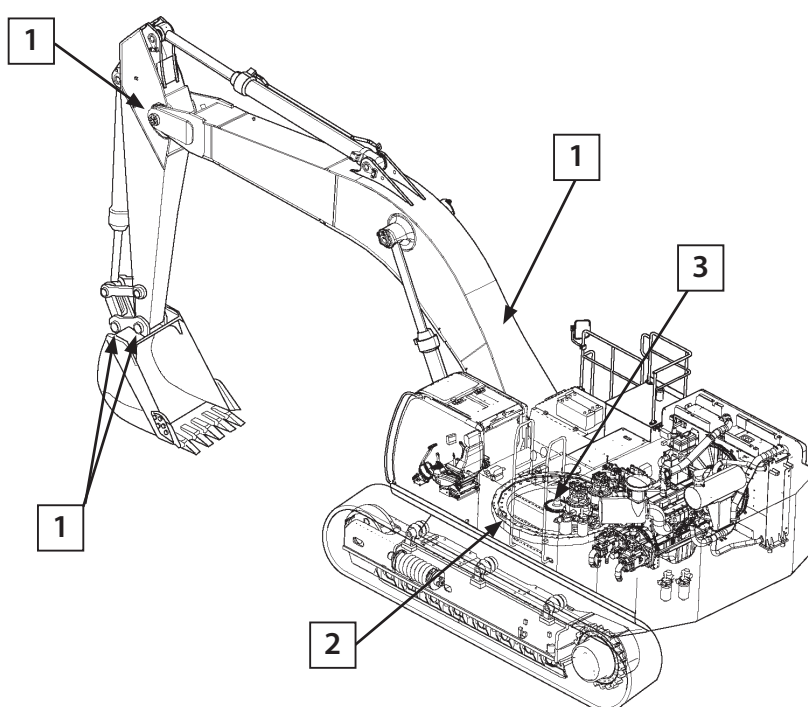
* Contract your authorized dealer for maintenance.

MAINTENANCE

A. GREASING

Parts	Quantity	Interval (hours)							
		10	50	100	250	500	1000	2000	
1 Front Joint Pins	Boom Pivot Boom Cylinder Bottom End	4	★						
	Bucket and Link Pins	Backhoe	9	★★					
	Others	Backhoe	7	★					
2. Swing Bearing	3								
3. Swing Internal Gear	1								

NOTE: ★ Grease every 10 hours for first 100 hours.
 ★★ Maintenance required when operating in water or mud.



T1J7-01-02-002

Brand Names of Recommended Grease

Where to be applied	Bucket, Arm and Boom, Swing Gear, Swing Bearing, etc.	
Manufacturer	-20 to 45 °C (-4 to 113 °F)	
Nippon Koyu	SEP 2	★1
British Petroleum	BP Energrease	LS-EP2
Caltex Oil	Multifax	EP2
Esso	Beacon	EP2
Idemitsu Kosan	Daphne Coronex Grease	EP2
Mobil Oil	Mobilux	EP2
Nippon Oil	Epinoc Grease	AP2
Shell Oil	Shell Alvania	EP2 ★2

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

- ★1 Front Joint Pin and Swing Bearing
- ★2 Swing Gear

MAINTENANCE

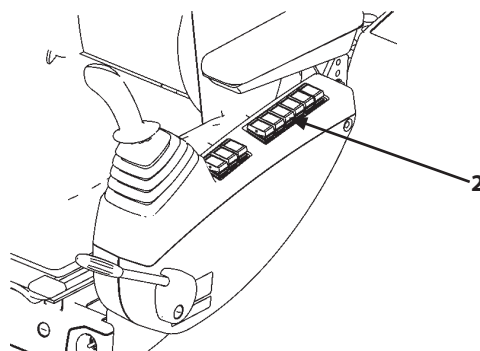
AUTOMATIC LUBRICATION --- IF EQUIPPED

The automatic lubrication device uses a controller-built-in, grease-tank-attached electric pump (1) to automatically lubricate the greasing points on the front attachment at intervals. Turn auto lubrication switch (2) ON, then confirm that auto lubrication indicators (4), (5) display.

The electric pump (1) is set to operate for duration of approximately 2 minutes at 3 operating hour intervals.

The electric pump (1) is located in the right front cover.

Electric pump (1) and grease tank (6) are all-in-one designs.



M1J1-03-001

The following points are lubricated by the automatic lubrication device.

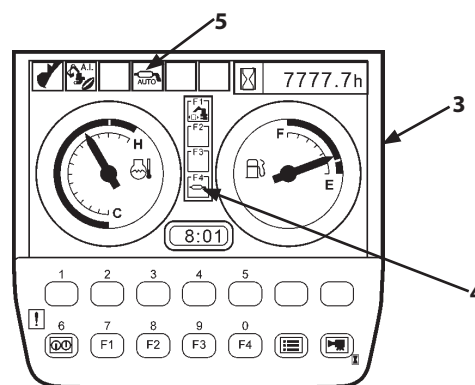
As for the bucket and link pins, use a grease gun to lubricate them. (Refer to the heading "Greasing" in the "MAINTENANCE" section.)

Check Grease Quantity/Add Grease

Check Grease Quantity:

1. Park the machine on a firm, level surface.
2. Lower the bucket to the ground.
3. Check remaining grease quantity in grease tank (6) located in the tool box.

Add grease as necessary referring to the procedures below.

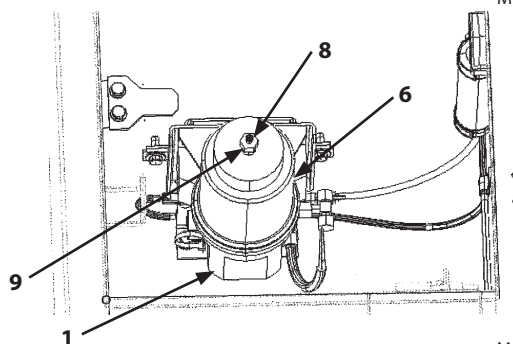


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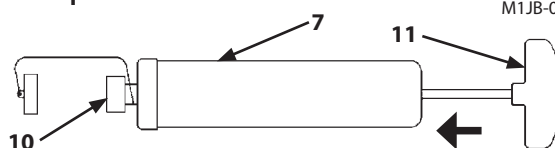
IMPORTANT: Check grease tank (6) and add grease as needed so that the tank does not become empty. If the electric pump is operated with the grease tank empty, air will get into lubrication lines, resulting in insufficient lubrication.

Adding Grease Using Specially Designed Refilling Pump:

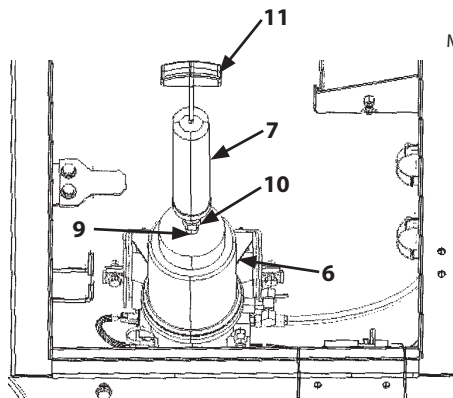
1. Insert the grease cartridge 0.4 liter into refilling pump (7).
2. Remove the filler cap (8) from top of grease tank (6).
3. Apply the tip of refilling pump (7) to the filler (9) opening of grease tank (6), and secure the joint using cap nut (10).
4. Slowly push the handle (11) straight into refilling pump (7) to the stop.
5. Remove refilling pump (7). Securely tighten cap (8) onto the filler opening.



M1JB-07-050



M1JB-07-051



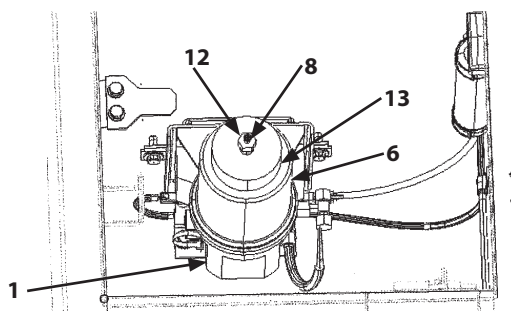
M1JB-07-052

MAINTENANCE

Adding Grease Via Grease Fittings Using Grease Gun:

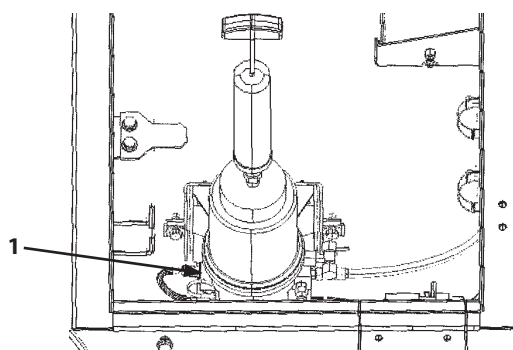
Add grease into the grease tank (6) via the grease fitting located on the top of the tank using a electric grease gun.

Note that grease may not be able to added via the grease fitting in cold weather as grease becomes hard. Be sure to fill the tank full before this happens so that adding grease is not required while the weather is cold. If adding grease is required in cold weather, warm the grease cartridge, then add using the specially designed refilling pump described above. (The capacity of the tank is approximately 2 liters which could cover approximately 2000 to 2400 operating hours.)




M1JB-07-050

- IMPORTANT:**
- **Check grease tank (6) and add grease as needed so that the tank does not become empty. If the electric pump (1) is operated with the grease tank empty, air will get into lubrication lines, resulting in insufficient lubrication.**
 - **Do not remove grease tank upper cover (13) when greasing. Sand and garbage may enter into the grease tank (6). Take special care to keep clean free from dirt when refilling.**
 - **Be careful not to allow dust to enter grease tank (6). The electric pump (1) may be damaged if dust becomes mixed into the auto lubrication system.**



M1JB-07-052

 **NOTE:** The electric pump (1) is equipped with a safety valve. If the pump delivery pressure exceeds 34 MPa (350 kgf/cm², 4980 psi), grease will be discharged from the safety valve. If this happens, contact your authorized dealer for inspection.

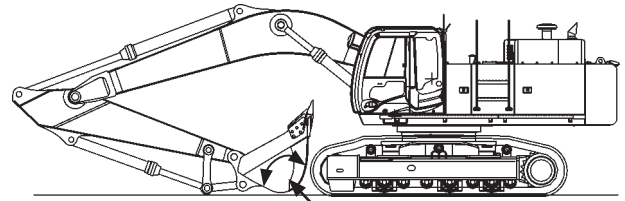
Also, contact your authorized dealer for any failure of equipment or lines, or for any inquiries.

MAINTENANCE

1

Front Joint Pins (BACKHOE)

Bucket and Link Pins --- every 10 hours



Vertical

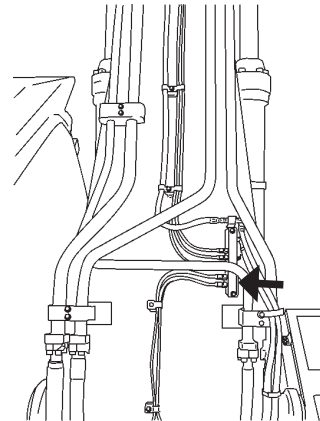
M1J1-07-057

Others --- every 50 hours

(every 10 hours for first 100 hours)

This machine can be lubricated through grease fittings without using the auto lubrication device by following the procedure below.

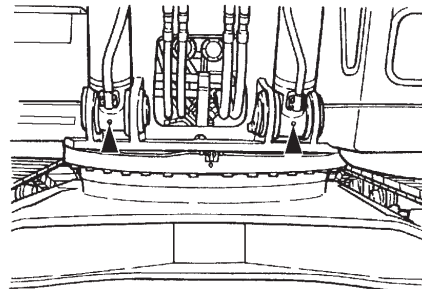
NOTE: When greasing the backhoe front attachment, fully extend the arm cylinder, lower the boom until the bucket comes in contact with the ground, and adjust the bucket cylinder stroke so that the bucket bottom is approximately upright to the ground as illustrated to the right. This position allows easy access to all greasing points.



M1J1-07-050

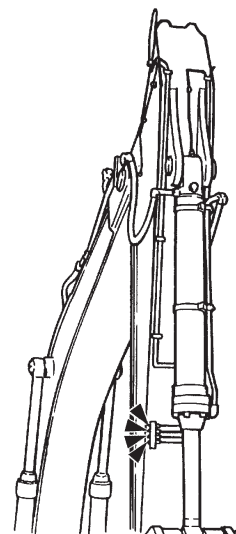
- Boom Pivot
(When the auto lubrication device is not used)

- Boom Cylinder Bottom End
(When the auto lubrication device is not used)



M116-07-002

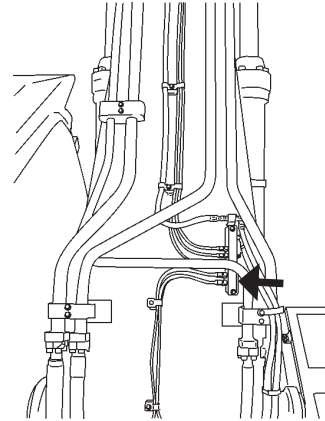
- Boom and Arm Joint Pin, Arm Cylinder Rod Pin and Bucket Cylinder Bottom Pin.
(When the auto lubrication device is not used)



M111-07-008

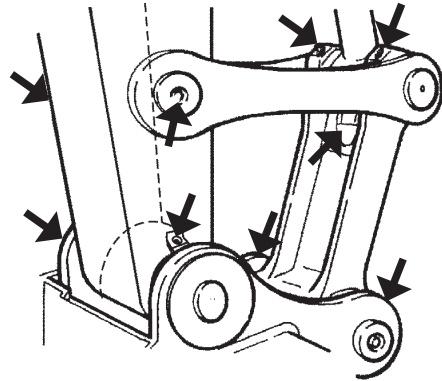
MAINTENANCE

- Boom Cylinder Rod Pins and Arm Cylinder Bottom Pin.
(Centralized greasing system)
(When the auto lubrication device is not used)



M1J1-07-050

- Bucket and Link Pins
every 10 hours



M1J1-07-058

MAINTENANCE

2 Swing Bearing --- every 500 hours

! WARNING: Lubricating both the swing bearing and gear and rotating the upperstructure must be done by one person. Before you lubricate the swing bearing, clear the area of all persons.

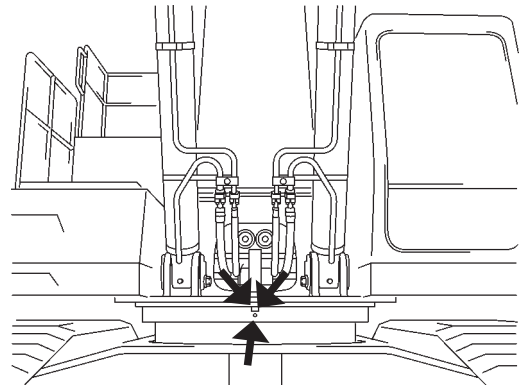
Each time you leave the cab

- Lower the bucket to the ground.
- Stop the engine.
- Pull the pilot control shut-off lever to the LOCK position.
- Use handrails.

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

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Turn the key switch OFF. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.
7. With the upperstructure stationary, apply grease via the three grease fittings.
8. Start the engine. Raise the bucket several inches off the ground and rotate the upperstructure 40° (1/9 turn).
9. Lower the bucket to the ground.
10. Repeat the procedure three times, beginning with step 7.
11. Apply grease to the swing bearing until grease can be seen escaping from the swing bearing seals.
12. Total amount of grease to be applied is approximately 3 to 4 strokes by grease lubricator.
13. Take care not to supply excessive grease.



M1J7-07-011

MAINTENANCE

ELECTRIC GREASE GUN --- IF EQUIPPED

WARNING: The electric grease gun is not a water-proof type. Don't expose the grease gun to rain and water. Refrain from using the grease gun while raining. Failure to do so may cause unexpected trouble such as an electricity leak. No specified daily maintenance is required. Take care not to collide the gun, the motor section especially, with an other object, or not to leave the gun dirty. Failure to do so may result in unexpected injury such as an electric shock. Be sure to keep the electric grease gun clean by wiping off after use. If left contaminated, the grease gum may slip out of your hand, possibly causing a foot injury.

Part Name

- 1- Switch
- 2- Motor Unit
- 3- Nozzle (CPN-2)
- 4- Cap
- 5- Grease Cartridge
- 6- Checking Port
- 7- Oil Cylinder
- 8- Chain

Preparation

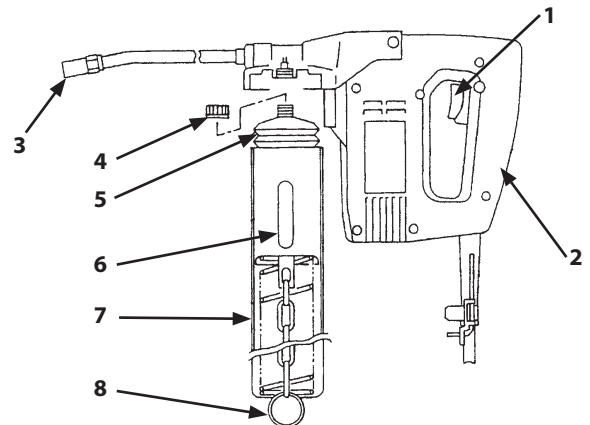
Install Cartridge Grease

IMPORTANT: Take care not to allow soil and/or dust to become mixed into grease when installing grease cartridge (5).

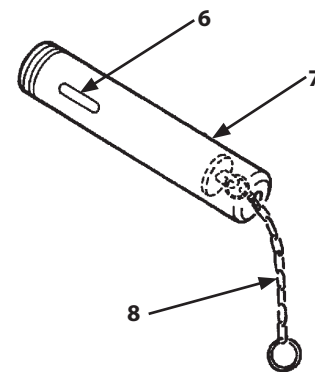
1. Rotate to remove oil cylinder (7) from motor unit (2).
2. Pull chain (8) all the way out of oil cylinder (7) and hang the chain on the notch on the bottom groove of oil cylinder (7).
3. Remove cap (4) from grease cartridge (5). Install grease cartridge (5) into the screw hole on motor unit (2).

IMPORTANT: If grease cartridge (5) is diagonally or forcibly tightened, damage to the screw threads may result so that grease cartridge (5) may not be properly installed to motor unit (2).

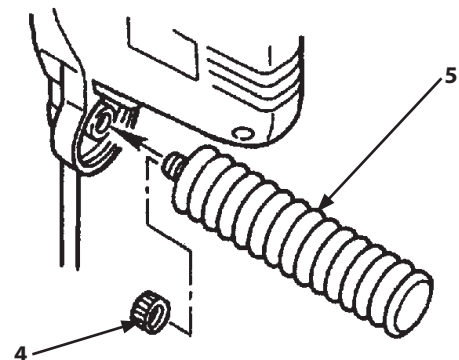
4. Install oil cylinder (7) in the original position on motor unit (2). Unhinge chain (8) from the notch.



M16J-07-044



M16J-07-042




M16J-07-043

MAINTENANCE


Greasing

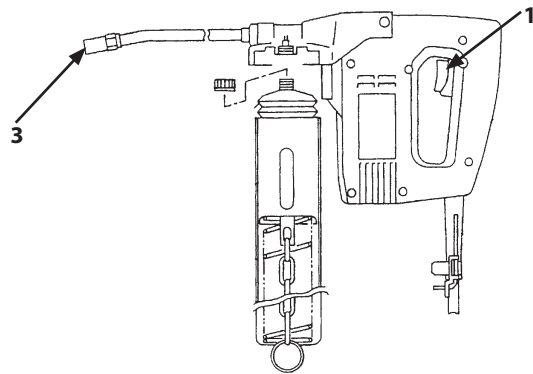
IMPORTANT: When grease is sufficiently supplied in a closed section, the motor speed becomes slow. Release switch (1) to end greasing. If grease is kept supplied further, seizure of the motor may result.

1. Pull switch (1) to drive the motor. Grease will be delivered from nozzle (3).

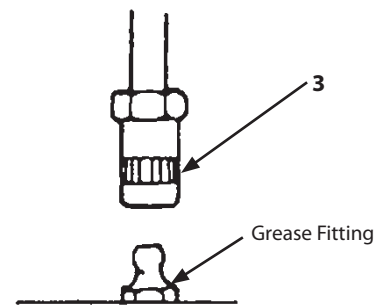
 **NOTE:** When using the grease gun first time, it takes time for air to be bled before grease is delivered.

2. After cleaning the grease fitting to be greased and the tip of grease gun nozzle (3), install the tip of nozzle (3) onto the grease fitting.
3. Pull switch (1) to supply grease. When grease is normally supplied, old grease will be pushed out of the clearances around the grease fitting.
4. After greasing is complete, bleed the pressure remaining in the grease gun by tilting the nozzle before disconnecting nozzle (3) from the grease fitting. A small amount of grease will spout at this moment.

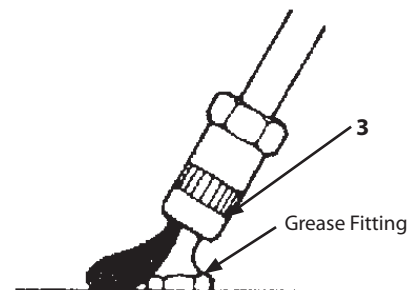
 **NOTE:** If the motor speed becomes extremely slow or stops, immediately release the switch. Since the grease gun operates at high speed, a small amount of grease may leak from the plunger. However, this is not a failure.



M16J-07-044



M16J-07-045



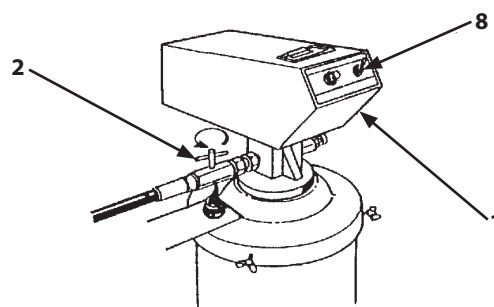
M16J-07-046

MAINTENANCE

LUBRICATOR --- IF EQUIPPED

1. Lubricator Operation

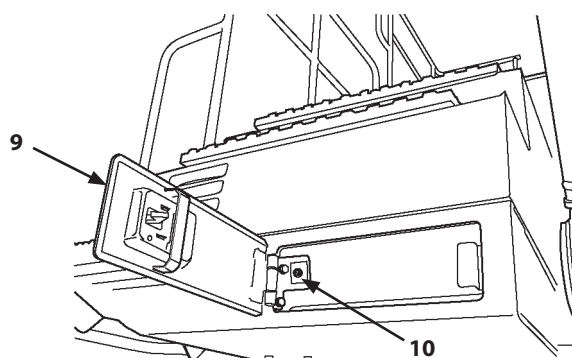
- (1) Turn power switch (8) ON to activate the pump (1). Grease is sucked up and supplied to high-pressure grease gun (3).



M111-07-011

IMPORTANT: When the pump begins to suck grease, any air inside pump (1) will be mixed in, making grease turn whitish. Open check valve cock (2) to bleed this air-mixed grease. Securely close check valve cock (2) when all air-mixed grease is bled out.

- (2) Open front right cover (9), turn switch (10) ON.
- (3) Take out grease gun (3) from front right cover (9). Get high-pressure grease gun (3) and pay out the hose from hose reel (4) to the length required.
- (4) Press hydro-chuck (5) protruding from high-pressure grease gun (3) into a grease nipple and pull the gun lever (11) to discharge grease.
- (5) Release the gun lever (11) when greasing is complete; grease discharge will stop.

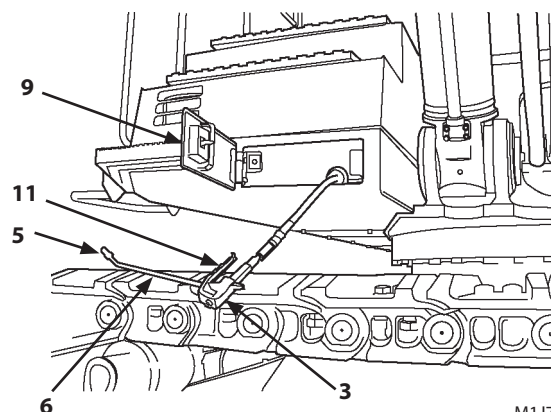


M1J7-07-040


IMPORTANT: When detaching hydro-chuck (5) from grease nipple (7), grease nipple (7) tip may break unless a special care, is taken, as follows:

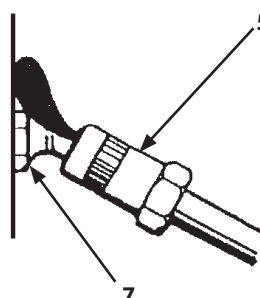
- Tilt nozzle (6) a little so as to release the connecting pressure applied to hydro-chuck (5).
- Slowly detach hydro-chuck (5) from nipple (7).

- (6) When all greasing work is complete, turn power switch (8) OFF, then pull grease gun (3) lever to release remaining pressure from grease gun (3), pump (1), and the hose so as to ensure long life of the components. A little grease will be discharged at this time.



M1J7-07-042

 **NOTE:** The hose has a limited service life. Periodically inspect the hose for cracks, grease leakage, or any other damage. If any damage is found, replace the hose.



M111-07-013

MAINTENANCE

2. Grease Container Replacement

When the grease container becomes empty, follow the procedure below to replace it.

IMPORTANT: When replacing the grease container, be sure that no sand or debris sticks to suction tube (5) or to follower plate (3). If foreign matter, such as sand, gets into grease, damage to the pump and to parts being lubricated will result. If follower plate (3) is not correctly positioned inside the container, the pump may not suck grease, even with grease remaining in the container. Reposition the plate correctly if this happens.

- (1) Loosen wing nuts (2) located on pail cover (7).

Remove the pump assembly (pump (1), pail cover (7), and suction tube (5)) and follower plate (3) from the empty grease container (4).

- (2) Remove the cover from the new grease container.

- (3) Apply grease to the back of follower plate (3) to fill concaved sections; this will prevent air from mixing into the grease contents.

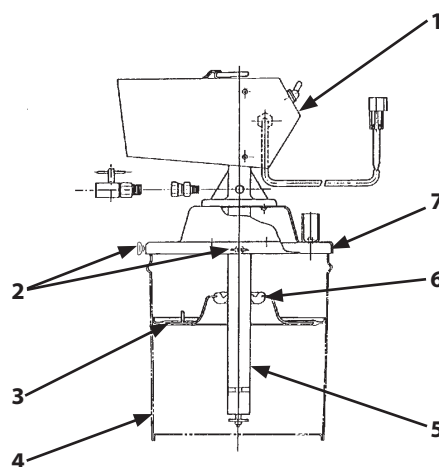
- (4) Place follower plate (3) flat on the grease contents in the container. Using both hands, press follower plate (3) down while moving both hands back and forth along the periphery of the container inside, as illustrated, until grease comes out of seal packing (6) hole.

IMPORTANT: Be careful not to damage seal packing (6) by the end of suction tube (5) when inserting it.

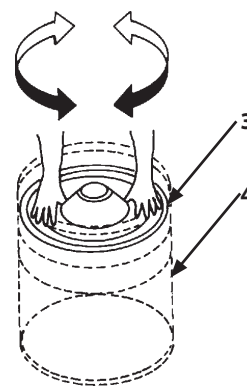
- (5) Slowly insert suction tube (5) (the pump assembly) into the grease contents via the seal packing hole.

- (6) Be sure that pail cover (7) correctly settles on the container. Equally tighten each wing nut (2) to pail cover (7) to securely attach the pump assembly onto the container.

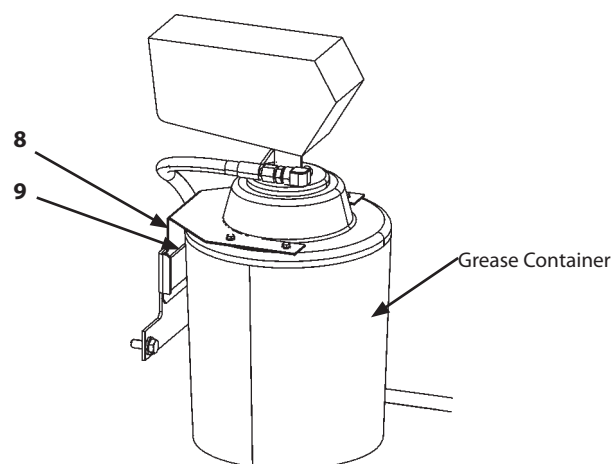
- (7) After replacing the grease container, surely insert bracket (8) installed pail cover (7) into bracket (9) of the lubricator box.



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M111-07-087



M1J7-07-045

MAINTENANCE

3 Swing Internal Gear --- every 500 hours



WARNING: Adding or changing swing internal gear grease and rotating the upperstructure must be done by one person. Before you start, clear the area of all persons.

Each time you leave the cab

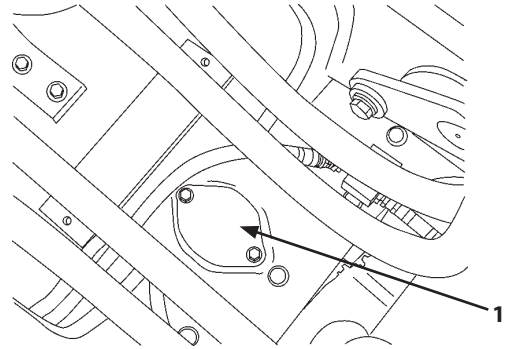
- Lower the bucket to the ground.
- Stop the engine.
- Pull the pilot control shut-off lever to the LOCK position.
- Use handrails.

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

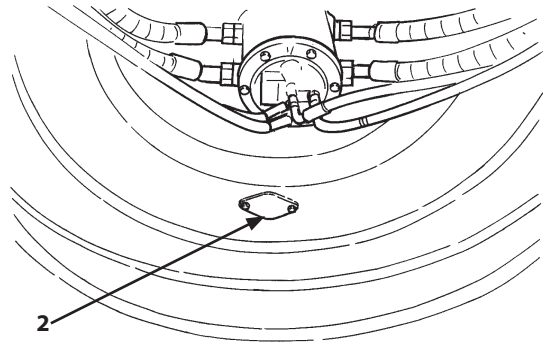
IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Turn the key switch OFF. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.
7. Remove the cover (1) on the upper structure .
8. Grease must be to the top of all internal gear teeth of the swing bearing and be free of contamination by dirt and water.
Add approximately 0.5 kg (1.1 lb) of grease, if required. If the grease is contaminated, remove grease and replace with clean grease.
9. Install the cover (1).
10. If grease shows any sign of water or mud, replace all the grease on the internal gear.
Remove cover (2) from the bottom of the swing gear housing, located near the center joint.

Grease capacity: 16 to 18 liter (4.2 to 4.8 US gal)



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MAINTENANCE

B. ENGINE OIL

Parts		Quantity	Interval (hours)						
			10	50	100	250	500	1000	2000
1. Engine oil	Oil Level Check	—							
2. Engine oil	Change	57 L (15.1 US gal)							
3. Engine oil Filter	Replacement	2							

Recommended Engine Oil

IMPORTANT: Use only genuine Hitachi engine oil as shown below or engine oil equivalent to DH-1 specified in JASO. Failure to do so may deteriorate the engine performance and/or shorten the engine service life. Please be noted that all engine failures caused by using engine oil other than specified are excluded from Hitachi Warranty Policy. Consult your nearest Hitachi dealer for the unclear points.

Depending upon the expected air temperature range between oil changes, use the oil viscosity shown on the temperature chart below.

Brand Names of Recommended Engine Oil

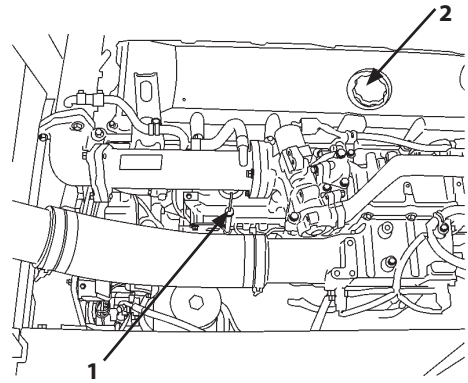
Kind of Oil	Engine Oil		
Application	Engine Crank Case		
Air Temp.	-20 to 30 °C (-4 to 86 °F)	-15 to 45 °C (5 to 113 °F)	
Standard			JASO
Manufacturer	Supper wide DH-1 10W30	Supper wide DH-1 15W40	DH-1

MAINTENANCE


1 Engine Oil Level --- check daily

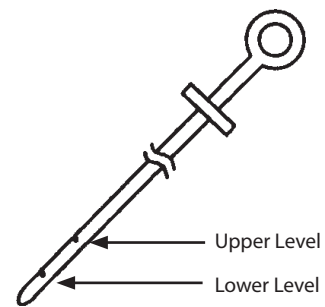
IMPORTANT: For most accurate readings, check the oil level every day before starting the machine. Be sure the machine is on a level surface.

1. Remove dipstick (1). Wipe oil off with a clean cloth. Reinsert dipstick (1).
2. Remove dipstick (1) again. Read level. Oil level must be between the circle marks.
3. If necessary, add oil via oil filler cap (2).
Be sure to use only recommended oil (see Recommended Engine Oil Chart).



M1J1-07-022

 **NOTE:** Checking the oil level immediately after shut down will result in inaccurate readings. Be sure to allow the oil to settle for at least 10 minutes before checking.



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MAINTENANCE

2 Change Engine Oil --- every 500 hours

IMPORTANT: Depending on the fuel quality to be used, the change intervals of engine oil and engine oil filter vary. Consult your nearest Hitachi dealer for the details.

3 Replace Engine Oil Filter --- every 500 hours

IMPORTANT: Depending on the fuel quality to be used, the change intervals of engine oil and engine oil filter vary. Consult your nearest Hitachi dealer for the details.

1. Run the engine to warm oil.
DO NOT run the engine until oil is hot.
2. Park the machine on a level surface.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

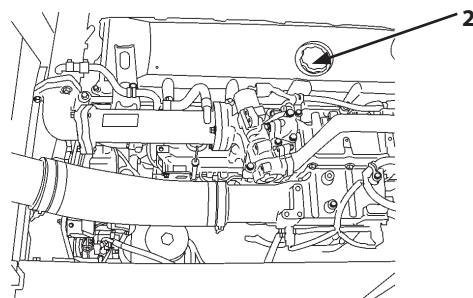
5. Run the engine at slow idle speed without load for five minutes.
6. Turn the key switch OFF. Remove the key from the key switch.
7. Pull the pilot control shut-off lever to the LOCK position.

⚠ WARNING: Engine oil may be hot. Take extra care to avoid burns.

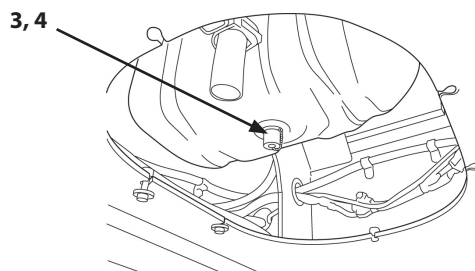
8. Remove oil filler cap (2).

IMPORTANT: Install drainer (5) to the drain valve slowly. Oil may exhaust in large quantities when suddenly tightened.

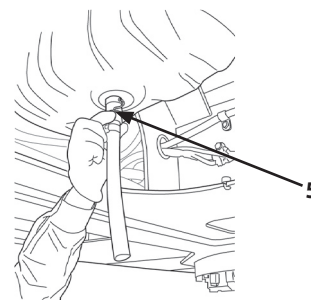
9. Remove cap (4) from oil pan drain valve (3). Install drainer (5) to the drain valve.
10. Screw drainer (5) into drain valve. Drain valve (3) will be opened to drain oil.
11. Remove oil filler cap (2). Then, allow oil to drain through a clean cloth into a 60-liter (16 US gal) container.
12. After all oil has been drained, inspect the cloth for any debris such as small pieces of metal.
13. Remove drainer (5). Install cap (4) to drain valve (3).



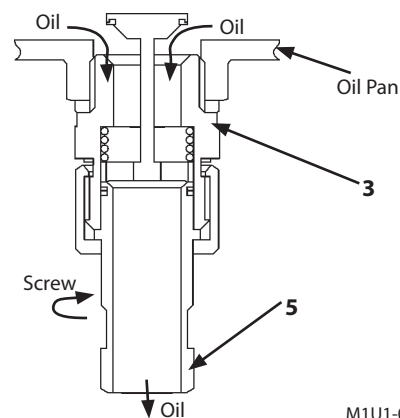
M1J1-07-022



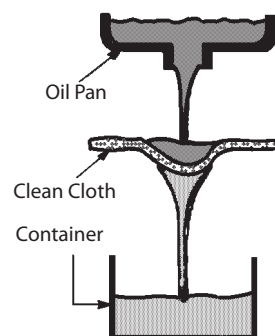
M1U1-07-045



M1U1-07-046




M1U1-07-002

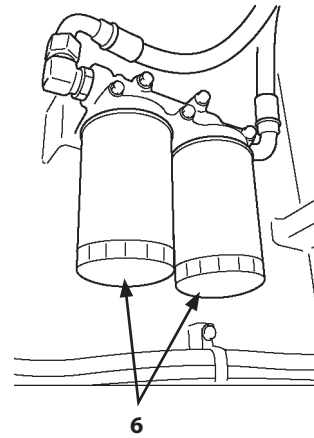


M104-07-010

MAINTENANCE

14. Open the right access cover and secure the cover with rod.
15. Remove the filter cartridges of engine oil filter (6) by turning it counterclockwise with the filter wrench.
16. Clean the filter gasket contact area on the engine.
17. Apply a thin film of clean oil to the gasket of the new filter.
18. Install new filter. Turn the filter cartridge clockwise by hand until the gasket touches the contact area. Be sure not to damage the gasket when installing the filter.
19. Tighten engine oil filter (6) 3/4 to 1 turn more using the filter wrench. Be careful not to overtighten.
20. Remove the oil filler cap. Fill the engine with recommended oil. Check that oil level is between the circle marks on the dipstick after 15 minutes.
21. Install the oil filler cap.
22. Start the engine. Run the engine at slow idle for 5 minutes.
23. Check that the engine oil pressure indicator on the monitor panel goes out immediately. If not, stop the engine immediately and find the cause.
24. Stop the engine. Remove the key from the key switch.
25. Check for any leakage at the drain plug.
26. Check oil level on the dipstick.

 **NOTE:** Do not re-use the cartridge element.

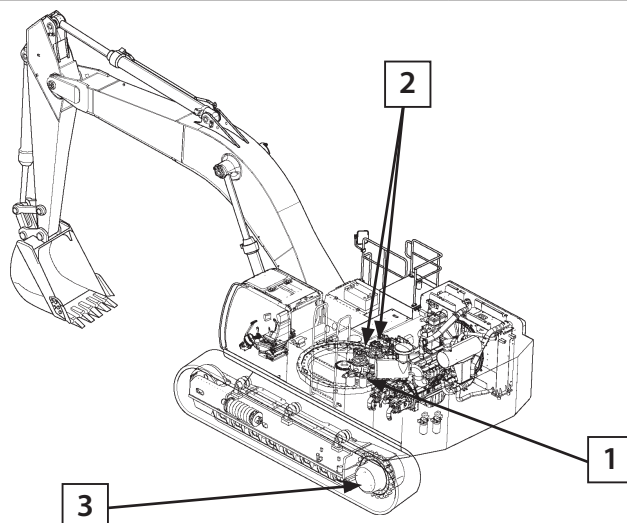


M1J7-07-014

MAINTENANCE

C. TRANSMISSION OIL

Parts		Quantity	Interval (hours)							
			10	50	100	250	500	1000	2000	
1. Pump Transmission	Oil Level Check	—								
	Change	6.2 L (1.6 US gal)								
	Clean Air Breather	1								
2. Swing Reduction Gear	Oil Level Check	—								
	Change	10.5 Lx2 (2.8 US galx2)								
3. Travel Reduction Gear	Oil Level Check	—								
	Change	16 Lx2 (4.2 US galx2)								



Brand Names of Recommended Oil

T1J7-01-02-002

Application	Swing and Travel Reduction Gear		Pump Transmission		
Kind of Oil	Gear oil		Engine Oil or Gear Oil (shown in left column)		
Air Temp.	-20 to 45 °C (-4 to 113 °F)		-20 to 40 °C (-4 to 104 °F)	-10 to 35 °C (14 to 95 °F)	-25 to 40 °C (-13 to 104 °F)
Manufacturer			BP Vanellus C3		
British Petroleum	BP Gear oil	SAE90EP	30 40		
			RPM DELO 300 Oil		
Caltex Oil	Universal Thuban	SAE 90	30 40		
			Essolube D-3		
Esso	Esso Gear Oil	80W-90, 85W-90	30 40		
Idemitsu Kosan	Apollo Gear	HE90	Apolloil super wide 15W-40	Apolloil diesel motive	
				S-330	S-340
Mobil Oil	Mobilube	GX90		Mobil Delvac	
				1330	1340
Nippon Oil	Gear Lube SP90	(Swing and travel reduction device) *2	15W-40 *1	Hidiesel S3	
				-20 to 35 °C (-4 to 95 °F)	10W-30
Shell Oil	Shell Spirax	EP90		Rymla D	
				30	40
Remarks	API GL 4 Class		API CD Class		

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

***1** Engine oil (15W-40) for pump transmission

***2** Gear oil for swing and travel reduction device

Engine/gear oil can be used for pump transmission.

