PART No. EM18E – EN1 –1

Operator's Manual

EX1200-5C
Excavator

Serial No. 002001 and up

HITACHI

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 standard specification machine can be operated under the following conditions without being modified.
Atmospheric Temperature: -20°C to 50°C (-4°F to 122°F)
Altitude: 0 m to 2000 m (0 ft to 6600 ft)

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

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

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

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

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

Prior to operating this machine in a country other than a country of its intended use, it may be necessary to make modifications to it so that it complies with the local standards (including safety standards) and requirements of that particular country. Please do not operate this machine outside of the country of its intended use until such compliance has been confirmed. Please contact Hitachi Construction Machinery Co., Ltd. or any of our authorized distributor or dealer if you have any questions concerning compliance.

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

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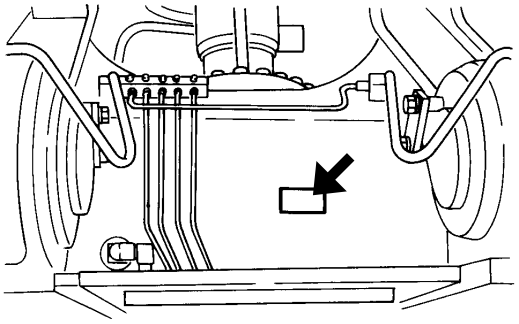
MACHINE NUMBERS

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

MACHINE

MODEL/TYPE:_____

PRODUCT
IDENTIFICATION
NUMBER:_____



M142-12-001

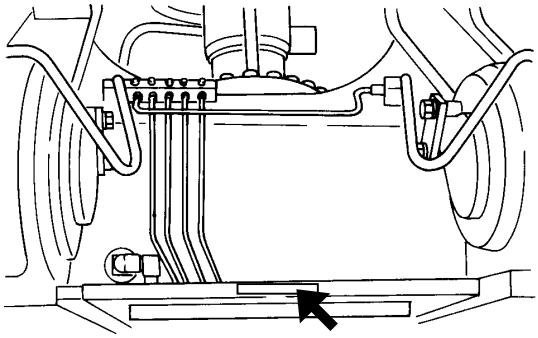
PRODUCT IDENTIFICATION NUMBER

PRODUCT
IDENTIFICATION
NUMBER:_____

NOTE:

HCM18E00000002001 — Marks to indicate the start and end of the PIN

PRODUCT IDENTIFICATION NUMBER (PIN)



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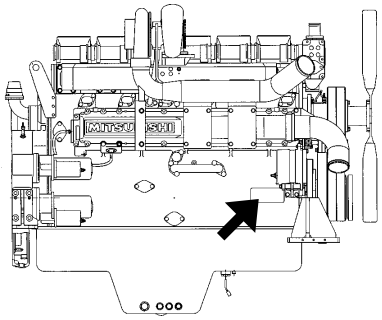
ENGINE

TYPE:_____

MFG. NO.: _____

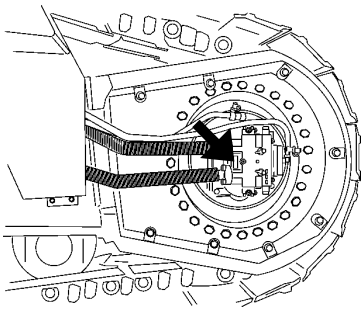


M183-12-002

TRAVEL MOTOR

TYPE:_____

MFG. NO.:_____



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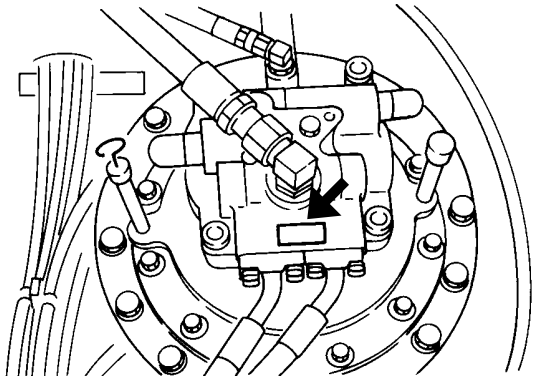
MACHINE NUMBERS

SWING MOTOR

TYPE:_____

MFG. NO.:_____

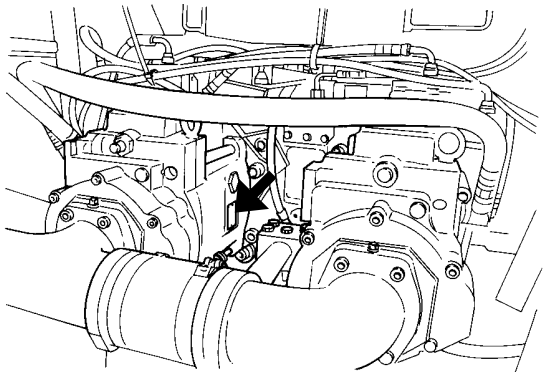


M142-12-003

HYDRAULIC PUMP

TYPE:_____

MFG. NO.:_____

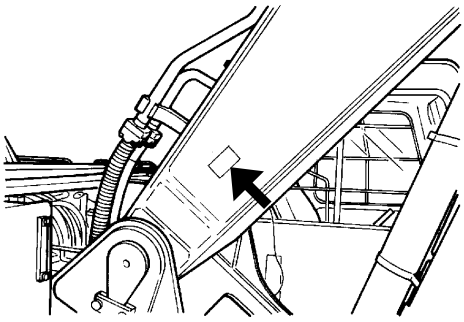


M142-12-004

BOOM

TYPE:_____

MFG. NO.:_____

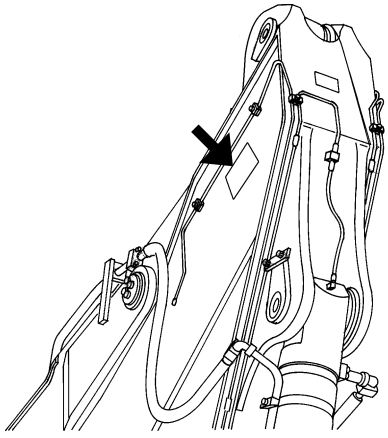


M111-12-005

ARM

TYPE:_____

MFG. NO.:_____

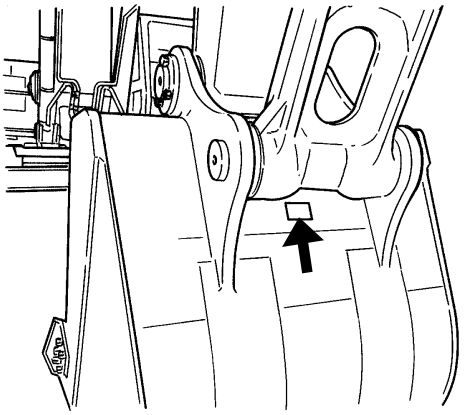


M17V-00-005

BUCKET

TYPE:_____

MFG. NO.:_____



M116-12-004

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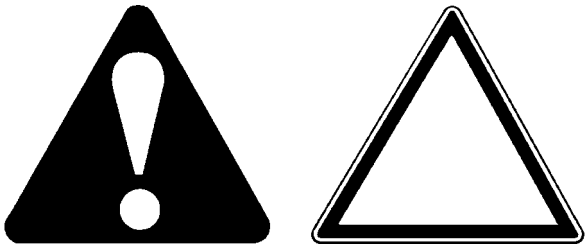
RECOGNIZE SAFETY INFORMATION

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



SA-688

001-E01A-0001

UNDERSTAND SIGNAL WORDS

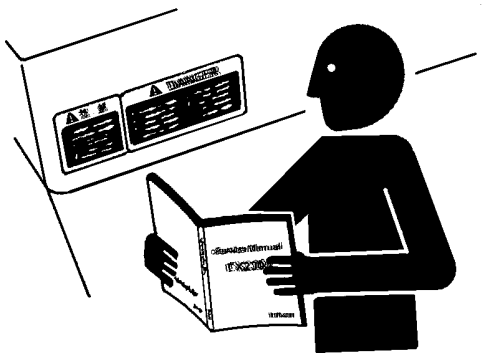
- On machine safety signs, signal words designating the degree or level of hazard - DANGER, WARNING, or CAUTION - are used with the safety alert symbol.
  - **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
  - **WARNING** indicates 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.

SA-1223

- **CAUTION** also calls attention to safety messages in this manual.
- 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

FOLLOW SAFETY INSTRUCTIONS



SA-003

- 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.
- 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

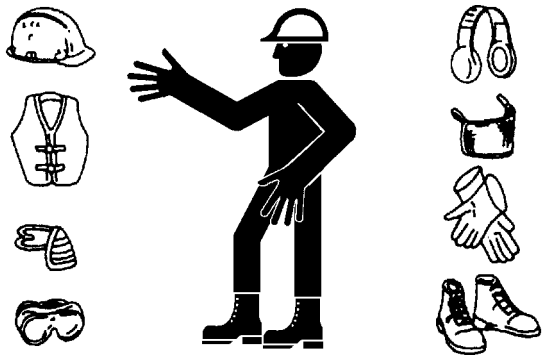
PREPARE FOR EMERGENCIES

SA-437

- Be prepared if a fire starts or if an accident occurs.
  - Keep a first aid kit and fire extinguisher on hand.
  - Thoroughly read and understand the label attached on the fire extinguisher 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

WEAR PROTECTIVE CLOTHING



SA-438

- 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.

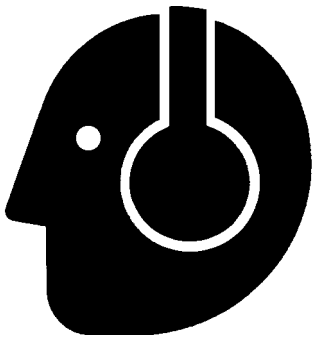
  Be sure to wear the correct equipment and clothing for the job. Do not take any chances.

  - 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

PROTECT AGAINST NOISE



SA-434

- 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

INSPECT MACHINE

SA-435

- 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

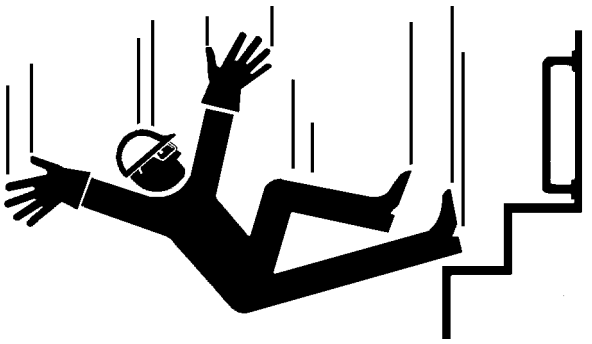
GENERAL PRECAUTIONS FOR CAB

- 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.
- Don't leave parts and/or tools lying around the operator's seat. Store them in their specified locations.
- Avoid storing transparent bottles in the cab. Don't 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.
- Don't leave cigarette lighters in the cab. When the temperature in the cab increases, the lighter may explode.

524-E01A-0000

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 handholds.
  - 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.



SA-439

008-E01A-0439

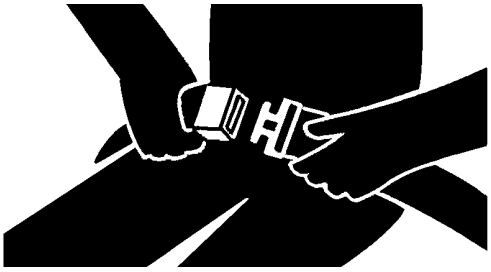
ADJUST THE OPERATOR'S SEAT

- 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.

SA-378

009-E01A-0378

FASTEN YOUR SEAT BELT



SA-237

- 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.

010-E01A-0237

MOVE AND OPERATE MACHINE SAFELY

SA-426

- 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.

011-E01A-0426

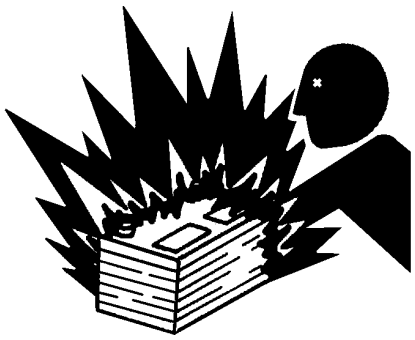
OPERATE ONLY FROM OPERATOR'S SEAT

SA-444

- Inappropriate engine starting procedures may cause the machine to runaway, possibly resulting in serious injury or death.
  - Start the engine only from 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.

012-E01B-0444

JUMP STARTING



SA-032

- 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.
  - 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

KEEP RIDERS OFF MACHINE

SA-379

- Riders on machine are subject to injury such as being struck by foreign objects and being thrown off the machine.
  - Only allow the operator 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-0379

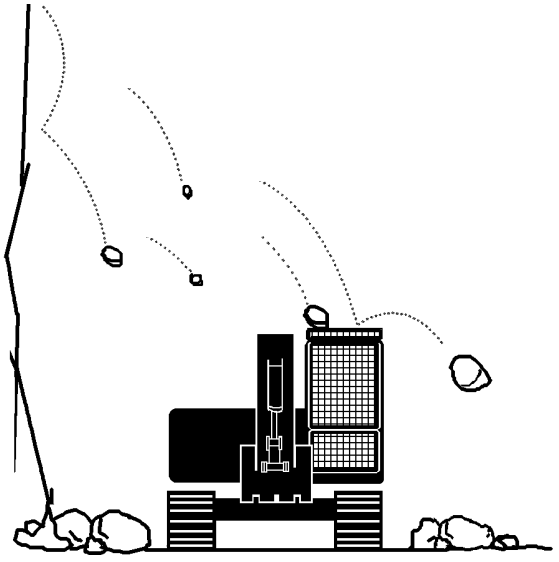
INVESTIGATE JOB SITE BEFOREHAND

SA-380

- 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.

015-E01A-0380

PROTECT AGAINST FALLING STONES AND DEBRIS



SA-490

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

015-E01A-0380

PROVIDE SIGNALS FOR JOBS INVOLVING MULTIPLE NUMBERS OF MACHINES

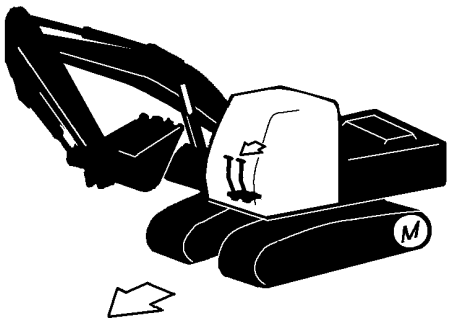
- For jobs involving multiple numbers of machines, provide signals commonly known by all personnel involved. Also, appoint a signal person to coordinate the job site. Make sure that all personnel obey the signal person's directions.

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.

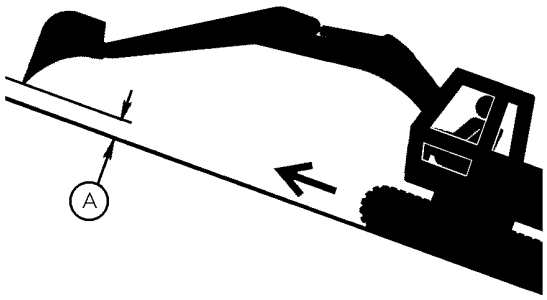


SA-491

017-E01A-0491

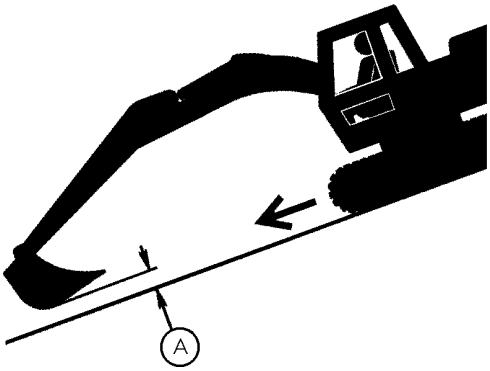
DRIVE MACHINE SAFELY

- 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.

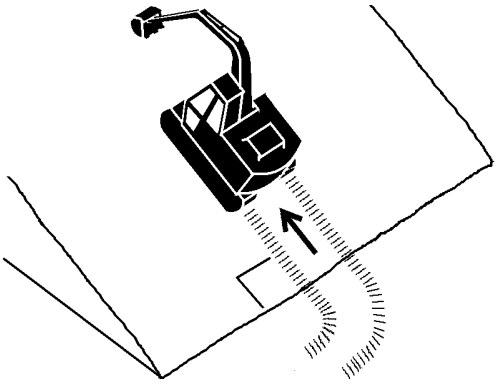


SA-387

- Driving on a slope may cause the machine to slip or overturn, possibly resulting in serious injury or death.
  - 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.

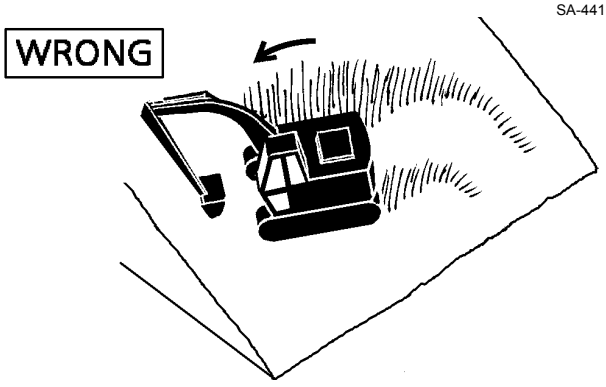


SA-388



SA-441

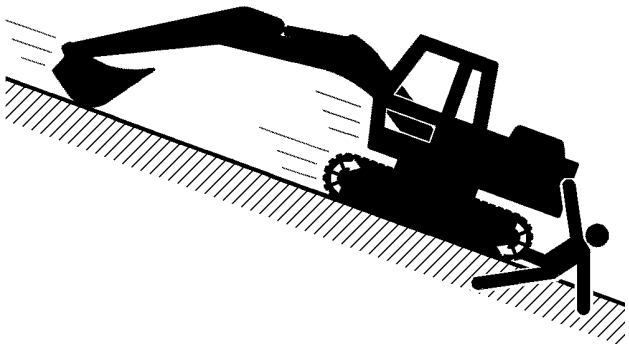
  - Driving across the face of a slope or steering on a slope may cause the machine to skid or turnover. If the direction must be changed, move the machine to level ground, then, change the direction to ensure sage operation.



SA-589

019-E01C-0492

AVOID INJURY FROM ROLLAWAY ACCI-DENTS



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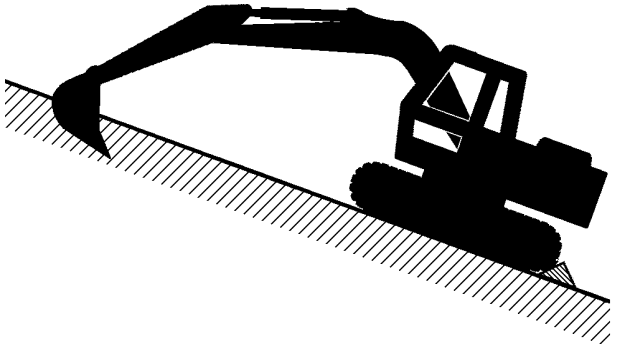


SA-392

- 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.

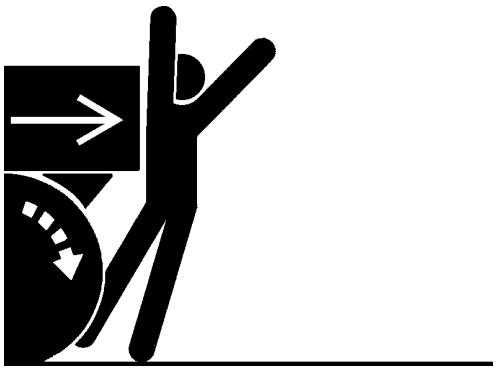
020-E02A-0493

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 BY-STANDERS 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.

021-E01A-0494



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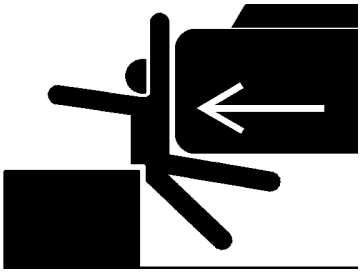
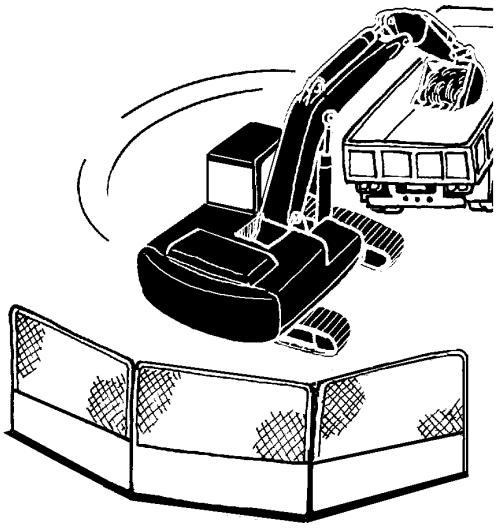


SA-384

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 an other 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.



SA-386

022-E01A-0386

NEVER POSITION BUCKET OVER ANYONE

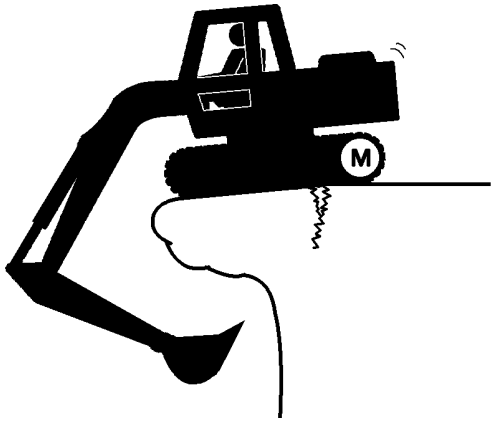
- Never lift, move, or swing bucket above anyone or a truck cab.
  Serious injury or machine damage may result due to bucket load spill or due to collision with the bucket.

SA-487

023-E01A-0487

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.



SA-488

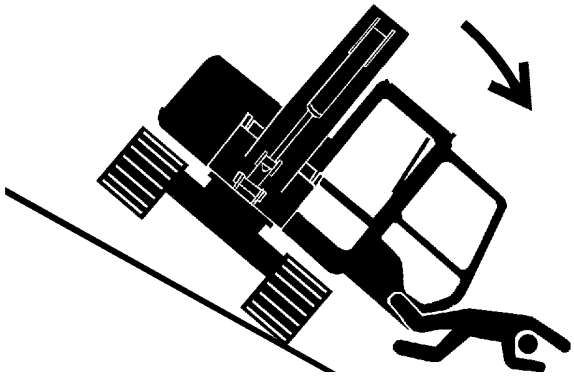
024-E01A-0488

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

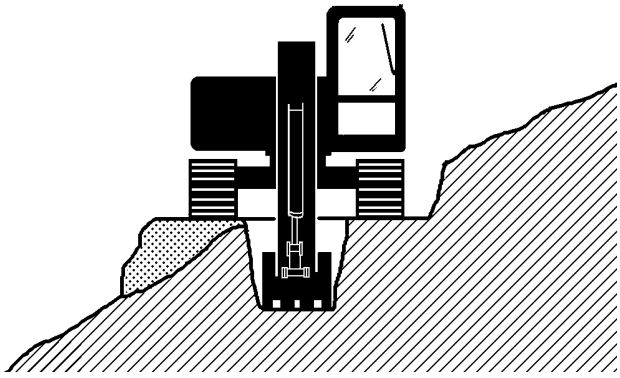


SA-012

- 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.



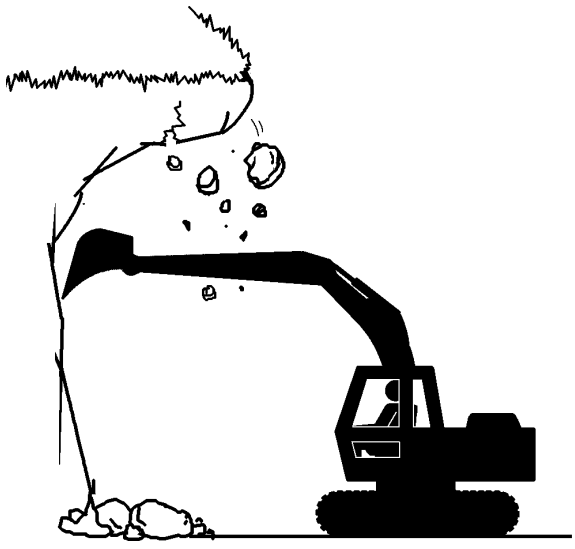
SA-440

- Be careful when working on frozen ground.
  - Temperature increases will cause the ground to become soft and make ground travel unstable.