MAINTENANCE

1 Pump Transmission

Check Oil Level --- every 250 hours

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

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.

! WARNING: Engine oil may be hot. Wait for engine oil to cool before starting work.

7. Remove dipstick (1). Oil must be within the specified range.
8. If necessary, remove socket (5) of air breather (4) and add oil from supply plug (2). (See engine oil chart)
9. Recheck oil level.

Change Engine Oil --- every 1000 hours Clean Air Breather --- every 1000 hours

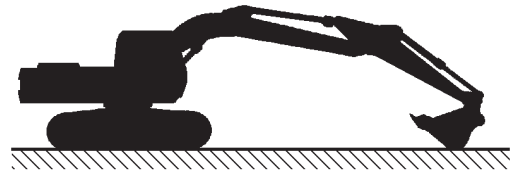
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

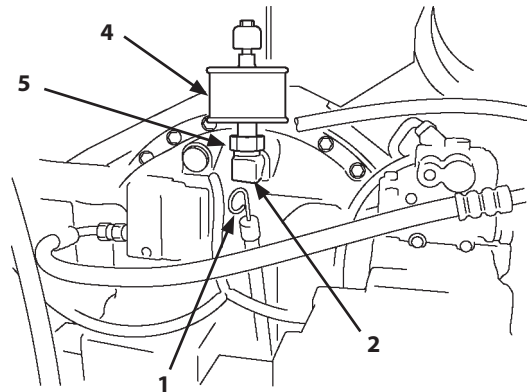
4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.

! WARNING: Gear oil may be hot. Wait for gear oil to cool before starting work.

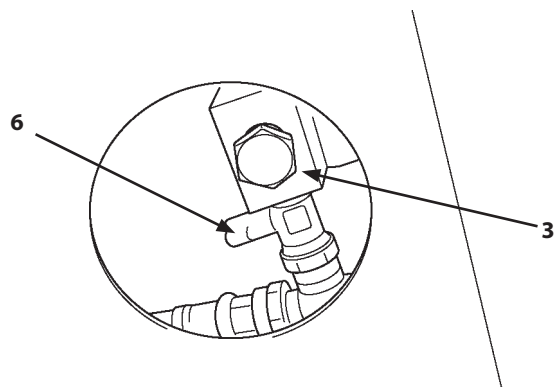
7. Remove drain plug (3) and open drain cock (6) to drain oil.
8. Reinstall the drain plug (3) and close drain cock (6).



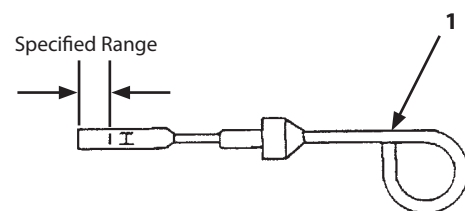
M104-07-021



M1JB-07-035



M1JB-07-044



M16J-07-048

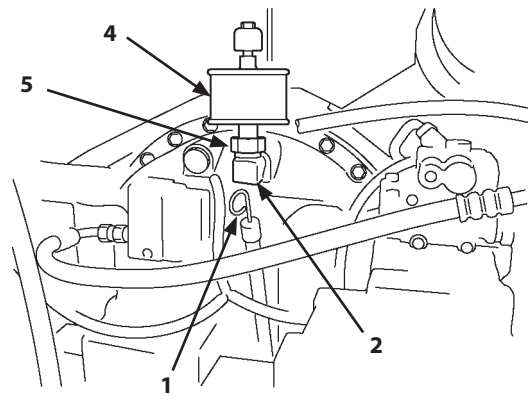
MAINTENANCE

9. Remove socket (5) on the top of oil supply plug (2) and add oil until it is between marks on dipstick (1).
10. Remove air breather (4) from socket (5).
After cleaning air breather (4), wrap the thread of air breather (4) and socket (5) with sealing-type tape. Reinstall socket (5) and air breather (4) on oil supply plug (2).

Tighten torque

Socket and plug: 210 N•m (21 kgf•m 150 lbf•ft)

Air breather and socket: 15 N•m (1.5 kgf•m 11 lbf•ft)



M1JB-07-035

MAINTENANCE

2 Swing Reduction Gear

Check Oil Level --- every 250 hours

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

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for three minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.

! WARNING: Gear oil may be hot. Wait for gear oil to cool before starting work.

7. Remove dipstick (1). Oil must be between marks.
8. If necessary, remove oil supply cap (2) and add oil. (See gear oil chart)
9. Recheck oil level.

Change Gear Oil --- every 1000 hours

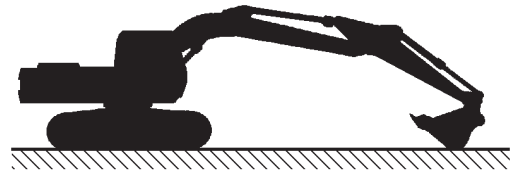
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

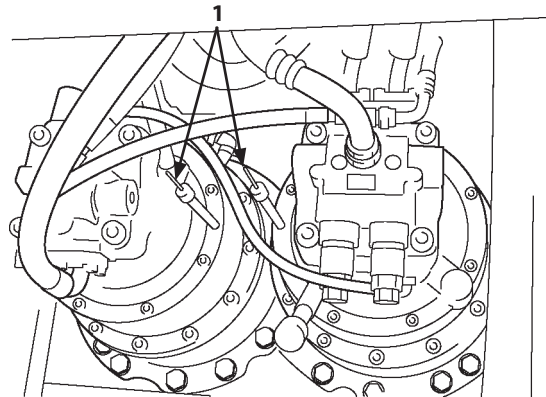
4. Run the engine at slow idle speed without load for three minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.

! WARNING: Gear oil may be hot. Wait for gear oil to cool before starting work.

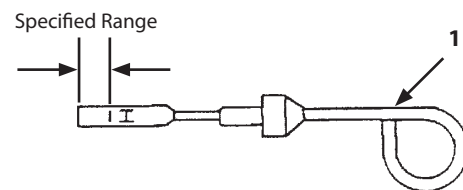
7. Remove drain plugs (4) mounted on the end of drain pipe and open drain cocks (3) to drain oil.
8. Reinstall drain plugs (4).
9. Remove oil supply caps (2) and add oil until it is between marks on dipsticks (1).



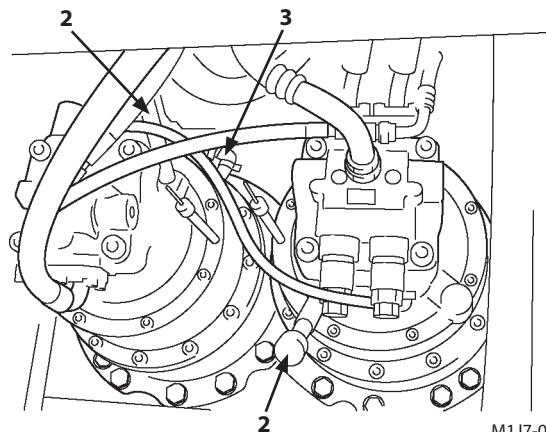
M104-07-021



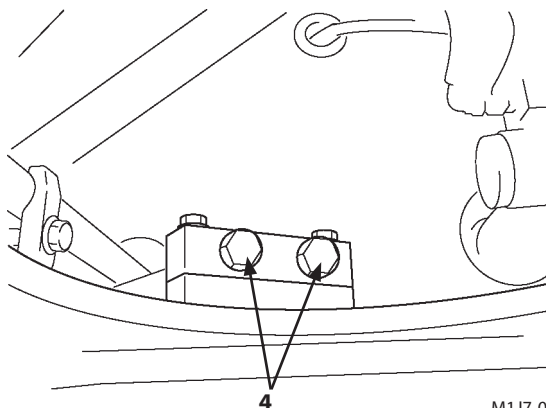
M1J7-07-005



M16J-07-048



M1J7-07-005



M1J7-07-017

MAINTENANCE

3 Travel Reduction Gear

Check Oil Level --- every 250 hours

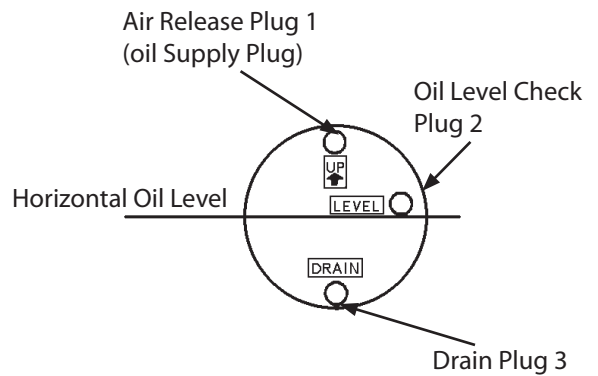
1. Park the machine on a level surface.
2. Rotate the travel motor until the imaginary line through plug (1) and plug (3) is vertical.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

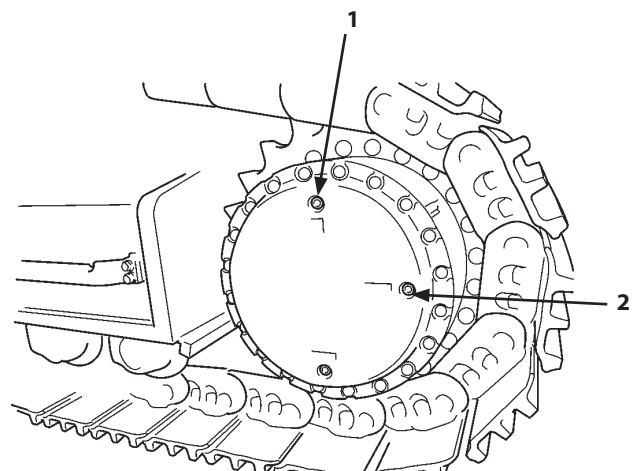
5. Run the engine at slow idle speed without load for three minutes.
6. Stop the engine. Remove the key from the key switch.
7. Pull the pilot control shut-off lever to the LOCK position.

WARNING: Keep body and face away from the air release plug. Gear oil is hot. Wait for gear oil to cool and then gradually loosen the air release plug to release pressure.

8. After gear oil has cooled, slowly loosen air release plug (1) to release pressure.
9. Remove air release plug (1) and oil level check plug (2). Oil must be up to the bottom of hole.
10. If necessary, add oil until oil flows out of the oil level check plug hole. (See gear oil chart)
11. Wrap the plug threads with sealing-type tape. Install plugs (1) and (2). Tighten plugs (1) and (2) to 70 N·m (7 kgf·m, 51 lbf·ft).
12. Check the gear oil level in the other travel reduction gear.



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M17P-07-011

MAINTENANCE

Change Gear Oil --- every 2000 hours

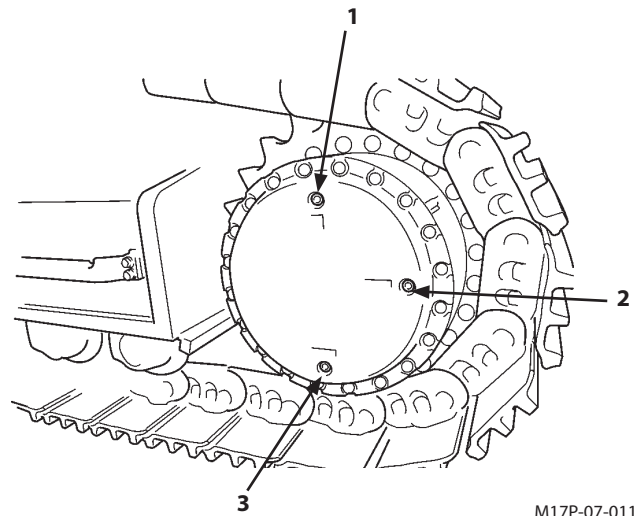
1. Park the machine on a level surface.
2. Rotate the travel motor until the imaginary line through plug (1) and plug (3) is vertical.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

5. Run the engine at slow idle speed without load for three minutes.
6. Stop the engine. Remove the key from the key switch.
7. Pull the pilot control shut-off lever to the LOCK position.

! WARNING: Keep body and face away from the air release plug. Gear oil is hot. Wait for gear oil to cool and then gradually loosen the air release plug to release pressure.

8. After gear oil has cooled, slowly loosen air release plug (1) to release pressure.
9. Remove drain plug (3) to drain oil.
10. Wrap the threads of the drain plug with sealing-type tape. Install the plug. Tighten the plug to 70 N•m (7.1 kgf•m, 51 lbf•ft).
11. Remove oil level check plug (2).
12. Add oil until oil flows out of the oil level check plug hole. (See gear oil chart)
13. Wrap the threads of oil level check plug (2) and air release plug (1) with sealing-type tape. Reinstall the plugs. Tighten the plugs to 70 N•m (7.1 kgf•m, 51 lbf•ft).
14. Repeat steps 8 to 13 for the other travel reduction gear.




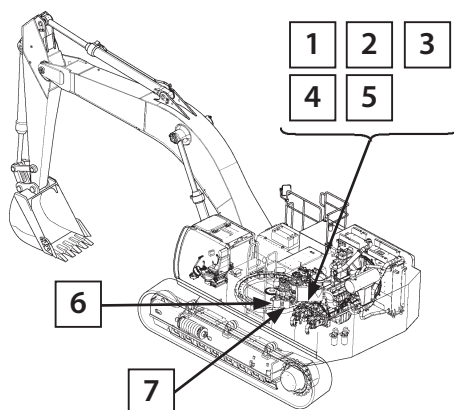
M17P-07-011

MAINTENANCE

D. HYDRAULIC SYSTEM

Parts	Quantity	Interval (hours)								
		10	50	100	250	500	1000	1500	2500	4000
1. Check Hydraulic Oil Level	1									
2. Drain Hydraulic Oil Tank Sump	1									
3. Change Hydraulic Oil	720 L (190 US gal)							*	*	*
4. Suction Filter Cleaning	2	When changing hydraulic oil								
5. Replace Hydraulic Oil Tank Filter	1									
6. Replace Pump Drain Filter	1									
7. Replace Pilot Oil Filter	1									
8. Replace Air Breather Filter	1									
9. Check Hoses and Lines	for leaks									
	for cracks, bend, etc.									


 **NOTE:** * Hydraulic oil changing intervals differ according to kind of hydraulic oil used. See recommended oil chart.



T1J7-01-02-002

Brand Names of Recommended HydraulicOil

Kind of Lubricant	Hydraulic Oil					
	Hydraulic System					
Where to be applied	4000 hours		2500 hours		1500 hours	
Change Interval	4000 hours		2500 hours		1500 hours	
Environmental Temp.	-20 to 40°C (-4 to 104°F)	-10 to 40°C (14 to 104°F)	-20 to 40°C (-4 to 104°F)	-10 to 40°C (14 to 104°F)	-20 to 40°C (-4 to 104°F)	-10 to 40°C (14 to 104°F)
Manufacturer	Super EX 46HN		Super Hydro 46 WRHU		Bartran HV46	
Hitachi	Super EX 46HN		Super Hydro 46 WRHU			
Idemitsu Kosan			Super Hydro 46 WRHU			
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 46
Remarks	Anti-wear type hydraulic oil					

 **NOTE:** Use proper hydraulic oil in accordance with the atmospheric temperature. The machine shipped from the factory is filled with oil marked .
 When the atmospheric temperature is between -40°C and +20°C: Use the proper hydraulic oil having high and low temperature characteristics by referring to the values shown below.
 Low Temperature Viscosity: Less than 4000cSt at -40°C
 High Temperature Viscosity: More than 6.5cSt at +80°C
 The above values are approximately equivalent to ISO viscosity grade #22. However, low temperature viscosity will differ depending on each product. Contact each hydraulic oil manufacture directly.
 When the atmospheric temperature is below -40°C: Contact your authorized dealer.

MAINTENANCE

INSPECTION AND MAINTENANCE OF HYDRAULIC EQUIPMENT

IMPORTANT: Do not adjust the engine governor and/or hydraulic components.



WARNING: During operation, the parts of the hydraulic system become very hot. Allow the machine to cool down before beginning inspection or maintenance.

1. Be sure that the machine is parked on a level, firm surface before servicing hydraulic equipment.
2. Lower the bucket to the ground and stop the engine.
3. Begin servicing hydraulic components only after components, hydraulic oil and lubricants are completely cooled, and after releasing residual pressure.
 - 3.1 Bleed air from the hydraulic oil tank to release internal pressure.
 - 3.2 Allow the machine to cool down.
Note that servicing heated and pressurized hydraulic components may cause hot parts and/or oil to fly off or escape suddenly, possibly resulting in personal injury.
 - 3.3 Keep body parts and face away from plugs or screws when removing them.
Hydraulic components may be pressurized even when cooled.
 - 3.4 Never attempt to service or inspect the travel and swing motor circuits on slopes. They are highly pressurized due to self-weight.
 - 3.5 Even after bleeding the air from the hydraulic oil tank, pressure remains in the various circuits of the hydraulic system. Be sure to operate each control lever a few times to release residual pressure from the system.
4. When connecting hydraulic hoses and pipes, take special care to keep seal surfaces free from dirt and to avoid damaging them. Keep these precautions in mind:
 - 4.1 Wash hoses, pipes, and the tank interior with a washing liquid and thoroughly wipe it out before reconnecting them.
 - 4.2 Only use O-rings that are free of damage or defects. Be careful not to damage them during reassembly.
 - 4.3 Do not allow high pressure hoses to twist when connecting them. The life of twisted hoses will be shortened considerably.
 - 4.4 Carefully tighten low pressure hose clamps.
Do not over tighten them.

MAINTENANCE

5. When adding hydraulic oil, always use the same brand of oil; do not mix brands of oil. As the machine is filled with Super EX 46HN when it is shipped from the factory, use it as a general rule. When selecting to use another brand of oil listed in the table "Brand names of recommended hydraulic oil", be sure to completely replace the oil in the system.
6. Do not use hydraulic oils other than those listed in the table "Brand names of recommended hydraulic oil".
7. Never run the engine without oil in the hydraulic oil tank.

MAINTENANCE

1 Check Hydraulic Oil Level --- daily

IMPORTANT: Never run the engine without oil in hydraulic oil tank.

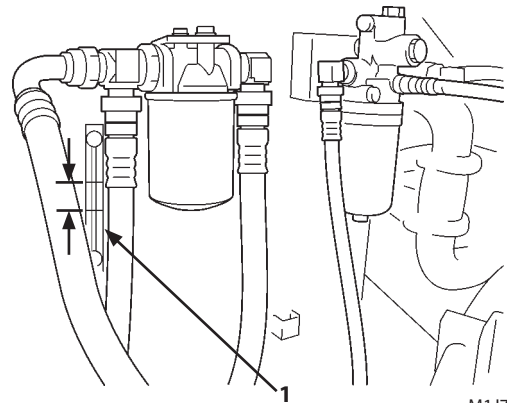
1. Park the machine on a level surface.
2. (Backhoe)
Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

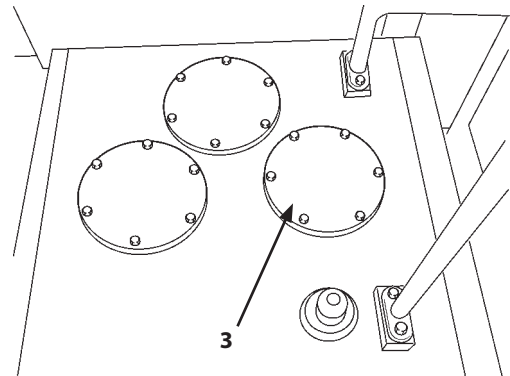
5. Run the engine at slow idle speed without load for five minutes.
6. Turn the key switch OFF. Remove the key from the key switch.
7. Pull the pilot control shut-off lever to the LOCK position.
8. Open the access door in front of the main pump. Check oil level with level gauge (1) on hydraulic oil tank. Oil must be between marks on the gauge. If necessary, add oil.
- 8-1 Leave the machine for a while after stopping operation. After the oil temperature is cooled, push air bleed valve (4) to bleed air from the hydraulic oil tank.
9. Remove cover (3).
10. Add oil. Recheck oil level gauge.
11. Install cover (3).



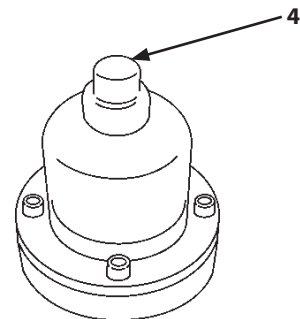
M104-07-021



M1J7-07-029



M1J7-07-048



M1J1-07-006

MAINTENANCE

2 Drain Hydraulic Oil Tank Sump

--- every 250 hours

WARNING: Hydraulic oil may be hot just after operation. Be sure to wait for oil to cool before starting work.

IMPORTANT: Never run the engine without oil in hydraulic oil tank.

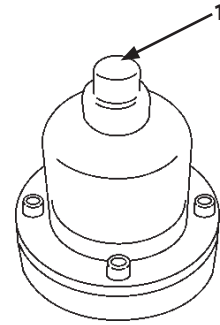
1. Park the machine on a level surface with the upperstructure rotated 90° for easier access.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

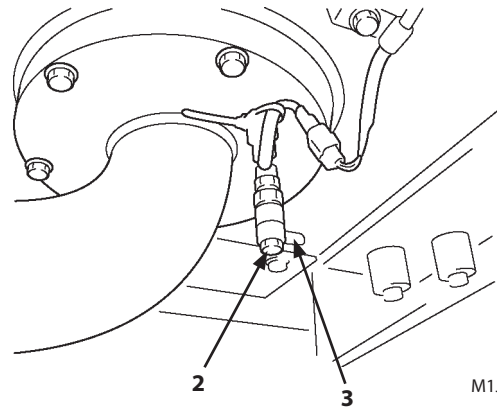
4. Run the engine at slow idle speed without load for five minutes.
5. Turn the key switch OFF. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.

WARNING: Do not loosen the drain plug until oil is cool. Hydraulic oil may be hot, potentially causing serious injury.

7. Leave the machine for a while after stopping operation. After the oil temperature is cooled, push air bleed valve (1) to bleed air from the hydraulic oil tank.
8. After oil is cool, remove the drain plug (2) and open drain cock (3) to drain water and sediment.
9. After draining water and sediment, tighten drain plug (2) and cock (3) securely.



M1J1-07-006



M1J7-07-013

MAINTENANCE

3 Change Hydraulic Oil

4 Suction Filter Cleaning

--- every 4000 hours, 2500 hours
or 1500 hours

! WARNING: Hydraulic oil may be hot. Wait for oil to cool before starting work.

IMPORTANT: Hydraulic oil changing intervals differ according to kind of hydraulic oils used. (See Recommended Oil Chart in this group)

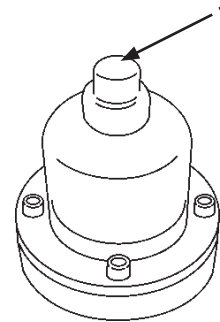
1. Park the machine on a level surface with the upperstructure rotated 90° for easier access.
2. (Backhoe)
Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

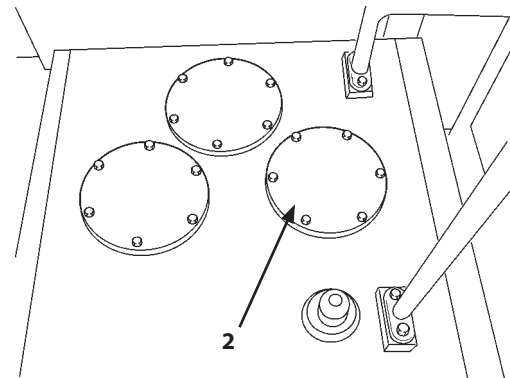
5. Run the engine at slow idle speed without load for five minutes.
6. Stop the engine. Remove the key from the key switch.
7. Pull the pilot control shut-off lever to the LOCK position.
8. Clean the top of the hydraulic oil tank to keep dirt out of the hydraulic system.
9. Leave the machine for a while after stopping operation. After the oil temperature is cooled, push air bleed valve (1) to bleed air from the hydraulic oil tank.
10. Remove cover (2).
11. Remove oil using a suction pump. The hydraulic oil tank capacity, up to specified oil level, is approximately 720 liter (190 US gal)
12. Remove drain plug (5) and open drain cock (3). Allow oil to drain.



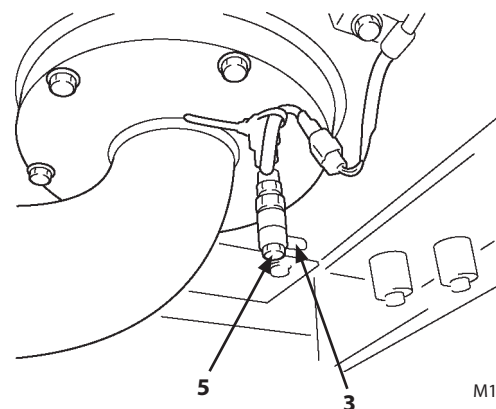
M104-07-117



M1J1-07-006



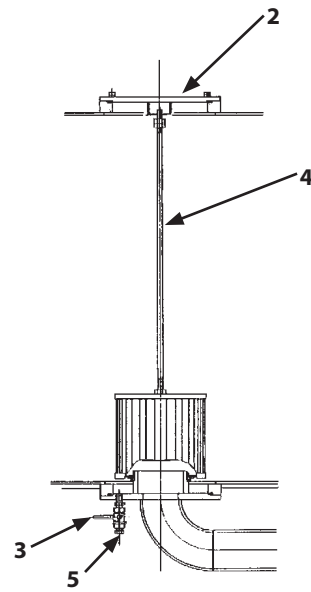
M1J7-07-048



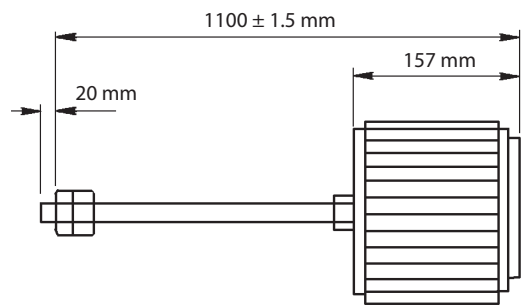
M1J7-07-013

MAINTENANCE

13. Remove suction filter and rod assembly (4).
14. Clean the filter and tank interior. If the filter is to be replaced, install new filter on the rod as shown. Tighten nut to 14.5 to 19.5 N·m (1.5 to 2.0 kgf·m, 10.5 to 14.5 lbf·ft).
15. Install suction filter and rod assembly (4). Make sure the filter is positioned correctly on the outlet.
16. Clean, install and tighten drain plug (5) and drain cock (3).



M1J1-07-060



Rod Assembly

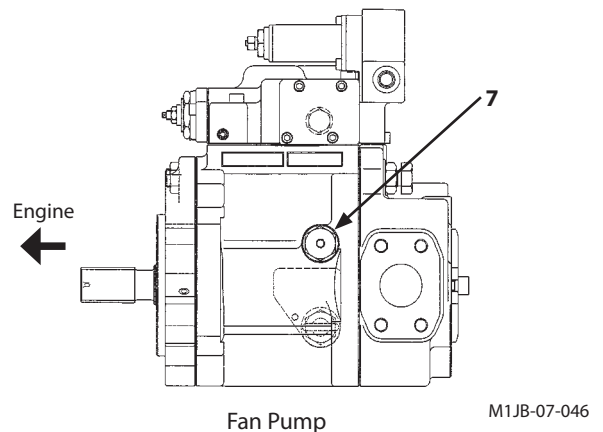
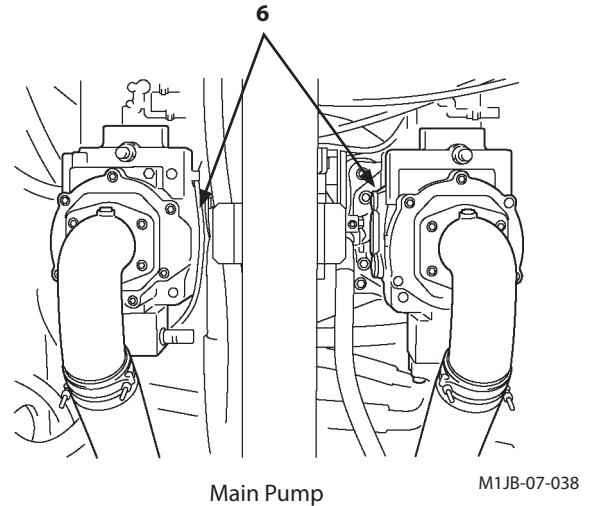
M17V-07-069

MAINTENANCE

17. Install cover (2). After removing cap (1), make sure suction filter and rod assembly (4) is in correct position. Tighten the bolts to 50 N·m (5.1 kgf·m, 37 lbf·ft).
18. Add oil until it is between the marks on the sight gauge.

IMPORTANT: If the hydraulic pump is not filled with oil, it will be damaged when the engine is started.

19. Loosen plug (6) on the top of the pump.
20. Fill the pump with oil through plug (6) port.
21. Retighten the plug (6).
22. Start the engine and run at slow idle. Put a "Do Not Operate" tag on the pilot control shut-off lever. Make sure the pilot control shut-off lever is in the LOCK position.
23. Slowly loosen plug (7) to release trapped air. Retighten the plug when air stops and oil flows from the plug.
24. Loosen port (7) on the top of hydraulic fan pump. Purge air from the hydraulic pump and fill the pump with oil through the port.
25. After filling the pump with oil, retighten the port. Then, start the engine and run at slow idle.
26. Slowly loosen port (7) to release trapped air. Retighten the plug when air stops and oil flows from the plug.
27. Purge air from the hydraulic system by running the engine at slow idle and operating all control levers slowly and smoothly for 15 minutes.
28. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended.
29. Lower the bucket to the ground.
30. Turn the auto-idle switch off.
31. Stop the engine. Remove the key from the key switch.
32. Pull the pilot control shut-off lever to the LOCK position.
33. Check the oil level gauge. Remove cover (2) to add oil if necessary.



MAINTENANCE

5 Replace Hydraulic Oil Tank Filter

--- every 1000 hours

WARNING: Hydraulic oil may be hot just after operation. Be sure to wait for oil to cool before starting work.

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

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

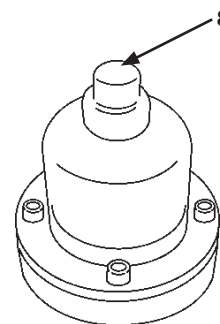
4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.
7. Leave the machine for a while after stopping operation. After the oil temperature is cooled, push air bleed valve (8) to bleed air from the hydraulic oil tank.

NOTE: There is spring tension under the cover. Hold down the cover when removing last two bolts.

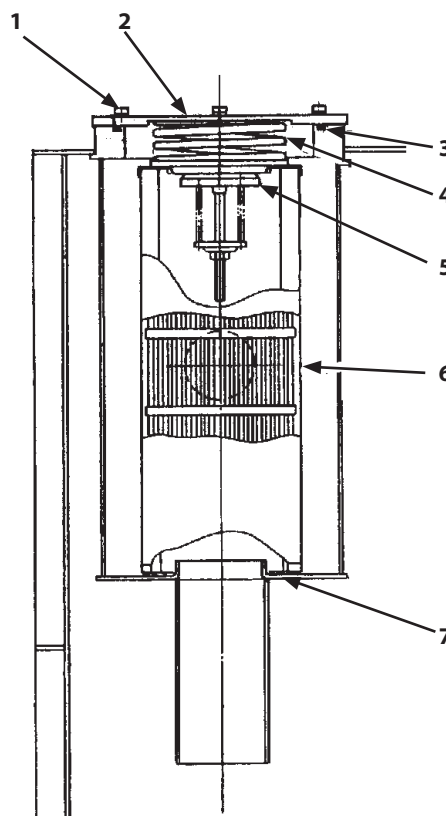
8. Hold down filter cover (2) against light spring load when removing the last two bolts (1). Remove filter cover (2).
9. Remove spring (4), valve (5) and element (6).
10. Discard element (6) and O-ring (3).
11. Install a new element (6), valve (5) and spring (4). And check surely that rubber (7) is installed.
12. Install cover (2) with new O-ring (3).
13. Install and tighten bolts (1) to 50 N·m (5.1 kgf·m, 37 lbf·ft).
14. After replacing the filter element, bleed air from the pump and check the oil level in the hydraulic oil tank. (Refer to the Bleed Air from Hydraulic System in Step 3.) If the machine is operated with air remaining in the hydraulic system, damage to the hydraulic pump may result.
15. Replace the element at the regular interval to keep hydraulic oil clean and to extend the life of the hydraulic components.



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M111-07-040

MAINTENANCE

6 Replace Pump Drain Filter

--- every 1000 hours



WARNING: Hydraulic oil may be hot just after operation. Be sure to wait for oil to cool before starting work.

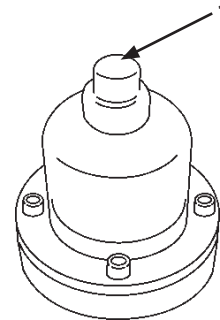
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

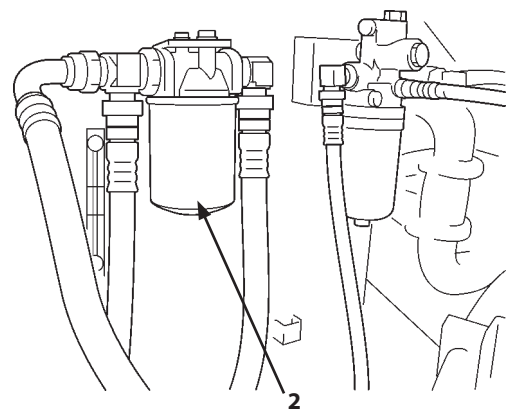
4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Operate the right and left control levers to release pressure from the pilot accumulator.
7. Pull the pilot control shut-off lever to the LOCK position.
8. Leave the machine for a while after stopping operation. After the oil temperature is cooled, push air bleed valve (1) to bleed air from the hydraulic oil tank.
9. Remove filter cartridge (2) by turning it counterclockwise with filter wrench.
10. Clean the filter gasket contact area.
11. Apply a thin film of clean oil to the gasket of new filter.
12. Install the new filter. Turn filter cartridge clockwise by hand until gasket touches contact area. Be sure not to damage gasket when installing filter.
13. Tighten filter cartridge (2) 1/2 turn more using wrench.
14. Start the engine. Check for any leakage.
15. After replacing the filter element, bleed air from the pump and check the oil level in the hydraulic oil tank. (Refer to the Bleed Air from Hydraulic System in Step 3.) If the machine is operated with air remaining in the hydraulic system, damage to the hydraulic pump may result.
16. Replace the element at the regular interval to keep hydraulic oil clean and to extend the life of the hydraulic components.



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M1J1-07-006



M1J7-07-029

MAINTENANCE

7 Replace Pilot Oil Filter --- every 1000 hours

WARNING: Hydraulic oil may be hot just after operation. Be sure to wait for oil to cool before starting work.

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

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.

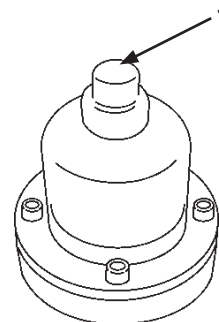
WARNING: The hydraulic oil tank is pressurized. Push the pressure release button (1) on the air breather before removing the air breather.

7. Remove the filter cartridge of pilot oil filter (3) by turning it counterclockwise with the filter wrench.
8. Clean the filter o-ring contact area on the filter head (2).
9. Apply a thin film of clean oil to the gasket of the new filter.
10. Install new filter. Turn the filter cartridge clockwise by hand until the o-ring touches the contact area. Be sure not to damage the o-ring when installing the filter.

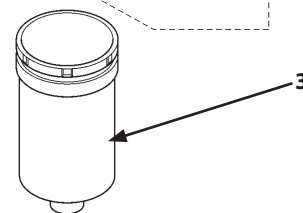
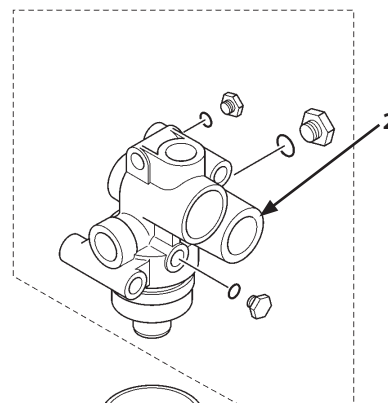
NOTE: Do not re-use the filter cartridge.



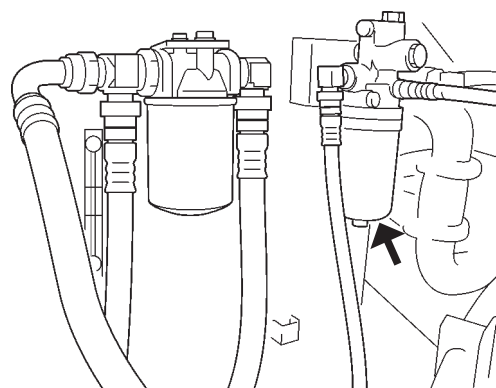
M104-07-021



M1J1-07-006



M1U1-07-050



M1J7-07-029

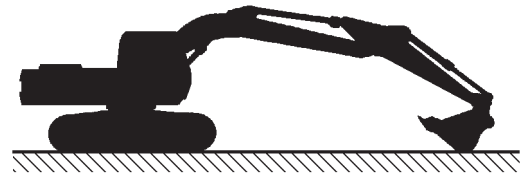
MAINTENANCE

8 Replace Air Breather Element --- every 4000 hours

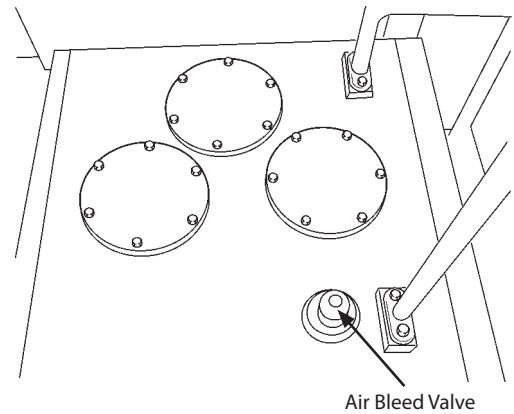
WARNING: Hydraulic oil may be hot just after operation. Hot hydraulic oil may spout, possibly causing severe burns. Be sure to wait for oil to cool before starting work.

Replacement Procedures

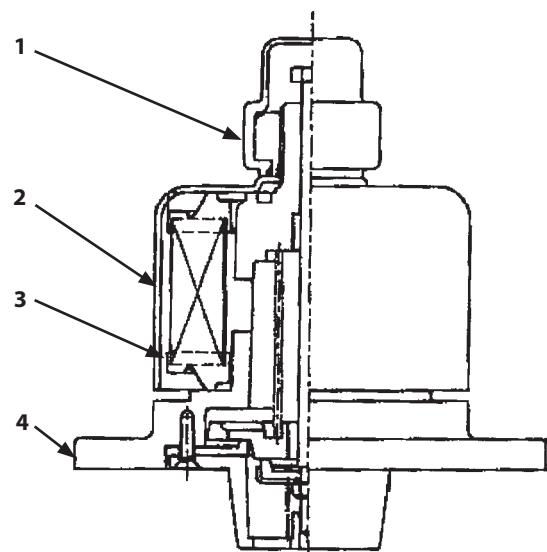
1. Park the machine on solid and level ground. Fully extend the bucket cylinder, fully retract the arm cylinder, and lower the bucket to the ground as illustrated to the right. Stop the engine.
2. Before replacing the element, be sure to bleed air pressure from the hydraulic oil tank by pressing the air bleed valve on the hydraulic oil tank.
3. Turn cover (2) clockwise about 1/4 turn. Turn cap (1) counterclockwise to remove it.
4. Turn cover (2) counterclockwise to remove it. Then, remove element (3).
5. Install new element (3). Tighten to install cover (2) until cover (2) comes in contact with the element. Then, further tighten the cover 1/4 turn.
6. Securely tighten cap (1) clockwise by hand. While holding cap (1) by hand so that cap (1) does not rotate, securely tighten cover (2) by rotating counterclockwise 5 to 10° by hand.
7. Take care never to allow water and/or contaminant to stay between cover (2) and body (4) (air breathing port).
8. Replace the element periodically to keep hydraulic oil clean and to extend hydraulic components service life.