025-E01B-0495

NEVER UNDERCUT A HIGH BANK

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

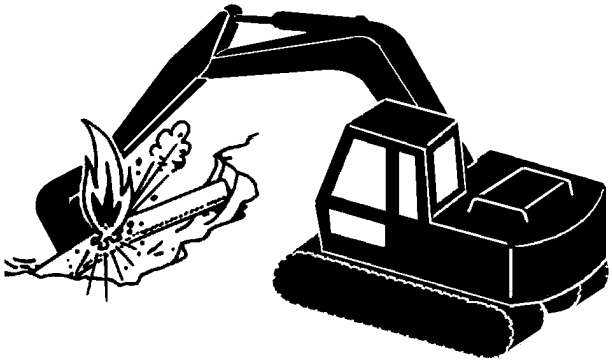


SA-489

026-E01A-0489

DIG WITH CAUTION

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

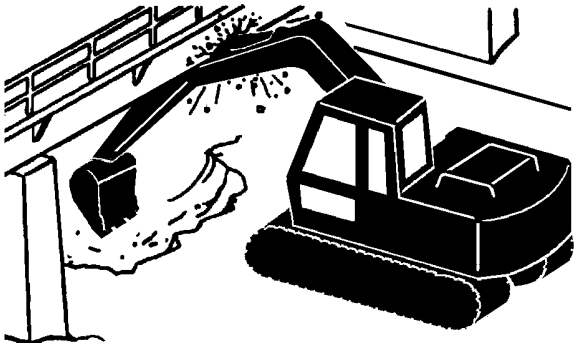


SA-382

027-E01A-0382

OPERATE WITH CAUTION

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

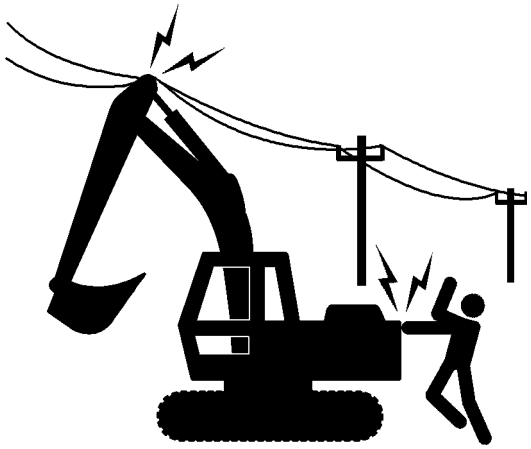


SA-389

028-E01A-0389

AVOID POWER LINES

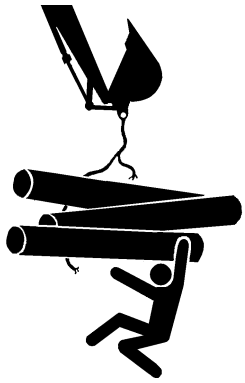
- Serious injury or death can result if the machine or front attachments are not kept a safe distance from electric lines.
  - When operating near an electric line, NEVER move any part of the machine or load closer than 3 m plus twice the line insulator length.
  - Check and comply with any local regulations 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.



SA-381

029-E01A-0381

OBJECT HANDLING

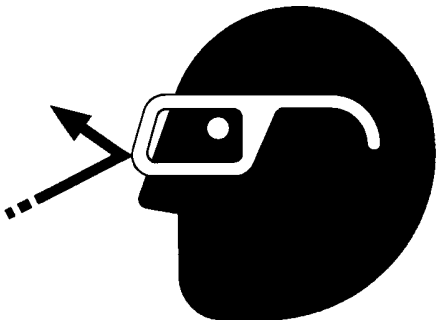


SA-014

- 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, sables, 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 will 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.

030-E01A-0014

PROTECT AGAINST FLYING DEBRIS



SA-432

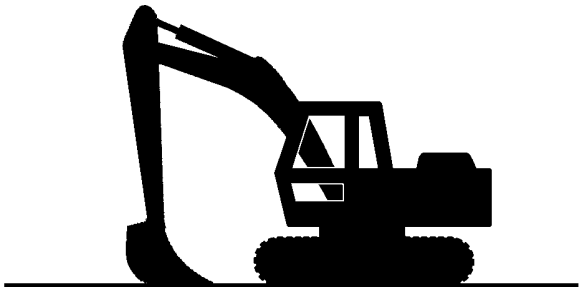
- If flying debris hit eyes or any other part of the body, serious injury may result.
  - Guard against injury from flying pieces of metal or debris; wear goggles or safety glasses.
  - Keep bystanders away from the working area before striking any object.

031-E01A-0432

PARK MACHINE SAFELY

To avoid accidents:

- Park machine on a 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

033-E08B-0390

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.

SA-018

- 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-019

034-E01A-0496

PRACTICE SAFE MAINTENANCE

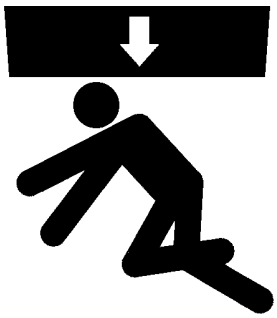
To avoid accidents:

- Understand service procedures before doing 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.

SA-028

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.

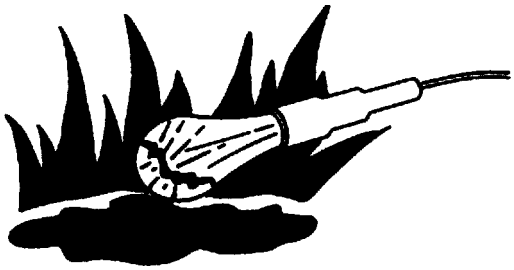


SA-527

- 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 110° angle between the boom and arm. Securely support any machine elements that must be raised for service work.
- Never work under a machine raised by the boom.
- 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-E02B-0497

- 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.

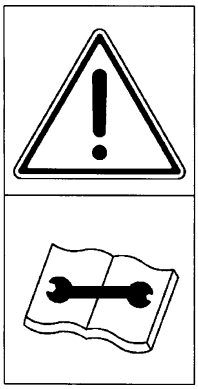


SA-037

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

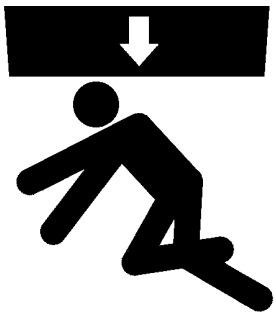


SS2045102

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

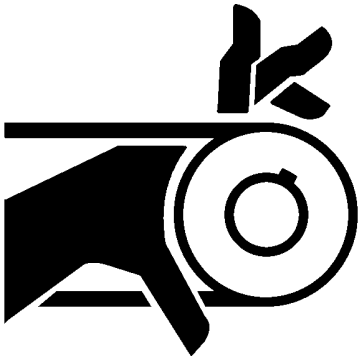


SA-527

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.

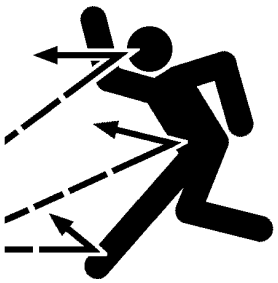
502-E01A-0026



SA-026

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.



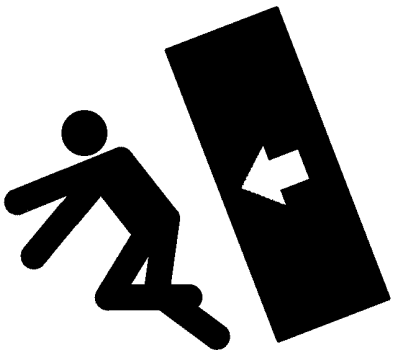
SA-344

- 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.

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.



SA-034

504-E01A-0034

PREVENT BURNS

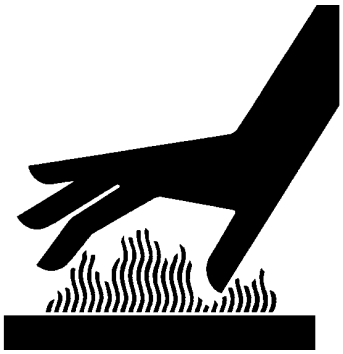
Hot spraying fluids:

- 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.



SA-225

505-E01B-0498

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).

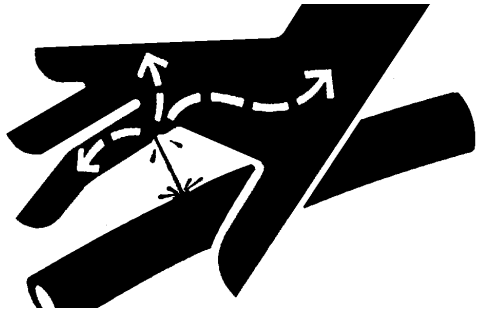
SA-019

- 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.

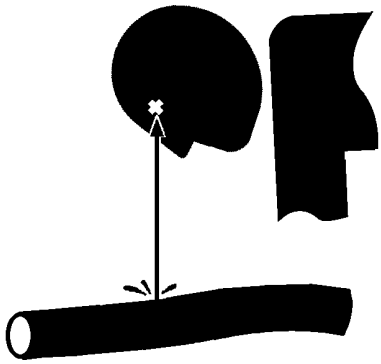
S506-E01A-0019

AVOID HIGH-PRESSURE FLUIDS

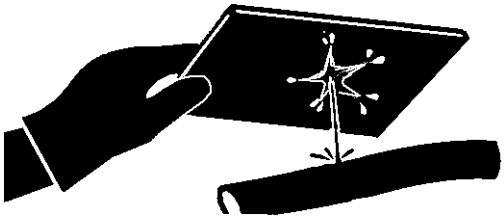
- Fluids such as diesel fuel or hydraulic oil under pressure can penetrate the skin or eyes causing serious injury, blindness or death.
  - Avoid this hazard by relieving pressure before disconnecting hydraulic or other lines.
  - Tighten all connections before applying pressure.
  - Search for leaks 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.



SA-031



SA-292



SA-044

507-E03A-0499

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, oil, antifreeze fluid and window washer fluid, 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 fire breaks out, failure to stop the engine will escalate 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 Emergency Engine Stop Switch:

- If a fire breaks out, failure to release pressurized air inside the hydraulic tank will escalate fire, hampering fire fighting.
  - Check the emergency engine stop switch function every 250 hours:
    1) Start the engine and run it at slow Idle.
    2) Turn the emergency engine stop switch to the EMERG. STOP position.
    3) Confirm that both engines stop and that pressurized air inside the hydraulic oil tank is released (a hissing sound should be heard).
  - If any abnormalities are found, be sure to repair them before operating the machine.

Check Heat Shields:

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

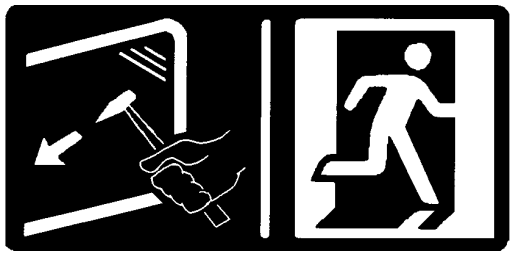
508-E02A-0393

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.

518-E02B-0393

SA-393

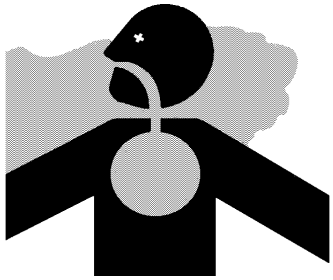


SS-1510

BEWARE OF EXHAUST FUMES

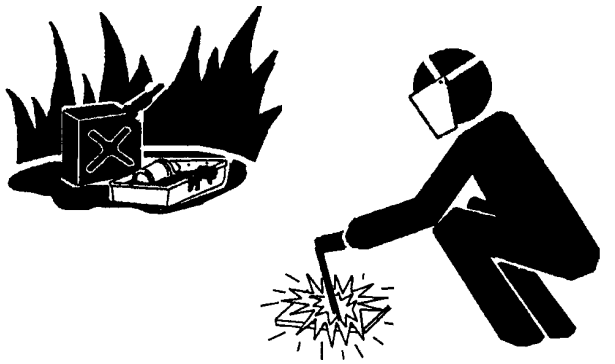
- Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.
  - If you must operate in a building, be sure there is adequate ventilation. Either use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring enough outside air into the area.

509-E01A-0016



SA-016

PRECAUTIONS FOR WELDING AND GRINDING



SA-818

- 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

AVOID HEATING NEAR PRESSURIZED FLUID LINES

SA-030

- 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..

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

SA-029

- Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch. If inhaled, these fumes may cause sickness.
  - 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.

511-E01A-0029

PREVENT BATTERY EXPLOSIONS

SA-032

- Battery gas can explode.
  - Keep sparks, lighted matches, and flame away from the top of battery.
  - Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.
  - Do not charge a frozen battery; it may explode. Warm the battery to 16 °C (60 °F) first.
  - Do not continue to use or charge the battery when 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.

512-E01B-0032

SERVICE AIR CONDITIONING SYSTEM SAFELY

SA-405

- If spilled onto skin, refrigerant may cause a cold contact burn.
  - Refer to the freon container for proper use when servicing the air conditioning system.
  - Use a recovery and recycling system to avoid venting freon into the atmosphere.
  - Never let the freon stream make contact with the skin.

513-E01A-0405

HANDLE CHEMICAL PRODUCTS SAFELY

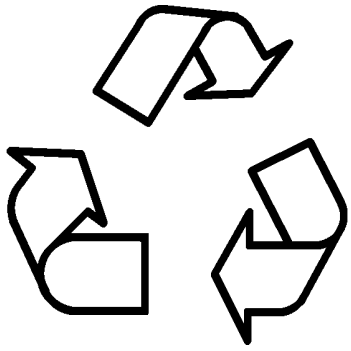
- Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with your machine include such items as lubricants, coolants, paints, and adhesives.
  - A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, 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.

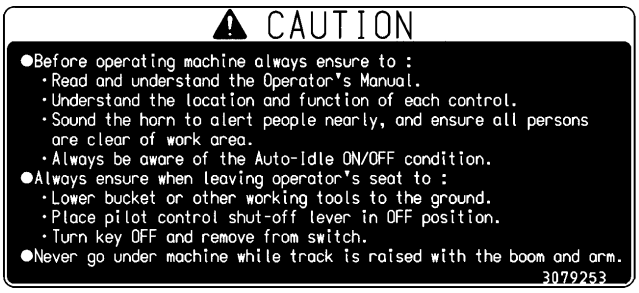


SA-226

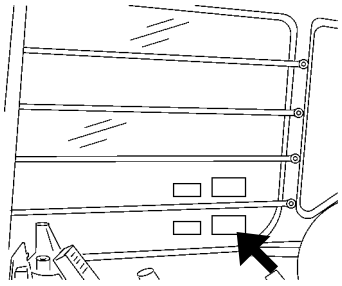
516-E01A-0226

SAFETY SIGNS

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.