M104-07-021



M1J7-07-048



M1G6-07-001

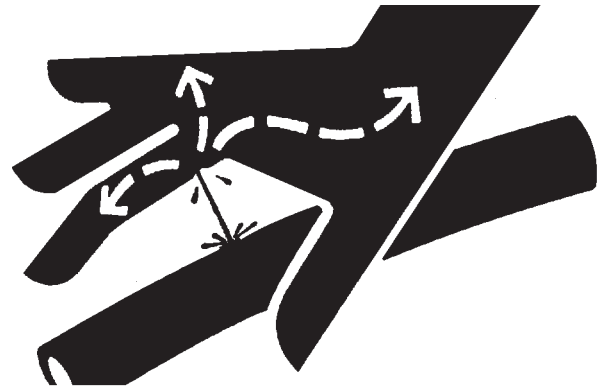
MAINTENANCE

9 Check Hoses and Lines

--- daily

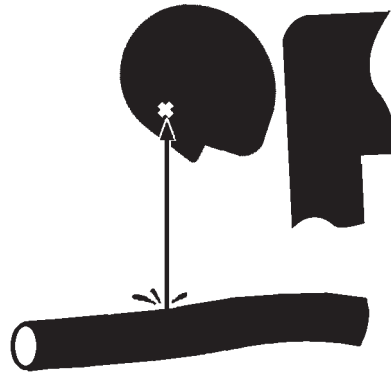
--- every 250 hours

- !** **WARNING:** 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. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

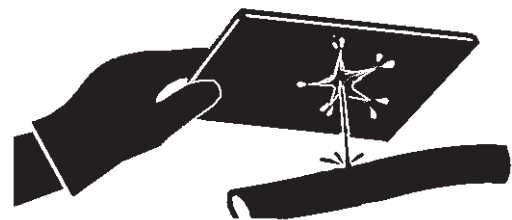


SA-031

- !** **WARNING:** Hydraulic oil and lubricant leaks can lead to fire that may result in serious injury. To avoid this hazard :
- Park the machine on a firm, level surface. Lower the bucket to the ground. Stop the engine. Remove key from the key switch. Pull the pilot control shut-off lever to the LOCK position.
 - Check for missing or loose clamps, kinked hoses, lines or hoses that rub against each other, damaged oil cooler, and loose oil cooler flange bolts, for leaks. Check hoses, lines and oil cooler at the check points indicated below for leaks and other damage that may result in future leaks. If any abnormalities are found, replace or retighten them, as shown in Tables 1-3.
 - Tighten, repair or replace any missing, loose or damaged clamps, hoses, lines, oil cooler, and loose oil cooler flange bolts. Do not bend or strike high-pressure lines. Never install bent or damaged hoses or lines.



SA-292

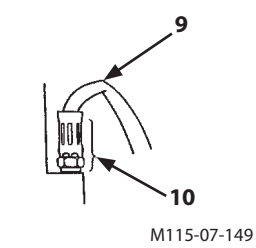
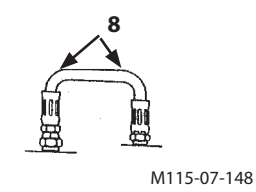
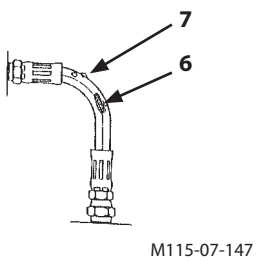
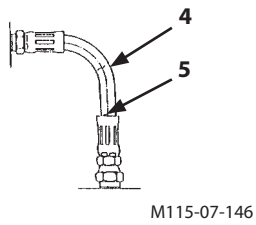
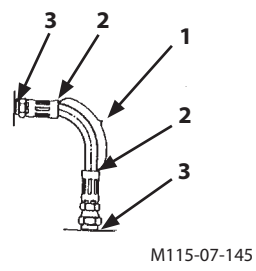
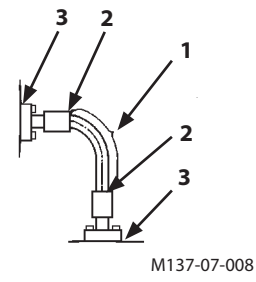


SA-044

MAINTENANCE

Table 1. Hoses

Interval(hours)	Check Points	Abnormalities	Remedies
Daily	Hose covers Hose ends Fittings	Leak (1) Leak (2) Leak (3)	Replace Replace Retighten or replace hose or O-ring
Every 250 hours	Hose covers Hose ends	Crack (4) Crack (5)	Replace Replace
	Hose covers Hose covers	Exposed reinforcement (6) Blister (7)	Replace Replace
	Hose	Bend (8)	Replace
	Hose	Collapse (9)	Replace (Use proper bend radius)
	Hose ends and fittings	Deformation or Corrosion (10)	Replace



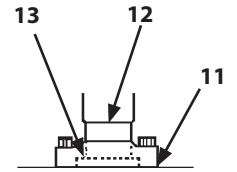
NOTE: Refer to the illustrations in Fig.1 for each check point location or for a description of the abnormality. Use genuine Hitachi parts.

Fig.1

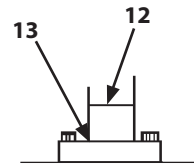
MAINTENANCE

Table 2. Lines

Interval(hours)	Check Points	Abnormalities	Remedies
Daily	Contact surfaces of flange joints	Leak (11)	Replace O-ring and/or retighten bolts
	Welded surfaces on joints	Leak (12)	Replace
Every 250 hours	Joint neck Welded surfaces on joints Clamps	Crack (13)	Replace
		Crack (12)	Replace
		Missing	Replace
		Deformation	Replace
		Loose	Retighten



M137-07-001



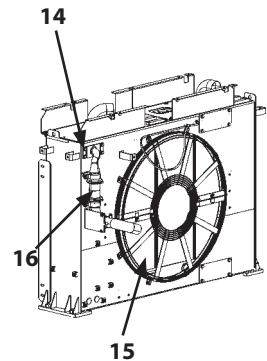
M137-07-007

NOTE: Refer to the illustrations in Fig.2 for each check point location or for a description of the abnormality. Use genuine Hitachi parts

Fig.2

Table 3. Oil cooler

Interval(hours)	Check Points	Abnormalities	Remedies
Every 250 hours	Contact surfaces of flange joints	Leak (14)	Replace O-ring and/or retighten bolts
	Oil cooler Coupling and rubber hose	Leak (15) Leak (16)	Replace Retighten or replace



M1J7-07-046

NOTE: Refer to the illustrations in Fig.3 for each check point location.

Fig.3

MAINTENANCE

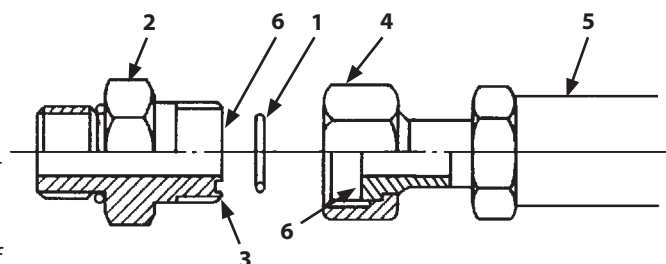
SERVICE RECOMMENDATIONS FOR HYDRAULIC FITTINGS

Two hydraulic fitting designs are used on this machine.

Flat Face O-ring Seal Fitting (ORS Fitting)

An O-ring is used on the sealing surfaces to prevent oil leakage.

1. Inspect fitting sealing surfaces (6). They must be free of dirt or defects.
2. Replace O-ring (1) with a new one when assembling fittings.
3. Lubricate O-ring (1) and install it into groove (3) using petroleum jelly to hold it in place.
4. Tighten fitting (2) by hand, pressing the fitting joint together to ensure O-ring (1) remains in place and is not damaged.
5. Tighten fitting (2) or nut (4) to the torque values shown. Do not allow hose (5) to twist when tightening fittings.
6. Check for leaks. If oil leaks from a loose connection, do not tighten fitting (2). Open the connection, replace O-ring (1) and check for correct O-ring position before tightening the connection.



M104-07-033

Torque specifications

±10%

Width across flats (mm)		27	32	36	41,46	50
Fastening torque	N•m	93	137	175	205	255
	(kgf•m)	(9.5)	(14)	(18)	(21)	(26)
	(lbf•ft)	(69)	(101)	(130)	(152)	(188)

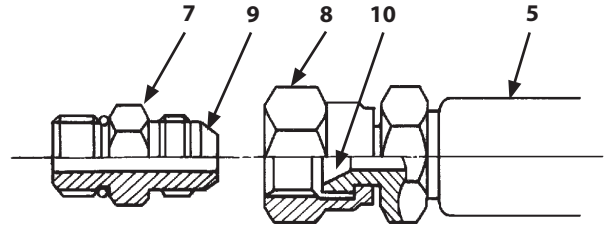
MAINTENANCE

Metal Face Seal Fittings

Fittings are used on smaller hoses and consist of a metal flare and a metal flare seat.

1. Inspect flare (10) and flare seat (9). They must be free of dirt or obvious defects.

IMPORTANT: Defects in the tube flare cannot be repaired. Overtightening a defective flare fitting will not stop a leak.



M202-07-051

2. Tighten fitting (7) by hand.
3. Tighten fitting (7) or nut (8) to the torque values shown. Do not allow hose (5) to twist when tightening fittings.

Width across flats (mm)		19	22	27
Fastening torque	N•m	29.5	39	93
	(kgf•m)	(3)	(4)	(9.5)
	(lbf•ft)	(21.5)	(29)	(69)

MAINTENANCE

E. FUEL SYSTEM

Tank capacity 900 liter (238 US gal)

Parts	Quantity	Interval (hours)						
		10	50	100	250	500	1000	2000
1. Drain Fuel Tank Sump	1							
2. Check Water Separator	3							
3. Replace Main Fuel Filter	2							
4. Replace Fuel Pre-Filter	1							
5. Clean Feed Pump Strainer	1							
6. Check Fuel Hoses	for leaks.							
	for cracks, bend, etc.							

Recommended Fuel

Use high quality DIESEL FUEL only (JIS K-2204) (ASTM 2-D). Kerosene must NOT be used.

Refueling

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

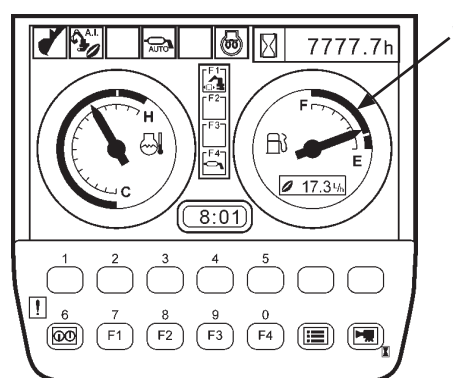
IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.

! WARNING: Handle fuel carefully. Shut the engine off before fueling. Do not smoke while you fill the fuel tank or work on fuel system.

7. Check fuel level gauge (1) or the monitor panel. Add fuel if necessary.


IMPORTANT: Keep all dirt, dust, water and other foreign materials out of the fuel system.

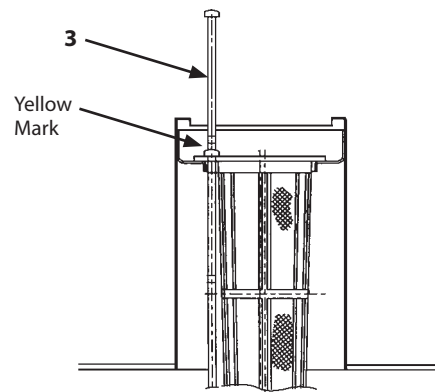
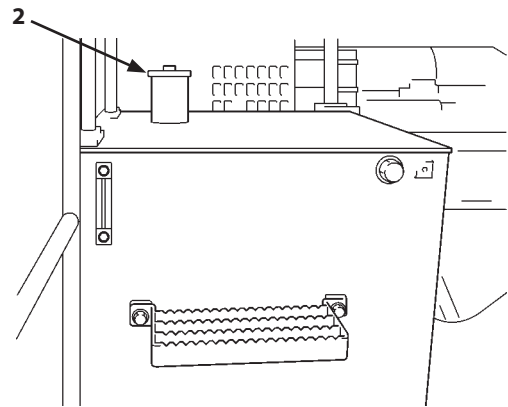


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MAINTENANCE

- To avoid condensation, fill the tank at the end of each day's operation. Take care not to spill fuel on the machine or ground. Fuel tank capacity is 900 liters (238 US gal). Do not fill the tank more than specified. Stop filling when a yellow mark on fuel level gauge (3) becomes visible. Be sure to position the fuel service nozzle so that any part of the nozzle does not obstruct rising of the float-type fuel level gauge (3).
- Reinstall filter cap (2) on the filler tube. Be sure to lock filter cap (2) with the key to prevent the cap from being lost as well as to prevent vandalism.

 **NOTE:** Take precautions for Fueling with Automatic Fueling Device (Optional). Avoid overfilling. Never fail to remove filler cap (2) when refueling with the automatic fueling device and be sure to stop fueling when the yellow mark on the float becomes visible.




1 Drain Fuel Tank Sump --- daily

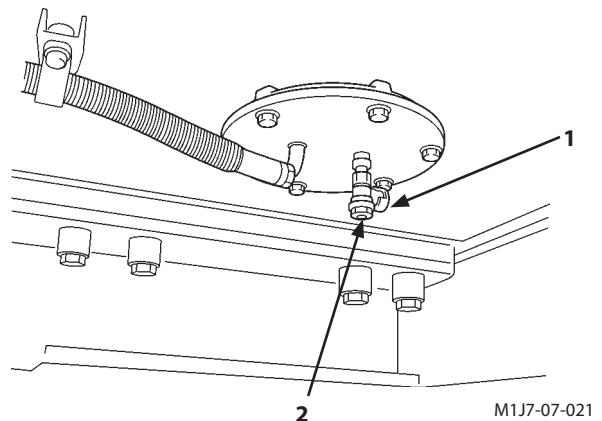
- Park the machine on a level surface with the upperstructure rotated 90° for easier access.
- Lower the bucket to the ground.
- Turn the auto-idle off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

- Run the engine at slow idle speed without load for five minutes.
- Turn the key switch OFF. Remove the key from the key switch.
- Pull the pilot control shut-off lever to the LOCK position.

 **NOTE:** The plug is installed in the drain cock to prevent vandalism.

- Remove plug (2) and open drain cock (1) for several seconds to drain water and sediment. Close the drain cock.
- Install and tighten the plug.



MAINTENANCE

2 Check Water Separator

--- daily (Before starting operation)

Water separator separates any water that may get mixed with the fuel. Water separator contains a float which rises as water accumulates.

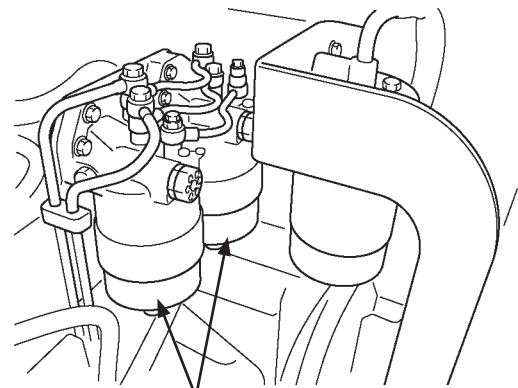
Be sure to drain the sediment when the float rises up to the "Drain Water" mark written on the outside of water separator.

IMPORTANT: If the fuel contains an excessive amount of water, shorten the interval between water separator checks.

Draining Procedures (Main Filter)

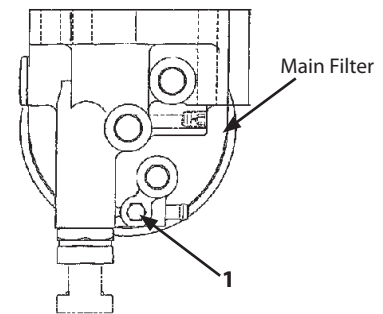
1. Place 0.5 liters (0.5 US qt) or larger capacity container under drain plug (3) to collect the drained water.
2. Shut off the fuel supply by closing cock on the bottom of the fuel tank.
3. Loosen plug (1) on the top of the fuel main filter.
4. Rotate drain plug (3) on the bottom of the filter about 4-turns counterclockwise to drain the water accumulated in the filter.
5. After draining water, securely tighten drain plug (3) and plug (1). Return fuel cock to the original position.
6. Start the engine. Check drain plug (3) and plug (1) for fuel leaks.

Wrench size: 10 mm

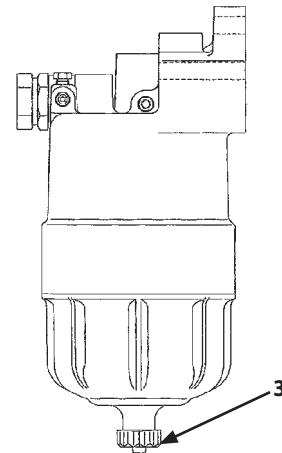


Main Filter

M1J7-07-028



M1GR-07-010




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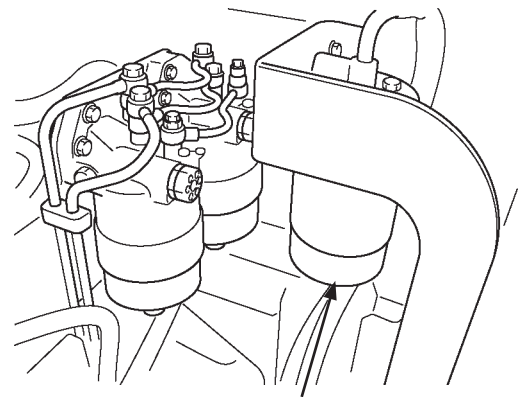
MAINTENANCE

Draining Procedures (Pre-Filter)

1. Place 0.5 liters (0.5 US qt) or larger capacity container under drain plug (5) to collect the drained water.
2. Shut off the fuel supply by closing cock on the bottom of the fuel tank.
3. Loosen plug (4) on the top of the fuel pre-filter.
4. Rotate drain plug (5) counterclockwise to completely drain water.
5. After draining water, securely tighten drain plug (5) and plug (4). Return fuel cock to the original position.
6. Start the engine. Check drain plug (5) and plug (4) for fuel leaks.

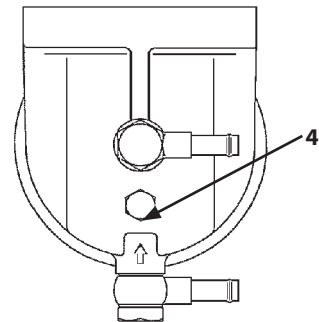
 **NOTE:** After draining water mixed in fuel, bleed air from the fuel supply system.

Wrench size: 14 mm

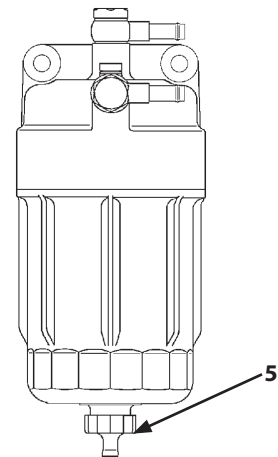


Pre-Filter

M1J7-07-028



M1U1-07-004



M1U1-07-005

MAINTENANCE

Air Bleeding Procedures

IMPORTANT: Air in the fuel system may make the engine hard to start or make it run irregularly. After draining water and sediment from the water separator, replacing the fuel filter, cleaning the fuel solenoid pump strainer or running the fuel tank dry, be sure to bleed the air from the fuel system.

WARNING: Fuel leaks may lead to fires.

1. Check that fuel cock on the bottom of the fuel tank is opened.
2. Loosen air bleed plug (2) on the fuel main filter (3).
3. Supply fuel by reciprocating priming pump (6). After no air bubbles are spouted through air bleed plug (2), lock the priming pump (6).
4. Supply fuel by reciprocating priming pump (1) of main filter (3), bleed the remained air.
5. Tighten air bleed plug (2) of main filter (3)

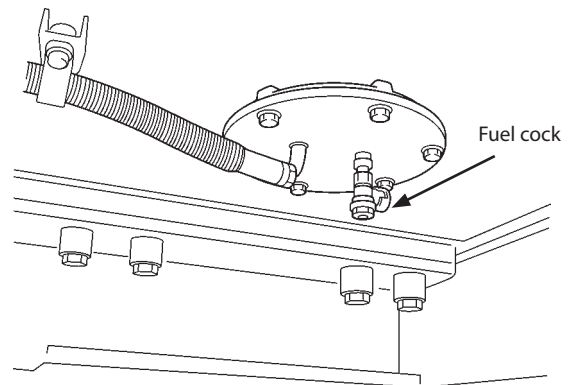
CAUTION: Bleed air from main filter (3) one by one.

IMPORTANT: Over tightening air bleed plug (2) causes damage.

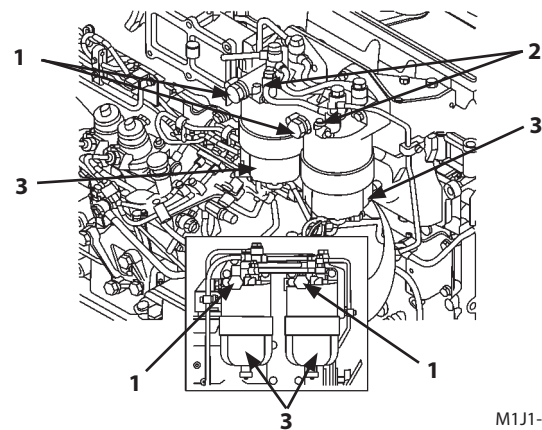
6. Loose air breather plug (5) of fuel feed pump (4). Supply fuel by reciprocating priming pump (6) of fuel feed pump (4), bleed the remained air.
7. Tighten air bleed plug (5) of fuel feed pump (4)

IMPORTANT: Do not over tighten air bleed plug (5).

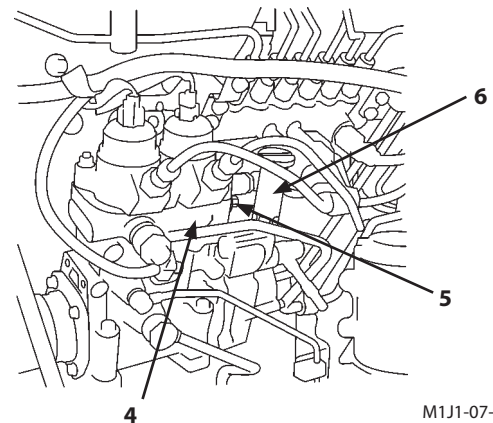
8. After tightening air bleed plug (1), reciprocate priming pump (6) approx. 150 strokes.
9. Wipe off any spilled fuel.
10. Start the engine. Check that no fuel leaks are present. If the engine does not start, repeat the above procedures from step 1.
Wrench size: 10 mm



M1J7-07-021



M1J1-07-062



M1J1-07-063

MAINTENANCE

3 REPLACE FUEL MAIN FILTER ELEMENT --- every 500 hours

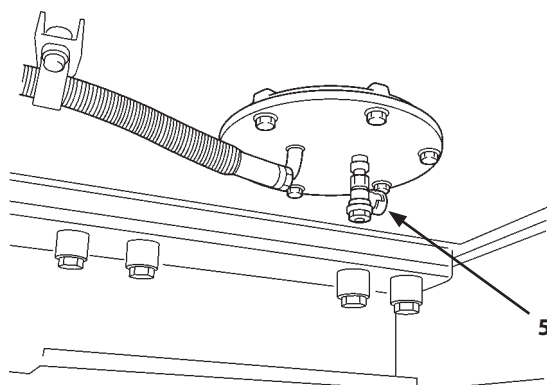
IMPORTANT: Be sure to use only genuine Hitachi elements for the main fuel cartridge and the pre-cartridge. Failure to do so may deteriorate the engine performance and/or shorten the engine service life. Please be noted that all engine failures caused by using other manufacturers' elements are excluded from Hitachi Warranty Policy.

Procedures:

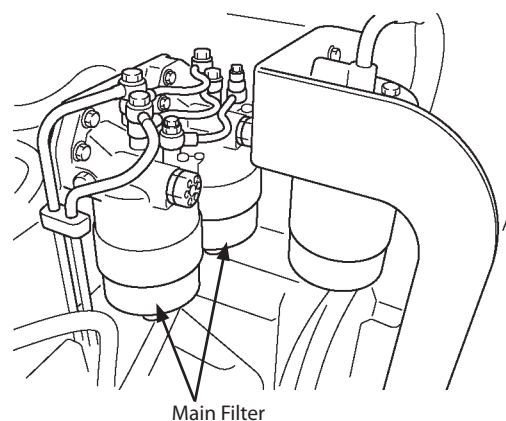
1. Close cock (5) on the bottom of the fuel tank.
2. Place a 1-liter (1 US qt) or larger capacity drain container under drain plug (2).
3. Loosen air bleed plug (1) and drain plug (2). Drain fuel until fuel does not flow out of the filter.
4. Remove transparent filter case (7) using the exclusive tool.
5. When transparent filter case (7) is removed, the element is exposed. Remove the element by hand.
6. Install a new element. Tighten transparent filter case (7) to $29.4 \pm 2 \text{ N}\cdot\text{m}$ ($3 \pm 0.2 \text{ kgf}\cdot\text{m}$, $21.7 \pm 1.4 \text{ lbf}\cdot\text{ft}$) using the exclusive tool.
7. Tighten air bleed plug (1) and drain plug (2).
8. Open cock (5) on the bottom of the fuel tank.
9. Bleed air from the fuel supply system.

After replacing the fuel filter element, bleed air from the fuel supply system. (Refer to the air bleed procedures described on page 7-51.)

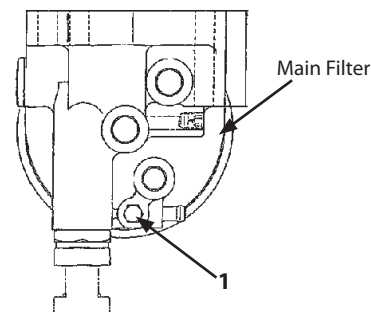
Wrench size: 10 mm



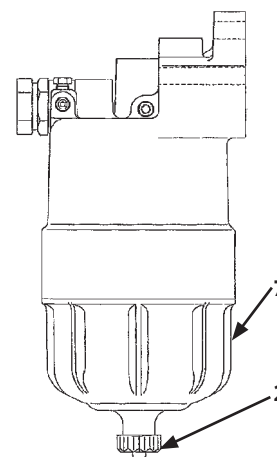
M1J7-07-021



M1J7-07-028



M1GR-07-010



M1GR-07-002

MAINTENANCE

4 REPLACE FUEL PRE-FILTER ELEMENT --- every 500 hours

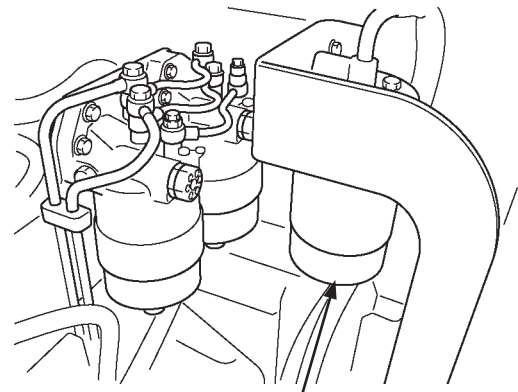
IMPORTANT: Be sure to use only genuine Hitachi elements for the main fuel cartridge and the pre-cartridge. Failure to do so may deteriorate the engine performance and/or shorten the engine service life. Please be noted that all engine failures caused by using other manufacturers' elements are excluded from Hitachi Warranty Policy.

Procedures:

1. Place a 1-liter (1 US qt) or larger capacity container under drain plug (1).
2. Loosen air bleed plug (3) and drain plug (1). Drain fuel until fuel does not flow out of the filter.
3. Remove transparent filter case (2) using an exclusive tool.
4. When transparent filter case (2) is removed, the element is exposed. Remove the element by hand.
5. Install a new element. Tighten transparent filter case (2) to $30 \pm 2 \text{ N}\cdot\text{m}$ ($3 \pm 0.2 \text{ kgf}\cdot\text{m}$, $22 \pm 1.4 \text{ lbf}\cdot\text{ft}$) using the exclusive tool.
6. Tighten air bleed plug (3) and drain plug (1).
7. Bleed air from the fuel supply system.

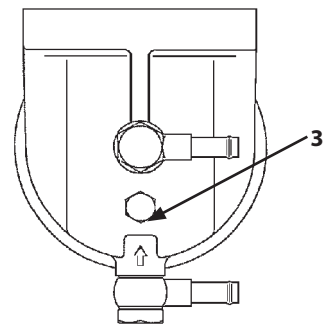
After replacing the fuel filter element, bleed air from the fuel supply system. (Refer to the air bleed procedures described on page 7-51.)

Wrench size: 14 mm

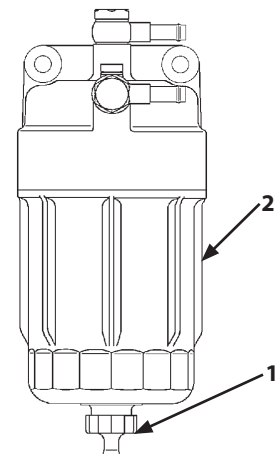


Fuel Pre-filte

M1J7-07-028



M1U1-07-004

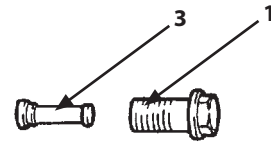


M1U1-07-005

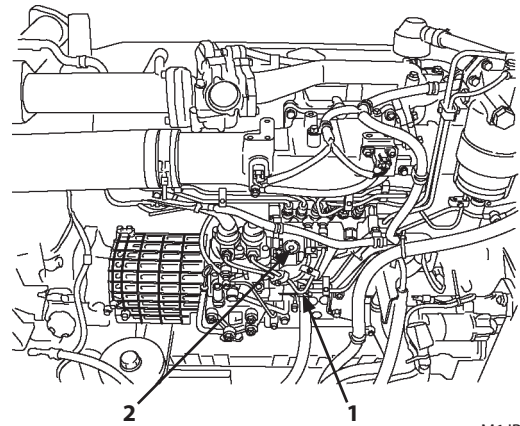
MAINTENANCE

5 Clean Feed Pump Strainer --- every 500 hours

1. Remove the feed pump (2) inlet hose joint bolt (1), located at the water separator inlet.
2. Remove strainer (3) from joint bolt (1) using a screw driver.
3. Clean strainer (3) using diesel fuel.
4. Install and tighten strainer (3) in joint bolt (1).
5. Install and tighten joint bolt (1).
6. After replacing for filter, bleed air from the fuel system.



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M1JB-07-039

MAINTENANCE

6 Check Fuel Hoses --- daily --- every 250 hours

⚠ WARNING: Fuel leaks can lead to fires that may result in serious injury.
To avoid this hazard :

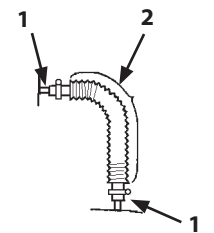
1. Park the machine on a firm, level surface. Lower the bucket to the ground. Stop the engine. Remove key from the key switch. Pull the pilot control shut-off lever to the LOCK position.
2. Check for kinked hoses, and hoses that rub against each other parts for leaks.
Check hoses at the check points indicated below for leaks and other damage that may result in future leaks. If any abnormalities are found, replace or retighten them, as shown in Table 4.
3. Repair or replace any loose or damaged hoses. Never install bent or damaged hoses.



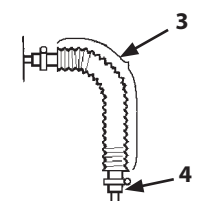
SA-019

Table 4. Hoses

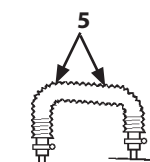
Interval(hours)	Check Points	Abnormalities	Remedies
Daily	Hose ends	Leak (1)	Retighten or replace
	Surface braid hose	Friction (2) Crack (2)	Replace Replace
Every 250 hours	Surface braid hose	Crack (3)	Replace
	Hose ends	Crack (4)	Replace
	Hose	Bend (5)	Replace
	Hose	Collapse (6)	Replace (Use proper bend radius)
	Hose ends and fittings	Deformation or Corrosion (7)	Replace



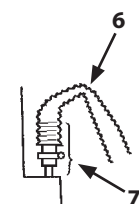
M137-07-003



M137-07-004



M137-07-005



M137-07-006

✎ NOTE: Refer to the illustrations in Fig.1 for each check point location or for a description of the abnormality. Use genuine Hitachi parts.

Fig. 1

MAINTENANCE

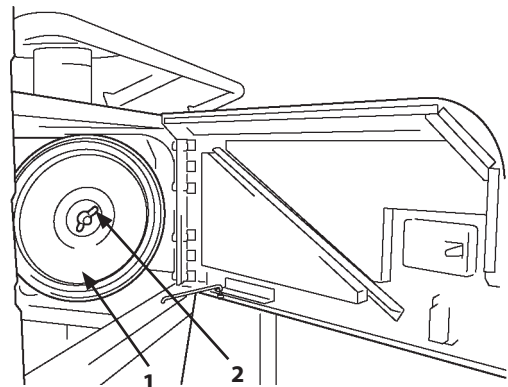
F. AIR CLEANER

Parts		Quantity	Interval (hours)							
			10	50	100	250	500	1000	2000	
1. Air Cleaner Outer Element	Cleaning	1								(Or when indicator lit)
	Replacement	1	After cleaning 6 times or 1 year							
2. Air Cleaner Inner Element	Replacement	1	When outer element is replaced							

1 Clean the Air Cleaner Outer Element
--- every 250 hours or when the restriction indicator comes ON

2 Replace the Air Cleaner Outer and Inner Elements
--- after cleaning six times or after one year

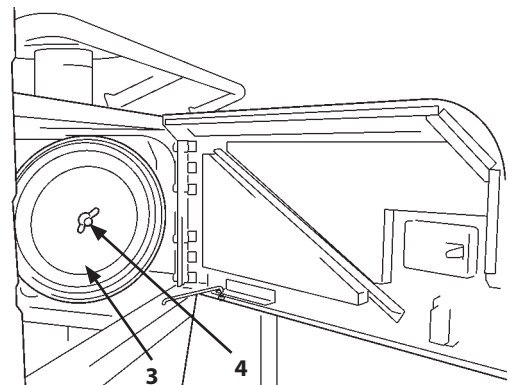
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.



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IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.
7. Loosen butterfly nut (2) to remove cover (1).
8. Clean cover (1) interior.
9. Loosen butterfly nut (4) to remove outer element (3).




M1J7-07-044

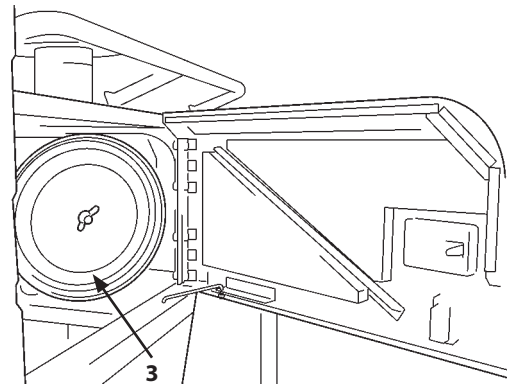
! WARNING: Use reduced compressed air pressure. Clear area of bystanders, guard against flying chips, and wear personal protection equipment including goggles or safety glasses.

10. Clean outer element (3) using compressed air. Direct the air to the inside of the filter element, blowing out.

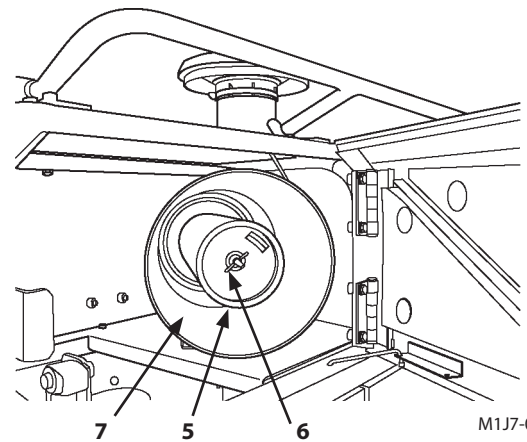
MAINTENANCE

11. Clean the filter interior before installing outer element (3).
12. Install outer element (3). While slightly pushing outer element (3) into the body to hold it in place.
13. Install cover (1) and tighten butterfly nut (2).
14. Start the engine and run at slow idle.
15. Check the air filter restriction indicator on the monitor panel. If the air filter restriction indicator comes ON, stop the engine and replace outer element (3).
16. When replacing the air cleaner filter element, replace both outer and inner elements (3), (5) together. Slowly remove inner element (5) after removing outer element (3). Clean body (7) before installing new elements. First, install inner element (5) and then install outer element (3).
17. Clean body (7) interior, every 250 hours or when air filter restriction indicator comes on.

 **NOTE:** When installing outer element (3), insert outer element (3) so that outer element (3) aligns with the groove on body (7). If inserted without aligning with the groove, the element may become difficult to remove.



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M1J7-07-037

MAINTENANCE

G. COOLING SYSTEM

Parts	Quantity	Interval (hours)						
		10	50	100	250	500	1000	2000
1. Check Coolant Level	1							
2. Change Coolant	57 L (15.1 US gal)	Twice a year *						
3. Clean Radiator, Oil Cooler, In-ter Cooler, Fuel Cooler Core	Outside	1						
	Inside	1	Once a year					
4. Clean Oil Cooler Front Screen	1					★		

 **NOTE:** ★ Shorten maintenance interval when the machine is operated in dusty areas.
 * When genuine Hitachi coolant is used, replace every two years or 4000 operating hours, whichever comes first.

Coolant

Fill the radiator with soft, pure tap or bottled water.

Anti-rust agent

Add approximately 0.8 L (0.8 US qt) of anti-rust agent to the new coolant when the coolant is changed.

It is not necessary to add anti-rust agent when antifreeze is used.

Antifreeze

If the air temperature is expected to fall below 0°C (32°F), fill the cooling system with an antifreeze and soft water mix. As a general rule, the ratio of antifreeze should range between 30% and 60% as shown in the table below. If the ratio is below 30%, the system may develop rust, and if it is above 60%, the engine may overheat.

MAINTENANCE

Antifreeze Mixing Table

Air temperature		Mixing ratio	Refill capacities			
			Antifreezes		Soft water	
°C	°F	%	liters	US gal	liters	US gal
-1	30	30	17.1	4.52	39.9	10.54
-4	25	30	17.1	4.52	39.9	10.54
-7	19	30	17.1	4.52	39.9	10.54
-11	12	30	17.1	4.52	39.9	10.54
-15	5	35	20.0	5.28	37.0	9.78
-20	-4	40	22.8	6.02	34.2	9.04
-25	-13	45	25.7	6.79	31.3	8.27
-33	-27	50	28.5	7.53	28.5	7.53
-50	-58	60	34.2	9.04	22.8	6.02



WARNING:

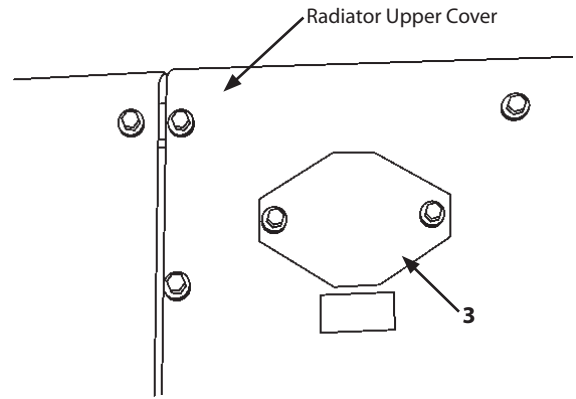
- **Antifreeze is poisonous; if ingested, it can cause serious injury or death. Induce vomiting and get emergency medical attention immediately.**
- **When storing antifreeze, be sure to keep it in a clearly marked container with a tight lid. Always keep antifreeze out of the reach of children.**
- **If antifreeze is accidentally splashed into eyes, flush with water for 10 to 15 minutes and get emergency medical attention.**
- **When storing or disposing of antifreeze, be sure to comply with all local regulations.**

MAINTENANCE

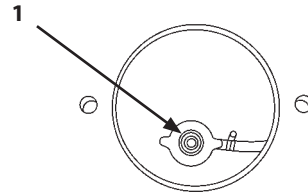
1 Check Coolant Level --- daily

WARNING: Do not loosen radiator filler cap (1) unless the system is cool. Loosen the cap slowly to the stop. Release all pressure before removing the cap.