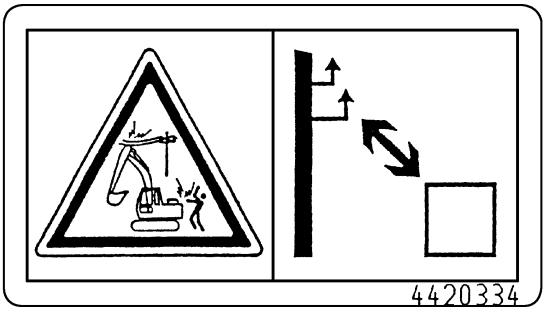


SS-977

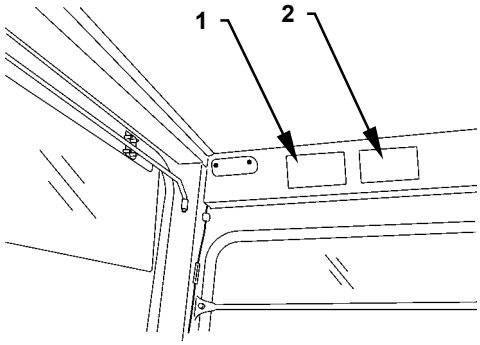


SS-2024

(1)



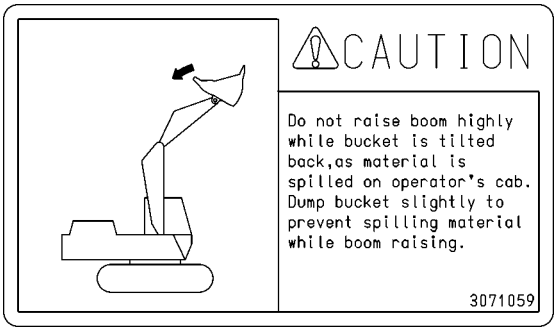
SS-1613



SS-2025

Caution: Electrocution is possible if the machine is operated too close to power lines. Always keep a safe distance from power lines.

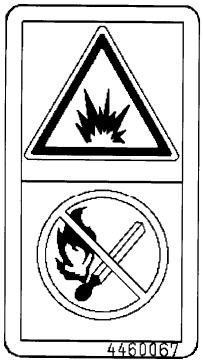
(2)



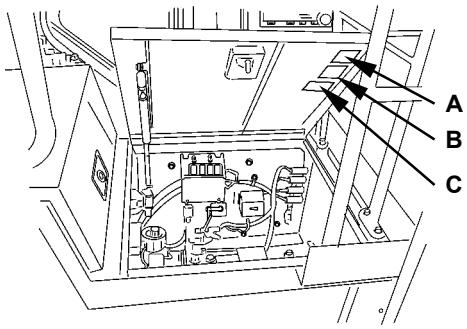
SS3071059

(Loading Shovel)

A



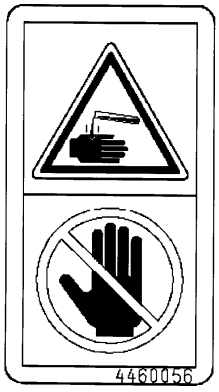
SS4460067



SS-2481

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

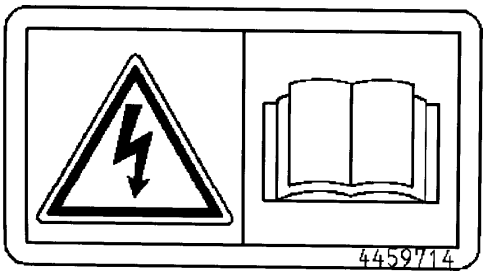
B



SS4460056

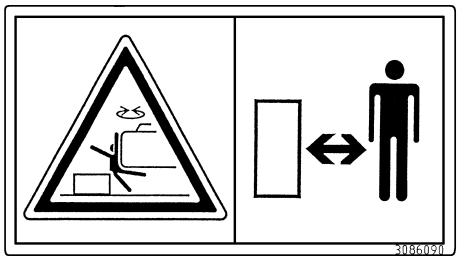
- Skin contact with electrolyte will cause burns. Splashed electrolyte into eyes will cause blindness. Take care not to touch electrolyte.

C



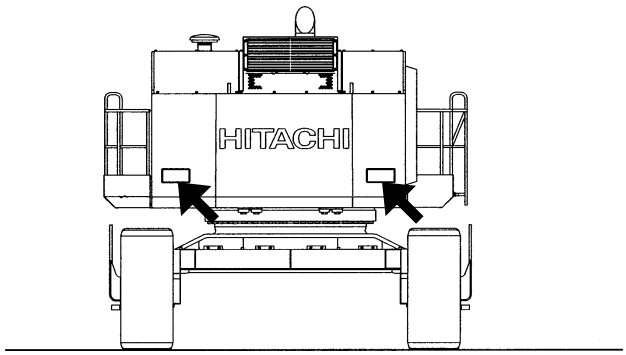
SS4459714

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

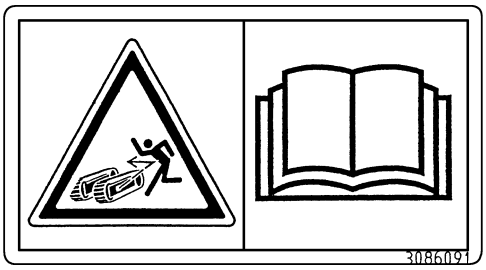


SS-1614

Caution: Personnel in the swing radius may be crushed by the upperstructure when the machine swings. Stand clear of the swing radius.

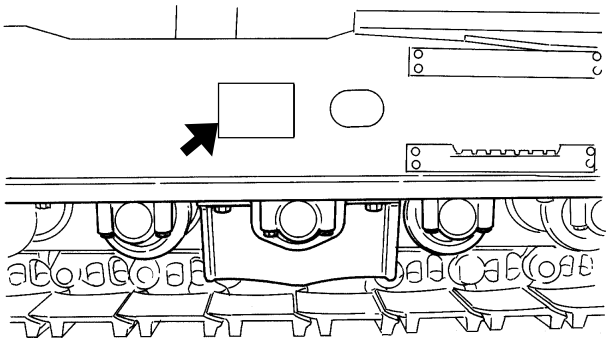


SS-2027



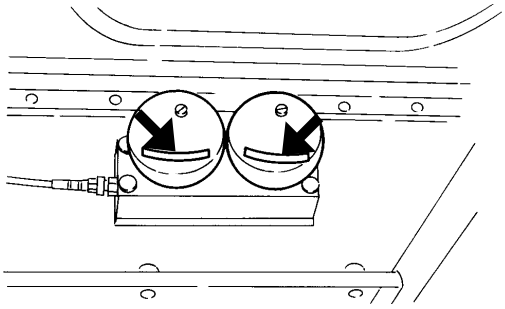
SS-1615

Caution: Serious injury may result if the plug flys off the track adjuster. Read the Operator's Manual before loosening the track, and adjust the track sag following the correct procedure.

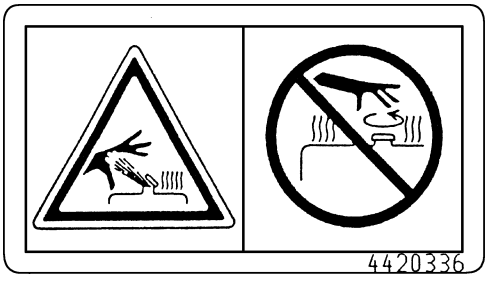


SS-2225

SS-413

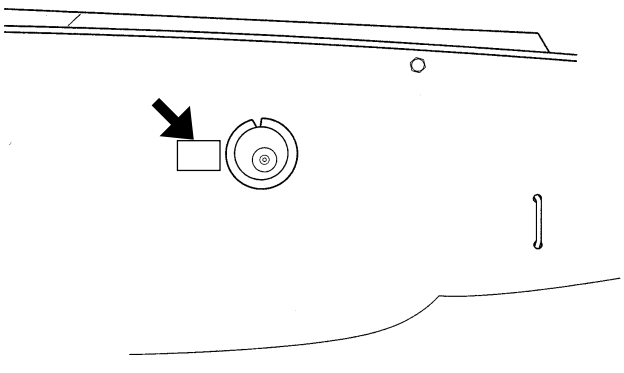


M142-07-109

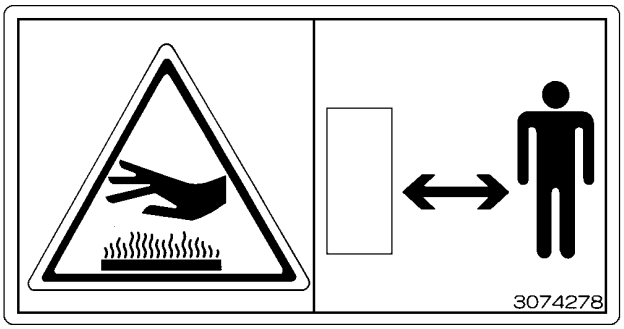


SS-1619

Caution: Hot coolant or oil may spout if the radiator or hydraulic oil cap is removed while the machine temperature is still high, possibly causing a burn. Wait until the machine has cooled to remove the cap.

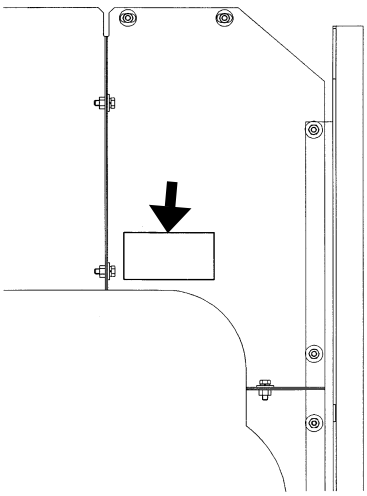


SS-2221



SS-661

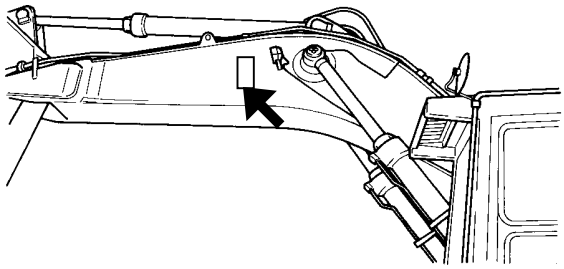
Caution: Possible severe burns. Do not touch the engine components while they are hot.



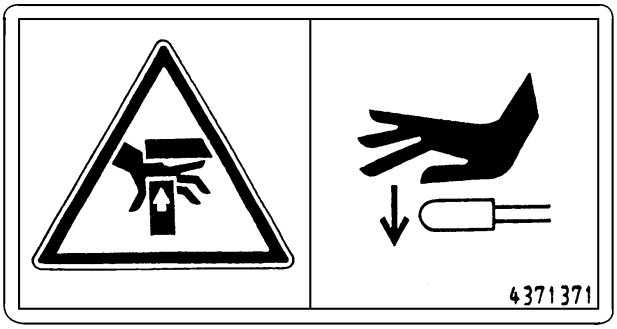
SS-2482

Caution: Stand clear of the equipment. If knocked over by the equipment, serious injury may result.

SS-1620



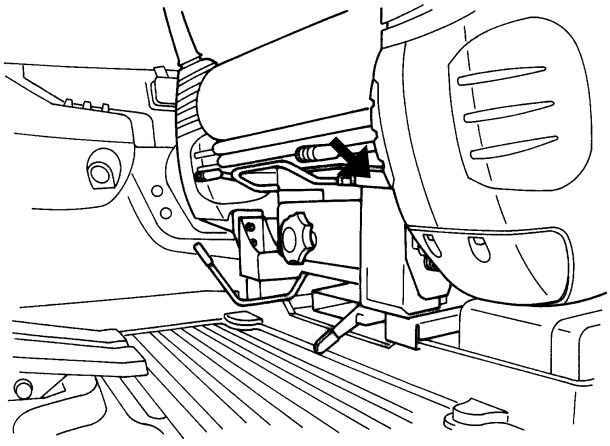
SS-666



SS-955

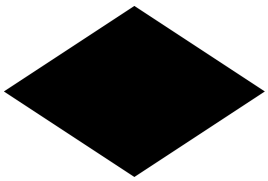
Caution: Possibility of pinched fingers.

Push down with the palm.