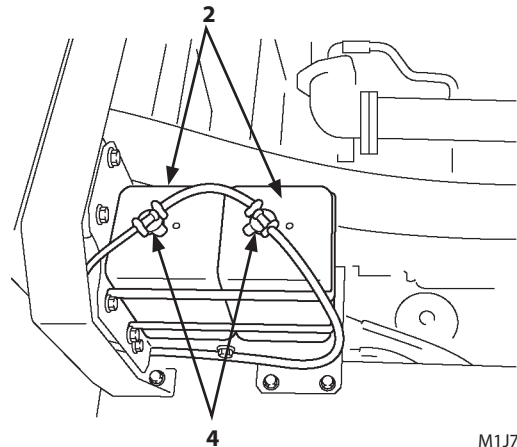
With the engine cold, the coolant level must be between the FULL and LOW marks on coolant reservoir (2), located side of the fuel tank. If the coolant level is below the low mark, remove cap (4) and add coolant to coolant reservoir (2). If coolant reservoir (2) is empty, remove cover (3) located on the radiator and add coolant to the radiator and then to coolant reservoir (2).



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M1J7-07-007

MAINTENANCE

2 Change Coolant --- twice a year (in spring and autumn)

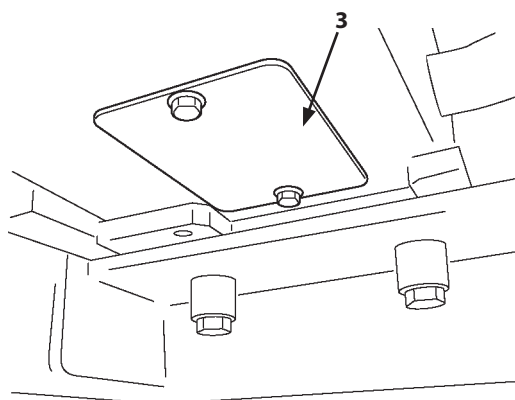
 **NOTE:** Before leaving the Hitachi Factory, the cooling system is filled with a mixture of water and Genuine Hitachi Long-Life Coolant. As long as Genuine Hitachi Long-Life Coolant is used, the service intervals between changing the coolant is once every two years, or every 4000 hours, whichever comes first.

 **WARNING:** Do not loosen the radiator cap until the system is cool. Loosen the cap slowly to the stop. Release all pressure before removing the cap.

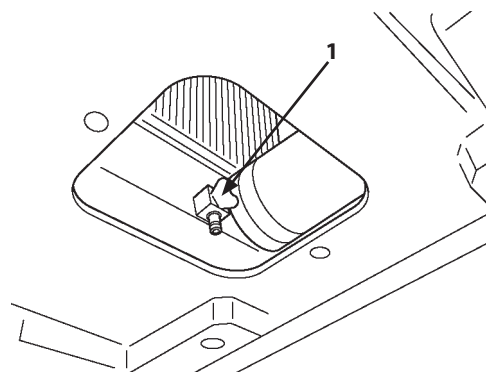
1. Remove cover (3) of radiator drain cock.
2. Remove the radiator cap. Open drain cocks (1) and (2) on the radiator and engine block to allow the coolant to drain completely.
3. Close drain cocks (1) and (2). Fill the radiator with tap water and a radiator cleaner agent. Start the engine and run at a speed slightly higher than slow idle; when the needle of the temperature gauge reaches the green zone, run the engine for about ten more minutes.
4. Stop the engine and open drain cock (1). Flush out the cooling system with tap water, until draining water is clear. This helps remove rust and sediment.
5. Close drain cock (1). Fill the radiator with tap water and an anti-rust agent or antifreeze at the specified mixing ratio. When adding coolant, do so slowly to avoid mixing air bubbles in the system.
6. Run the engine to sufficiently bleed the air from the cooling system.
7. After adding coolant, operate the engine for several minutes. Check the coolant level again, and add coolant if necessary.



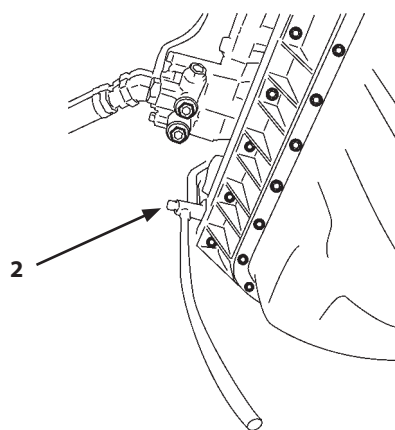
SA-039



M1J7-07-018



M1J7-07-022



M1J1-07-044

MAINTENANCE

3 Clean Radiator/ Oil Cooler/ Inter Cooler/ Fuel Cooler Core --- every 500 hours

WARNING: Use reduced compressed air pressure for cleaning purposes. Clear the area of bystanders, guard against flying chips, and wear personal protection equipment including eye protection.

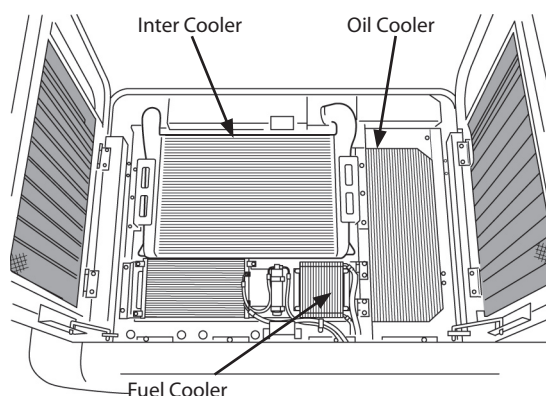
IMPORTANT: If the compressed air [should be less than 0.2 MPa (2 kgf/cm²)] or tap water pressure is high, damage to the radiator / oil cooler fins may result. Keep the nozzle more than 500 mm away from the core surface.

The radiator and the oil cooler are arranged in parallel. And inter cooler is arranged in series. When cleaning the radiator/ oil cooler, open the bracket installed condenser/ fuel cooler. Clean any dust stuck to the core.

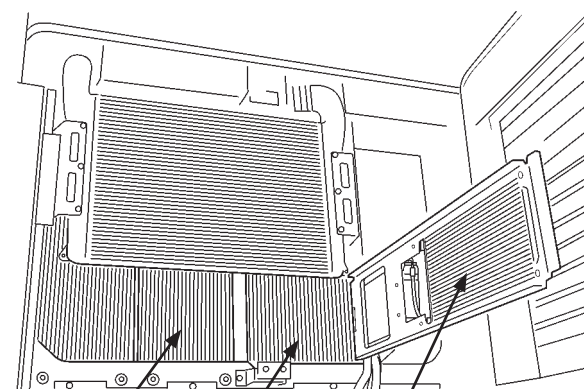
Clean the radiator / oil cooler/ inter cooler core using compressed air [less than 0.2 MPa (2 kgf/cm²)] or tap water to prevent the cooling system performance from deteriorating.

4 Clean Oil Cooler Front Screen --- every 500 hours

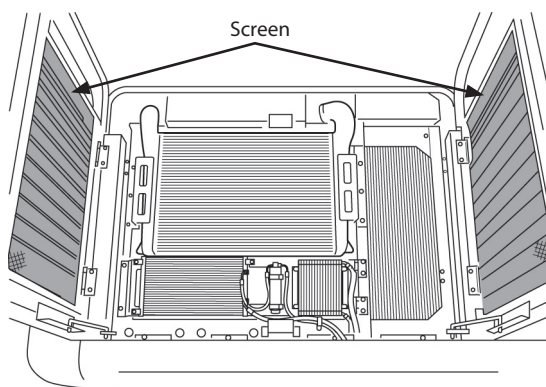
IMPORTANT: When operating the machine in a dusty environment, check the screen every day for dirt and clogging. If clogged, remove, clean and reinstall the screen.



M1J7-07-027



M1J7-07-024



M1J7-07-027

MAINTENANCE

H. AIR CONDITIONER

Parts		Quantity	Interval (hours)						
			10	50	100	250	500	1000	2000
1. Circulating Air Filter	Cleaning	1							
	Replacement	1	When excessively restricted						
Fresh Air Filter	Cleaning	1							
	Replacement	1							
2. Check Refrigerant (Gas) Quantity		1							
3. Check Compressor Belt Tension		1							
4. Clean Condenser Core		1							
5. Check Looseness at each of Fastened Areas		—							
6. Check In-Season and Off-Season		—	Twice a year						

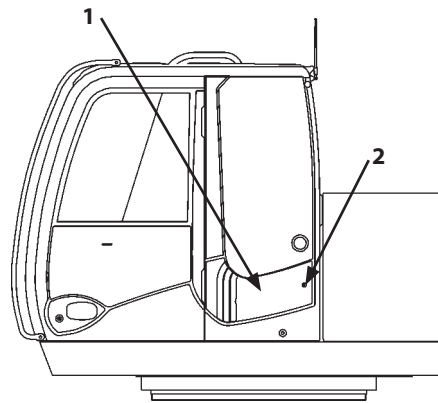
MAINTENANCE

- 1 Clean and Replace Air Conditioner Filter**
Clean Filter
Circulating Air Filter --- every 250 hours
Fresh Air Filter --- every 250 hours

Replace Filter
Circulating Air Filter --- When excessively restricted
Fresh Air Filter --- every 1000 hours

Removing Fresh Air Filter

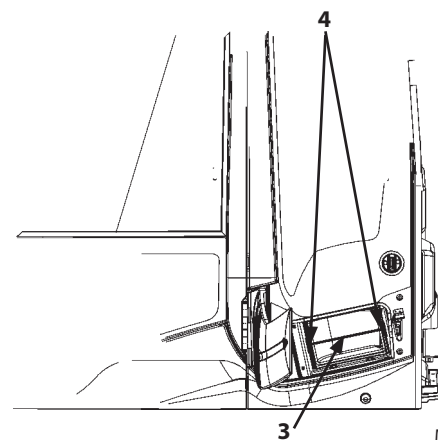
1. Insert the key into keyhole (2) on left cab side cover (1). Then, rotate the key counterclockwise to unlock the key. Open cover (1).
2. While pressing knobs (4) on both sides of fresh air filter (3) inward, horizontally remove the fresh air filter.



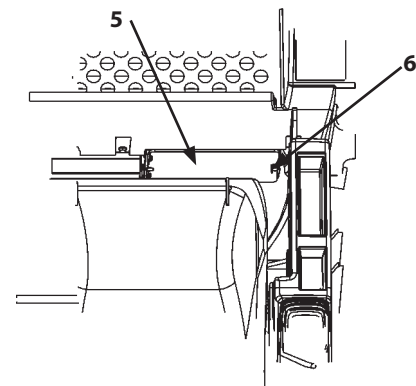
M1U1-07-010

Removing Recirculation Filter

1. Recirculation filter (5) is located under the rear deck.
2. Holding grips (6), pull them toward you to remove.



M1U1-07-011



M1U1-07-012

MAINTENANCE

⚠ WARNING: Use reduced compressed air pressure (less than 0.2 MPa, 2 kgf/cm²) for cleaning purposes. Clear the area of bystanders, guard against flying chips, and wear personal protection equipment including eye protection.

Cleaning

Clean both the external and internal filters by blowing compressed air or washing with water.

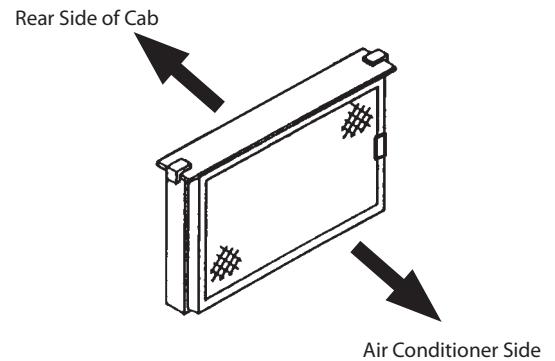
When washing the filters with water, follow the procedures below:

1. Wash with tap water.
2. Soak the filters in neutral detergent-mixed water for approx. 5 minutes.
3. Wash the filters with water again.
4. Dry the filters.

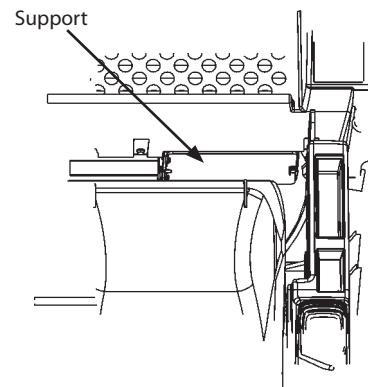
Installation

When installing the cleaned recirculation and/or ventilation filter or new filters, follow the reverse order of the Removing Filter procedures described on the front page.

- **Ventilation Filter**
Use attention when installing the filter so that the notch faces the back of the cab and the stamped arrows face the air conditioner unit. After installing the filter, install the upper cover while aligning it with the duct.
- **Recirculation Filter**
While contacting the attached filter plate onto the duct, install the filter so that the clips align with the duct mounting holes.



M1U1-07-013



M1U1-07-012

MAINTENANCE

2 Check Refrigerant (Gas) Quantity --- every 250 hours

WARNING: DO NOT allow liquid refrigerant to contact eye or skin. Liquid refrigerant will freeze eye or skin on contact. Be careful not to loosen connections in the air conditioning circuit.

Insufficient refrigerant quantity will reduce cooling capacity of the air conditioner. Check quantity via sight glass (2) provided on receiver tank (1).

Inspection Procedure

1. Start the engine and run at approximately 1500 min⁻¹ (rpm).
2. Turn the air conditioner switch to ON.
3. Set the blower switch to HI.
4. Set the temperature control switch to the coolest position.
5. Check refrigerant quantity through a sight glass on the receiver tank.

NOTE: If a sign of oil oozing out of the pipe joint is found, the refrigerant may be leaking.

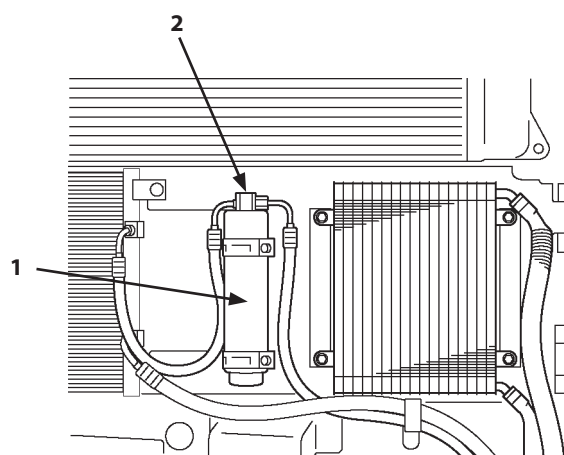
If the refrigerant level is low, consult your authorized dealer.

3 Check Compressor Belt Tension --- every 250 hours

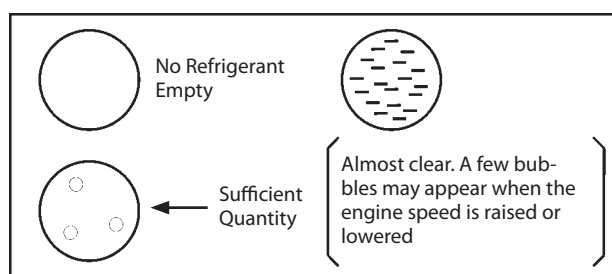
Visually check belt for wear. Replace if necessary. Check belt tension by depressing the midpoint between the crank and idle pulleys with the thumb. Deflection must be 6 to 10 mm (0.24 to 0.39 in.) at a depressing force of approximately 98 N (10 kgf, 22 lbf).

If tension is not within specifications, loosen the bolts for the idle pulley mounting bracket to adjust belt tension.

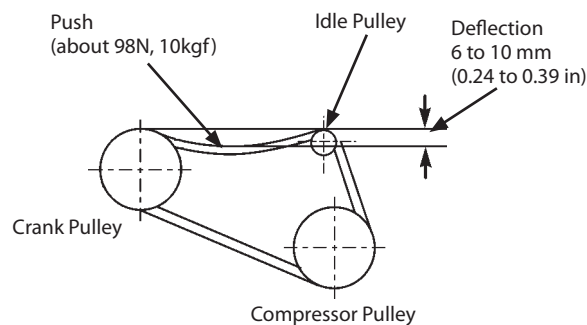
NOTE: When a new belt is installed, be sure to re-adjust the tension after operating the engine for 3 to 5 minutes at slow idle speed to be sure that the new belt is seated correctly.



M1J7-07-025



M107-01-010



M1J1-07-064

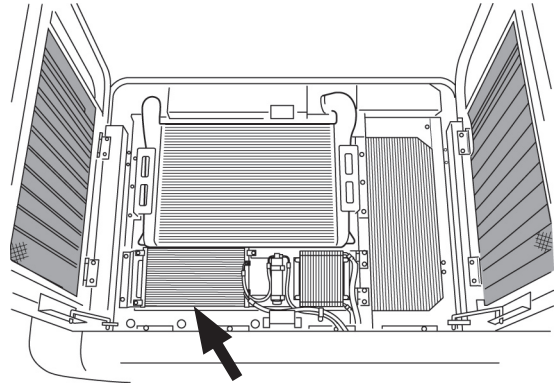
MAINTENANCE

4 Clean Condenser Core --- every 500 hours

WARNING: Always wear safety glasses or goggles when using compressed air to clean condenser core.

IMPORTANT: High-pressure air or water can damage condenser fins.

Condenser is located in front of the oil cooler. Clean the condenser core with water or steam.



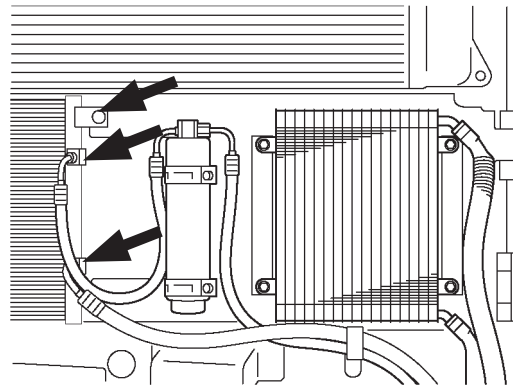
M1J7-07-027

5 Check Looseness at Each of Fastened Areas --- every 250 hours

Check tightness of mounting bolts, hose connections and fittings after first 50 hours then every 250 hours. Tighten to torque specifications if any are loose.

Torque Specifications for Hose Connections:

Wrench Size (mm)	Tightening Torque		
	N·m	(kgf·m)	(lbf·ft)
19	14.5 to 19.5	(1.5 to 2.0)	(10.5 to 14.5)
24	24.5 to 29.5	(2.5 to 3.0)	(18.0 to 21.5)
27	29.5 to 34.0	(3.0 to 3.5)	(21.5 to 25.5)



M1J7-07-025

MAINTENANCE

6 Check In-Season and Off-Season --- twice a year



WARNING: Do not attempt to loosen connections in air conditioning circuit when the air conditioner malfunctions. Doing so may cause high pressure gas to spout, resulting in serious injury. Consult your authorized dealer immediately.

1. Preseason maintenance

Prior to the season, consult your authorized dealer for maintenance of the air conditioner in order to operate it in good condition during the season.

This maintenance includes replenishment of refrigerant, inspection and replacing (if necessary) of inner and outer air filters, line connections, pressure switches and inspection and cleaning of evaporator.

2. Off-season maintenance

(1) Operate the compressor once a week at low speed for several minutes in order to maintain its parts in well lubricated condition. Be sure to run the engine at slow idle and place the temperature control switch in MEDIUM COOL. This operation also revents refrigerant leakage caused by dried up shaft seal.

(2) Check for refrigerant leakage. If the refrigerant level is low during off-season, rust will be formed inside the circuit.



NOTE: Do not remove V-belt from the compressor during off-season.

MAINTENANCE

I. ELECTRICAL SYSTEM

Parts		Quantity	Interval (hours)					
			10	50	100	250	500	1000
1. Battery	Level Check	2	Every month					
	Specific Gravity	2	Every month					
2. Replace Fuse	Replacement	—	As required					



WARNING: Improper radio communication equipment and associated parts, and/or improper installation of radio communication equipment effects the machine's electronic parts, causing involuntary movement of the machine.

Also, improper installation of electrical equipments may cause machine failure and/or a fire on the machine.

Be sure to consult your authorized dealer when installing a radio communication equipment or additional electrical parts, or when replacing electrical parts.

Never attempt to disassemble or modify the electrical/electronic components. If replacement or modification of such components is required, contact your authorized dealer.

MAINTENANCE

1 Batteries



WARNING: Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check the battery electrolyte level. Do not continue to use or charge the battery when electrolyte level is lower than specified. Explosion of the battery may result.

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into the eyes.

Batteries are installed in the front right cover.

Avoid hazard by:

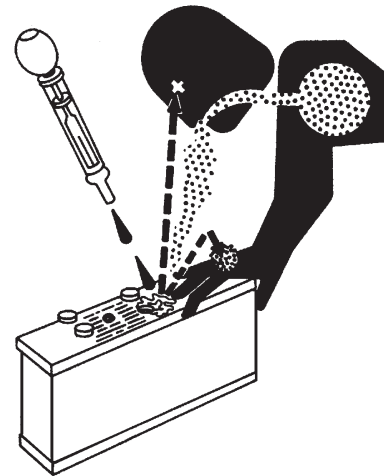
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Using proper booster battery starting procedures.

If you spill acid on yourself:

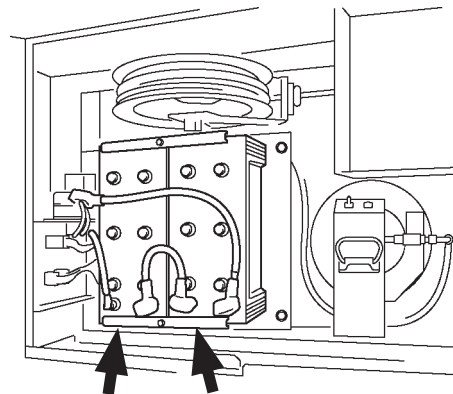
1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. If splashed in eyes, flush with water for 10 to 15 minutes. Get medical attention immediately.



SA-032



SA-036



Batteries Location

M1J7-07-026

MAINTENANCE


If acid is swallowed:

- 1. Drink large amounts of water or milk.**
- 2. Then drink milk of magnesia, beaten eggs, or vegetable oil.**
- 3. Get medical attention immediately.**

IMPORTANT: Add water to batteries in freezing weather before you begin operating your machine for the day, or else charge the batteries.

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

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

 **NOTE:** *In case electrolyte is refilled more than the specified upper level line or beyond the bottom end of the sleeve, remove the excess electrolyte until the electrolyte level is down to the bottom end of the sleeve using a pipette. After neutralizing the removed electrolyte with sodium bicarbonate, flush it with plenty of water, otherwise, consult the battery manufacturer.*

MAINTENANCE

Electrolyte Level Check --- every one month

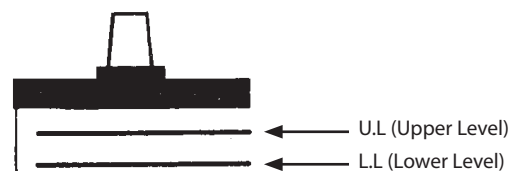
1. Check the electrolyte level at least once a month.
2. Park the machine on level ground and stop the engine.
3. Check the electrolyte level.

3.1 When checking the level from the battery side: Clean around the level check lines with a wet towel. Do not use a dry towel. Static electricity may be developed, causing the battery gas to explode. Check if the electrolyte level is between U.L (Upper Level) and L.L (Lower Level). In case the electrolyte level is lower than the middle level between the U.L and L.L, immediately refill distilled water or commercial battery fluid. Be sure to refill with distilled water before recharging (operating the machine). After refilling, securely tighten the filler plug.

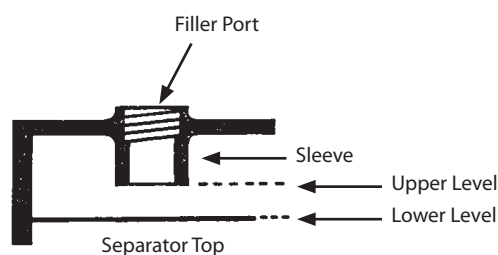
3.2 When impossible to check the level from the battery side or no level check mark is indicated on the side: After removing the filler plug from the top of the battery. Check the electrolyte level by viewing through the filler port. It is difficult to judge the accurate electrolyte level in this case. Therefore, when the electrolyte level is flush with the U.L, the level is judged to be proper. Then, referring to the right illustrations, check the level. When the electrolyte level is lower than the bottom end of the sleeve, refill with distilled water or commercial battery fluid up to the bottom end of the sleeve. Be sure to refill with distilled water before recharging (operating the machine). After refilling, securely tighten the filler plug.

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

4. Always keep around the battery terminals clean to prevent battery discharge. Check terminals for loose and/or rust. Coat terminals with grease or petroleum jelly to prevent corrosion build up.



M146-07-109



M146-07-110

Proper



Since the electrolyte surface touches the bottom end of the sleeve, the electrolyte surface is raised due to surface tension so that the electrode ends are seen curved.

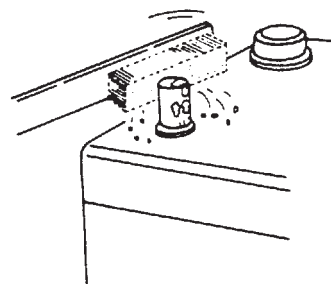
M146-07-111

Lower



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

M146-07-112



M409-07-072

MAINTENANCE

Check electrolyte specific gravity

! WARNING: Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check the battery electrolyte level.

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into the eyes.

Never check the battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove the grounded (–) battery clamp first and replace it last.

Avoid hazard by:

1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Using proper booster battery starting procedures.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. If splashed in eyes, flush with water for 10 to 15 minutes. Get medical attention immediately.

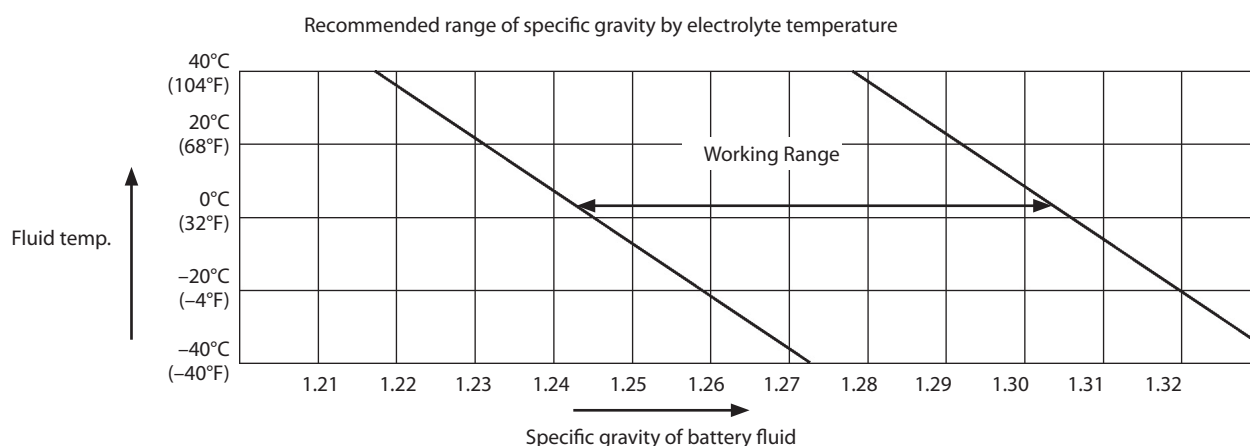
If acid is swallowed:

1. Drink large amounts of water or milk.
2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
3. Get medical attention immediately.

IMPORTANT: Check the specific gravity of the electrolyte after it is cooled, not immediately after operation.

Check the electrolyte specific gravity in each battery cell.

The lowest limit of the specific gravity for the electrolyte varies depending on electrolyte temperature. The specific gravity should be kept within the range shown below. Charge the battery if the specific gravity is below the limit.



M104-07-054

REPLACE BATTERIES

Your machine has two 12-volt batteries with negative (–) ground.

If one battery in a 24-volt system has failed but the other is still good, replace the failed battery with one of the same type. For example, replace a failed maintenance-free battery with a new maintenance-free battery. Different types of batteries may have different rates of charge. This difference could overload one of the batteries and cause it to fail.

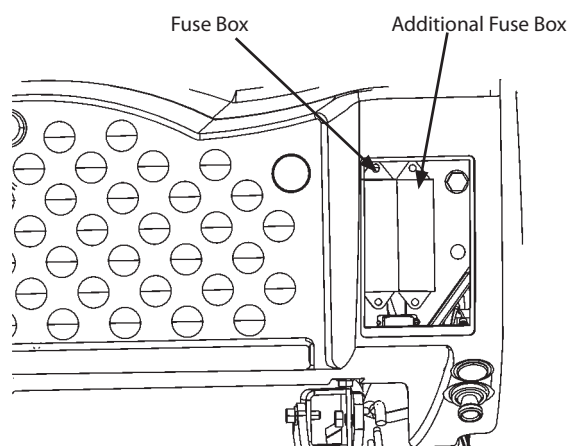
MAINTENANCE

2 REPLACING FUSES

If any electrical equipment fails to operate, first check the fuses. Fuse box is located behind the operator's seat. A fuse location/specification decal is attached to the fuse box cover.

Remove the fuse box cover by lifting it upward. Spare fuses are located on the underside of the cover.

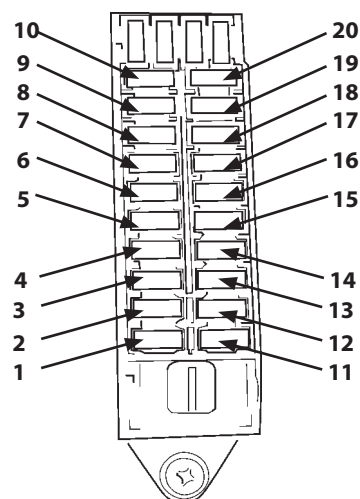
IMPORTANT: Be sure to install fuses with correct amperage ratings to prevent electrical system damage due to overload.



M1J1-01-021

FUSE BOX

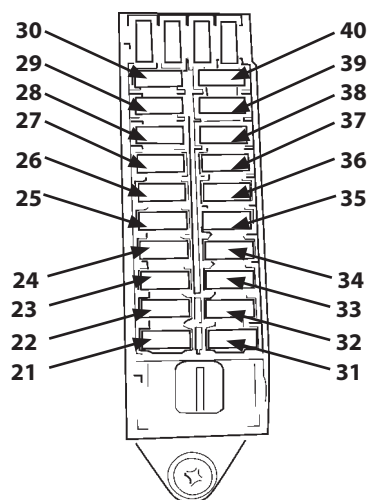
10- CONTROLLER 5A	20- OPTION3 5A
9- BACKUP 10A	19- SW. BOX 5A
8- ECM 30A	18- POWER ON 5A
7- LUBRICATOR 10A	17- AIRCON 5A
6- OPTION2 10A	16- GLOW. R 5A
5- OPTION1 5A	15- AUXILIARY 10A
4- SOLENOID 10A	14- PCV 15A
3- HEATER 20A	13- LIGHTER 10A
2- WIPER 10A	12- ROOM LAMP/RADIO 5A
1- LAMP 20A	11- HORN 10A



ADDITIONAL FUSE BOX

30- AUTO LUB. 10A	40- SPARE
29- LIGHT1 10A	39- SPARE
28- SPARE	38- SPARE
27- AUXILIARY3 5A	37- SPARE
26- QYICK HITCH 5A	36- SPARE
25- IMOB1 5A	35- SPARE
24- 12V UNIT 10A	34- AUXILIARY2 10A
23- CAB LAMP REAR 10A	33- WARNING LAMP 10A
22- CAB LAMP FRONT 10A	32- CAB LAMP FRONT+2 10A
21- SEAT HEATER 10A	31- SEAT COMPR. 10A

M1GR-01-003



M1GR-01-003

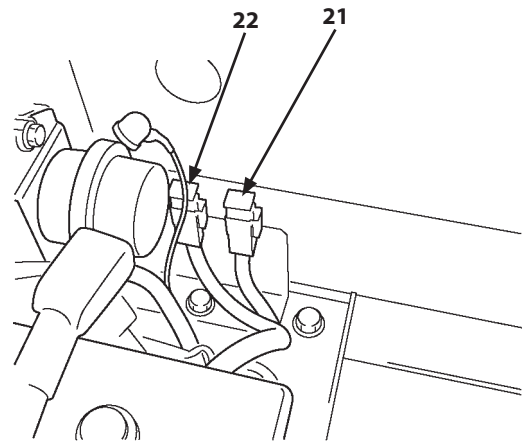
MAINTENANCE

- Fusible Link (Main Fuse)

In case the starter will not rotate even if the key switch is turned to the START position, fusible link may be the cause of the trouble. Open the front right side cover to check the fuse. Replace it if blown.

21- + Side (Red) 45A

22- - Side (Black) 75A




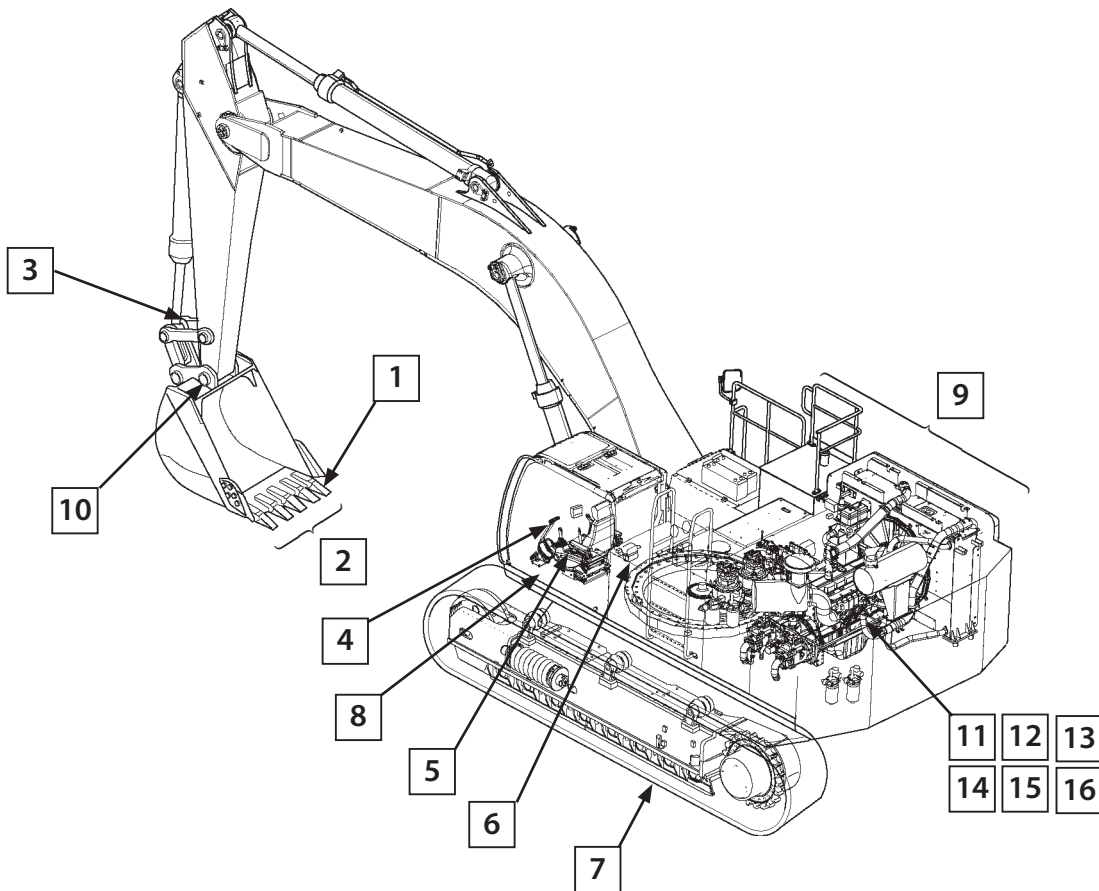
M1J7-07-010

MAINTENANCE

J. MISCELLANEOUS

Parts	Quantity	Interval (hours)								
		10	50	100	250	500	1000	2000	4000	
1. Check Bucket Teeth for Wear and Looseness	—									
2. Change Bucket	—					As required				
3. Adjust Bucket Linkage	1					As required				
4. Remove Travel Levers	2					As required				
5. Check and Replace Seat Belt	1					Every 3 years (Replace)				
6. Check Windshield Washer Fluid Level	1					As required				
7. Check Track Sag	2									
8. Clean Cab Floor	—					As required				
9. Check Tightening Torque of Bolts and Nuts	—		★							
10. Check O-rings in Bucket Joints	—									
11. Retighten Cylinder Head Bolt	—					*As required				
12. Inspect and Adjust Valve Clearance	—						*			
13. Check fuel Injection Timing	—					*As required				
14. Measure Engine Compression Pressure	—						*			
15. Check Starter and Alternator	—						*			
16. Check Water Pump	—								*	

 **NOTE:** ★ First time only.
 * Contract your authorized dealer for maintenance.



MAINTENANCE

1 Check Bucket Teeth --- daily

Check the bucket teeth for wear and looseness

Check for wearing and looseness of the Bucket tooth points.

1. Replacement intervals

Replace tooth point (1) wear beyond the service limit, replace them.

Dimension A in mm (in)			
	New	Limit of Use	Parts No.
Standard	254 (10.0")	120 (4.7")	4471407
Rock Bucket	280 (11.0")	140 (5.5")	4350781

NOTE: When tooth point (1) is used in excess of the service limit, a hole will be made on the tooth point, which makes the nose exposed and worn out, and will eventually break or let the tooth point fall off.

2. Replacement

WARNING: Guard against injury from flying pieces of metal. Wear goggles or safety glasses.

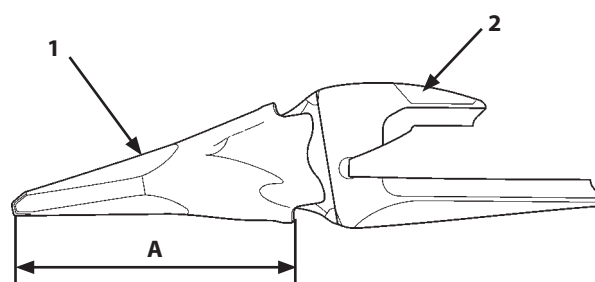
(1) Removing the tooth point

(a) Preparations for removing tooth point.

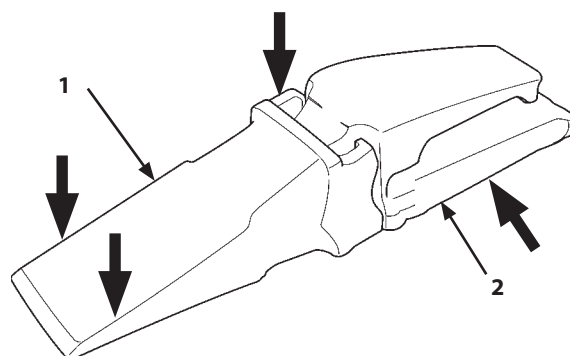
Hit the left and right top ends and the left and right lugs of tooth point (1) alternately with hammer to knock off pebbles, soil, etc., stuck in the gap between tooth point (1) and adapter (2).

(b) Inserting lock removal tool.