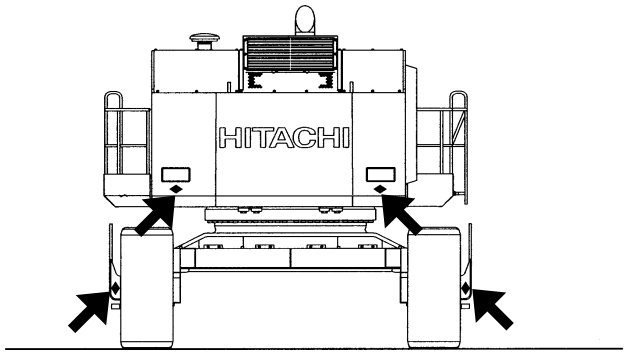


SS-969

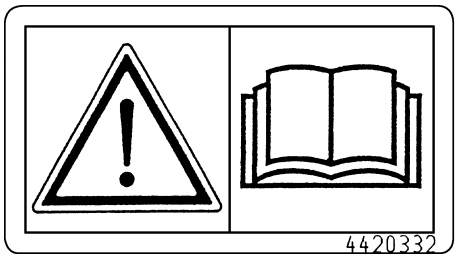
REFLECTOR



SS-1988

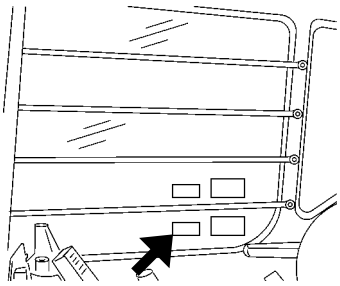


SS-2227

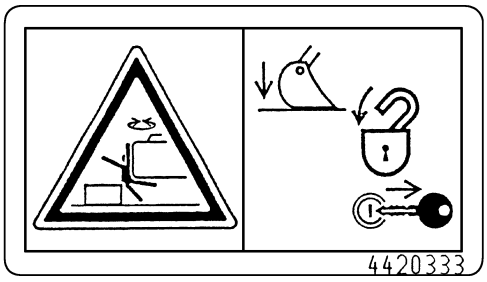


SS-1616

Caution: Always read the Operator's Manual before operating, servicing, disassembling, assembling, and transporting the machine.

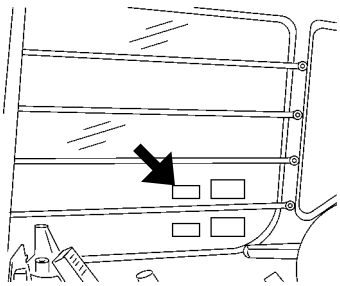


SS-2024



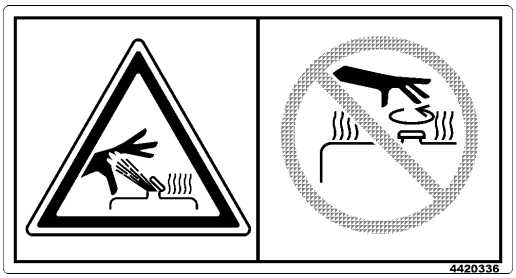
SS-1617

Caution: 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.



SS-2024

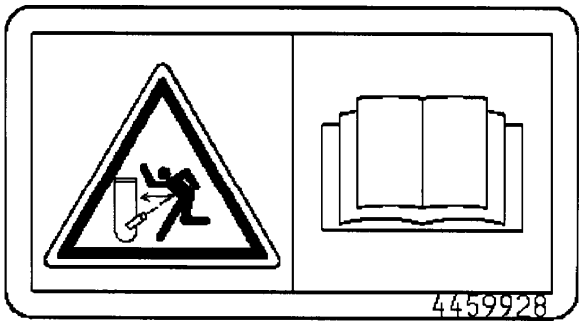
A



SS4420336

- 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.

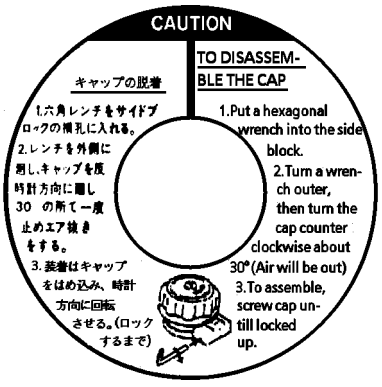
B



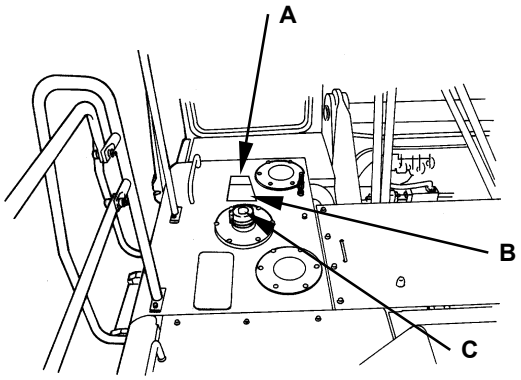
SS-4459928

- Sign indicates a burn hazard from compressed air and spurting hot oil if the oil inlet is uncapped during or right after operation.
  Read manual for safe and proper handign.

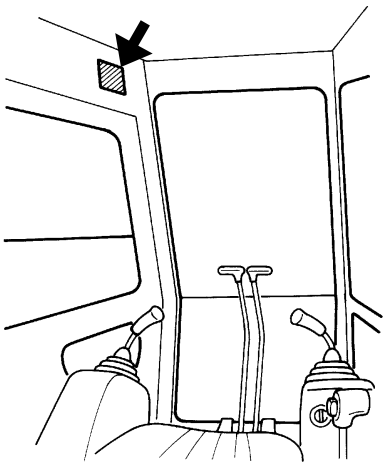
C



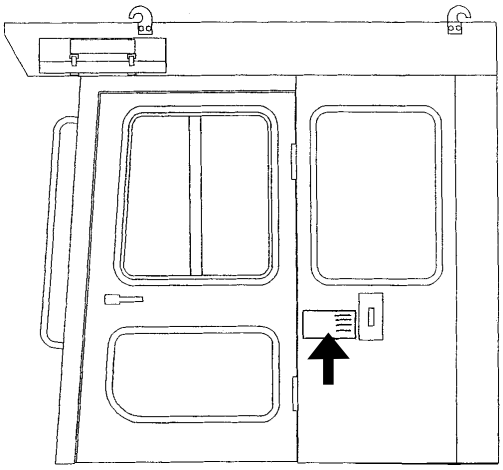
SS-228



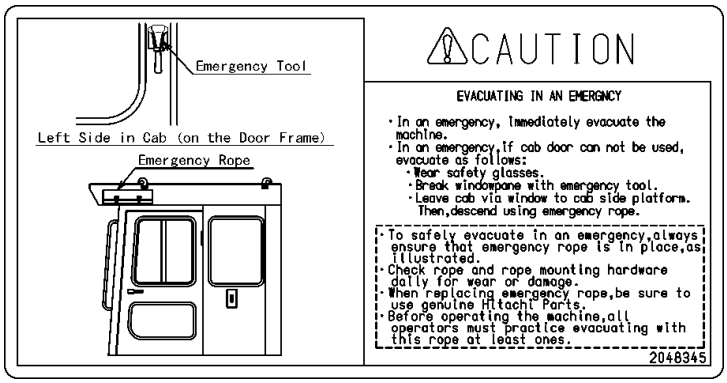
SS-971



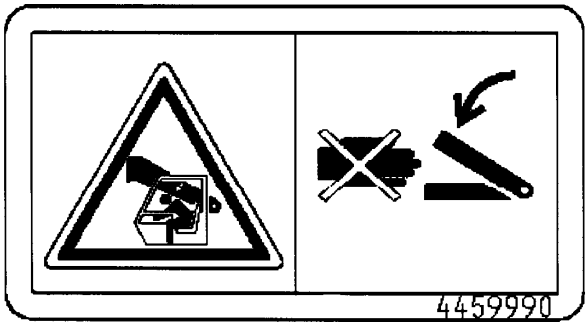
SS-277



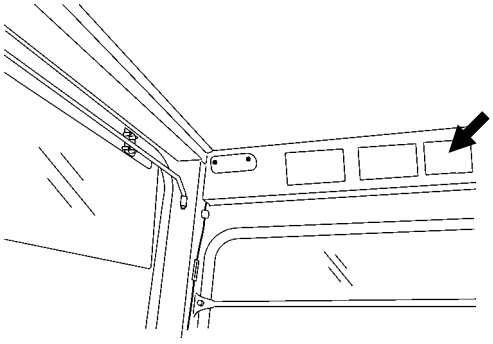
SS-2479



SS2048345



SS4459990



SS-2480

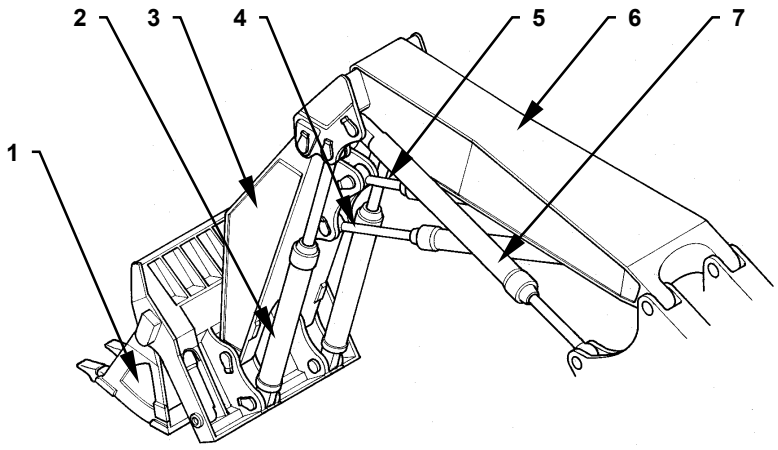
- Don’t extend your hands or head from the window.
  Your hands or head may come in contact with the boom.

MEMO

COMPONENTS NAME

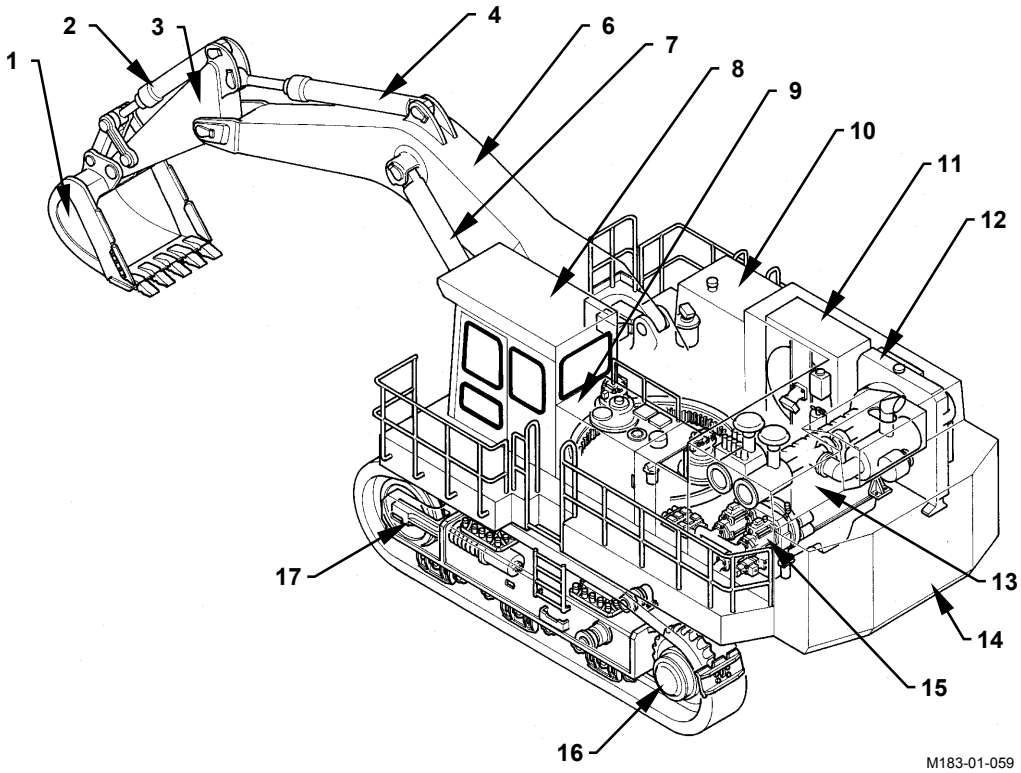
1- Bucket
2- Bucket Cylinder
3- Arm
4- Arm Cylinder
5- Level Cylinder
6- Boom
7- Boom Cylinder
8- Cab
9- Hydraulic Oil Tank
10- Fuel Tank
11- Oil Cooler
12- Radiator
13- Engine
14- Counterweight
15- Pump
16- Travel Device
17- Front Idler

Loading Shovel Front Attachment



M182-01-058

Backhoe Front Attachment



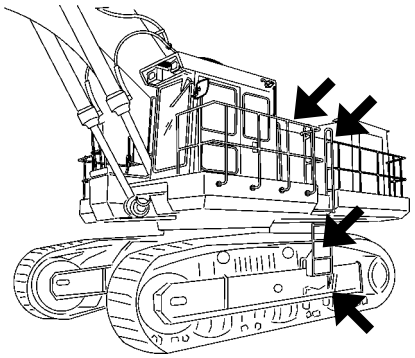
M183-01-059

GETTING ON / OFF THE MACHINE

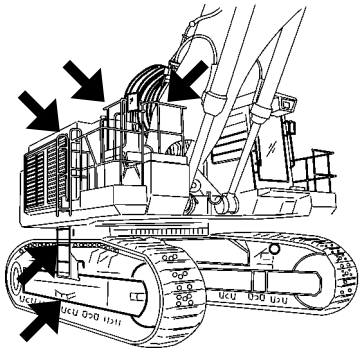
For safety, steps and handrails are provided at various places on the machine. Use them when getting on/off the machine and when inspecting/servicing.