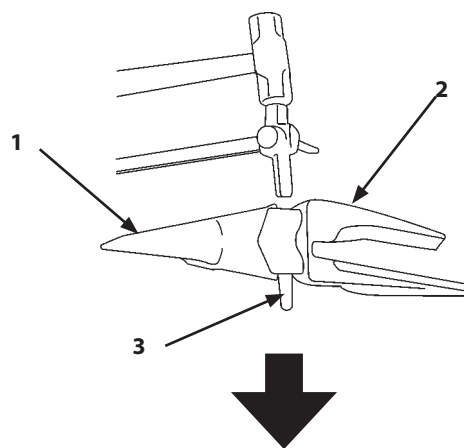
Remove pebbles, dirt, etc., completely from the gap between lock pin (3) and adapter (2). Place pin-removing jig on the top end of lock pin (3) and hit it with hammer to remove lock pin (3). When driving out the pin, first hit with a shorter jig until top end of lock pin (3) comes to the upper end position of the lug of tooth point (1), and then use the longer jig to remove lock pin (3).



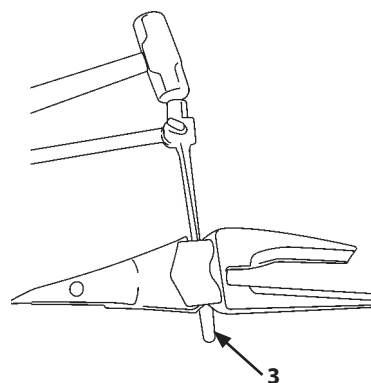
M1J1-07-065



M1J1-07-066



M1J1-07-067



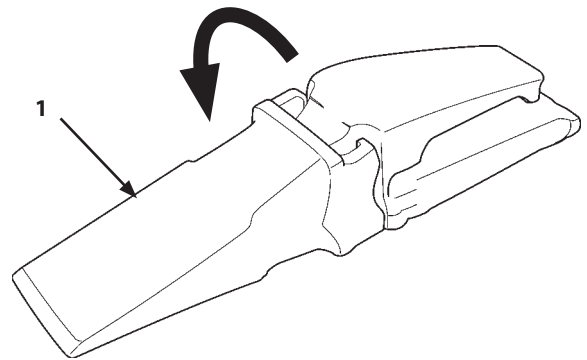
M1J1-07-068

MAINTENANCE

(c) Removing the tooth point

Turn tooth point (1) to the left, twist and pull it toward you to remove it.

Remove the plug, and check if rubber has cracking; if it has, replace the rubber with new one. While the pin and plug can withstand several replacements of the tooth point, be sure to check whether they are usable or not when replacing tooth point (1).



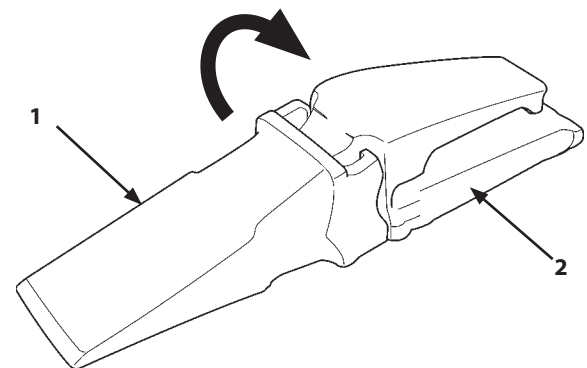
(2) Mounting the tooth point

(a) Mounting the tooth point

Clean the top end of the adapter (2) nose. If pebbles, dirt, etc., are stuck to the adapter nose, tooth point (1) will not insert properly and the pin cannot be driven in.

Also check that lock pin (3) has no cracks.

Insert tooth point (1) slowly until the tooth point comes to the end of the adapter (2) nose while twisting and turning it to the right.



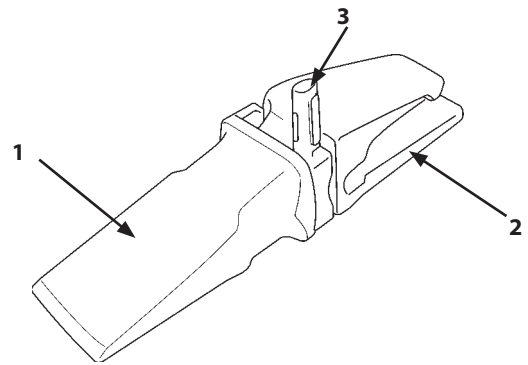
M1J1-07-066

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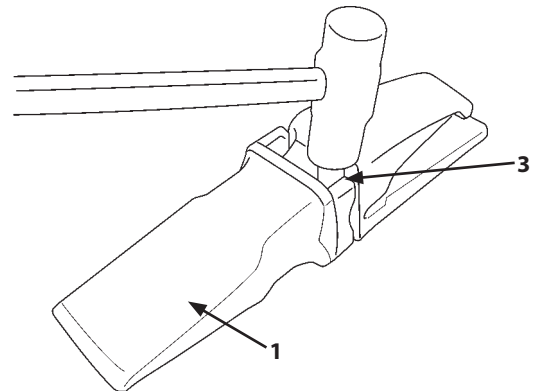
MAINTENANCE

b. Inserting the pin


- (1) Insert lock pin (3) facing toward the adapter nose.
- (2) With tooth point (1) fully inserted onto the adapter (2), tap lock pin (3) into the tooth point (1) with a hammer until the top of lock pin (3) comes flat with the nose surface. (i.e. until the lock pin (3) fits into the grooves of tooth point (1).)

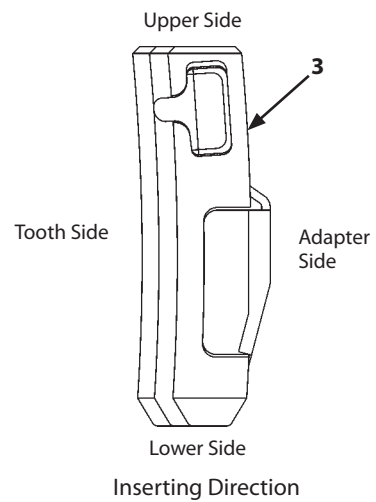


M1J1-07-070



M1J1-07-071

-  **NOTE:** (1) Since rubber is susceptible to corrosion, do not use grease, oil and other oily materials when inserting the lock pin (3).
- (2) In mounting welding-type nose and adapter (2) onto the bucket, the lock pin (3) should be removed from the nose when preheating and welding. Otherwise, the rubber will be spoiled.



M1J1-07-077

MAINTENANCE

2 Change Bucket

⚠ WARNING: When driving the connecting pins in or out, guard against injury from flying pieces of metal or debris; wear goggles or safety glasses, and safety equipment appropriate to the job.

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.

Type A (Separate Type O-ring)

2. Remove o-rings (1) after loosening nut (2).

Type B (Unit Type O-ring)

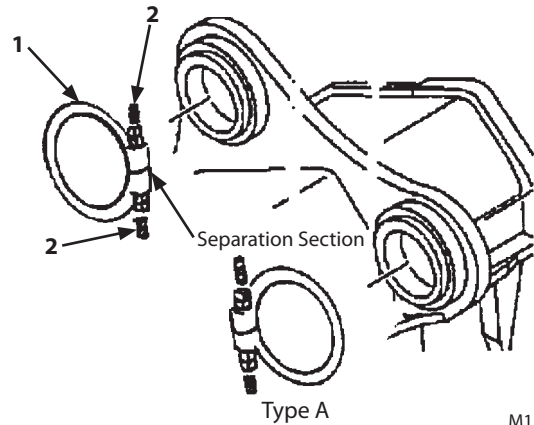
2. Slide O-rings (3) out of the way, as shown.
3. Remove bucket pins A and B to separate the arm and bucket. Clean the pins and pin bores. Apply sufficient grease to the pins and pin bores.
4. Align the arm and alternate bucket. Be sure the bucket will not roll.
5. Install bucket pins A and B.
6. Install the locking pins and snap ring on pins A and B.
7. Adjust bucket linkage clearance for pins A. See the Adjusting Bucket Linkage procedure on the next page.

Type A (Separate Type O-ring)

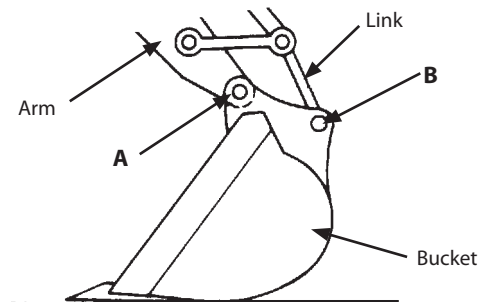
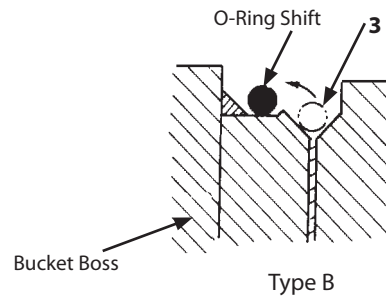
8. Tighten nut (2) after installing O-rings (1) on the bucket boss A and B. And cut off the bolt extended from the nut. Refer to the check O-rings in bucket of Chapter 7.

Type B (Unit Type O-ring)

8. Install O-rings (3) on the bucket boss A and B.
9. Apply grease to pin joints A and B.
10. Start the engine and run at slow idle. Slowly operate the bucket in both directions to check for any interference in bucket movement. Do not operate a machine that has any movement interference. Correct interference problem.



M1J1-07-074




M104-07-063

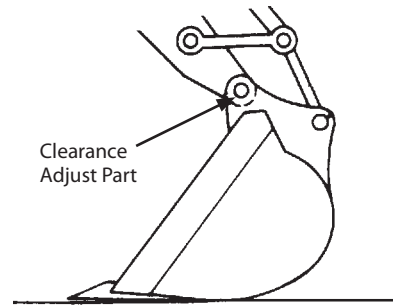
MAINTENANCE

3 Adjust the Bucket Linkage (Backhoe)

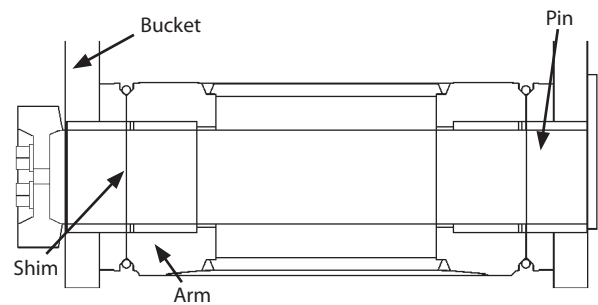
When play in the linkage increases, remove and install shims as follows:

1. Park the machine on a level surface. Lower the bucket to the ground with the flat side down so that the bucket will not roll.
2. Run the engine at slow idle. With the bucket on the ground, slowly swing counterclockwise slightly until the top of the left bucket boss contacts the arm.
3. Stop the engine. Pull the pilot control shut-off lever to the LOCK position.
4. Adjust the clearance between arm and bucket to become from 0.5mm to 1mm (0.02 – 0.04 in) by Shims.

 **NOTE:** The product is shipped with shims (1mm (0.04 in) : 2 pieces, 1.6mm (0.063 in): 1 piece) from the factory.



M104-07-063



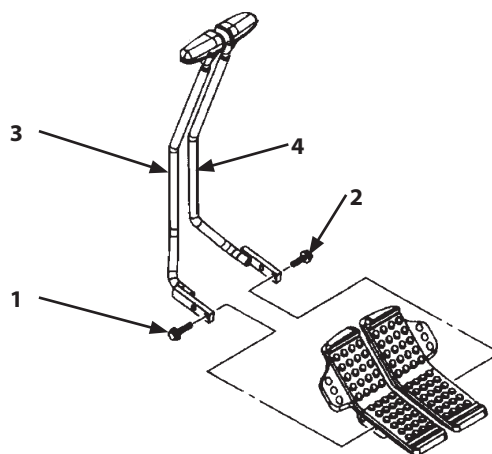
M1JB-07-057

MAINTENANCE


4 Remove the Travel Levers

The travel levers may be removed if desired.

1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.
4. Turn the key switch OFF. Remove the key.
5. Pull the pilot control shut-off lever to the LOCK position.
6. Remove bolts (1) and (2) to remove levers (3) and (4) from brackets.



M178-07-077

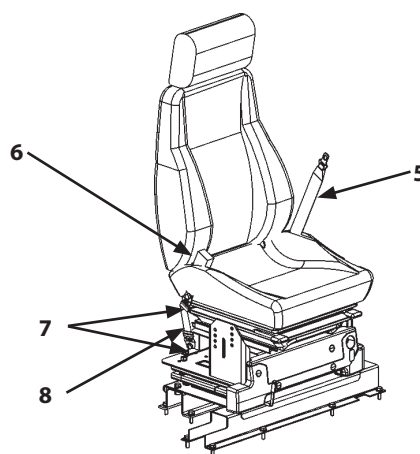
 **NOTE:** Wrench size 17 mm
Tightening torque 50 N•m
 (5.1 kgf•m, 37 lbf•ft)

5 Check and Replace Seat Belt Check --- daily Replace --- every 3 years

Always maintain the seat belt in a functional condition and replace when necessary to ensure proper performance.

Prior to operating the machine, thoroughly examine belt (5), buckle (6) and attaching hardware (7) and tether belt (8). If any item is damaged or materially worn, replace the seat belt or component before operating the machine.

We recommend that the seat belt be replaced every three years regardless of its apparent condition.



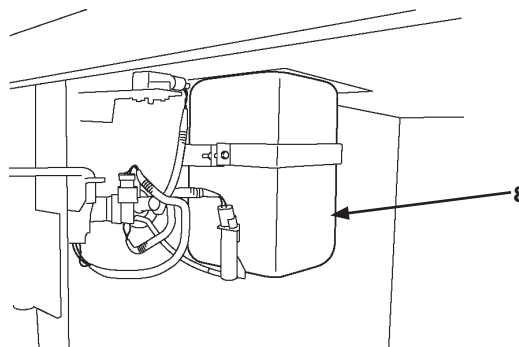
M1U1-07-008

6 Check Windshield Washer Fluid Level

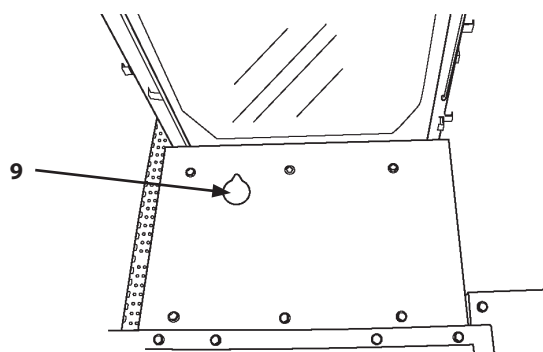
Windshield washer fluid tank (8) is located in the cover after the cab.

Check the windshield washer fluid tank (8) at daily.

If the windshield washer fluid is needed, remove cap (9) and add the windshield washer fluid.



M1J7-07-008



M1J7-07-038

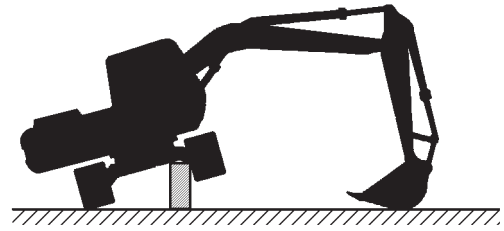
MAINTENANCE

7 Check Track Sag --- every 50 hours

Swing the upperstructure 90° and lower the bucket to raise the track off the ground as shown.


Keep the angle between the boom and arm 90 to 110° and position the bucket's round side on the ground. Place blocks under the machine frame to support the machine. Rotate the raised track in reverse two full rotations and then forward two full rotations.

Measure distance (A) at the middle of the track frame from the bottom of the track frame to the back face of the track shoe.



M104-07-067

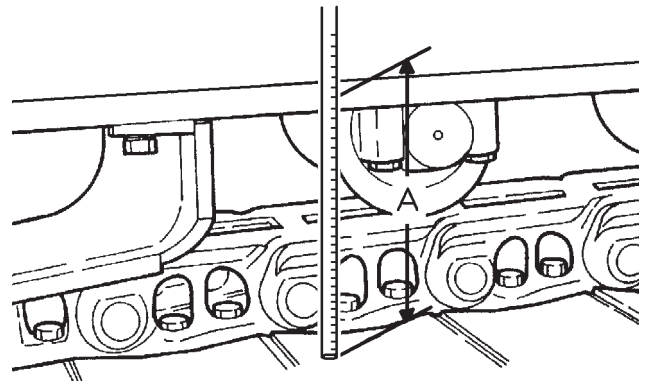
Track Sag Specifications	
Model	A
ZAXIS650LC-3	450 to 500 mm (17.7 to 19.7 in)
ZAXIS670LCH-3	

 **NOTE:** Check track sag after thoroughly removing soil stuck on the track area by washing.

Adjust Track Sag

Precautions for 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. Each time, be sure to place blocks under the machine frame to support the machine.
3. After adjusting track sag of both tracks, move the machine back and forth several times.
4. Check track sag again. If track sag is not within specifications, repeat adjustment until correct sag is obtained.



M107-07-068

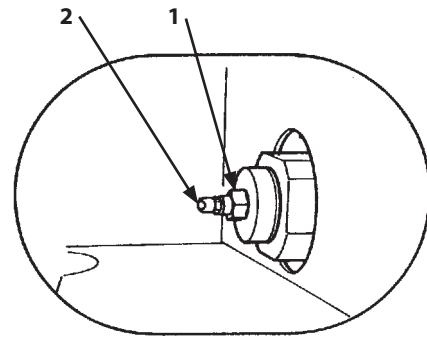
MAINTENANCE

Loosen the Track

WARNING: Do not loosen valve (1) quickly or loosen it 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 between sprockets and track links, remove it before loosening.

1. To loosen the track, slowly turn valve (1) counterclockwise using long socket 24; grease will escape from the grease outlet.
2. Between 1 to 1.5 turns of valve (1) is sufficient to loosen the track.
3. If grease does not drain smoothly, slowly rotate the raised track.
4. When proper track sag is obtained, turn valve (1) clockwise and tighten to 147 N·m (15 kgf·m, 108 lbf·ft).



M116-07-093

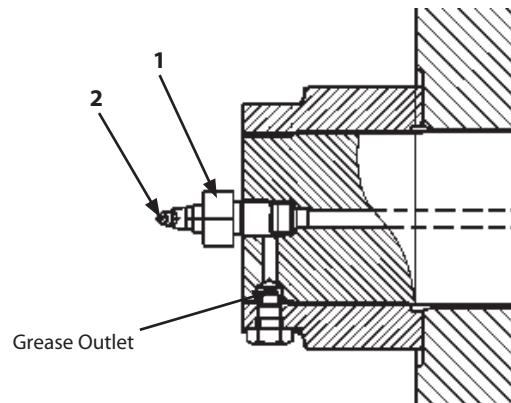
Tighten the Track

WARNING: It is abnormal if the track remains tight after turning valve (1) counterclockwise or if the track is still loose after charging grease to fitting (2). In such cases, NEVER ATTEMPT TO DISASSEMBLE the track or track adjuster, because of dangerous high-pressure grease inside the track adjuster. See your authorized dealer immediately.

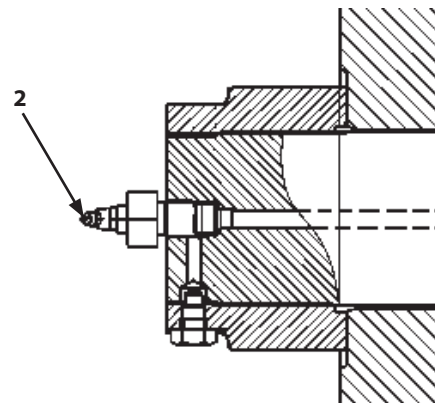
To tighten the track, connect a grease gun to grease fitting (2) and add grease until the sag is within specifications.

Replace the Track

CAUTION: Special training and expertise are needed to replace the track. NEVER ATTEMPT to replace the track yourself. Be sure to ask your authorized dealer for track replacement.



M16J-07-083



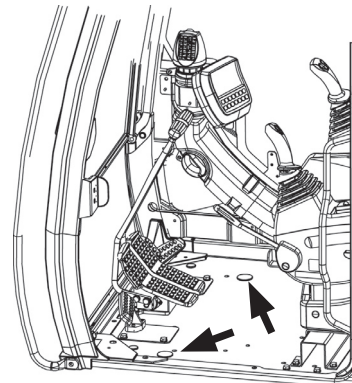
M16J-07-083

MAINTENANCE

8 Clean Cab Floor --- as necessary

IMPORTANT: When cleaning the cab floor with tap water, spray the floor only. Take care not to splash the surrounding area. Do not increase water spray speed by restricting the hose end, and do not use high pressure steam for cleaning. Be sure to completely remove any moisture from the surrounding area.

1. Park the machine on solid and level surface. Lower the bucket to the ground. Before cleaning, stop the engine.
2. Sweep the cab floor clean using a brush, and brush dust from the cab floor while spraying water.
3. When cleaning the floor mat, sweep dust (water) along the grooves on the floor mat.
4. When cleaning after removing the floor mat, remove two caps (1) plugging the cleaning holes on the floor plate. Sweep dust (water) through these cleaning holes.



M1U1-077-052

MAINTENANCE

9 Check Tightening Torque of Bolts and Nuts --- every 250 hours (first time after 50 hours)

Check tightness after the first 50 hours then every 250 hours. Tighten to torque shown if any are loose. Bolts and nuts should be replaced with those of the same or higher grade. For tightening nuts and bolts other than specified in the table below, refer to the Tightening Torque Chart at the end of this section.

IMPORTANT: Check and tighten bolts and nuts using a torque wrench.

Torque Specifications

No	Descriptions	Bolt Dia mm	Q'ty	Wrench Size (mm)	Torque		
					N•m	(kgf•m)	(lbf•ft)
1	Engine cushion rubber mounting bolt	Front	2	41	1050	(107)	(770)
		Rear	2	50	1950	(200)	(1450)
2	Engine bracket mounting bolt	14	8	22	210	(21.5)	(155)
3	Radiator mounting bolt	24	4	36	950	(97.0)	(700)
4	Hydraulic oil tank mounting bolt	18	8	27	300	(30.5)	(220)
5	Fuel tank mounting bolt	18	8	27	330	(30.5)	(220)
6	ORS fittings for hydraulic hoses and piping	1 – 3/16 – 12UNF		36	180	(18.5)	(135)
		1 – 7/16 – 12UNF		41	210	(21.5)	(155)
7	Pump device mounting bolt	12	14	19	110	(11.0)	(80)
8	Fan pump mounting bolt	20	8	★17	400	(41.0)	(295)
9	Fan motor mounting bolt	16	4	★14	210	(21.5)	(155)
10	Control valve mounting bolt	12	4	19	110	(11.0)	(80)
11	Control valve bracket mounting bolt	20	4	30	400	(41.0)	(295)
12	Swing device mounting bolt	20	8	30	400	(41.0)	(295)
13	Swing motor mounting bolt (hexagonal wrench)	22	26	32	750	(76.5)	(550)
14	Battery mounting nut	12	16	★10	90	(9.0)	(65)
15	Cab mounting nut	12	2	19	35	(3.5)	(26)
16	Cab anchor mounting nut	16	6	24	210	(21.5)	(155)
17	Swing bearing mounting bolt to upper structure	30	40	46	1750	(178)	(1290)
	Swing bearing mounting bolt to undercarriage	30	40	46	1750	(178)	(1290)
18	Travel device mounting bolt	27	48	41	1400	(143)	(1035)
	Travel motor mounting bolt	18	8	27	300	(30.5)	(220)
	Sprocket mounting bolt	27	48	41	1400	(143)	(1035)
19	Upper roller mounting bolt	20	24	30	550	(56.0)	(405)

 NOTE: ★ Hexagonal socket wrench

MAINTENANCE





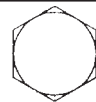


Torque Specifications

No	Descriptions	Bolt Dia	Q'ty	Wrench Size (mm)	Torque		
		mm			N•m	(kgf•m)	(lbf•ft)
20	Lower roller mounting bolt	24	64	36	950	(97.0)	(700)
21	Track shoe bolt	27	376	32	2000	(204)	(1475)
22	Track guard mounting bolt	LC	16	41	1400	(143)	(1035)
		LCH	30	41	1400	(143)	(1035)
23	Track mounting bolt	36	44	55	2800	(285)	(2060)
24	Coupling and clamp of low pressure piping	Coupling	8	13	10.5 to 12.5	(1.1 to 1.3)	(7.5 to 9.0)
		Clamp	1/4-28 UNF	11	10	(1.0)	(7.2)
25	Counterweight mounting bolt	45	2	65	2800	(285)	(2060)
		24	4	36	700	(71.5)	(520)
26	Shuttle Valve Mounting Bolt	10	4	★8	50	(5.1)	(37)
27	Front pin-retaining bolt	20	24	30	400	(41.0)	(295)
	Front pin-retaining nut	20	7	30	400	(41.0)	(295)

 NOTE: ★ Hexagonal socket wrench

MAINTENANCE

Tightening Torque Chart

Bolt Dia.	Wrench Size	Hexagon Wrench Size	 M552-07-091			   M552-07-090			   M157-07-225		
			N•m	(kgf•m)	(lbf•ft)	Socket Bolt			N•m	(kgf•m)	(lbf•ft)
M8	13	6	30	(3.1)	(22)	20	(2.0)	(15.0)	10	(1.0)	(7.4)
M10	17	8	65	(6.6)	(48)	50	(5.1)	(37)	20	(2.0)	(15.0)
M12	19	10	110	(11.0)	(81)	90	(9.2)	(66)	35	(3.6)	(26.0)
M14	22	12	180	(18.5)	(135)	140	(14.0)	(103)	55	(5.6)	(41)
M16	24	14	270	(27.5)	(200)	210	(21.5)	(155)	80	(8.2)	(59)
M18	27	14	400	(41.0)	(295)	300	(30.5)	(220)	120	(12.0)	(89)
M20	30	17	550	(56.0)	(410)	400	(41.0)	(295)	170	(17.0)	(125)
M22	32	17	750	(76.5)	(550)	550	(56.0)	(410)	220	(22.5)	(162)
M24	36	19	950	(97.0)	(700)	700	(71.5)	(520)	280	(28.5)	(205)
M27	41	19	1400	(143)	(1030)	1050	(107)	(770)	400	(41.0)	(295)
M30	46	22	1950	(200)	(1440)	1450	(148)	(1070)	550	(56.0)	(410)
M33	50	24	2600	(265)	(1920)	1950	(200)	(1440)	750	(76.5)	(550)
M36	55	27	3200	(325)	(2360)	2450	(250)	(1810)	950	(97.0)	(700)

⚠ WARNING: If fixing bolts for counterweight are loosened, consult your nearest authorized dealer.

IMPORTANT: Make sure bolt and nut threads are clean before installing.
 Apply lubricant (e. g. white zinc B solved into spindle oil) to bolts and nuts to stabilize their friction coefficient.

✎ NOTE: Tightening torque required is shown in N•m.
 For example, when tightening a bolt or nut with a wrench of 1 m length, turning the end of it with a force of 120 N, the torque produced will be:

$$1\text{ m} \times 120\text{ N} = 120\text{ N}\cdot\text{m}$$

To produce the same torque with a wrench of 0.25 m:

$$0.25\text{ m} \times \boxed{}\text{ N} = 120\text{ N}\cdot\text{m}$$

Necessary force will be:

$$120\text{ N}\cdot\text{m} \div 0.25\text{ m} = 480\text{ N}$$

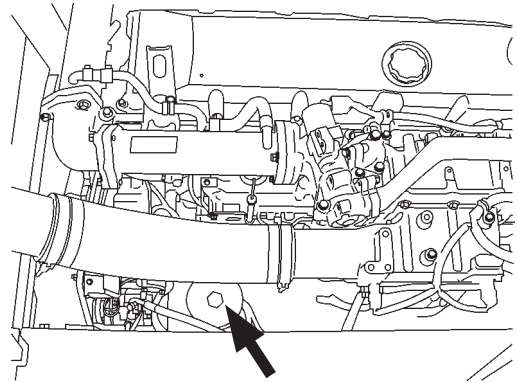
MAINTENANCE

1. Retighten engine insulation rubber mounting bolts and nuts.

Mounting Bolts (Front)

Tool: 41 mm

Torque: 1050 N•m (107 kgf•m, 770 lbf•ft)

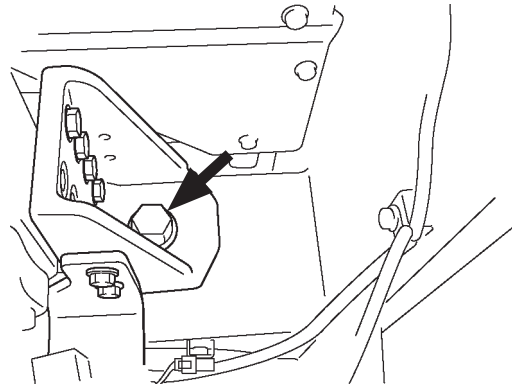


M1J1-07-022

Mounting Bolts (Rear)

Tool: 50 mm

Torque: 1950 N•m (200 kgf•m, 1450 lbf•ft)



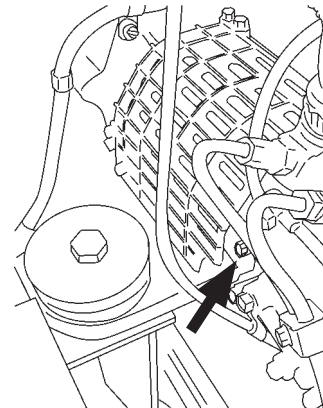
M1JB-07-019

2. Retighten engine bracket mounting bolts.

Mounting Bolts (Front)

Tool: 22 mm

Torque: 210 N•m (21 kgf•m, 155 lbf•ft)

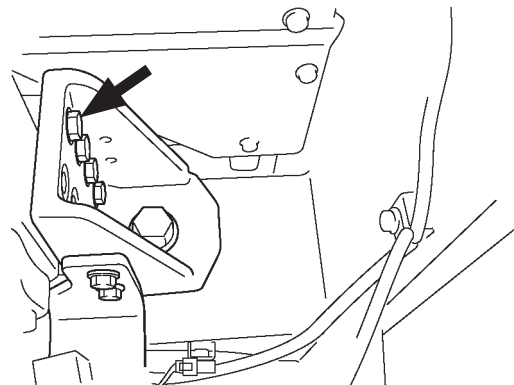


M1J1-07-046

Mounting Bolts (Rear)

Tool: 30 mm

Torque: 400 N•m (40 kgf•m, 290 lbf•ft)



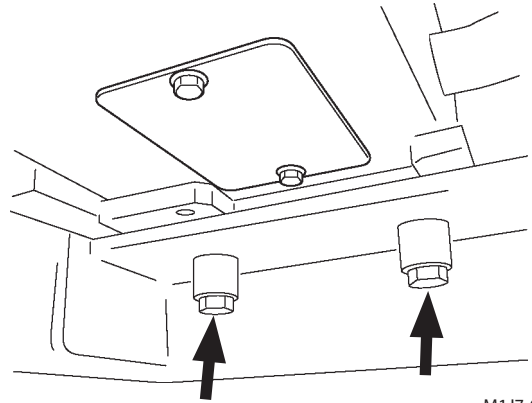
M1JB-07-019

MAINTENANCE

3. Retighten radiator mounting bolts.

Tool: 36 mm

Torque: 950 N•m (97 kgf•m, 700 lbf•ft)

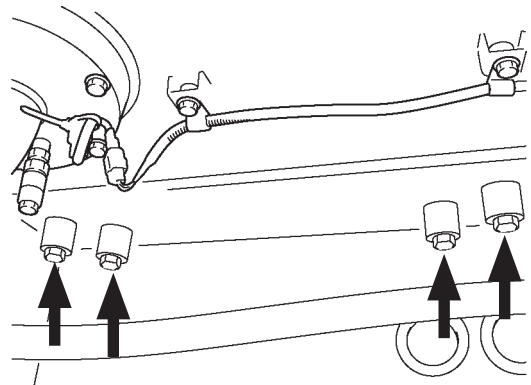


M1J7-07-018

4. Retighten hydraulic oil tank mounting bolts.

Tool: 27 mm

Torque: 300 N•m (31 kgf•m, 200 lbf•ft)

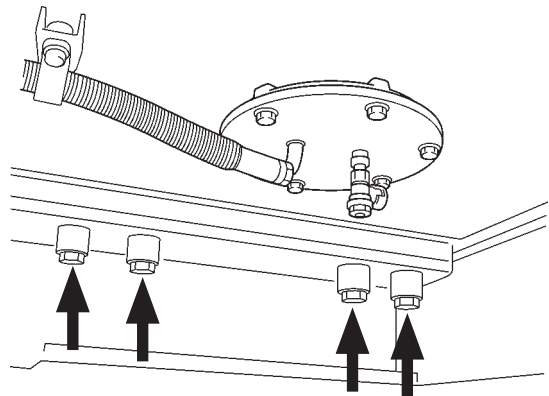


M1J7-07-012

5. Retighten fuel tank mounting bolts.

Tool: 27 mm

Torque: 300 N•m (31 kgf•m, 200 lbf•ft)



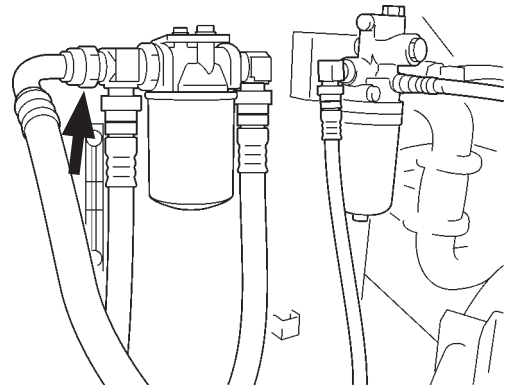
M1J7-07-021

MAINTENANCE

6. Retighten ORS fittings for hydraulic hoses and piping.

Tool: 36 mm

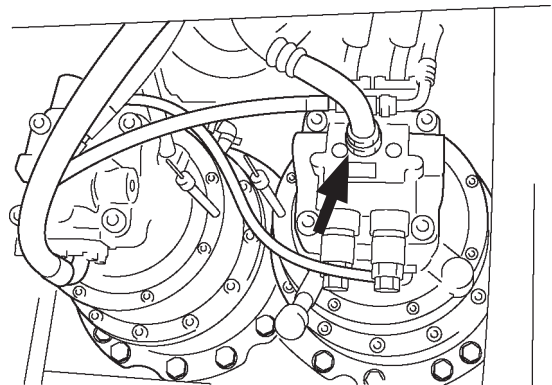
Torque: 180 N•m (19 kgf•m, 135 lbf•ft)



M1J7-07-029

Tool: 41 mm

Torque: 210 Nžm (22 kgf•m, 155 lbf•ft)

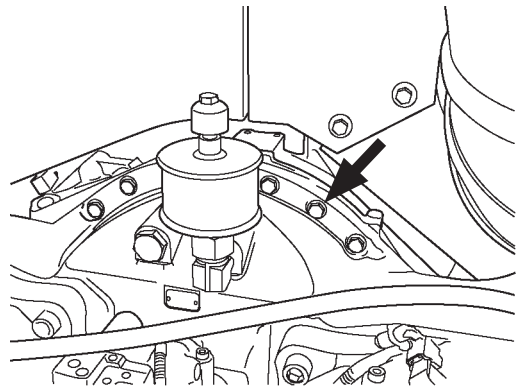


M1J7-07-05

7. Retighten pump transmission mounting bolts.

Tool: 19 mm

Torque: 110 N•m (11 kgf•m, 80 lbf•ft)

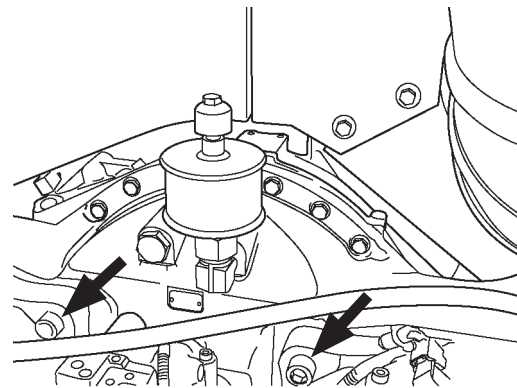


M1JB-07-005

8. Retighten pump device mounting bolts.

Tool: 17 mm Hexagonal Socket Wrench

Torque: 400 N•m (41 kgf•m, 295 lbf•ft)



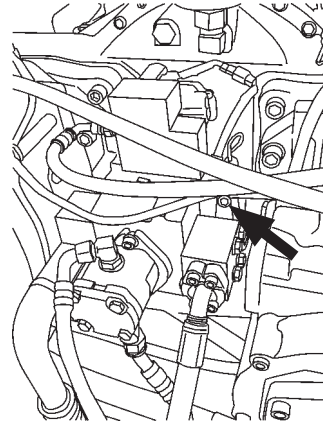
M1JB-07-005

MAINTENANCE

9. Retighten fan pump mounting bolts.

Tool: 14 mm Hexagonal Socket Wrench

Torque: 210 N•m (22 kgf•m, 155 lbf•ft)

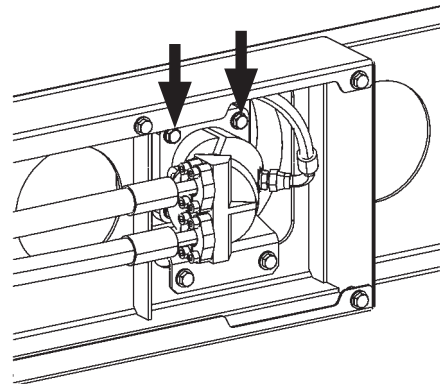


M1JB-07-054

10. Retighten fan motor mounting bolts.

Tool: 19 mm

Torque: 110 N•m (11 kgf•m, 80 lbf•ft)

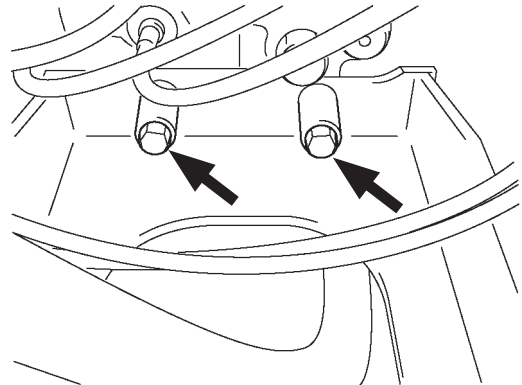


M1J7-07-047

11. Retighten control valve mounting bolts.

Tool: 30 mm

Torque: 400 N•m (41 kgf•m, 295 lbf•ft)

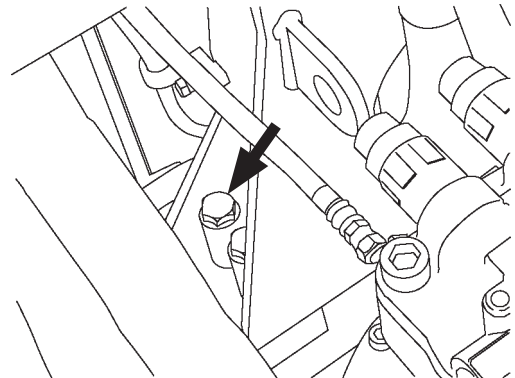


M1J7-07-016

12. Retighten control valve bracket mounting bolts.

Tool: 30 mm

Torque: 400 N•m (41 kgf•m, 295 lbf•ft)



M1J7-07-041

MAINTENANCE

13. A. Retighten swing device mounting bolts.

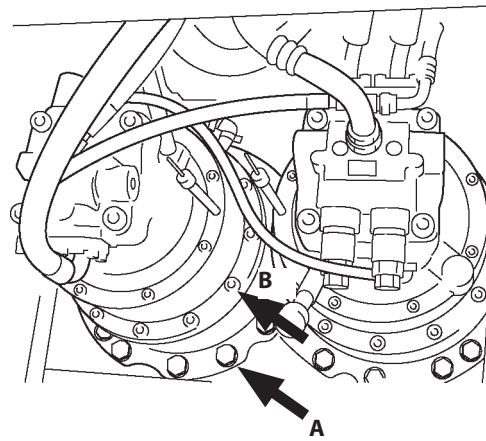
Tool: 32 mm

Torque: 750 N•m (77 kgf•m, 550 lbf•ft)

B. Retighten ring gear housing mounting bolts.

Tool: 14 mm Hexagonal Socket Wrench

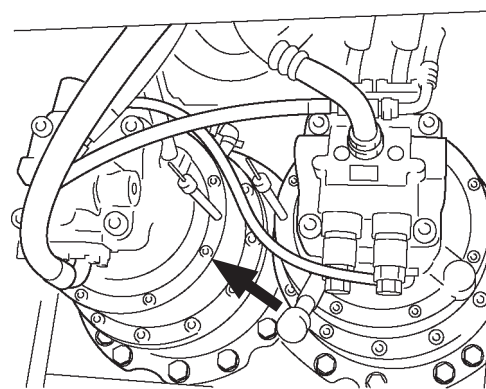
Torque: 300 N•m (31 kgf•m, 220 lbf•ft)



14. Retighten swing motor mounting bolts.

Tool: 10 mm Hexagonal Socket Wrench

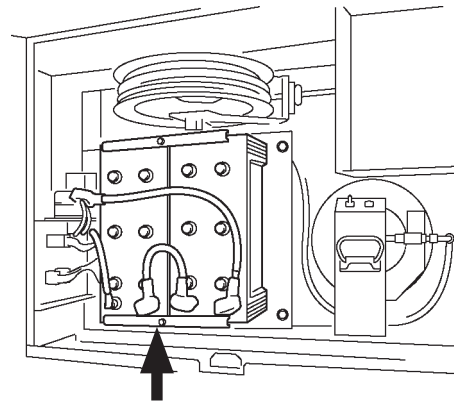
Torque: 90 Nžm (9 kgf•m, 65 lbf•ft)



15. Retighten battery mounting bolts.

Tool: 19 mm

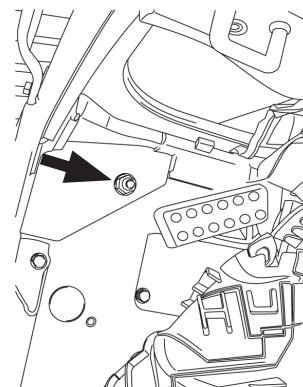
Torque: 35 N•m (3.5 kgf•m, 26 lbf•ft)



16. Retighten cab mounting nuts.

Tool: 24 mm

Torque: 210 N•m (22 kgf•m, 155 lbf•ft)



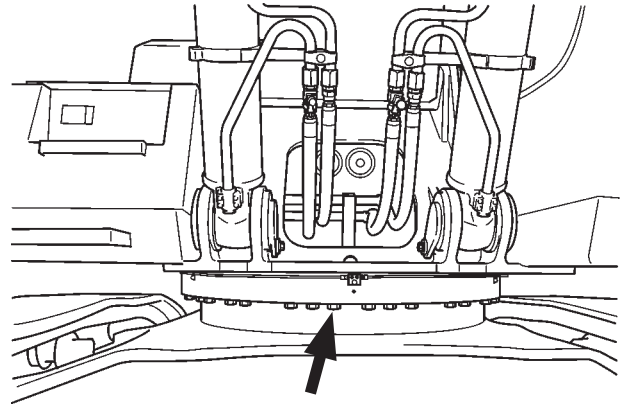
MAINTENANCE

17. Retighten swing bearing mounting bolts.

Upperstructure

Tool: 46 mm

Torque: 1750 N•m (178 kgf•m, 1290 lbf•ft)

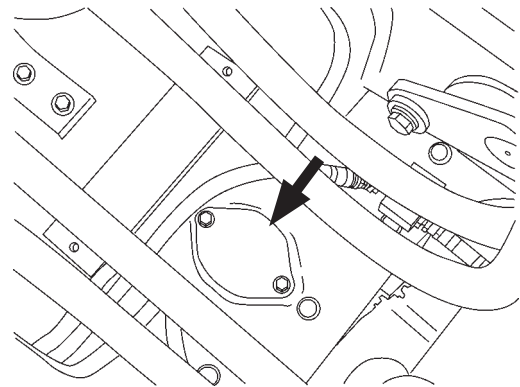


M17P-07-028

Undercarriage

Tool: 46 mm

Torque: 1750 N•m (178 kgf•m, 1290 lbf•ft)



M1J1-07-024

18. Retighten travel device mounting bolts.

Tool: 41 mm

Torque: 1400 N•m (143 kgf•m, 1035 lbf•ft)

Retighten travel motor mounting bolts.

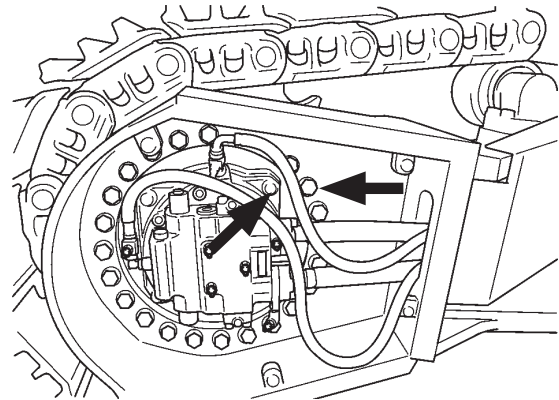
Tool: 27 mm

Torque: 300 N•m (31 kgf•m, 220 lbf•ft)

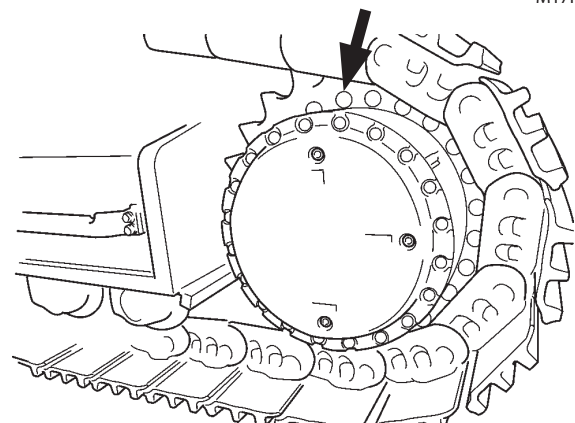
Retighten sprocket mounting bolts.

Tool: 41 mm

Torque: 1400 N•m (143 kgf•m, 1035 lbf•ft)



M17P-01-001



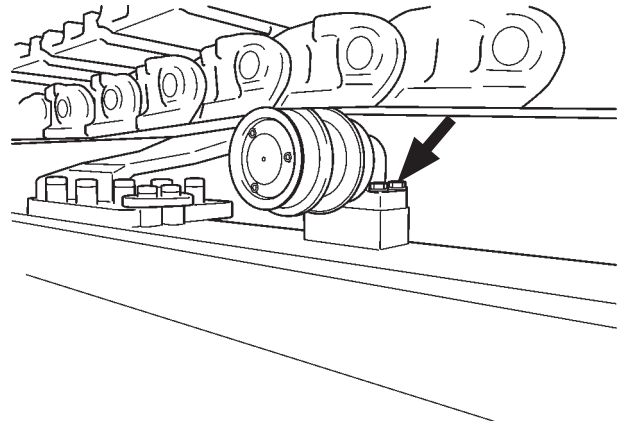
M17P-07-011

MAINTENANCE

19. Retighten upper roller mounting bolts.

Tool: 30 mm

Torque: 550 N•m (56 kgf•m, 405 lbf•ft)

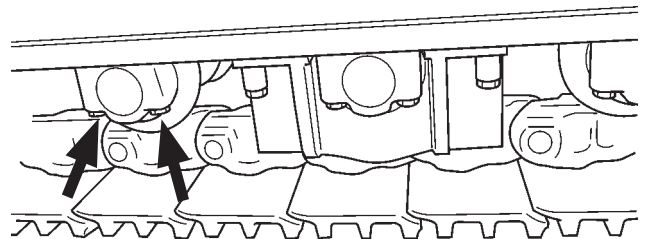


M17P-07-031

20. Retighten lower roller mounting bolts.

Tool: 36 mm

Torque: 950 N•m (97 kgf•m, 700 lbf•ft)

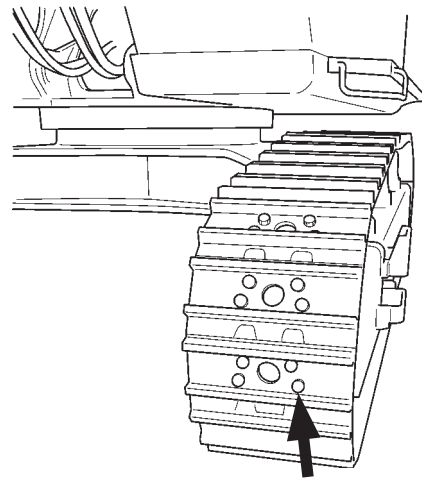


M17P-07-032

21. Retighten shoe mounting bolts.

Tool: 41 mm

Torque: 2000 N•m (204 kgf•m, 1475 lbf•ft)

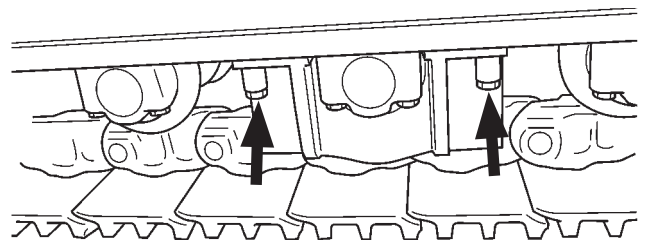


M17V-07-051

22. Retighten track guard mounting bolts.

Tool: 41 mm

Torque: 1400 N•m (143 kgf•m, 1035 lbf•ft)



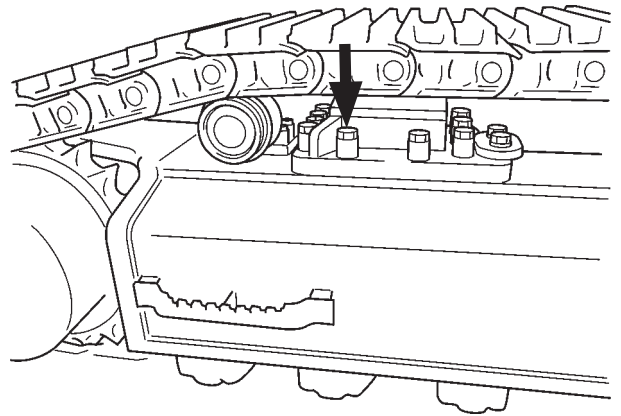
M17P-07-032

MAINTENANCE

23. Retighten track mounting bolts.

Tool: 55 mm

Torque: 2800 N·m (285 kgf·m, 2060 lbf·ft)



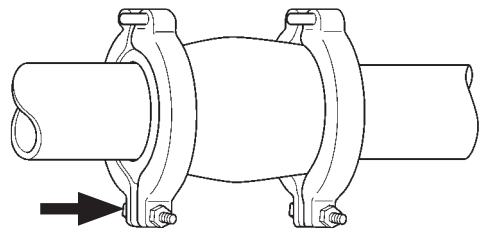
M17P-07-034

24. Retighten coupling and clamp

Coupling

Tool: 13 mm

Torque: 10.5 to 12.5 N·m (1.1 to 1.3 kgf·m, 7.5 to 9.0 lbf·ft)

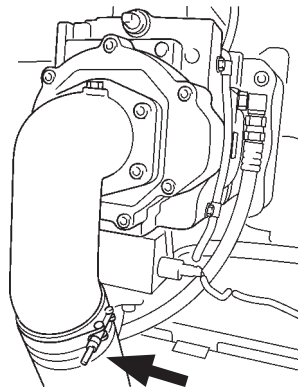


M1G6-07-008

T-bolt clamp

Tool: 11 mm

Torque: 10 N·m (1 kgf·m, 7.0 lbf·ft)



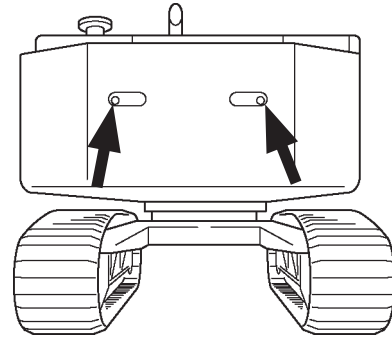
M1J7-07-003

MAINTENANCE

25. Retighten counterweight mounting bolts

Tool: 65 mm

Torque: 2800 N•m (285 kgf•m, 2060 lbf•ft)

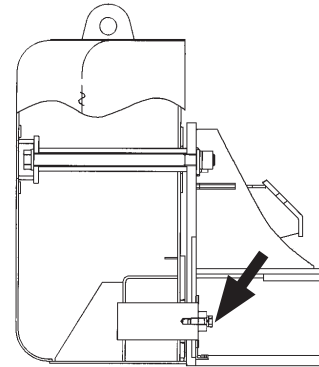


M1J7-07-023

Counterweight mounting retaining bolts.

Tool: 36 mm

Torque: 700 N•m (72 kgf•m, 520 lbf•ft)

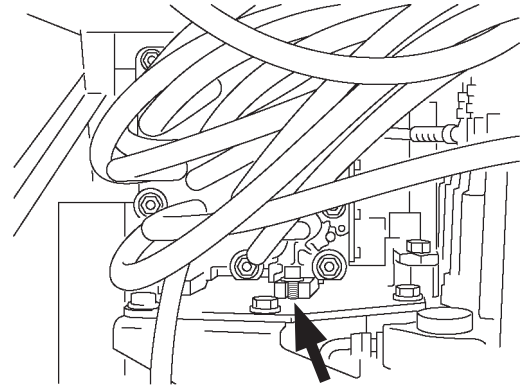


M162-07-070

26. Retighten shuttle valve mounting bolts.

Tool: 8 mm Hexagonal Socket Wrench

Torque: 50 N•m (5 kgf•m, 37 lbf•ft)



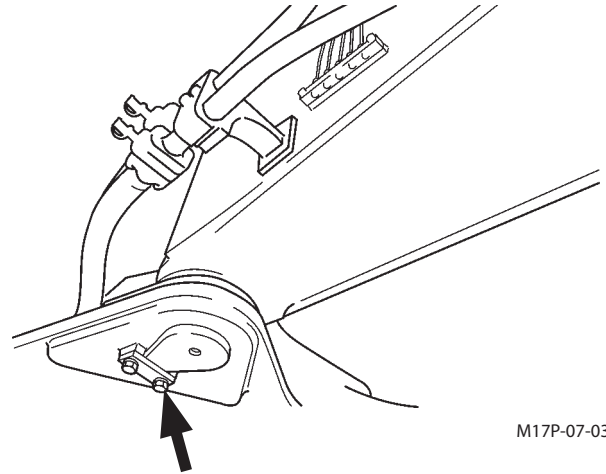
M1J7-07-009

MAINTENANCE

27. Retighten front pin-retaining bolts.

Tool: 30 mm

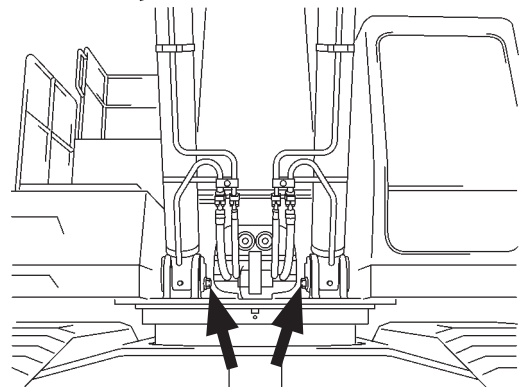
Torque: 400 N·m (41 kgf·m, 295 lbf·ft)



M17P-07-039

Tool: 30 mm

Torque: 400 N·m (41 kgf·m, 295 lbf·ft)

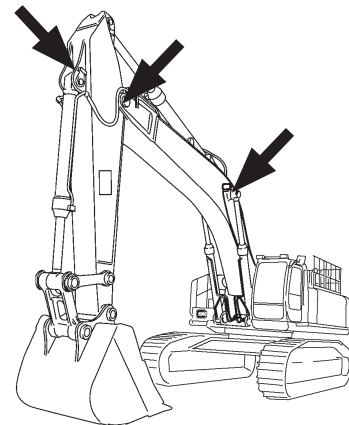


M1J7-07-011

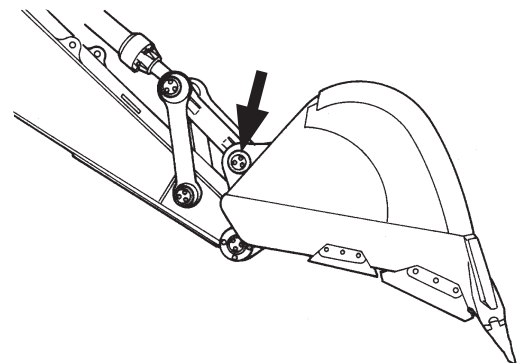
Front pin-retaining nuts

Tool: 30 mm

Torque: 400 N·m (41 kgf·m, 295 lbf·ft)



M17V-01-005

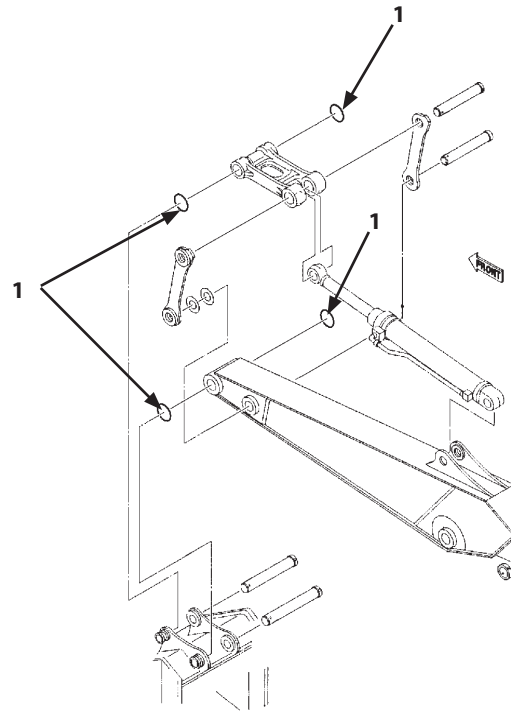


M162-06-032

MAINTENANCE

10 Check O-rings in Bucket Joints --- daily

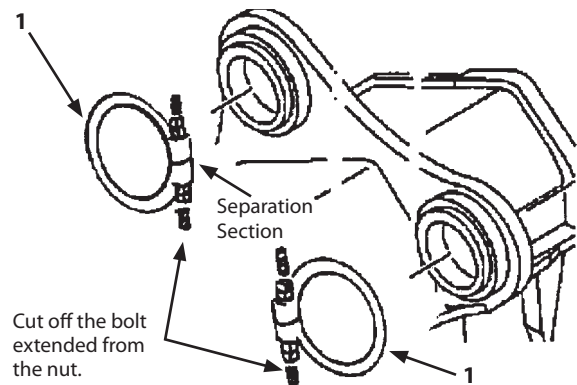
O-rings (1) are provided on both ends of the bucket joint pins as illustrated to the right, to prevent soil from entering the bucket joints and retain the grease in the bucket joints. Thereby, wear on the bucket joint parts such as the pins and the arm tip can be reduced. Check O-rings (1) for cracks or any damage. If any, replace the O-ring while referring to the separation type O-ring installation method described below. (There are two kind of O-ring type.)



M1JB-07-049

Type A (Separation Type O-ring) Installation Method

1. Install the O-ring (1) in the direction as illustrated to the right so that the separation section of the O-ring (1) does not directly come in contact with soil to protect the O-ring (1) from being damaged quickly by soil or foreign matter.
2. Install the O-ring (1) with care not to make a gap in the separation section of the O-ring.
3. After installing the O-ring (1), cut off the bolt extended from the nut so that the O-ring is not damaged by soil which may come in contact with the bolt.

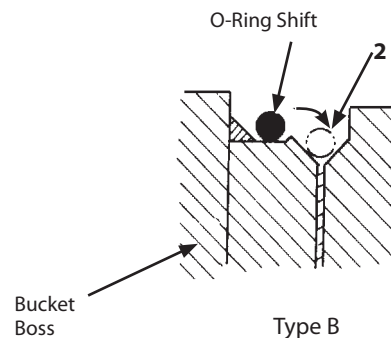


Type A

M1J1-07-074

Type B (Unit Type O-ring) Installation Method

Slide O-rings (2) out of the way, as shown



Type B

M104-07-063

MAINTENANCE

11 Retighten Cylinder Head Bolt
--- As required

See your authorized dealer.

12 Inspect and Adjust Valve Clearance
--- every 1 000 hours

See your authorized dealer.

13 Check Fuel Injection Timing
--- As required

See your authorized dealer.

14 Measure Engine Compression Pressure
--- every 1 000 hours

See your authorized dealer.

15 Check Starter and Alternator
--- every 1 000 hours

See your authorized dealer.

16 Check Water Pump
--- every 4 000 hours

See your authorized dealer.

HYDRAULIC CIRCUIT AND ELECTRICAL CIRCUIT

HYDRAULIC SYSTEM

IMPORTANT: Hydraulic equipment such as hydraulic pumps, control valves, and relief valves have been adjusted at the factory. Do not attempt to disassemble or turn the adjusting screws, as they are very difficult to readjust. Consult your authorized dealer if any trouble should occur.

- The excavator is equipped with the "O. H. S" (Optimum Hydraulic System) developed by Hitachi.

The "O. H. S" features:

Quick response of the actuators.

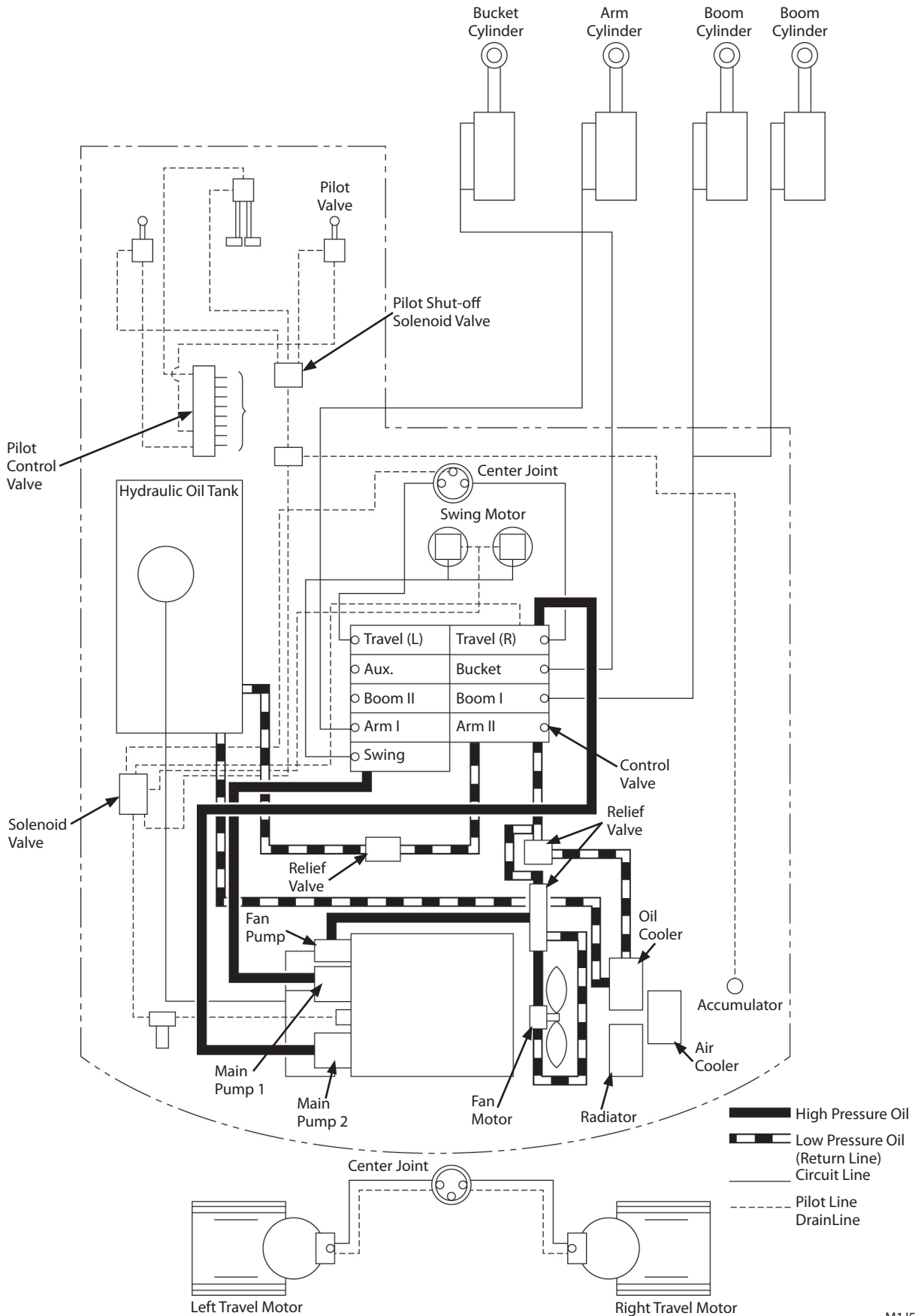
Improved precise swinging.

Improved combined operation of each functions.

- The control valve and each circuit are provided with relief valves of sufficient capacity to protect the actuators and other equipment from damage caused by the surge pressure and filter plugging.
- Travel parking brake is automatically released when the travel lever is operated. When the control lever is placed in NEUTRAL, the brake is automatically applied.
- Swing parking brake is automatically released when any control levers except for the travel levers are operated. When the control lever is placed in NEUTRAL, the brake is automatically applied.
- The excavator is equipped with an accumulator in the hydraulic system in order to operate front attachment for a few seconds after the engine has stopped. The accumulator is charged with high pressure gas: do not attempt to remove or disassemble it, and do not expose the accumulator to flame.

HYDRAULIC CIRCUIT AND ELECTRICAL CIRCUIT

MAIN CIRCUIT



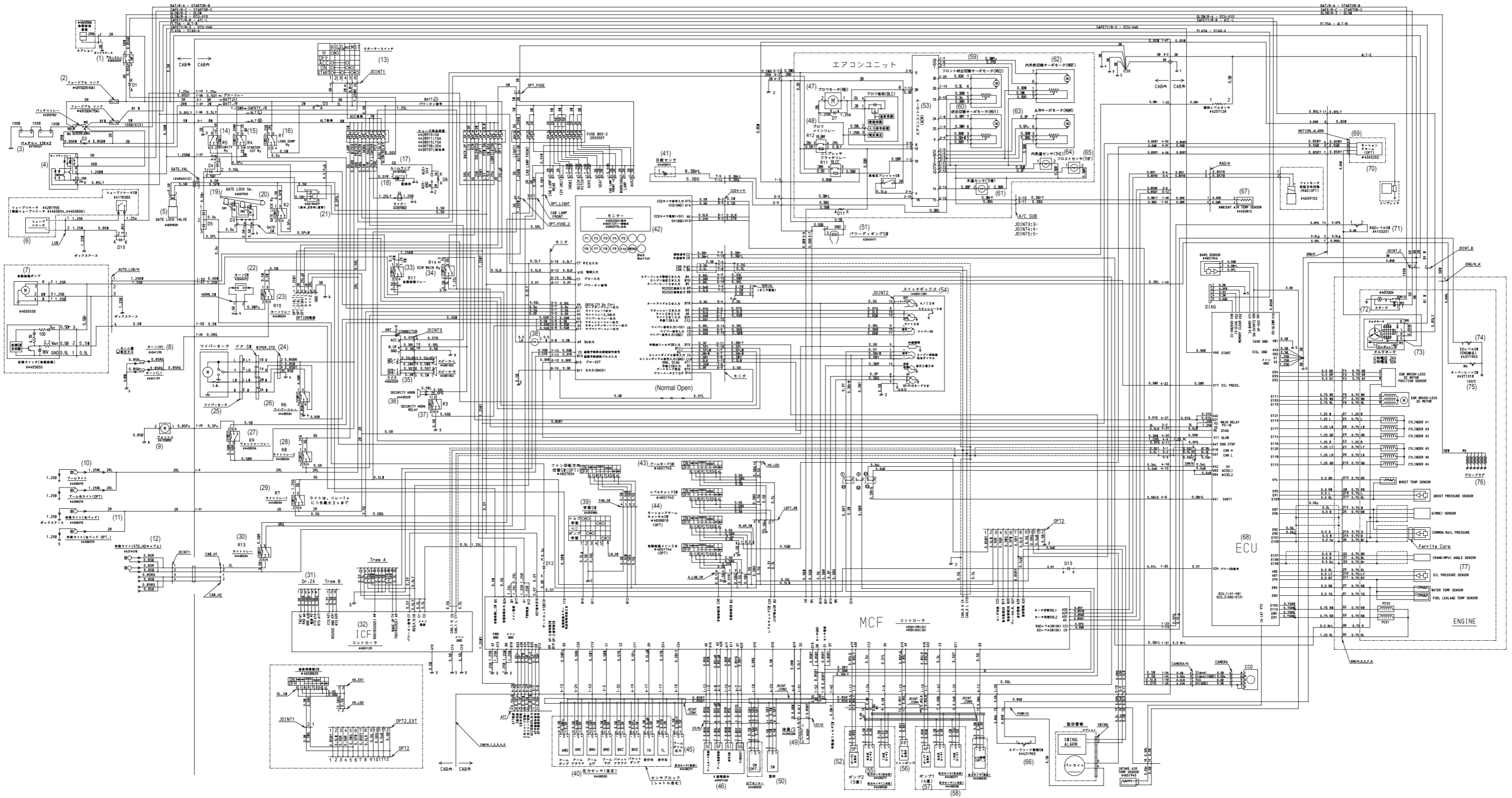
M1J5-08-001

HYDRAULIC CIRCUIT AND ELECTRICAL CIRCUIT

ELECTRICAL CIRCUIT

1. Glow Relay
2. Fusible Link
3. Battery
4. Safety Relay
5. Gate Lock (Pilot shut-off) Solenoid Valve
6. Lubricator Unit
7. Auto Lubricator
8. Horn
9. Washer
10. Work Light (Boom)
11. Work Light (R Fender)
12. Work Light (Cab)
13. Starter Switch
14. Security Relay
15. Starter Cut Relay
16. Load Dump Relay
17. Room Lamp
18. Cigarette Lighter
19. Gate Lock (Pilot shut-off) Switch
20. Gate Lock (Pilot shut-off) Relay
21. Eng. Stop Switch
22. Horn Switch
23. Horn Relay
24. Wiper
25. Wiper Motor
26. Wiper Relay
27. Washer Relay
28. Light Relay 2
29. Light Relay 1
30. Light Relay
31. Connector to Dr. ZX
32. ICF Controller
33. Auto Lub. Relay
34. ECM Main Relay
35. Radio
36. Security Horn
37. Security Horn Relay
38. Buzzer
39. Learning SW
40. Pressure Sensor (Low)
41. Solar Radiation Sensor
42. Monitor (Indicator)
43. Boom Mode SW
44. Travel Alarm Deactivation SW
45. Boom Bottom Pressure Sensor
46. Solenoid Valve Unit
47. Blower Motor
48. Blower Main Relay
49. Hyd. Temp. Sensor
50. Swing Pressure Valve
51. Power Digging SW
52. Pump 2 Solenoid Valve
53. Air Con. Controller
54. SW Box
55. Pump 2 Pressure Sensor
56. Fan Pump Solenoid Valve
57. Pump 1 Solenoid Valve
58. Pump 1 Pressure Sensor
59. Front Vent Servo Motor
60. Vent Servo Motor
61. Coolant Temp. Sensor
62. Fresh/Circulation Select Servo Motor
63. A/M Servo Motor
64. In-cab Temp. Sensor
65. Frost Sensor
66. Air Filter Restriction SW
67. Ambient Air Temp. Sensor
68. Controller
69. Travel Alarm
70. Compressor
71. Coolant Level SW
72. Starter
73. Alternator
74. Engine Oil Level SW
75. Overheat SW
76. Glow Plug
77. Engine Oil Pressure Sensor

ELECTRICAL DIAGRAM



MAINTENANCE UNDER SPECIAL ENVIRONMENTAL CONDITIONS

MAINTENANCE UNDER SPECIAL ENVIRONMENTAL CONDITIONS

Operating Conditions	Precautions for Maintenance
Muddy Soil, Rainy or Snowy Weather	<p>Before Operation: Check the tightness of plug and all drain cocks.</p> <p>After Operation: Clean the machine and check for cracks, damaged, loose or missing bolts and nuts. Lubricate all necessary parts without delay.</p>
Near the Ocean	<p>Before Operation: Check tightness of plugs and all drain cocks.</p> <p>After Operation: Thoroughly clean the machine with fresh water to wash off salt. Service electrical equipment often to prevent corrosion.</p>
Dusty Atmosphere	<p>Air Cleaner: Clean the element regularly at shorter service intervals.</p> <p>Radiator: Clean the oil cooler screen to prevent clogging of the radiator core.</p> <p>Fuel System: Clean the filter element and strainer regularly at shorter service intervals.</p> <p>Electrical Equipment: Clean them regularly, in particular, the commutator surface of the alternator and starter.</p>
Rocky Ground	<p>Tracks: Carefully operate while checking for cracks, damage and loose bolts and nuts. Loosen the tracks a little more than usual.</p> <p>Front Attachment: Standard attachment may be damaged when digging rocky ground. Reinforce the bucket before using it, or use a heavy duty bucket.</p>
Freezing Weather	<p>Fuel: Use high quality fuel suitable for low temperature.</p> <p>Lubricant: Use high quality low viscosity hydraulic oil and engine oil.</p> <p>Engine Coolant: Be sure to use antifreeze.</p> <p>Battery: Fully charge the batteries regularly at shorter service intervals. If not fully charged, electrolyte may freeze.</p> <p>Tracks: Keep the track clean. Park the machine on a hard surface to prevent the tracks from freezing to the ground.</p>
Falling Stones	<p>Cab: Provide a cab guard to protect the machine from falling stones when necessary.</p>

STORAGE

STORING THE MACHINE

1. Inspect the machine. Repair worn or damaged parts. Install new parts if necessary.
2. Clean the primary air cleaner element.
3. Retract all hydraulic cylinders, if possible. If not, coat exposed cylinder rods with grease.
4. Lubricate all grease points.
5. Park the tracks on long stable blocks.
6. Wash the machine.
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, operate hydraulic functions for travel, swing and digging two to three times for lubrication, at least once a month.
Be sure to check the coolant level and lubrication conditions before operating.

Precautions for Disconnecting or Connecting

Batteries


In case the batteries are kept disconnected for more than one month or when the batteries are reconnected, contact your nearest Hitachi dealer. Resetting of the ICX (Information Controller) may be required.

STORAGE

REMOVING THE MACHINE FROM STORAGE

 **CAUTION:** 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 full load operation.
5. Cycle all hydraulic functions several times.
6. Carefully check all systems before operating the machine at full load.

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

- (a) Check 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 has not been used for a long time, oil films on sliding surfaces may have broken down. Cycling hydraulic functions for travel, swing and digging two to three times is necessary to lubricate the sliding surfaces.

TROUBLESHOOTING

ENGINE

Problem	Cause	Solution
Engine Cranks But Will Not Start or Hard to Start	No fuel	Add fuel.
	Wrong fuel	Bleed air.
	Contaminated fuel	Drain tank. Use correct fuel.
	Low battery power	Drain tank and add clean fuel.
	Injection pump	Charge or install new battery.
	Wrong preheat line or glow plugs	See your authorized dealer.
	Poor electrical connection	See your authorized dealer.
	Starter motor failure	Clean and tighten battery and starter motor connections.
	Wrong engine oil	Replace starter.
	Air filter plugged	Drain oil. Use correct oil.
	Fuel filter plugged	Replace elements.
	Engine compression low	Remove air from fuel system.
	Injection nozzles dirty or not working correctly	Clean fuel tank strainer.
	Fuel shut-off switch	See your authorized dealer.
	Leaks in fuel system	See your authorized dealer.
	Air in fuel system	Switch on.
	Fuel feed pump plunger up	Check fuel system connections.
Feed pump strainer dirty	Bleed air.	
Fuel pre-filter cock closed	Push down and tighten knob.	
Engine Knocks, Runs Irregularly or Stops	Engine oil level low	Clean or replace.
	Plugged air intake system	See your authorized dealer.
	Feed pump strainer dirty	Install new filters.
	Injection pump out of time	Thermostat not working correctly or too "cool".
	Plugged fuel filters	Bleed air from fuel system.
	Low coolant temperature	Clean fuel tank outlet screen.
	Water, dirt or air in fuel system	See your authorized dealer.
	Injection nozzles dirty or faulty	Adjust or repair linkage.
	Fuel shut-off linkage	

TROUBLESHOOTING

ENGINE

Problem	Cause	Solution
Engine Not Developing Full Power	Air filters plugged	Replace filter elements.
	Fuel line restricted	Repair or replace fuel line.
	Contaminated fuel	Drain fuel tank and clean outlet screen. Refill.
	Fuel filters plugged	Change filters.
	Plugged vent in fuel tank cap	Clean or install new cap.
	Injection nozzles dirty or malfunctioning	See your authorized dealer.
	Injection pump linkage adjustment	See your authorized dealer.
	Wrong fuel	Use correct fuel.
	Wrong oil	Use correct oil.
	Turbocharger failure	See your authorized dealer.
	Injection pump out of timing	See your authorized dealer.
	Exhaust restriction	Remove muffler and run engine.
	Engine is too hot or cold	See below.
	Engine failure	See your authorized dealer.
Valve clearance	Check and adjust valves.	
Intake or exhaust system leakage	See your authorized dealer.	
Engine Overheats	Low coolant level	Add coolant.
	Thermostat	See your authorized dealer.
	Engine overloaded	Check hydraulic relief valves.
	Radiator cap faulty	Install new cap.
	Radiator core or oil cooler core plugged	Clean radiator and oil cooler.
	Radiator screen plugged	Clean screen.
	Injection pump out of timing	See your authorized dealer.
	Fan damaged	Replace fan.
	Air cleaner plugged	Clean air cleaner.
	Alternator belt loose	Tighten or install new belt.
	Pulley grooves worn	Replace pulleys.
	Cooling system passages dirty	Flush cooling system.
Temperature gauge or sending unit	See your authorized dealer.	

TROUBLESHOOTING

ENGINE

Problem	Cause	Solution
Coolant Temperature Too Low	Thermostat Temperature gauge or sending unit	See your authorized dealer. See your authorized dealer.
Low Engine Oil Pressure	Engine oil pump or pump drive Low oil level Engine oil pressure regulation valve Plugged oil pump intake screen Plugged oil filter Oil leaks Oil diluted with fuel or coolant Engine temperature too high Wrong oil	See your authorized dealer. Add oil. See your authorized dealer. See your authorized dealer. Install a new oil filter. Check for leaks. See your authorized dealer. Check cooling system. Drain oil. Use correct oil.
Engine Uses Too Much Oil	Wrong oil Oil leaks Engine temperature too high Plugged air cleaner Internal engine component wear	Drain oil. Use correct oil. Check engine oil drain plug. Check cooling system. Clean element or install new element. See your authorized dealer.
Engine Uses Too Much Fuel	Plugged or dirty air intake system Wrong fuel Fuel injection nozzles Injection pump out of time	Clean air intake system. Use correct fuel. See your authorized dealer. See your authorized dealer.
Excessive Black or Gray Exhaust Smoke	Wrong fuel Plugged or dirty air intake or exhaust system Injection pump out of timing Injection nozzles dirty or faulty Basic engine failures	Drain tank. Use correct fuel. Clean air intake and exhaust system. See your authorized dealer. See your authorized dealer. See your authorized dealer.

TROUBLESHOOTING

ENGINE

Problem	Cause	Solution
Exhaust Gas is White	Wrong fuel Cold engine Thermostat faulty or too "cool" Injection pump out of time Coolant leakage into engine cylinder Injection nozzles failure	Drain tank. Use correct fuel. Run engine until warm. See your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer.
Turbocharger Excessively Noisy or Vibrates	Bearings not lubricated Worn bearings Air leak in engine, intake or exhaust manifold Improper clearance between turbine wheel and turbine housing Broken blades on turbine	Insufficient oil pressure. Check for restricted turbocharger oil line. See your authorized dealer. Inspect, repair. See your authorized dealer. Remove exhaust elbow and air inlet hose and inspect.
Oil Dripping from Turbocharger Adapter	Damaged or worn bearings and/or worn seals Excessive crankcase pressure Turbocharger oil return line carbon build up where line passes exhaust manifold	See your authorized dealer. Inspect and clean air cleaner. Check for proper engine service intervals or dirt enter into engine. Check vent tube to ensure tube is not plugged. Clean. Remove line. Inspect, clean.
Excessive Drag in Turbocharger Rotating Members	Carbon build-up behind turbine wheel caused by combustion deposits Dirt build-up behind compressor wheel caused by air intake leaks Bearing seizure or dirty or worn bearings, caused by excessive temperature, unbalanced wheel, dirty oil, oil starvation, or insufficient lubrication	Inspect, clean. Inspect, clean. See your authorized dealer.