CAUTION:

1. **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.
2. **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.**



M183-01-003



M183-01-004

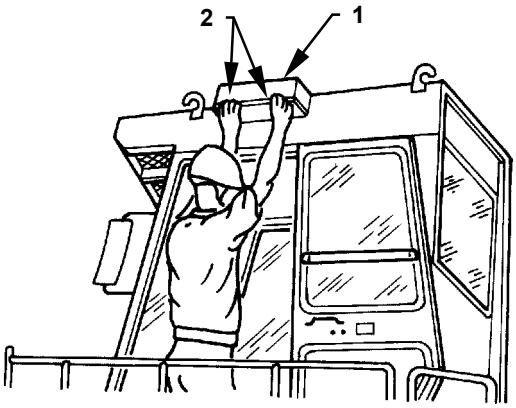
EMERGENCY ROPE (Elevated Cab)

The emergency rope is provided in case (1) located on the left outside wall of the cab.

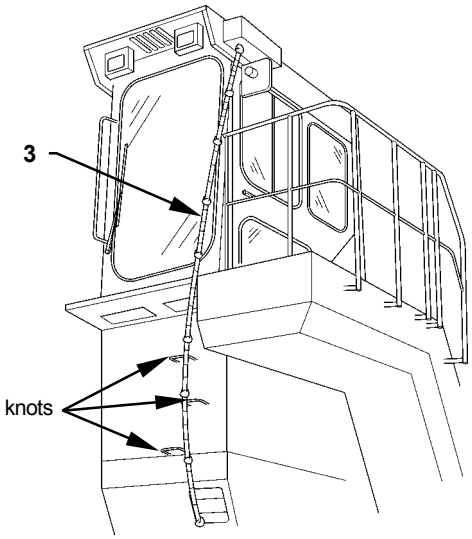
1. Unlock two latches (2) to open the hinged bottom cover.
2. Pull rope (3) out and lower it to the ground.
3. Lower yourself down the rope to the ground. The rope has knots to prevent slipping

Storing Emergency Rope

Wind the rope in the case and lock the cover latches.



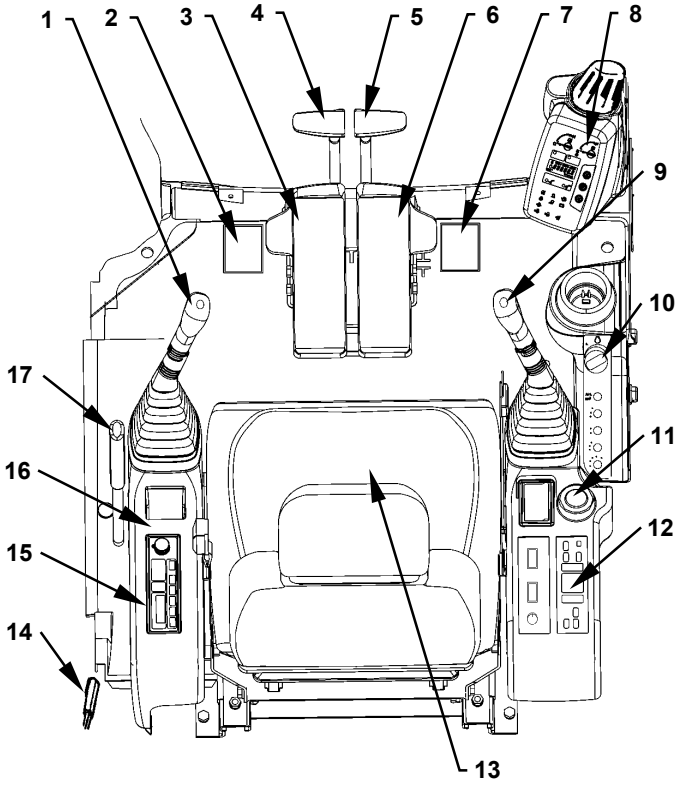
M142-01-022



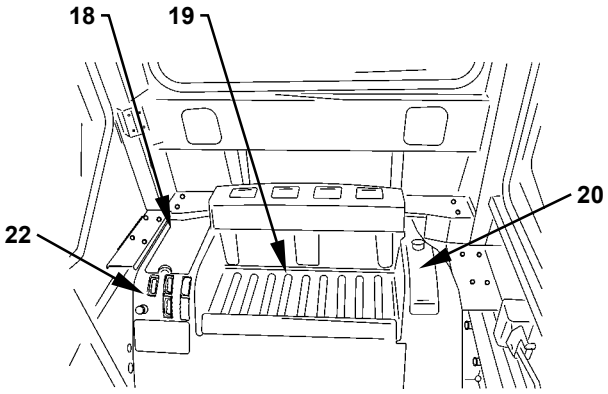
M17F-01-001

CAB FEATURES

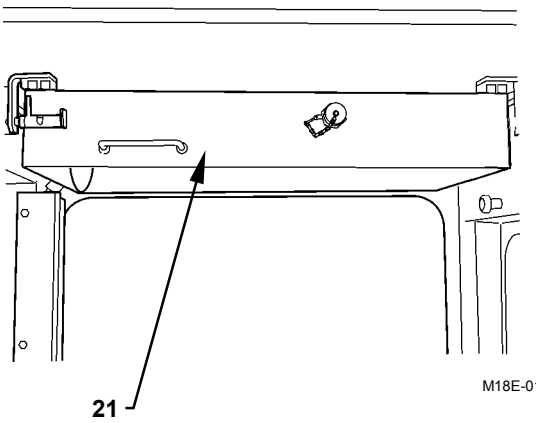
1- Left Control Lever/Horn Switch (On Top of Lever)
2- Bucket Close Pedal (Loading Shovel)
3- Left Travel Pedal
4- Left Travel Lever
5- Right Travel Lever
6- Right Travel Pedal
7- Bucket Open Pedal (Loading Shovel)
8- Monitor Panel/Switch Panel 1
9- Right Control Lever/Quick Idle Switch (On Top of Lever)
10- Switch Panel 2
11- Right Console
12- Air Conditioner Panel
13- Operator's Seat
14- Cab Door Release Lever
15- Radio
16- Left Console
17- Pilot Control Shut-Off Lever
18- Hot & Cool Box
19- Glove Compartment
20- Electrical Outlet
21- Fuse Box
22- Rear Console



M183-01-050

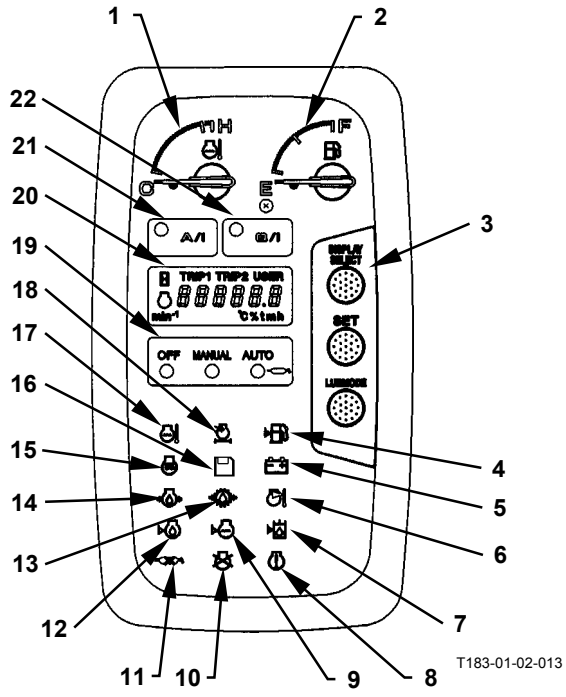


M18E-01-007



M18E-01-003

MONITOR PANEL

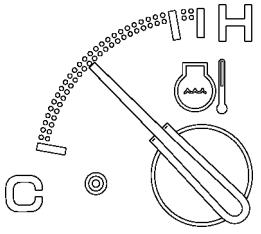


T183-01-02-013

1- Coolant Temperature Gauge
2- Fuel Gauge
3- Switch Panel 1
4- Fuel Level Indicator
5- Alternator Indicator
6- Engine Exhaust Temperature Indicator
7- Hydraulic Oil Level Indicator
8- Engine Warning Indicator
9- Coolant Level Indicator
10- Engine Stop Indicator
11- Auto-Lubrication Indicator
12- Engine Oil Level Indicator
13- Pump Transmission Oil Pressure Indicator
14- Engine Oil Pressure Indicator
15- Preheat Indicator
16- Download Indicator
17- Overheat Indicator
18- Air Filter Restriction Indicator
19- Lubrication Mode Indicator
20- Display
21- Auto-Idle Indicator
22- Quick Idle Indicator

COOLANT TEMPERATURE GAUGE

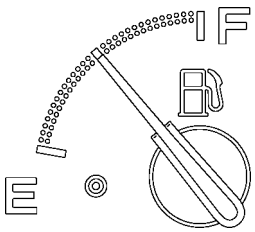
Engine coolant temperature is indicated. Coolant temperature is normal when the needle stays in the green zone while operating.



M178-01-104

FUEL GAUGE

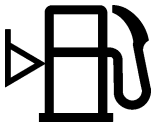
Fuel machine before needle reaches "E".



M178-01-105

FUEL LEVEL INDICATOR

When red fuel indicator lights, approximately 190 liters (50 US gal) of fuel remain.
Fuel tank capacity is 1400 liters (370 US gal).

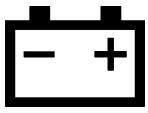


M183-01-068

NOTE: When the fuel tank is filled, the fuel volume is 1400 liters (370 US gal). The fuel gauge will start to move after the fuel remaining volume is reduced to less than 755 liters (200 US gal). Therefore, note that when the machine starts operating with the fuel tank filled, it will take a time until the fuel gauge starts to move.

ALTERNATOR INDICATOR

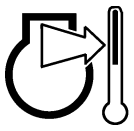
Red indicator will light with low alternator output.
Check electrical system



MM183-01-071

ENGINE EXHAUST TEMPERATURE INDICATOR

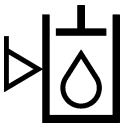
Warns the operator when an abnormal increase in the engine exhaust temperature is present. If the red indicator lights, stop operating the machine. Run engine at slow idle speed until the exhaust temperature lowers.



M183-01-074

HYDRAULIC OIL LEVEL INDICATOR

Red indicator will light when hydraulic oil level is inadequate for operation. Check hydraulic oil level.



M183-01-077

ENGINE WARNING INDICATOR

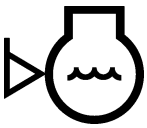
Red indicator will light on if an abnormality occurs in the engine or on the engine-related parts. The machine can be operated with this yellow indicator on. However, engine performance may be deteriorated. Be sure to contact your authorized dealer as soon as possible.

M183-01-080

NOTE: This indicator comes on for approximately 2 seconds when the key switch is turned to the ON position. This is normal.

COOLANT LEVEL INDICATOR

IMPORTANT: Prevent the machine damage. Low coolant will result in the engine or radiator damage.



M183-01-076

When the key switch is turned to the ON position, indicator will light if level is adequate for operation.

NOTE: This check does NOT take the place of daily inspection.

ENGINE STOP INDICATOR

Red indicator will light on if an abnormality in the engine or engine-related parts occurs. (Depending on the severity of the trouble, engine speed may decrease or the engine may automatically stop.) If this red indicator lights on, immediately position the machine in the park position, stop the engine and contact your authorized dealer.

M183-01-079

NOTE: This indicator lights on for approximately 2 seconds when the key switch is turned to the ON position. This is normal.

AUTO-LUBRICATION INDICATOR

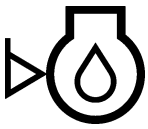
Red indicator will light when the auto-lubrication line is clogged or no grease remains.

M183-01-078

NOTE: Auto-lubrication Indicator lights on when the system is manually operated.

ENGINE OIL LEVEL INDICATOR (WARNING)

When the key switch is turned to the ON position, indicator will light if level is adequate for operation.



M183-01-075

NOTE: This check does NOT take the place of daily inspection.

PUMP TRANSMISSION OIL PRESSURE INDICATOR (WARNING)

Red indicator will light and buzzer will sound when pump transmission oil pressure is low. Stop the engine immediately. Check the pump transmission systems and oil levels for any abnormality.

M183-01-073

ENGINE OIL PRESSURE INDICATOR

IMPORTANT: Prevent possible engine damage. If engine oil pressure indicator comes on while operating, stop the engine immediately.

M183-01-072

Red indicator will light and buzzer will sound when engine oil pressure is low. Stop the engine immediately. Check the engine/hydraulic systems and oil levels for any abnormality.

NOTE: Cold oil, low oil level, or operating on a steep slope may cause indicator to light.

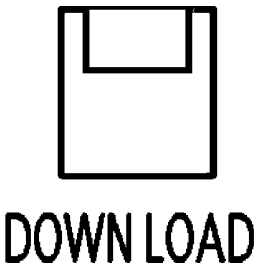
PREHEAT INDICATOR

Yellow indicator will light when preheat switch is turned to ON position in cold weather. Light will turn off after a few seconds, indicating that the preheat is completed.