TROUBLESHOOTING

ELECTRICAL SYSTEM

Problem	Cause	Solution
Nothing Works	Battery	Recharge or replace.
Nothing Works (Except clock)	Battery relay	Replace relay.
Batteries Undercharged	Loose or corroded connections Alternator belt loose Alternator not charging Fuse Key switch failure	Clean and tighten or replace batteries. Tighten or install new belt. See your authorized dealer. Replace fuse. Replace key switch.
Starting Motor Will Not Turn	Battery undercharged or dead Battery cables making poor connections Fusible link Key switch Start relay Starter solenoid Starter Starter pinion jammed in flywheel gear Major engine failure The pilot control shut-off lever is down Position	Recharge or replace battery. Clean connections. Replace fusible link. See your authorized dealer. See your authorized dealer. See your authorized dealer. Repair or replace start motor. Repair or replace starter. See your authorized dealer. Pull the pilot control shut-off lever up to the LOCK position
Starter Solenoid Chatters	Poor connections at batteries or starter Low battery charge Starter solenoid "hold-in" windings open	Clean connections. Recharge or replace batteries. See your authorized dealer.
Starter Motor Turns but Will Not Crank Engine	Starter pinion gear not engaging flywheel ring gear Pinion shift mechanism jammed or malfunctioning Pinion gear teeth broken Flywheel gear teeth broken The engine stop switch is activated	See your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer. Turn the engine stop switch off
Engine Cranks Slowly	Battery cables damaged or broken internally Battery or starter cable connections loose or corroded	Inspect and replace cables. Clean and tighten connections.

TROUBLESHOOTING

ELECTRICAL SYSTEM

Problem	Cause	Solution
Engine Cranks Slowly	Battery discharged or will not hold a charge Starter "dragging" Low battery voltage	Replace battery. See your authorized dealer. Recharge or replace battery.
Starter Motor Continues to Run After Engine Starts	Start relay stuck Starter solenoid stuck Starter not disengaging Key switch	See your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer.
Charging Indicator Light On-Engine Running	Loose or glazed alternator belt Engine rpm low Excessive electrical load from added accessories Loose or corroded electrical connections on battery, ground strap, starter, or alternator Battery voltage low Alternator or regulator Indicator circuit	Check belt. Replace if glazed, tighten if loose. Adjust rpm to specification. Remove accessories or install higher output alternator. Inspect, clean, or tighten electrical connections. Change or replace battery. See your authorized dealer. See your authorized dealer.
Noisy Alternator	Worn drive belt Worn pulleys Pulley misaligned Alternator bearing	Replace belt. Replace pulleys and belt. Adjust alternator mount. Loosen alternator belts. Turn pulley by hand. If any roughness is felt, repair alternator.
No Monitor Panel Indicators Work	Fuse Wiring harness	Replace fuse. See your authorized dealer.
Individual Light in Monitor Panel is Not Working	Bulb Fuse Wiring harness	Replace bulb. Replace fuse. See your authorized dealer.

TROUBLESHOOTING

ELECTRICAL SYSTEM

Problem	Cause	Solution
No Indicators in Gauge Panel Operate	Circuit board Wiring harness Fuse	See your authorized dealer. See your authorized dealer. Replace fuse.
Indicator Light in Gauge Panel is Inoperative	Bulb Fuse Sender Wiring harness failure	Replace bulb. Replace fuse. Do sender check. See your authorized dealer.
Coolant Temperature Gauge Does Not Work	Fuse Gauge Gauge sender Wiring harness	Replace fuse. See your authorized dealer. Do coolant temperature gauge sender check. See your authorized dealer.
Indicator Lights Do Not Operate Auto-idle	Fuse Bulb Auto-idle switch	Replace fuse. Replace bulb. See your authorized dealer.
Fuel Gauge Does Not Work	Fuse Gauge Wiring harness	Replace fuse. See your authorized dealer. See your authorized dealer.

TROUBLESHOOTING

ELECTRICAL SYSTEM

Problem	Cause	Solution
Work Mode Selector Does Not Work	Mode switches Electrical connector Wire harness (between MC and monitor) Main controller (MC) Solenoid valve unit	See your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer.
Fast/Slow Travel Speed Does Not Function	Travel mode switches Pilot pressure switch (Travel) Pump delivery pressure sensor wire harness Main controller (MC) Solenoid valve unit Damaged travel motor	See your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer.
Auto-Idle Does Not Work	Fuse Switch panel Electrical connector Wire harness EC motor Pressure switches (Travel, Front) Main controller	Replace fuse. See your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer.

TROUBLESHOOTING

CONTROL LEVERS

Problem	Cause	Solution
Moves Hard	Worn out pusher Pilot valve	See your authorized dealer. See your authorized dealer.
Does Nothing	Worn out pusher Pilot valve	See your authorized dealer. See your authorized dealer.
Does Not Return to Neutral	Pilot valve	See your authorized dealer.
Too Much Play	Worn out pivot joint	See your authorized dealer.
Lever is Not Vertical In Neutral	Pilot valve	See your authorized dealer.

HYDRAULIC SYSTEM

Problem	Cause	Solution
Hydraulic Functions are Slow	Low oil level Cold oil Wrong oil Engine speed too low Pilot circuit Worn pump Restricted pump suction line	Fill reservoir to full mark. Push hydraulic warm up switch. Drain tank. Use correct oil. Increase speed or see your authorized dealer. See your authorized dealer. See your authorized dealer. See your authorized dealer.
Hydraulic Oil Overheats	Wrong oil Air leak in pump suction line Oil lines restricted Low oil level Plugged filters Worn pump Plugged radiator or oil cooler Oil cooler bypass	Use correct oil. See your authorized dealer. See your authorized dealer. Fill reservoir to full mark. Install new filters. See your authorized dealer. Clean and straighten fins. See your authorized dealer.

TROUBLESHOOTING

HYDRAULIC SYSTEM

Problem	Cause	Solution
Hydraulic Oil Overheats	Relief valve Contaminated oil Travel motors Improperly adjusted hydraulic components	See your authorized dealer. Drain oil and refill. See your authorized dealer. See your authorized dealer.
Oil Foams	Air leak in line from reservoir to pump Kinks or dents in oil lines Wrong oil Water in oil High or low oil level	Repair leak or see your authorized dealer. Check lines. Use correct oil. Change oil. Correct level.
Low or No Oil Pressure	Wrong oil Improperly adjusted hydraulic components No oil in system Worn cylinder packings Relief valve	Use correct oil. See your authorized dealer. Fill with correct oil. See your authorized dealer. See your authorized dealer.
No Hydraulic Functions (Noise from pumps)	Hydraulic pump Lack of hydraulic oil Damaged suction line or hose Clogged suction filter	See your authorized dealer. Add oil. See your authorized dealer. Clean.
Hydraulic Cylinders Operate but Cannot Lift Load	Hydraulic pump worn Main relief valve pressure low Hydraulic oil level low Suction screen plugged Pump suction line leaking	See your authorized dealer. See your authorized dealer. Add oil. Clean strainer and system. Inspect suction line.

TROUBLESHOOTING

HYDRAULIC SYSTEM

Problem	Cause	Solution
One Control Lever Does Not Work	<ul style="list-style-type: none"> Relief valve pressure low Tube or hose damaged Hydraulic fittings loose Damaged O-rings in fittings Hydraulic Pump Pilot valve Pilot lines 	<ul style="list-style-type: none"> See your authorized dealer. Repair or replace. Tighten. Install new O-ring. See your authorized dealer. See your authorized dealer. Repair or replace.
One Cylinder Does Not Work	<ul style="list-style-type: none"> Control valve spool damaged or contaminated with dirt Hydraulic lines damaged Fittings loose O-ring in fitting damaged Pilot valve Pilot lines 	<ul style="list-style-type: none"> See your authorized dealer. Repair or replace. Tighten. Install new O-ring. See your authorized dealer. Repair or replace.
One Cylinder Does Not Work or Has Little Power	<ul style="list-style-type: none"> Piston seals leaking Cylinder rod damaged Pilot lines Pilot valve Failed wiring harness 	<ul style="list-style-type: none"> See your authorized dealer. See your authorized dealer. Repair or replace. See your authorized dealer. See your authorized dealer.
Both Travel Motors Do Not Work	<ul style="list-style-type: none"> Center joint failure 	<ul style="list-style-type: none"> See your authorized dealer.
Travel Motor Does Not Work	<ul style="list-style-type: none"> Travel motor Parking brake not releasing Pilot valve Pilot lines 	<ul style="list-style-type: none"> See your authorized dealer. See your authorized dealer. See your authorized dealer. Repair or replace.
Travel is Not Smooth	<ul style="list-style-type: none"> Track adjustment Track idler or rollers damaged Track frame bent 	<ul style="list-style-type: none"> Adjust tension. See your authorized dealer. See your authorized dealer.

TROUBLESHOOTING

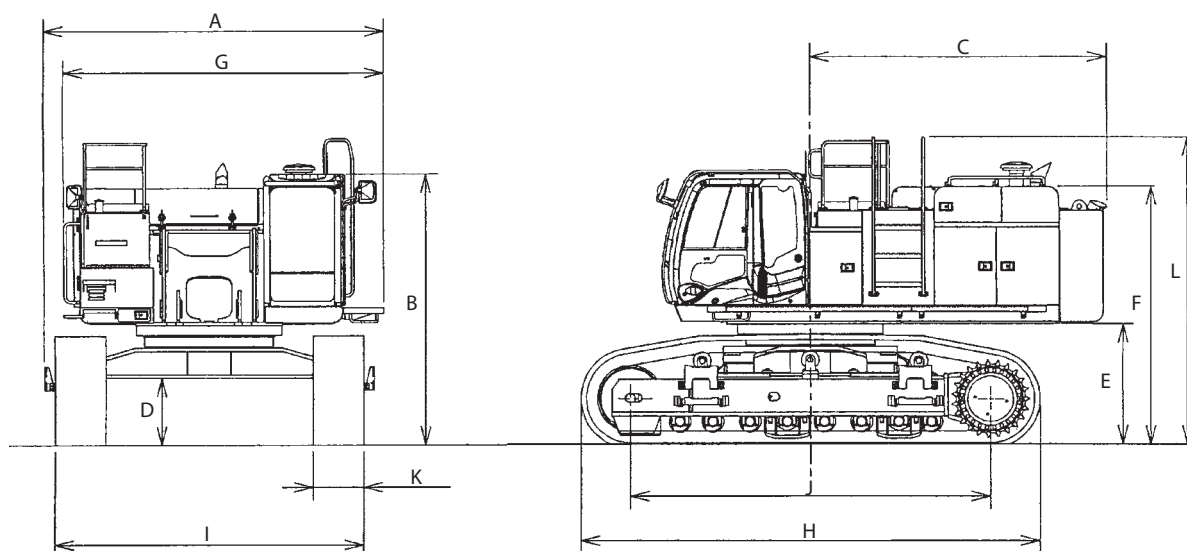
HYDRAULIC SYSTEM

Problem	Cause	Solution
Travel is Not Smooth	Rocks or mud "jammed" in track frame Travel brake not releasing	Remove and repair. See your authorized dealer.
Swing Does Not Work	Swing brake release valve Swing motor Pilot valve	See your authorized dealer. See your authorized dealer. See your authorized dealer.
Swing is Not Smooth	Swing gear Swing bearing Lack of grease	See your authorized dealer. See your authorized dealer. Apply grease.
Engine Stops When Travel or/ and Control Lever Moved	Failure of connector contact Failed wiring harness Failed Main controller	Repair or replace. See your authorized dealer. See your authorized dealer.

SPECIFICATIONS

SPECIFICATIONS

ZAXIS650LC-3



M1J7-12-001

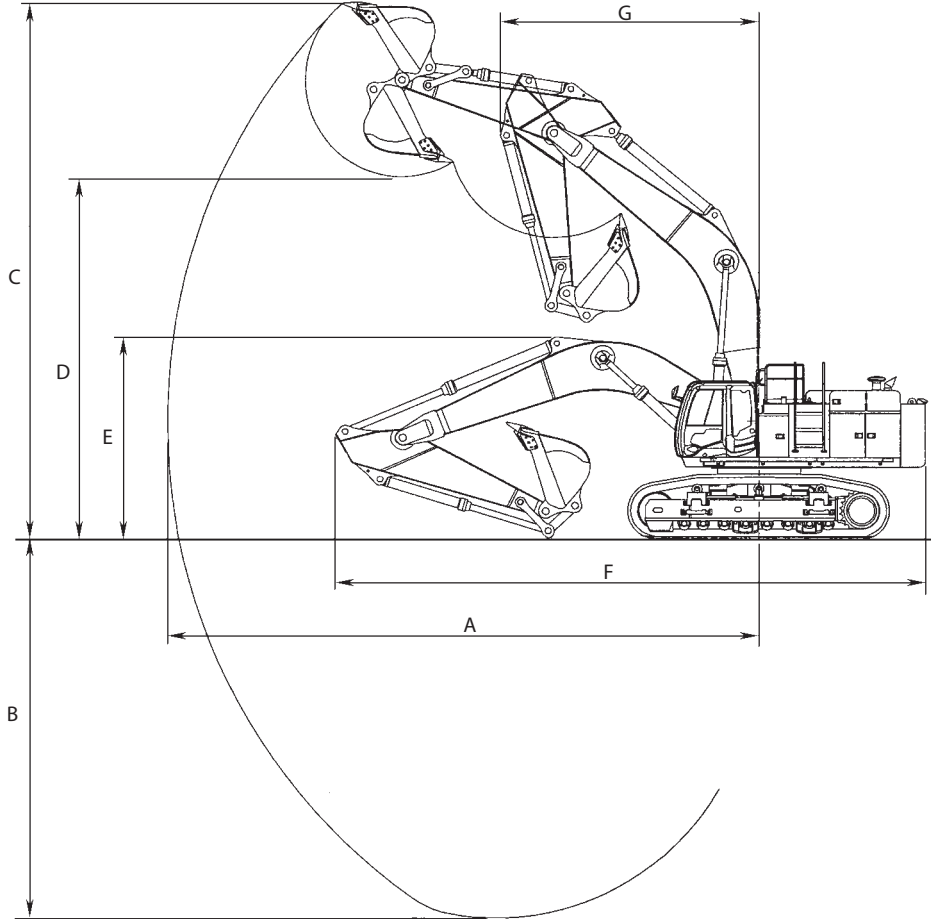
Model	ZAXIS650LC-3
Type of Front-End Attachment	3.6 m (11 ft 6 in) Arm
Bucket Capacity (Heaped)	PCSA 2.9 m ³ (3.8 yd ³), CECE 2.5 m ³
Operating Weight	65900 kg (145000 lb)
Base Machine Weight	50800 kg (112000 lb)
Engine	345 kW/1800 min ⁻¹ (469 PS/1800 rpm)
A: Overall Width (Excluding Back Mirrors)	4340 mm (14 ft 3 in)
B: Cab Height	3450 mm (11 ft 4 in)
C: Rear End Swing Radius	3850 mm (12 ft 8 in)
D: Minimum Ground Clearance	*860 mm (34 in)
E: Counterweight Clearance	*1530 mm (5 ft 0 in)
F: Engine Cover Height	3260 mm (10 ft 8in)
G: Overall Width of Upperstructure	4100 mm (13 ft 5 in)
H: Undercarriage Length	5840 mm (19 ft 2 in)
I: Undercarriage Width (Extended/Retracted)	3950 mm (12 ft 12 in)/3480 mm (11 ft 5in)
J: Sprocket Center to Idler Center	4590 mm (15 ft 1 in)
K: Track Shoe Width	650 mm (26 in) (Grouser shoe)
L: Overall Height	3900 mm (12 ft 10 in)
Ground Pressure	99 kPa (1.01 kgf/cm ² , 14.4 psi)
Swing Speed	9.5 min ⁻¹ (rpm)
Travel Speed (fast/slow)	4.9/3.4 km/h (3.0/2.1 mph)
Gradeability	35° (tanθ = 0.70)

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

SPECIFICATIONS

WORKING RANGES

ZAXIS650LC-3



M1J7-12-003

Item	Category	7.8 m (25 ft 7 in) Boom		6.8 m (22 ft 4 in) BE-Boom
		3.6 m Arm (11 ft 10 in)	4.2 m Arm (13 ft 9 in)	2.9 m BE-Arm (9 ft 6 in)
A: Maximum Digging Reach	mm (ft-in)	13250 (43' 6")	13850 (45' 5")	11800 (38' 9")
B: Maximum Digging Depth	mm (ft-in)	8530 (27' 12")	9150 (30' 0")	7120 (23' 4")
C: Maximum Cutting Height	mm (ft-in)	11190 (38' 9")	12240 (40' 2")	11190 (36' 9")
D: Maximum Dumping Height	mm (ft-in)	8050 (26' 5")	8330 (27' 4")	7330 (24' 1")
E: Overall Height	mm (ft-in)	*4460 (14' 8")	*4980 (16' 4")	*4960 (16' 3")
F: Overall Length	mm (ft-in)	*13200 (43' 4")	*13200 (43' 4")	*12260 (40' 3")
G: Minimum Swing Radius	mm (ft-in)	5780 (18' 12")	5760 (18' 11")	5240 (17' 2")


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

SPECIFICATIONS

SHOE TYPES AND APPLICATIONS

ZAXIS650LC-3

Shoe Width mm (in)	650 mm (26") Grouser Shoe	750 mm (30") Grouser Shoe	900mm(35") Grouser Shoe
Application	For Ordinary Ground (Standard)	For Weak Footing (Option)	For Weak Footing (Option)
Operating Weight	65900 (145300)	66500 (146600)	67500 (148800)
Base Machine Weight	50800 (112000)	51400 (113300)	52400 (115500)
Cab Height	3450 (11' 4")	3450 (11' 4")	3450 (11' 4")
Minimum Ground Clearance	*860 (34")	*860 (34")	*860 (34")
Undercarriage Length	5840 (19' 2")	5840 (19' 2")	5840 (19' 2")
Undercarriage Width (Extended/Retracted)	3950/3480 (12' 12"/11'5")	4050/3580 (13' 3"/11'9")	4200/3730 (13' 10"/12'3")
Ground Pressure	99 kPa (1.01 kgf/cm ² , 14.4 psi)	87 kPa (0.89 kgf/cm ² , 12.7 psi)	73 kPa (0.75 kgf/cm ² , 10.7 psi)

 **NOTE:** • The specifications for the front-end attachment are for 3.6 m (11 ft 10 in) arm with PCSA 2.9 m³ (3.8yd³) bucket for ZAXIS650LC-3.


- 750 mm (30 in) or 900 mm (35 in) grouser shoe should not be used on gravel or rocky ground.
- * The dimensions do not include the height of the shoe lug.

SPECIFICATIONS

BUCKET TYPES AND APPLICATIONS

ZAXIS650LC-3

Bucket	Bucket Capacity m ³ (yd ³)		Bucket Width mm (in)		Weight kg (lb)	Front-End Attachment m (ft-in)		
	PCSA (Heaped)	CECE (Heaped)	Without side cutter	With side cutter		6.8 m (22' 4") BE-Boom	7.8 m (25' 7") Standard Boom	
						2.9 m (9' 6") BE-arm	3.6 m (11' 10") Arm	4.2 m (13' 9") Arm
Hoe Bucket	2.5 (3.3)	2.2	1480 (4'10")	1620 (5'4")	2150 (4740)	※	⊙	⊙
	2.9 (3.8)	2.5	1680 (5'6")	1820 (5'12")	2310 (5100)	※	⊙	×
	3.5 (4.6)	3.1	1800 (5'11")	1990 (6'6")	2980 (6570)	⊙	※	※

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

⊙: General excavating

×: Not applicable (not warrantable)

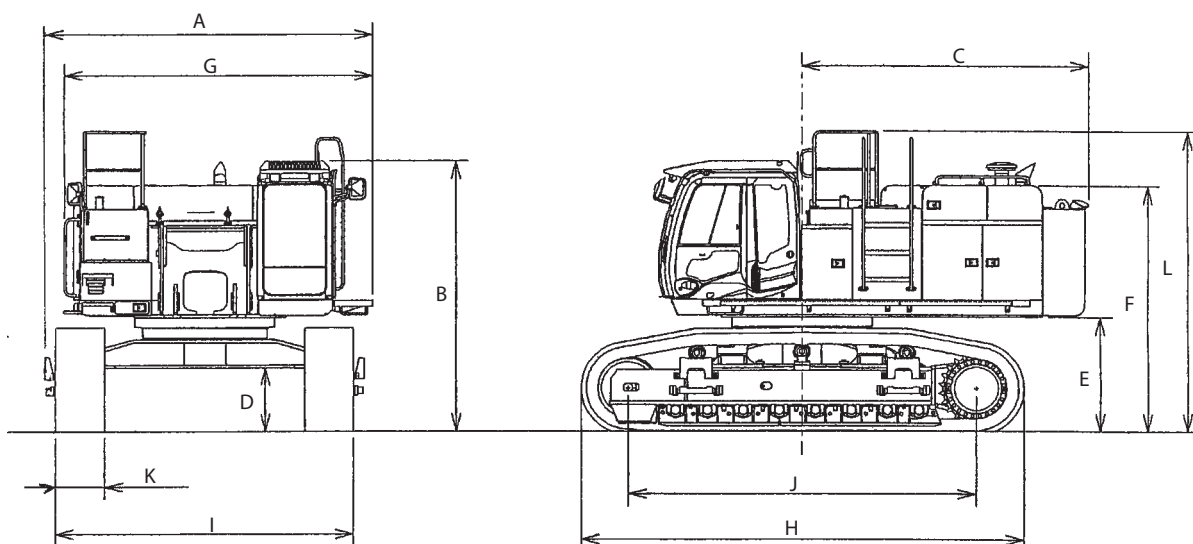
※: Impossible to install

(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.

SPECIFICATIONS

SPECIFICATIONS

ZAXIS670LCH-3



M1J7-12-002

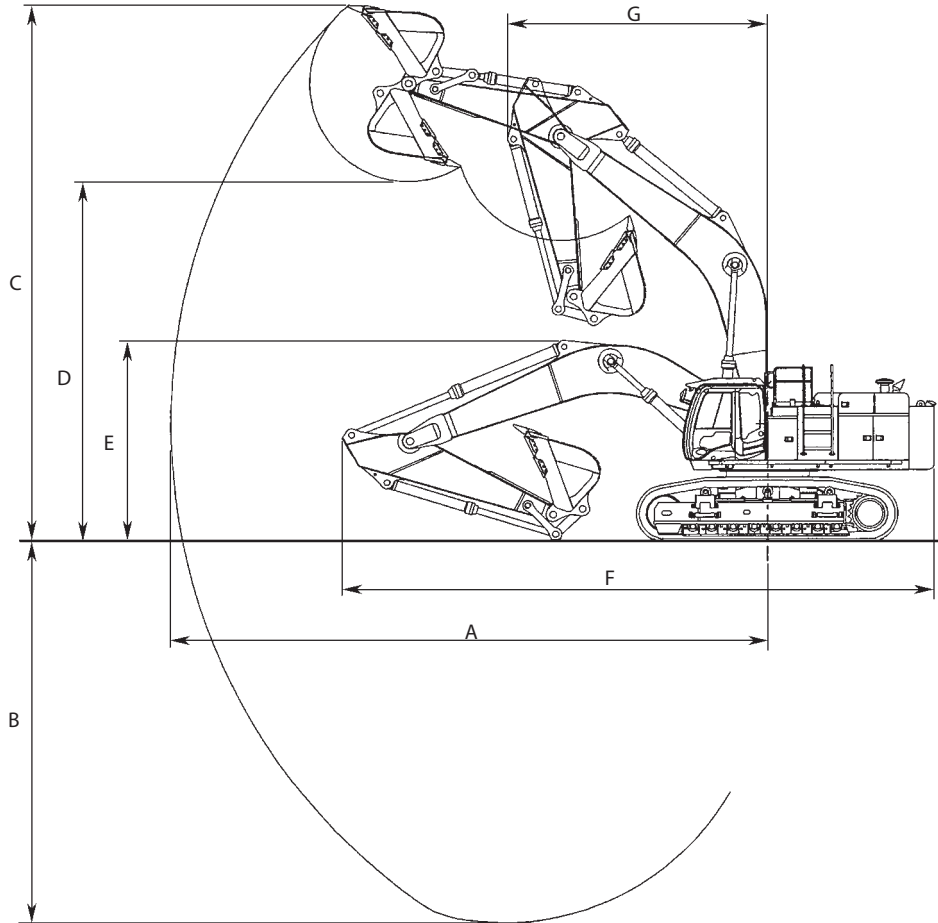
Model	ZAXIS670LCH-3
Type of Front-End Attachment	3.6 m (11 ft 0 in) H Arm
Bucket Capacity (Heaped)	PCSA 2.9 m ³ (3.8 yd ³), CECE 2.5 m ³
Operating Weight	67300 kg (148400 lb)
Base Machine Weight	51500 kg (113500 lb)
Engine	345 kW/1800 min ⁻¹ (469 PS/1800 rpm)
A: Overall Width (Excluding Back Mirrors)	4340 mm (14 ft 3 in)
B: Cab Height	3590 mm (11 ft 9 in)
C: Rear End Swing Radius	3850 mm (12 ft 8 in)
D: Minimum Ground Clearance	*860 mm (34 in)
E: Counterweight Clearance	*1530 mm (5 ft 0 in)
F: Engine Cover Height	3260 mm (10 ft 8 in)
G: Overall Width of Upperstructure	4100 mm (13 ft 5 in)
H: Undercarriage Length	5840 mm (19 ft 2 in)
I: Undercarriage Width (Extended/Retracted)	3950 mm (12 ft 12 in)/3480 mm (11 ft 5 in)
J: Sprocket Center to Idler Center	4590 mm (15 ft 1 in)
K: Track Shoe Width	650 mm (26 in) (Grouser shoe)
L: Overall Height	3900 mm (12 ft 10 in)
Ground Pressure	101 kPa (1.03 kgf/cm ² , 14.6 psi)
Swing Speed	9.5 min ⁻¹ (rpm)
Travel Speed (fast/slow)	4.9/3.4 km/h (3.0/2.1 mph)
Gradeability	35° (tanθ = 0.70)

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

SPECIFICATIONS

WORKING RANGES

ZAXIS670LCH-3



M1J7-12-004

Item	Category	7.8m (25 ft 7 in) H-Boom	6.8 m (22 ft 4 in) BE-Boom
		3.6 m H-Arm (11ft 10in)	2.9 m BE-Arm (9 ft 6 in)
A: Maximum Digging Reach	mm (ft-in)	13280 (43' 7")	11800 (38' 9")
B: Maximum Digging Depth	mm (ft-in)	7120 (23' 4")	7120 (23' 4")
C: Maximum Cutting Height	mm (ft-in)	11940 (39' 2")	11190 (36' 9")
D: Maximum Dumping Height	mm (ft-in)	8020 (26' 4")	7330 (24' 1")
E: Overall Height	mm (ft-in)	*4460 (14' 8")	*4960 (16' 3")
F: Overall Length	mm (ft-in)	*13200 (43' 4")	*12260 (40' 3")
G: Minimum Swing Radius	mm (ft-in)	5780 (18' 12")	5240 (17' 2")


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

SPECIFICATIONS

SHOE TYPES AND APPLICATIONS

ZAXIS670LCH-3

Shoe Width mm (in)		650 mm (26") Grouser Shoe	750 mm (30") Grouser Shoe
Application		For Ordinary Ground (Standard)	For Weak Footing (Option)
Operating Weight	kg (lb)	67300 (148400)	67900 (149700)
Base Machine Weight	kg (lb)	51500 (113500)	52100 (114900)
Cab Height	mm (ft•in)	3590 (11'9")	3590 (11'9")
Minimum Ground Clearance	mm (ft•in)	*860 (34")	*860 (34")
Undercarriage Length	mm (ft•in)	5840 (19'2")	5840 (19'2")
Undercarriage Width (Extended/Retracted)	mm (ft•in)	3950/3480 (12'12"/11'5")	4050/3580 (13'3"/11'9")
Ground Pressure		101 kPa (1.03 kgf/cm ² , 14.6 psi)	88 kPa (0.90 kgf/cm ² , 12.8 psi)

 **NOTE:** • The specifications for the front-end attachment are for 3.6 m (11 ft 10 in) H-Arm with PCSA 2.9 m³ (3.8 yd³) bucket for ZAXIS670LCH-3.


- 750 mm (30 in) grouser shoe should not be used on gravel or rocky ground.
- * The dimensions do not include the height of the shoe lug.

SPECIFICATIONS

BUCKET TYPES AND APPLICATIONS

ZAXIS670LCH-3

Bucket	Bucket Capacity m ³ (yd ³)		Bucket Width mm (in)		Weight kg (lb)	Front-End Attachment m (ft-in)	
	PCSA (Heaped)	CECE (Heaped)	Without side cutter	With side cutter		6.8 m (22' 4") BE-Boom	7.8 m (25' 7") H-Boom
						2.9 m (9' 6") BE-Arm	3.6 m (11' 10") H-Arm
Rock Bucket	2.9 (3.8)	2.5	1680 (5'6")	1680 (5'6")	2850 (6280)	※	△
	3.3 (4.3)	2.8	1790 (5'11")	1790 (5'11")	3120 (6880)	△	※

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

△ : Rock digging

※ : Impossible to install


Hoe bucket is applicable to the following types of work.

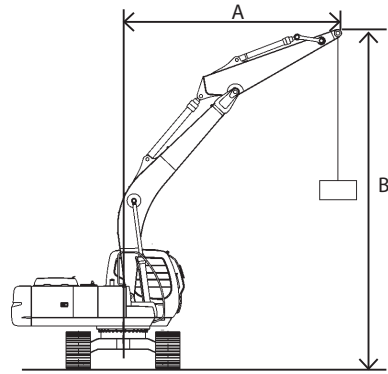
Rock digging:

For digging loading operation of mountain gravels, blasted rock, hard clay, soft rock and so on.

SPECIFICATIONS

LIFTING CAPACITIES

-  **NOTE:** 1. Lifting capacity of the ZX series does not exceed 75% of tipping load with the machine on firm, level ground or 87 % of full hydraulic capacity. (ISO 10567)
 2. * Indicates load limited by hydraulic capacity.



M1G6-13-013

A: Load radius
 B: Load point height

METRIC MEASURE

ZX670LCH-3 Boom (BE) 6.8 m , Arm (BE) 2.9 m, Without Bucket Shoes 650 mm

Unit; 1000 kg

B: Load point height m	A: Load radius														At max. reach				
	3.0 m		4.0 m		5.0 m		6.0 m		7.0 m		8.0 m		9.0 m		⊗	m			
8.0																	12.7*	12.7*	7.9
6.0							19.7*	19.7*	17.2	18.1*	13.8	17.1*			11.3	12.2*	11.3	12.2*	9.0
4.0							20.4	23.7*	16.1	20.6*	13.1	18.3	10.9	15.2	10.0	12.5*	10.0	12.5*	9.5
2.0							18.8	27.1*	15.1	21.6	12.4	17.6	10.5	14.7	9.5	13.3	9.5	13.3	9.6
0 (GROUND)					23.9	34.1*	18.1	26.8	14.5	21.0	12.0	17.1	10.2	14.4	9.8	13.9	9.8	13.9	9.3
-2.0	26.8*	26.8*	35.6	37.6*	24.0	31.6*	18.0	26.7*	14.4	20.8	12.0	17.1			11.2	15.9	11.2	15.9	8.4
-4.0			29.7*	29.7*	24.7	25.3*	18.6	21.3*											
-6.0																			

ZX670LCH-3 Boom (H) 7.8 m , Arm (H) 3.6 m, Without Bucket Shoes 650 mm

Unit; 1000 kg

B: Load point height m	A: Load radius																At max. reach				
	3.0 m		4.0 m		5.0 m		6.0 m		7.0 m		8.0 m		9.0 m		10.0 m		11.0 m		⊗	m	
9.0																			9.5*	9.5*	9.0
8.0													11.8*	13.1*					9.3*	9.3*	9.7
6.0							16.4*	16.4*	13.8	15.1*	11.4	14.2*	9.5	13.1					8.6	9.3*	10.5
4.0					26.1	28.4*	19.9	22.7*	15.8	19.3*	12.9	17.1*	10.8	15.1	9.1	12.7			7.7	9.7*	11.0
2.0							18.2	26.2*	14.6	21.2	12.1	17.3	10.2	14.4	8.7	12.3	7.5	10.6	7.4	10.5	11.1
0 (GROUND)					21.2*	21.2*	17.4	26.1	13.9	20.4	11.5	16.6	9.8	14.0	8.4	12.0			7.5	10.7	10.8
-2.0	16.5*	16.5*	22.0*	22.0*	23.1	31.6*	17.3	25.9	13.7	20.1	11.3	16.4	9.6	13.8	8.3	11.9			8.2	11.7	10.1
-4.0	29.1*	29.1*	32.7*	32.7*	23.5	27.9*	17.5	24.0*	13.9	20.3	11.5	16.6							10.0	14.3	8.9
-6.0					20.7*	20.7*	17.7*	17.7*											14.7*	14.7*	6.9

SPECIFICATIONS

SOUND LEVEL RESULTS (2000/14/EC)

LwA: sound-power level of airborne noise

LpA: sound level at operator's station


Unit: dB(A)

	LwA	LpA
ZAXIS650LC-3, 670LCH-3	107	72

VIBRATION LEVEL

Hands/Arms: The acceleration to which the operator's hands and arms will be exposed is lower than 2.5 m/s^2 .

Entire body: The acceleration to which the operator's entire body will be exposed is lower than 0.5 m/s^2 .

 **NOTE:** The acceleration is measured in accordance with ISO 2631/1; ISO 5349 and SAE J1166.

OPTIONAL ATTACHMENTS AND DEVICES

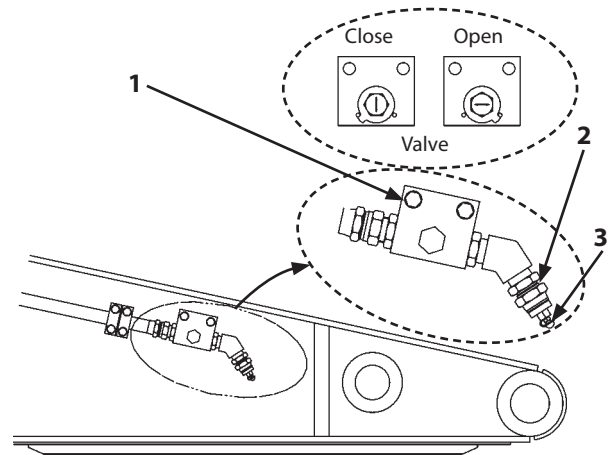
HYDRAULIC BREAKER

Select a breaker that is the correct size and weight for your machine. See your authorized dealer for correct breaker information.

Carefully study the operation manuals of the machine and breaker, and perform the required checks and/or inspection before connecting the breaker to the arm.

IMPORTANT: Precautions for connecting breaker piping.

- Do not allow impurities to enter into the system when switching the breaker with the bucket.
- Before attaching the hydraulic breaker, be sure to loosen air breather plug (3), located on the top of cap assembly (2), to release internal pressure and to drain the trapped hydraulic oil. Then, remove cap assembly (2). Install the breather fitting and the breaker rubber hose before opening valve (1).
- When the breaker is not used, apply the cover to the pipe opening on the arm top and install the plug into the hose end of the breaker to prevent impurities from entering the system. Be sure to provide spare covers and plugs in the tool box so that they will be available when needed.
- After connecting, check the connecting seal fitting for oil leakage, and pipe clamp bolts for looseness.

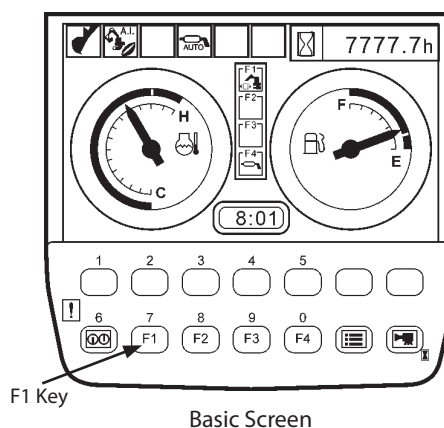


M1J1-13-001

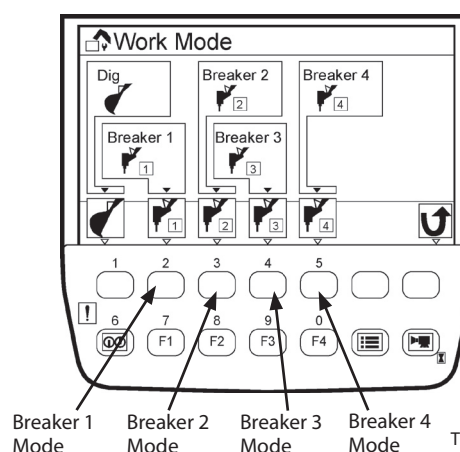
OPTIONAL ATTACHMENTS AND DEVICES

WORK MODE

1. When the basic screen displays, push key F1 and display the work mode screen.
2. Push the key located under an attachment mark to be used in order to select the attachment.
 - Digging Mode
 - Breaker 1 Mode
 - Breaker 2 Mode
 - Breaker 3 Mode
 - Breaker 4 Mode



M1J1-01-002



T1J7-02-01-002E

	Work Mode	Description
	Digging Mode	Designed for general digging and truck loading.
	Breaker 1 Mode ※1 (Initial Setting Flow Rate 230L/min)	Select this mode switch when using FURUKAWA HB40G.
	Breaker 2 Mode ※1 (Initial Setting Flow Rate 260L/min)	Select this mode switch when using NPK E-235 or OKADA OUB 324 respectively.
	Breaker 3 Mode ※1 (Initial Setting Flow Rate 300L/min)	Select this mode switch when using FURUKAWA F70.
	Breaker 4 Mode ※1 (Initial Setting Flow Rate 320L/min)	Select this mode switch when using FURUKAWA HB50G.

※1. When using hydraulic crusher, select the breaker mode 1, 2, 3 or 4 when the flow rate of the crusher corresponds to the breaker mode 1, 2, 3, or 4.

As for the machine equipped with the flow combined piping, when the flow combining valve is set to two pump combined, flow rate becomes the flow rate of selected breaker mode + pump 1.

When using hydraulic breaker or crusher, if required setting flow rate is insufficient, see your nearest authorized dealer for correct information.

NOTE: The manufacturer of the hydraulic breaker may change the hydraulic breaker specifications without giving notice. Contact your nearest Hitachi dealer for any questionable points.

OPTIONAL ATTACHMENTS AND DEVICES

BREAKER OPERATION

The breaker can be operated using attachment pedal (1) located on the right front of the seat, as illustrated.

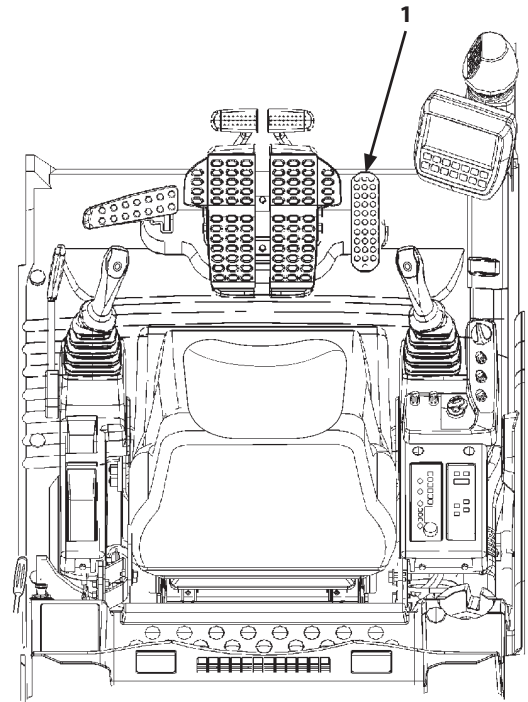
WARNING: Be sure to lock attachment pedal (1) with pedal lock (2) when the attachment pedal is not in use.

IMPORTANT: Before operating the hydraulic breaker, be sure to select the breaker mode using work mode key. Failure to do so, damage to hydraulic components and/or the hydraulic breaker may result.