M183-01-069

DOWNLOAD INDICATOR

When the monitoring system (optional) is provided, the green indicator comes ON if the system memory is fully occupied. If the indicator comes ON, download the data. Ask your authorized Hitachi dealer for details.



M118-01-012

OVERHEAT INDICATOR

M183-01-066

IMPORTANT: Prevent possible engine damage. Do not stop engine while this red indicator is ON. Instead, reduce load and run engine at slow idle. If overheat indicator continues to stay ON, shut engine off.

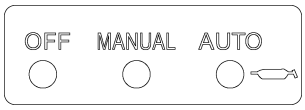
Red indicator will light when the engine coolant overheats. Reduce the load immediately and run engine at slow idle. Inspect for debris around radiator. Also, check for low coolant level in the reserve tank.

AIR FILTER RESTRICTION INDICATOR

M183-01-067

Red indicator will light when the air filter elements are clogged. Clean or replace outer element.

LUBRICATION MODE INDICATOR



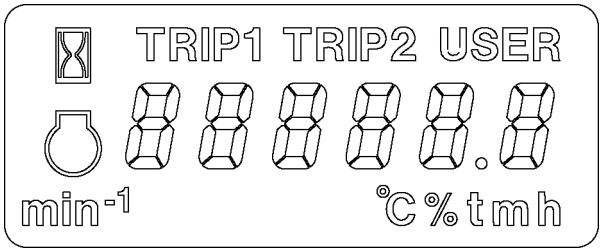
M183-01-064

Each time the lubrication (LUB) mode selection switch located on switch panel 1 monitor panel is pressed, one lubrication mode indicator (AUTO, MANUAL, or OFF) will light in turn.

DISPLAY

Liquid Crystal Display (LCD)

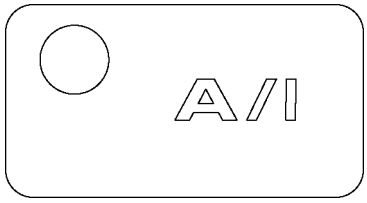
In the standard mode, the LCD can display three different types of information; "Hour Meter", "Trip Meter 1", or "Trip Meter 2".



M183-01-063

AUTO-IDLE INDICATOR

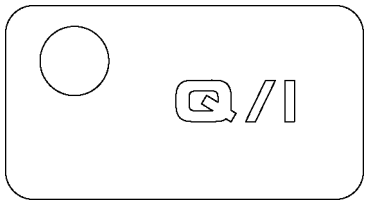
Green indicator will light when the auto-idle switch is turned on.



M183-01-061

QUICK IDLE INDICATOR

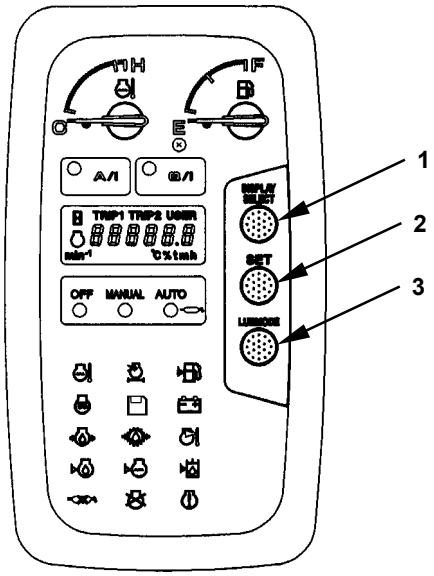
Green indicator will light when the quick idle switch is turned on.



M183-01-062

SWITCH PANEL 1

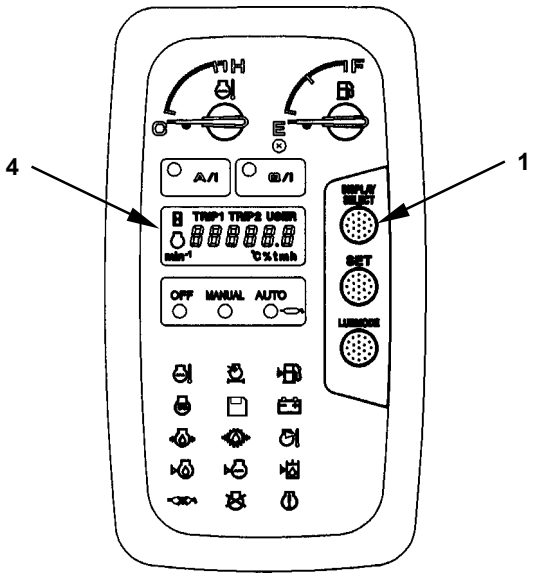
1- Display Selection Switch
2- Set Switch
3- Lubrication Mode Switch



T183-01-02-013

DISPLAY SELECTION SWITCH

Each time display selection switch (1) is pressed, LCD (4) indicates information on "Hour Meter", "Trip Meter 1", or "Trip Meter 2" in order. If the user's mode is set up LCD (4) will cycle through "Engine Speed", then "Hydraulic Oil Temperature" information in order after displaying "Trip Meter 2" information by pressing selection switch (1).



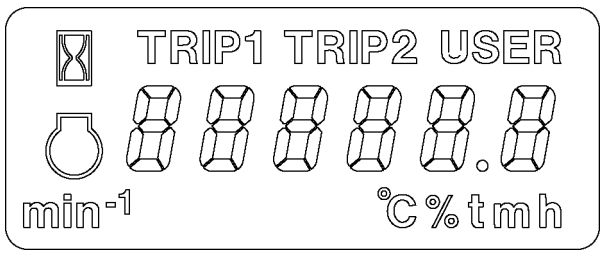
T183-01-02-013

HOUR METER

The accumulated operation hours of the machine are displayed on LCD (4). The right-hand number beyond the dismal point indicates tenths of an hour (6 minutes). The hour meter mark stays ON while indicating. While the machine is operating, the decimal point flashes.

- Hour Meter Check Function with Key Switch OFF
  The hour meter reading can be checked by depressing the display selection switch for longer than 0.5 seconds with the key switch OFF. The hour meter reading will be displayed as long as display selection switch (1) is pressed and will disappear when the switch is released.

When the hour meter is displayed:



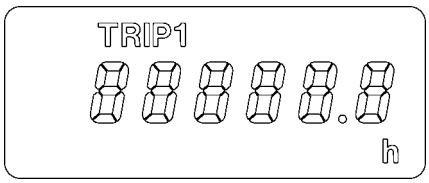
M183-01-063

TRIP METER 1 AND TRIP METER 2

The machine operation hours can be set in the trip meter as desired. Display Trip Meter 1 or 2 by operating display selection switch (1). Set the desired machine operation hours using the SET switch so that the trip meter counts the remaining hours from the set-hours. When the remaining hours become zero, either "TRIP 1" or "TRIP 2" flashes for 30 seconds, indicating that the time has expired. One digit beyond the decimal point indicates tenth of an hour (six minutes). "TRIP 1" or "TRIP 2" stays ON while indicating.

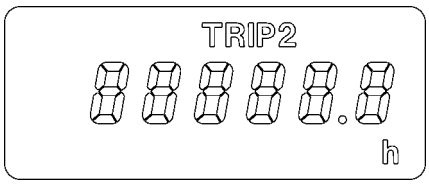
NOTE: If the time indicated on the trip meter is less than an hour when the key switch is turned ON, the TRIP mark will flash for 30 seconds. If the TRIP mark flashes, reset the time as desired using SET switch (4). After resetting is complete, the TRIP mark stops flashing. Setting hours can be made in Trip Meter 1 and Trip Meter 2 individually.

When Displaying Trip Meter 1:



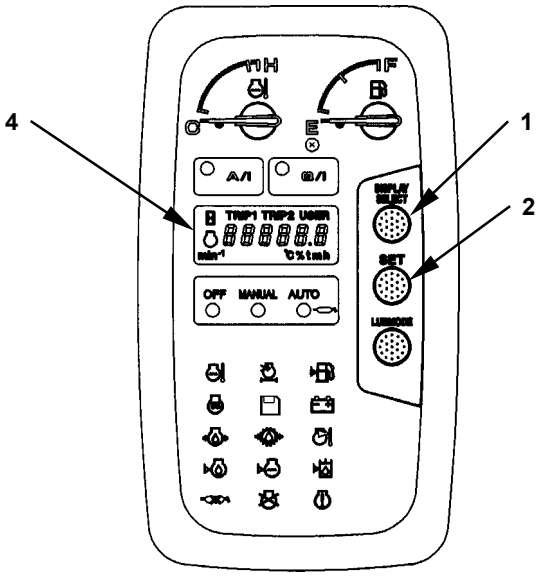
M178-01-007

When Displaying Trip Meter 2:



M178-01-008

SET SWITCH



T183-01-02-013

The set-hours in the Trip Meter 1 and Trip Meter 2 can be changed by pressing SET switch (2).

- Setting
  1. Press display selection switch (1) to display either Trip Meter 1 or 2 on the LCD (4).
  2. Each time SET switch (2) is pressed, the set-hour can be changed in the following order.
     50>100>150>200>250>300>400>500>750>1000>1250>1500>2000>2500>3000>3500>4000>4500>5000>50>
     When the SET switch is pressed for more than 2 seconds, the set-hour can be changed quickly.
  3. End to press SET switch (2) when the hour desired to set is indicated. Press display selection switch (1) to set the Trip Meter.
- Resetting
  As shown below, the set-hour can be changed:
  1. Press display selection switch (1) to display either Trip Meter 1 or 2 on the LCD (4).
  2. When SET switch (2) is pressed once, the currently indicated hours can be reset as shown in the following table.

Currently Indicated Hour		Set-Hour after Resetting
35.2	→	50.0
184.2	→	200.0

  3. Each time the SET switch is pressed further, the set-hour is changed as shown below.
     50>100>150>200>250>300>400>500>750>1000>1250>1500>2000>2500>3000>3500>4000>4500>5000>50>
     When the SET switch is pressed for more than 2 seconds, the set-hour can be changed quickly.
  4. End to press SET switch (2) when the hour desired to set is indicated. Press display selection switch (1) to set the Trip Meter.

LUBRICATION MODE SWITCH

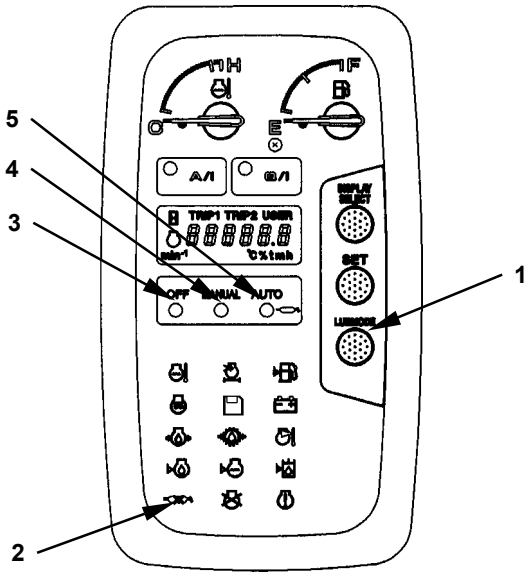
The AUTO, MANUAL, or OFF lubrication mode can be selected by pressing lubrication mode switch (1). At the same time, lubrication mode indicator (3, 4 or 5) will light.

3- OFF: The lubricator doesn't operate.

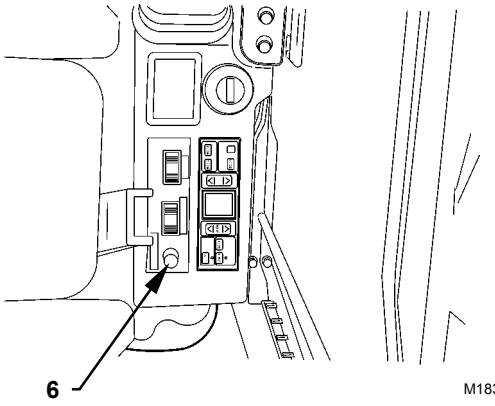
4- MANUAL: The lubricator operates continuously.

5- AUTO: The lubricator operates at an interval set by the auto-lubrication timer switch (6).

NOTE: It is normal for auto-lubrication warning indicator (2) to stay ON when lubrication mode switch (1) is in the MANUAL position.