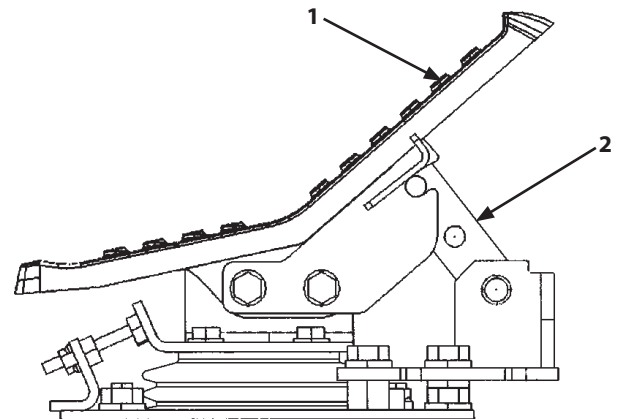
Select hydraulic oil flow rate breaker mode key to the proper position depending on the mode of hydraulic breaker employed.

IMPORTANT: Using a hydraulic breaker in an improper breaker mode may cause the pump to supply excessive oil flow, possibly resulting in damage to the hydraulic components on the excavator and/or the hydraulic breaker.

Flow Rate by Breaker Mode
Breaker 1 Mode: 230 L/min
Breaker 2 Mode: 260 L/min
Breaker 3 Mode: 300 L/min
Breaker 4 Mode: 320 L/min



M1J1-01-026



Locked Attachment Pedal

M1J1-13-002

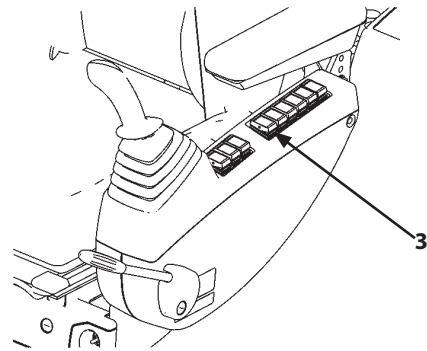
OPTIONAL ATTACHMENTS AND DEVICES

IMPORTANT: Turn the boom mode switch (3) [OFF] when operating a hydraulic breaker. If the boom mode switch (3) is turned [ON], boom-lowering force is reduced so that the designed hydraulic breaker power cannot be sufficiently utilized.

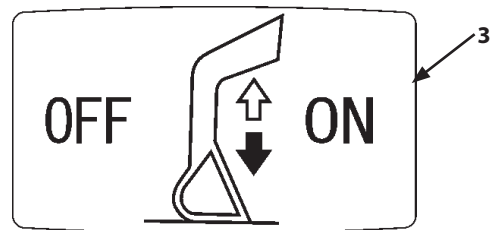
1. Select the proper hydraulic breaker mode on work mode screen (6) depending on the necessary oil flow rate of hydraulic breaker employed. Refer to the “work mode” section on page 13-2 for work mode setting procedures.
2. Move pedal lock (2) forward to unlock attachment pedal (1).
3. Push down on attachment pedal (1) to operate the breaker.

⚠ WARNING: If stopper bolt (5) does not contact to bracket (4), the attachment pedal falls backward and the hydraulic oil flows backward. Damage to the hydraulic breaker may result.

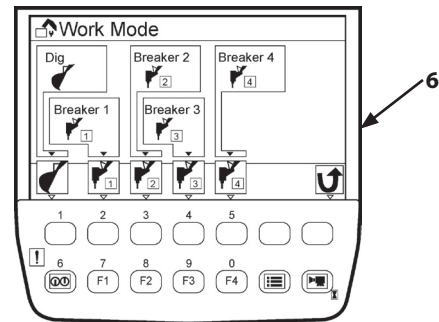
4. Remove foot from attachment pedal (1) to stop the breaker.
5. Always keep attachment pedal (1) locked with pedal lock (2) when the attachment pedal is not in use.



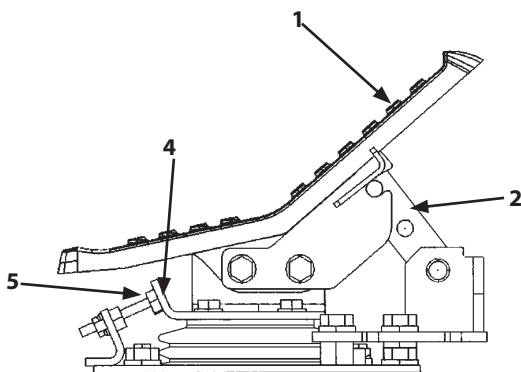
M1J1-03-001



M1J1-01-020

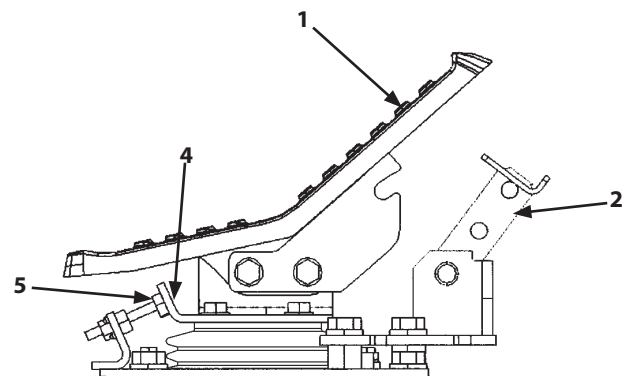


T1J7-02-01-002E



Locked Attachment pedal

M1J1-13-002



Unlocked Attachment pedal

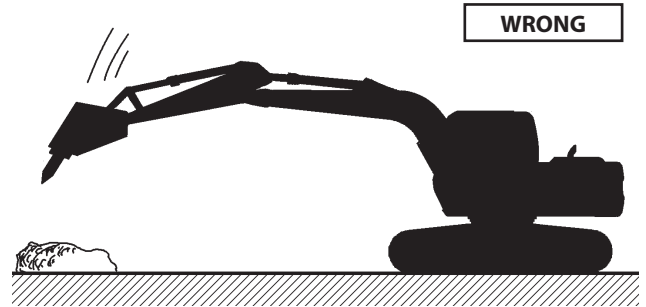
M1J1-13-003

OPTIONAL ATTACHMENTS AND DEVICES

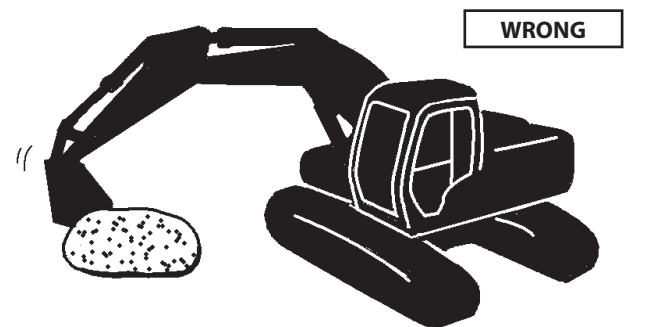
PRECAUTIONS FOR BREAKER OPERATION

WARNING: Machine stability is reduced as the breaker is much heavier than the bucket. When using a breaker, the machine is more apt to tip over. Also, flying objects may hit the cab or other part of the machine. Observe the following precautions and take any other precautions necessary to prevent accidents and machine damage from occurring.

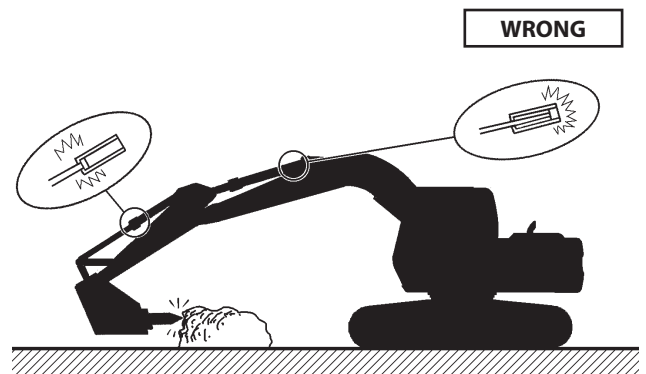
- Avoid hitting objects with breaker. The breaker is heavier than the bucket, causing the breaker to lower faster. Take care not to hit any objects with breaker. Doing so will result in damage to the breaker, the front attachment, and/or the upperstructure. Always move (lower) the breaker slowly to position the tip of the chisel on the object to be broken before starting breaker operation.
- Do not use the breaker and/or the swing function to move objects. Damage to the boom, arm, and/or breaker may result.
- To prevent cylinder/machine damage, do not operate the breaker with the hydraulic cylinder rod fully retracted or fully extended.
- Stop operation if breaker hydraulic hoses jump abnormally. Change in breaker accumulator pressure or a damaged accumulator will cause abnormal hose jumping and may cause breaker and/or machine damage. Immediately contact your authorized dealer if this happens.



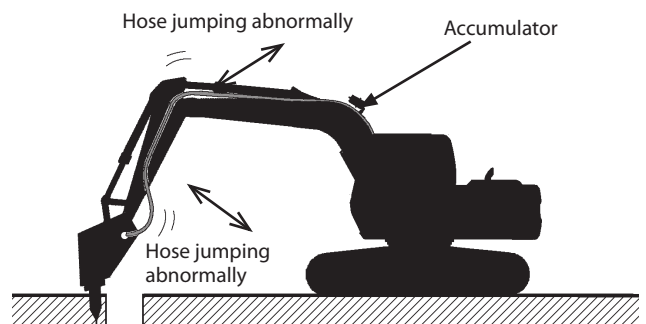
M104-05-055



M104-05-056



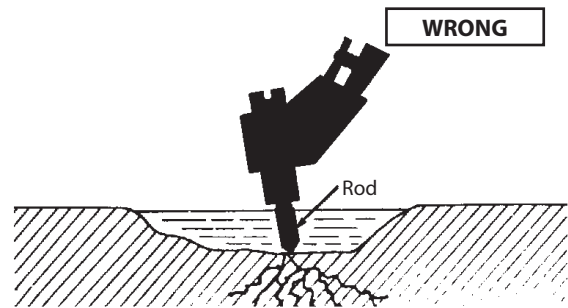
M104-05-057



M104-05-056

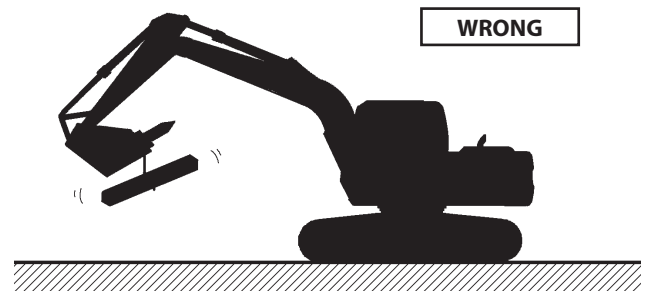
OPTIONAL ATTACHMENTS AND DEVICES

- Do not operate the breaker in water. Doing so will cause rust and seal damage, resulting in damage to the hydraulic system components.



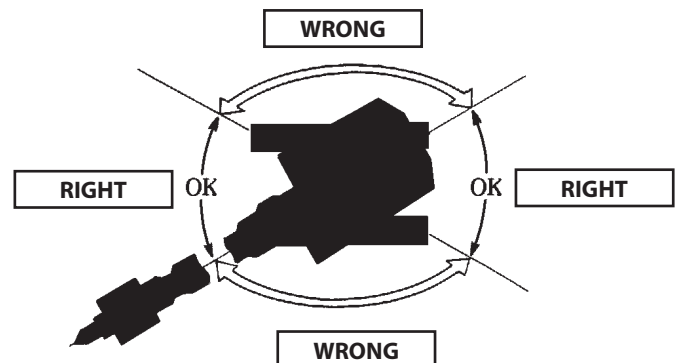
M104-05-059

- Do not use breaker for lifting operation. The machine tipping over and/or breaker damage may result.



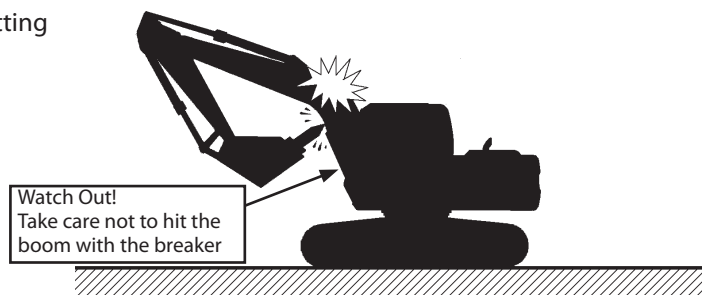
M104-05-060

- Do not operate the breaker to the side of the machine. The machine may become unstable and undercarriage component life may shorten as a result from operating the breaker to the side of the machine.



M104-05-061

- Operate the hydraulic excavator carefully to avoid hitting the boom.



M104-05-062

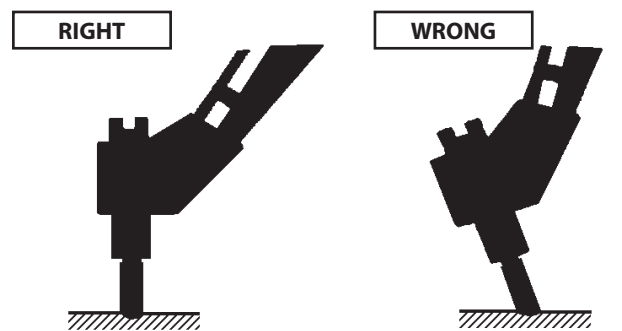
OPTIONAL ATTACHMENTS AND DEVICES

- Do not operate breaker with the arm positioned vertically. Excessive vibration to the arm cylinder will occur, causing oil leakage.



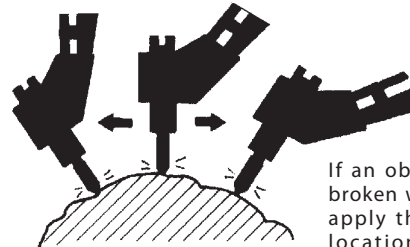
M147-05-013

- Press the breaker so that the chisel (the axis) is positioned and thrust perpendicular to the object.



M147-05-014

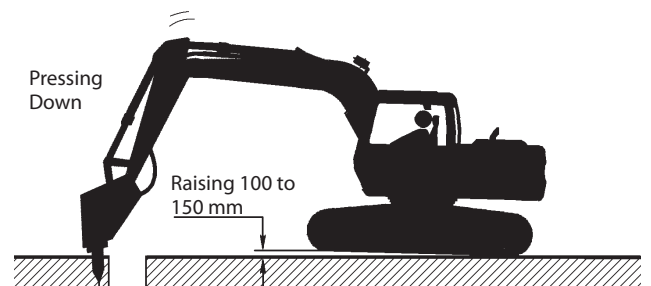
- Do not operate the breaker continuously longer than one minute. Excessive chisel wear will result. If an object could not be broken within one minute, apply the chisel to other locations, less than one minute for each location.



If an object could not be broken within one minute, apply the chisel to other locations, less than one minute for each location.

M147-05-015

- Raising the front part of the undercarriage by pressing down the breaker may cause damage to the front attachment. Although raising the front edge of the undercarriage up to 150 mm (6 in) is tolerable, do not practice this method more than necessary. Never raise the front edge of the undercarriage higher than 150 mm (6 in) by pressing the breaker down.



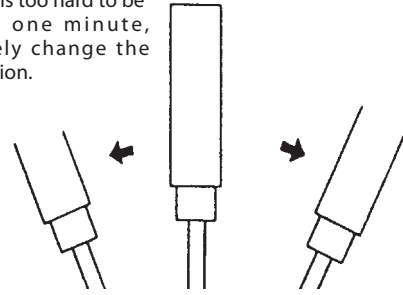
M147-05-016

OPTIONAL ATTACHMENTS AND DEVICES

- **Do not hit one place for longer than one minute.**

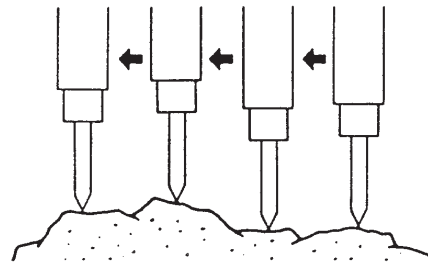
If the hydraulic breaker is allowed to hit one place for a long time, oil pressure may increase and accumulator damage may result. If a material is too hard to be broken in one minute, immediately change the hitting location. Try to hit a breakable edge first to make the work more efficient.

If a material is too hard to be broken in one minute, immediately change the hitting location.



M116-05-011

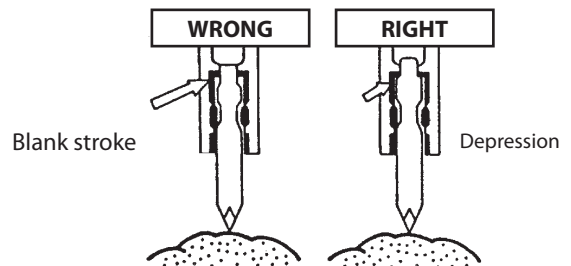
Break from an edge side.



M116-05-005

- **Avoid blank strokes of the chisel.**

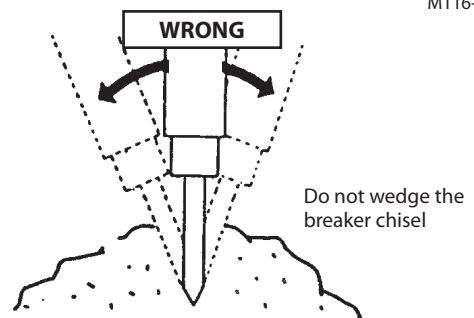
After depressing a material with the hydraulic breaker weight, start hitting. Blank strokes of the chisel may cause overheating of oil and damage to the accumulator.



M116-05-006

- **Do not wedge the breaker chisel into material.**

If the breaker chisel is used to wedge material, wear and damage to the chisel and wear bushing may result.

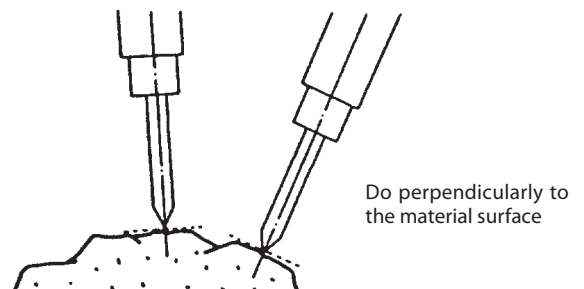


Do not wedge the breaker chisel

M116-05-007

- **Hit perpendicularly to the material surface.**

Unless the material surface is hit perpendicularly with the chisel, the bolts and chisel may be broken.



M116-05-008

OPTIONAL ATTACHMENTS AND DEVICES

BREAKER MAINTENANCE

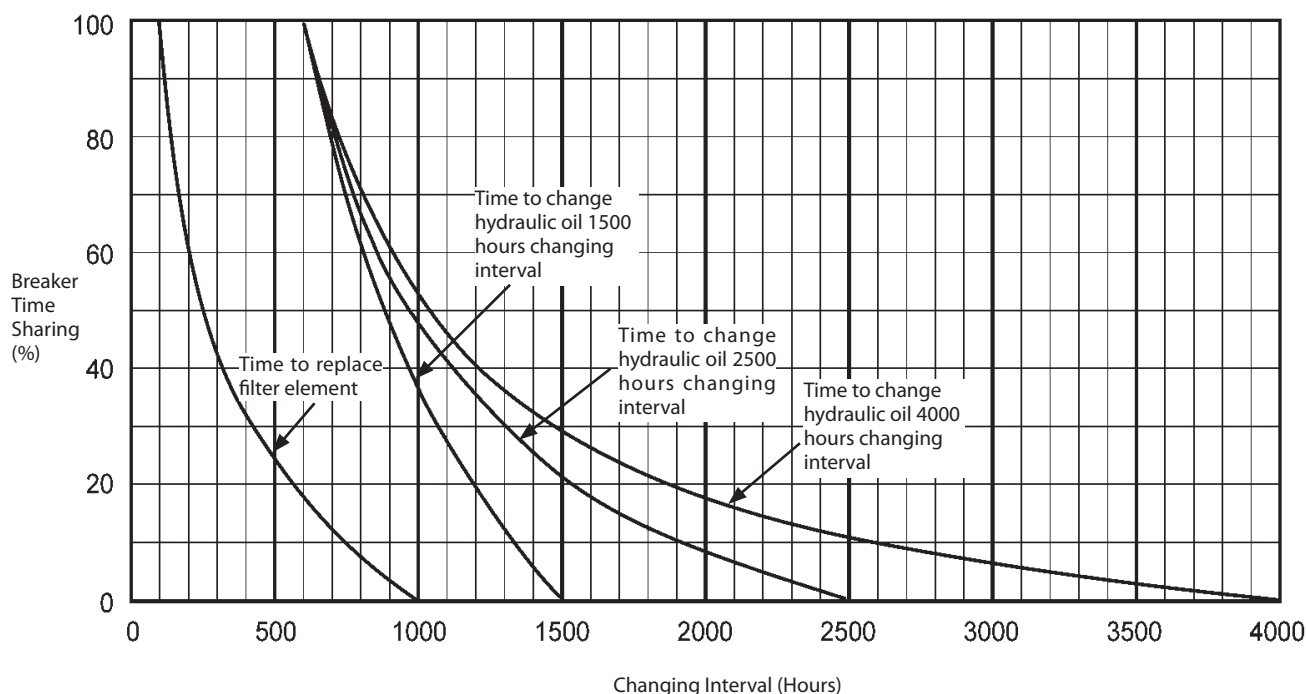
Change Hydraulic Oil and Replace Hydraulic Oil Tank Filter

Hydraulic breaker operation subjects the hydraulic system to become contaminated faster and to deteriorate the hydraulic oil quickly. For this reason, hydraulic oil must be changed and the hydraulic oil tank filter must be replaced more often than the machine attached with a bucket. Failure to do so may result in damage to the breaker, hydraulic oil pump, and other hydraulic system components. Recommended changing intervals are shown below. (For filter replacement and oil changing procedures, refer to the "Hydraulic System" in the "MAINTENANCE" Section.)

Changing Interval (hours)

	Machine with Hydraulic Breaker	Machine with Ordinary Bucket
Hydraulic Oil	600*	1500 or 2500 or 4000
Filter Element	100*	1000

NOTE: *The above figures are for 100% breaker time share. When the breaker time share is less, changing intervals can be extended as shown in the diagram below. Be sure to replace elements when breaker has been operated for 100 hours continuously.



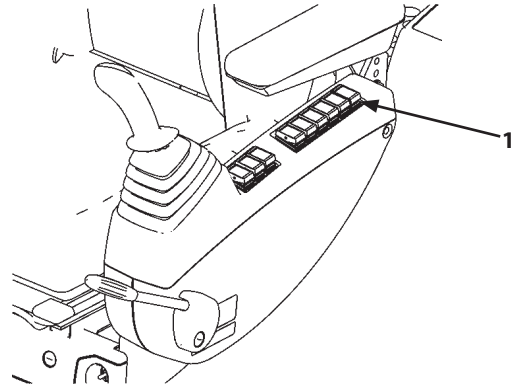
M1J1-13-011

OPTIONAL ATTACHMENTS AND DEVICES

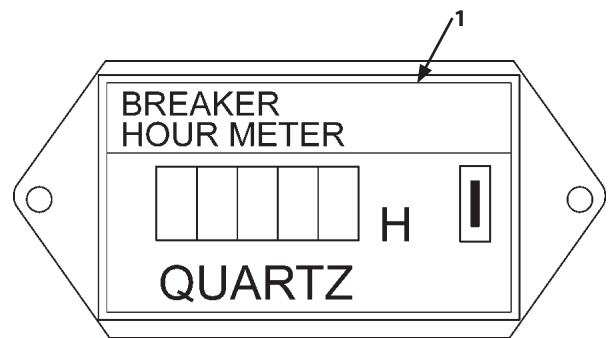
Breaker hour meter (1) is located in the operator's cab on the right control panel. This hour meter (1) operates when the breaker pedal is depressed. Obtain the average breaker operation ratio according to the following formula.

Average breaker operation ratio (%) = Breaker operation hours/Excavator operation hours = (Present breaker hour meter reading – Breaker hour meter reading when the breaker was previously removed)/(Present hour meter reading – hour meter reading when the breaker was previously removed)

In case the machine is fully engaged in breaker operation (breaker operation ratio:100%), perform the maintenance of hydraulic oil, the full flow filter element, and the breaker return filter based on the reading of the breaker hour meter.



M1J1-03-001



Breaker Hour Meter

M1J1-13-008

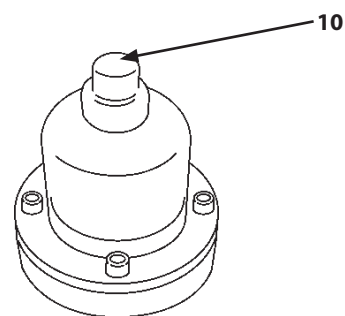
$$\text{Average breaker operation ratio (\%)} = \frac{\text{Excavator operation hours}}{\text{Breaker operation hours}} = \frac{(\text{Present breaker hour meter reading} - \text{breaker hour meter reading when the breaker was previously removed})}{(\text{Present breaker hour meter reading} - \text{breaker hour meter reading when the breaker was previously removed})}$$

OPTIONAL ATTACHMENTS AND DEVICES

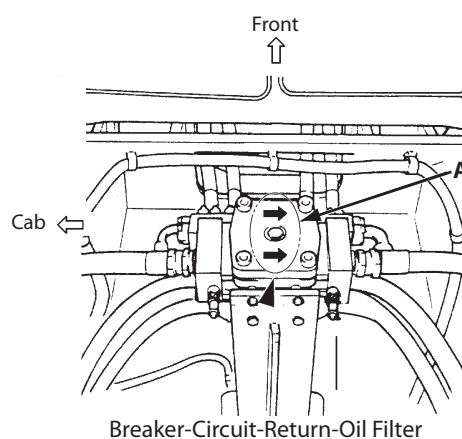
REPLACE BREAKER CIRCUIT RETURN OIL FILTER

⚠ WARNING: Hydraulic oil may be hot. Wait for oil to cool before starting work.

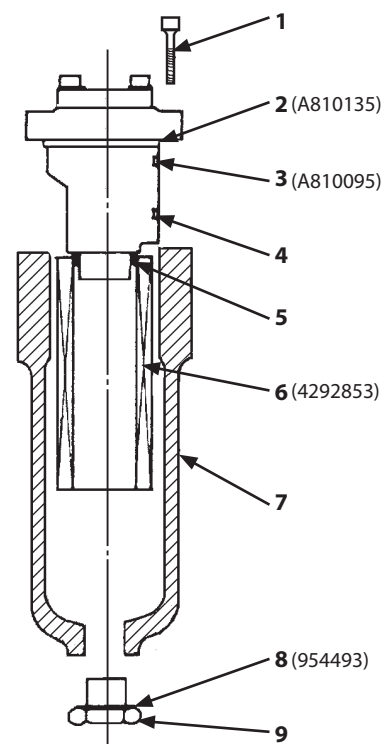
1. Park the machine on a level surface.
Lower the breaker to the ground.
2. Leave the machine for a while after stopping operation.
After the oil temperature is cooled, push air bleed valve (10) to bleed air from the hydraulic oil tank.
3. Loosen drain plug (9) to drain hydraulic oil from filter case (7).
4. Remove bolts (1) to remove cover assembly (4).
5. Remove element (6).
Inspect the element (6) for metal debris to help in early detection of failures.
6. Install a new element.
7. Inspect O-rings (2), (3), (5) and (8) for any damage.
Replace damaged O-rings.
8. Confirm that O-rings (2) and (3) are securely in the grooves.
Install cover assembly (4) so that arrows (A) on the cover point left, as shown in the figure.
9. Tighten drain plug (9).
Tightening Torque: 44 N•m (4.5 kgf•m, 32.5 lbf•ft)
10. Tighten bolts (1).
Tightening Torque: 127 to 147 N•m
(13 to 15 kgf•m, 94 to 108 lbf•ft)



M1J1-07-006



M111-05-009



M111-05-011

OPTIONAL ATTACHMENTS AND DEVICES

HYDRAULIC CRUSHER

Machine stability, applicable hydraulic oil pressure and oil quantity for crusher, etc. must be examined when selecting a crusher.

Be sure to consult your authorized dealer when selecting a crusher.

For operational instructions, refer to the crusher instruction manual.

Operation

The crusher can be operated using attachment pedal (1) located on the right front of the seat, as illustrated.

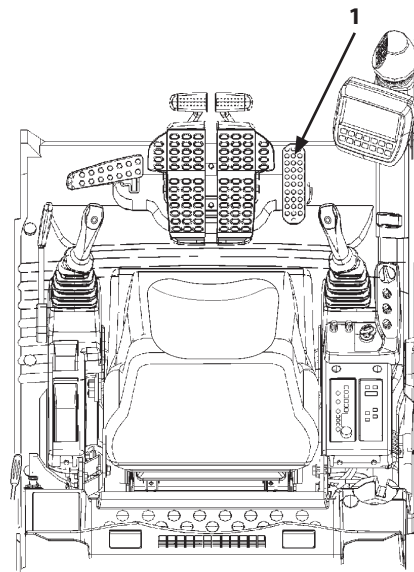
WARNING: Be sure to lock attachment pedal (1) with pedal lock (2) when the attachment pedal is not in use.

When operating a hydraulic crusher, do not step on attachment pedal (1) rearward. Damage to the hydraulic crusher may result.

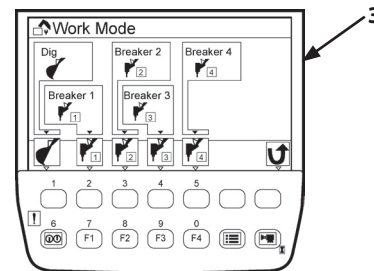
1. Select the proper hydraulic breaker mode on work mode screen (3) depending on the necessary oil flow rate of hydraulic crusher employed. Refer to the "work mode" section on page 13-2 for work mode setting procedures.
2. Move pedal lock (2) forward to unlock attachment pedal (1).

Note that if the attachment mode is selected, open/close speed of the crusher may become slow.

3. Push down on attachment pedal (1) either forward or backward to open or close the crusher.
4. Remove foot from attachment pedal (1) to stop the crusher.
5. Always keep attachment pedal (1) locked with pedal lock (2) when attachment pedal (1) is not in use.

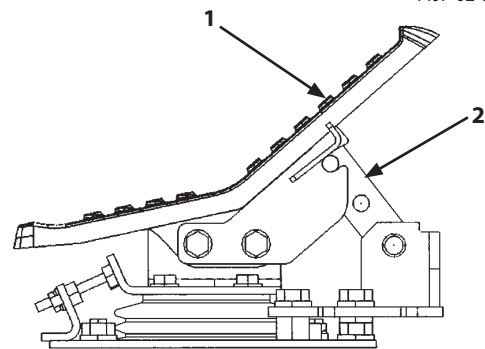


M1J1-01-026



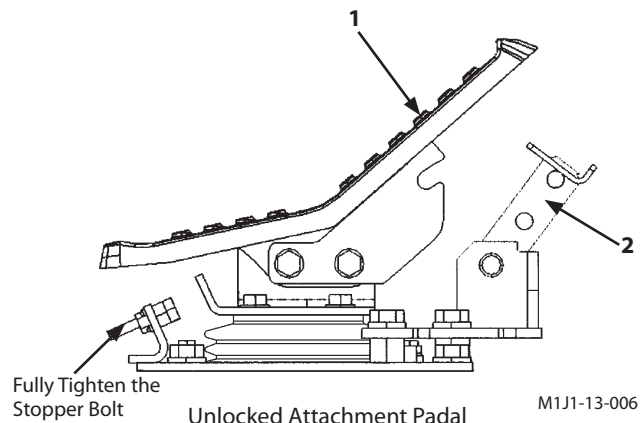
Work Mode Screen

T1J7-02-01-002E



Locked Attachment Pedal

M1J1-13-002



Unlocked Attachment Pedal

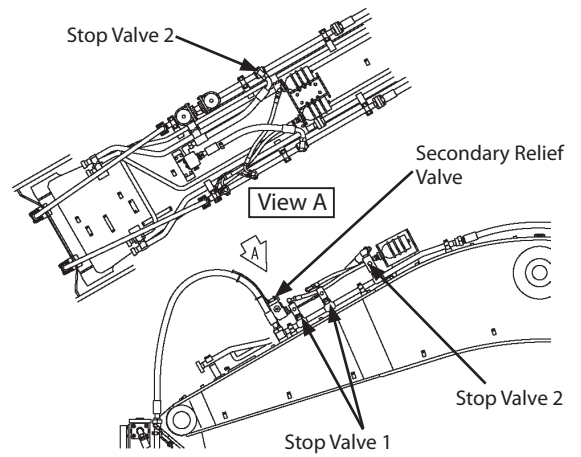
M1J1-13-006

OPTIONAL ATTACHMENTS AND DEVICES

STOP VALVE OPERATION

The stop valves are connected to pipes routed on the boom. Stop valves 2 illustrated to the right are provided in only the kit including the secondary relief valve.

- When using a hydraulic breaker, turn the stop valves to the positions as illustrated to the right.
- When using a hydraulic crusher, turn the stop valves to the positions as illustrated to the right. After using the hydraulic crusher, be sure to turn the stop valves back to the breaker operation positions.



M1J1-13-009

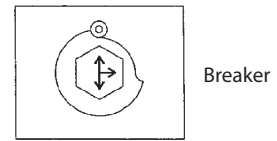
	Breaker	Crasher
Stop Valve 1		
Stop Valve 2		

M16J-12-025

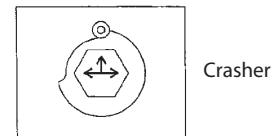
OPTIONAL ATTACHMENTS AND DEVICES

THREE-WAY-VALVE OPERATION (Machines equipped with the piping common to hydraulic breaker and crusher operation)

- Turn the three-way-valve to the position as shown in the upper right illustration when using a hydraulic breaker to allow the return oil to flow back to the line filter.
- Turn the three-way-valve to the position as shown in the lower right illustration when using a hydraulic crusher. After using a hydraulic crusher, be sure to turn the three-way-valve back to the hydraulic breaker position (as shown in the upper right illustration).

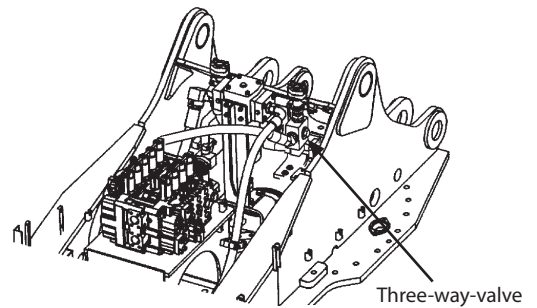


Breaker



Crasher

M16J-12-005



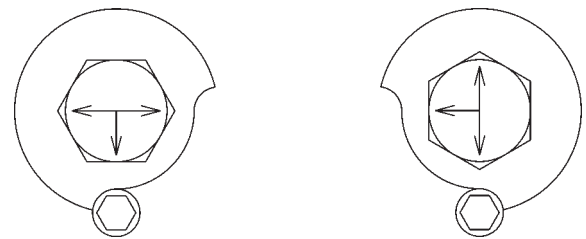
Three-way-valve

M1J7-13-001

FLOW COMBINING VALVE OPERATION

The flow combining valve is located under the front outside of the pump chamber.

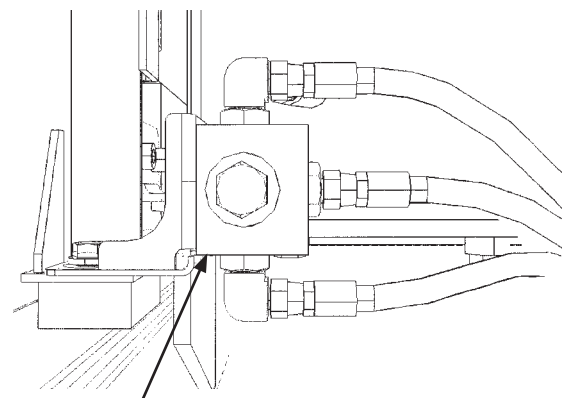
- Turn the flow combining valve to the position as shown in the left- right illustration when using a hydraulic breaker/ crusher so that the oil flows from the 2 pumps are not combined.
- Turn the flow combining valve to the position as shown in the right-right illustration when combining the oil flows from the 2 pumps for increasing the flow rate. When the oil flows from the 2 pumps are not combined, be sure to turn the flow combining valve back to the hydraulic breaker/crusher position (as shown in the left- right illustration).



Hydraulic Breaker/Crusher Position

2 Pump Combined Position

M1J1-13-010



Flow Combining Valve

M1J1-13-007

OPTIONAL ATTACHMENTS AND DEVICES

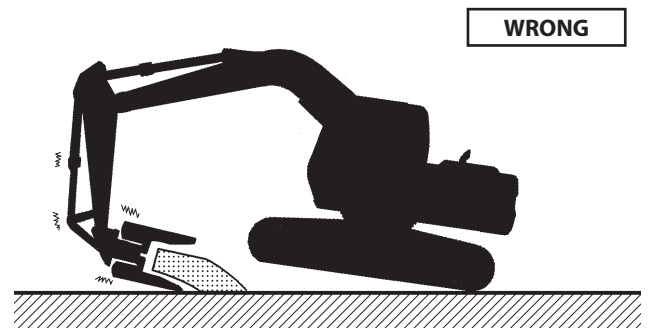
PRECAUTIONS FOR CRUSHER OPERATION

Prevent machine tipping over and damage to the front attachment. Observe the following precautions for crusher operation.

⚠ WARNING: Machine stability is reduced as crusher is much heavier than bucket.

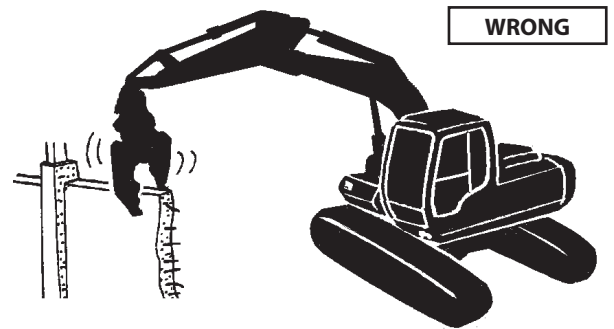
When operating with a crusher, the machine is more apt to tip over. Also, falling or flying objects may hit the cab or other part of the machine. Observe the following precautions and take any other precautions necessary to prevent accidents and machine damage from occurring.

- Do not allow the machine's weight to be supported by the crusher or bucket cylinder with the bucket cylinder fully extended or retracted. Doing so may damage the front attachment. In particular, avoid doing so with the bucket cylinder fully extended, as the front attachment will be easily damaged. Take care to prevent this from happening when dismantling foundation structures using the crusher.



M107-05-046

- Do not attempt to perform crushing on either side of the machine. Always perform crushing operations to the fore or rear, parallel with the tracks. Otherwise, tipping over may occur.



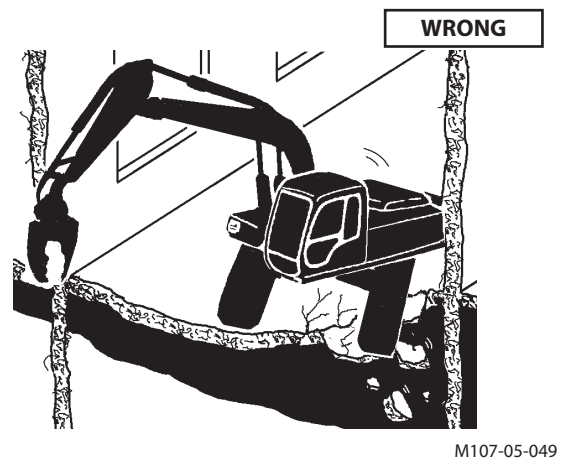
M107-05-047

OPTIONAL ATTACHMENTS AND DEVICES

- When operating the crusher up high with the boom fully raised, be careful of falling objects.



- When operating the crusher on a floor in a building, first confirm that the floor has sufficient strength to support the load caused by crushing, in addition to the machine weight.
- Always operate the crusher on a stable, level surface, not on a slope or on crushed scraps.
- Do not use the crusher to haul or load crushed scraps.
- If a multiple number of attachments, such as crusher and bucket, or crusher and breaker, are used, replacing them with each other at intervals, impurities are more apt to enter the hydraulic system and the hydraulic oil deteriorates quickly. For this reason, replace the hydraulic oil tank filter and change the hydraulic oil at the intervals specified in the breaker time sharing diagram in the previous section. Read the breaker time sharing diagram supposing that time sharing percentage of attachment (s) other than the crusher is that of the breaker.
- Always remove the crusher from the excavator before transporting the machine. Do not fully extend the bucket cylinder when transporting, as this may damage the front attachment, when vibrations arise during transportation.



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