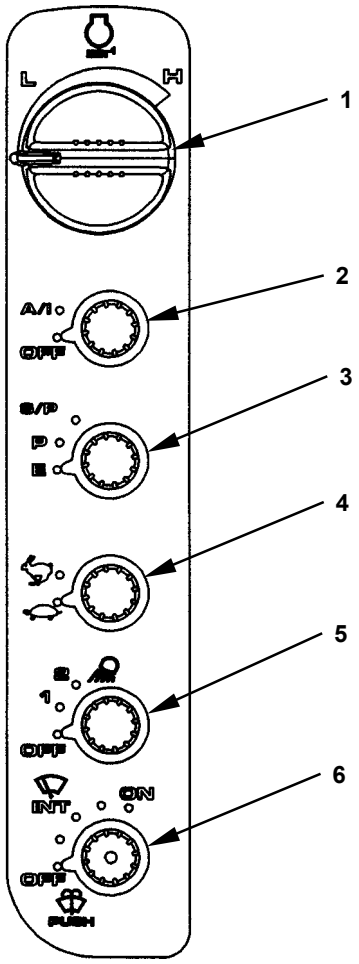
T183-01-02-013



M183-01-030

SWITCH PANEL 2

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

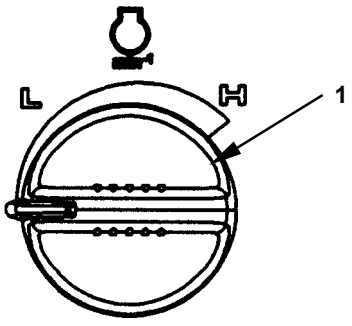


M183-01-051

ENGINE CONTROL DIAL

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

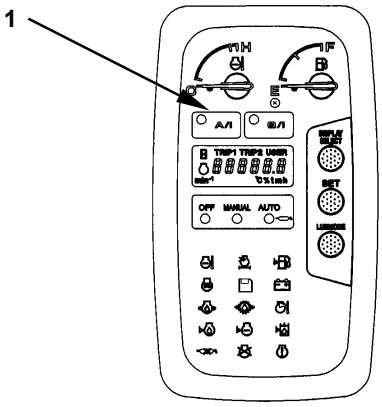
- The fully clockwise position : Fast idle
- The fully counterclockwise position : Slow idle



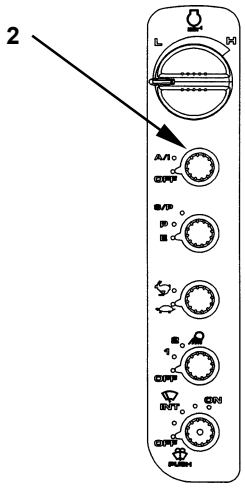
M183-01-052

AUTO-IDLE SWITCH

While auto-idle switch (2) is turned to [A/I], engine speed decreases to the auto-idle setting from the engine control dial setting approximately 4 seconds after the control levers are returned to neutral. Indicator (1) stays on while auto-idle switch (2) is turned to [A/I].
Turn auto-idle switch to [OFF] position to the auto-idle function. Indicator (1) will also be turned off.



T183-01-02-013



M183-01-051

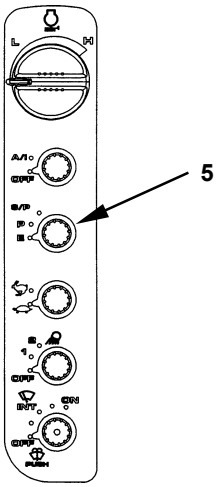
POWER MODE SWITCH

Turn power mode switch (5) to select the power mode.

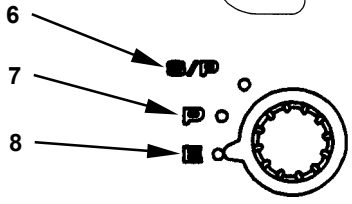
6- S/P (Super Power): Use to reduce cycle times and to increase production speed.

7- P (Power): Use when performing general excavation and loading.

8- E (Economy): Use to reduce fuel consumption.



M183-01-051



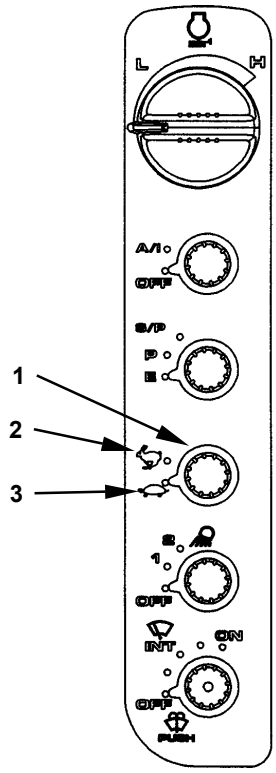
M183-01-054

TRAVEL MODE SWITCH

Fast speed mode (rabbit) and slow speed mode (turtle) can be selected by travel mode switch (1).

2- Mark (Fast Speed Mode)

3- Mark (Slow Speed Mode)

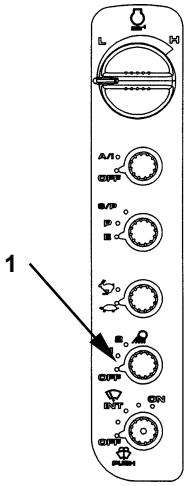


M183-01-051

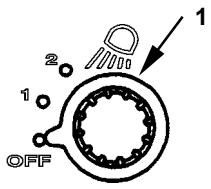
WORK LIGHT SWITCH

Work light switch (1) has the following positions:

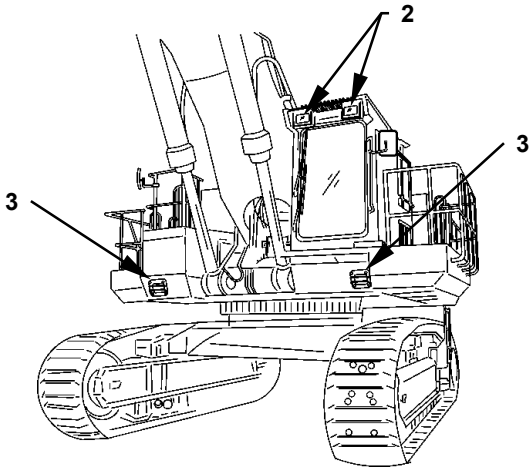
- 1 Position
  Work lights (3) on the base machine will light. Also, the instrument panel illumination will light.
- 2 Position
  Work lights (2) will light in addition.
- OFF Position
  Work lights (2) and (3) and the instrument panel illumination will turn off.



M183-01-051



M183-01-056



M183-01-031

WIPER/WASHER SWITCH

- WIPER
  Wiper/washer switch (1) has four positions as follows:

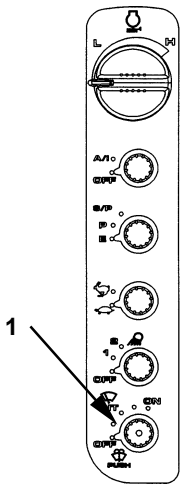
  2- ON: The wiper operates continuously.

  3- Short INT: The wiper operates at an interval of 3 seconds.

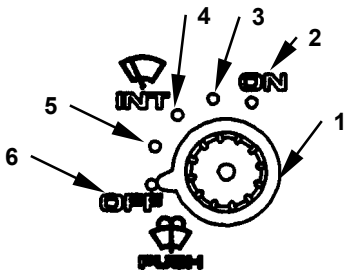
  4- INT: The wiper operates at an interval of 6 seconds. (Standard Intermittent Operation)

  5- Long INT: The wiper operates at an interval of 8 seconds.

  6- OFF: The wiper stops.



M183-01-051

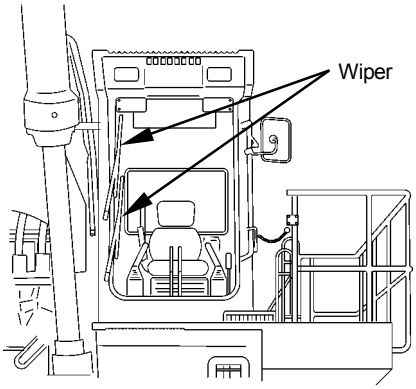


M183-01-057

- WASHER

IMPORTANT: Washer motor may be damaged if wiper/washer switch (1) is held for more than 20 seconds, or continually operated with no fluid in the washer tank.

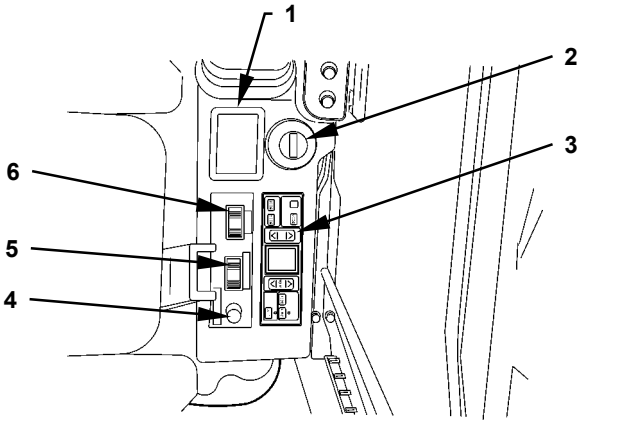
Depress wiper/washer switch (1) to squirt windshield washer fluid on windshield.



M183-01-033

RIGHT CONSOLE

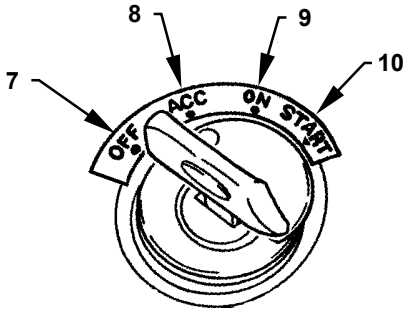
1- Ashtray
2- Key Switch
3- Air Conditioner Switch
4- ALU Timer Switch (Auto-Lubrication Timer Switch)
5- Heavy Lift Switch
6- Boom Mode Switch



M183-01-030

KEY SWITCH

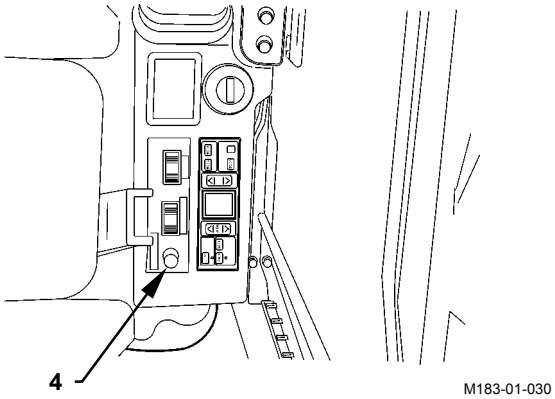
7- OFF (Engine Off)
8- ACC (Horn, Radio, Preheat etc.)
9- ON (Engine On)
10- START (Engine Start)



M183-01-034

ALU TIMER SWITCH (Auto-Lubrication Timer Switch)

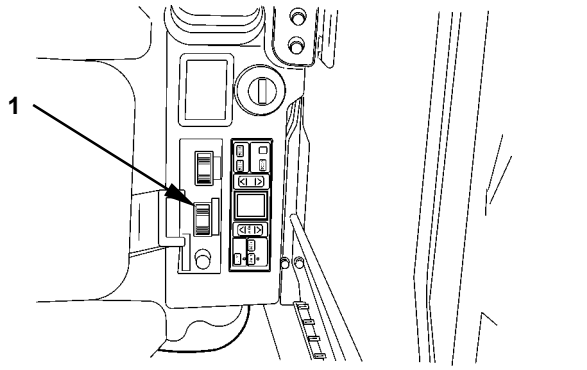
Turn ALU timer switch (4) to set the auto-lubrication time interval. The auto-lubrication interval can be set in three stages of 10, 20 and 30 minutes.



M183-01-030

HEAVY LIFT SWITCH

Boom and arm power will increase when heavy lift switch (1) is turned on. (Press the front half of the switch to turn on heavy lift switch (1).)
Press the rear half of switch (1) to turn it off. Boom and arm power will return to normal.



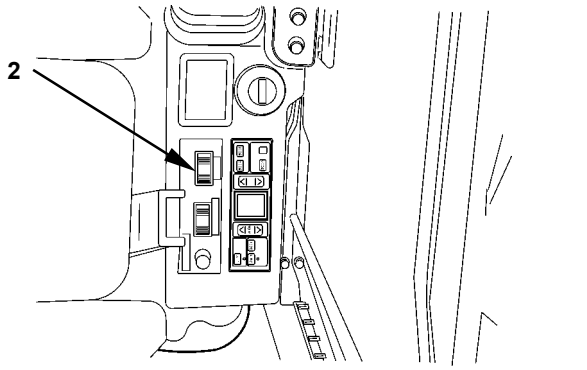
M183-01-030

BOOM MODE SWITCH

COMFORTABLE MODE
ON: Prevents the base machine from being raised to reduce vibration while excavating.

POWERFULL MODE
OFF: Allows the base machine to be evacuated from soft ground.

CAUTION: Never operate switch (2) while raising the machine off the ground.



M183-01-030

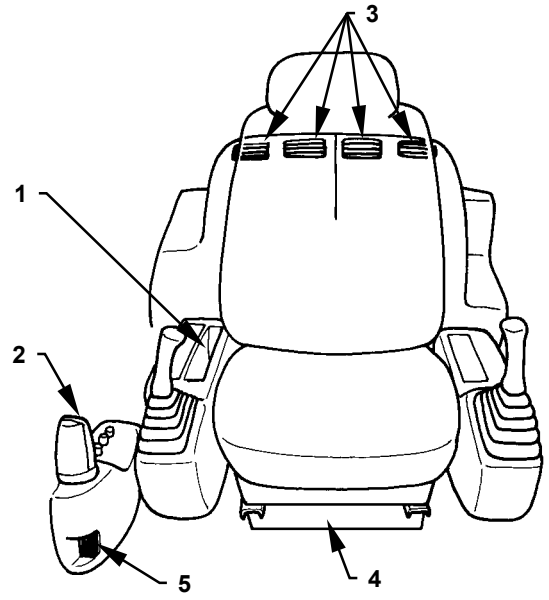
AUTO AIR CONDITIONER

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.

1- Control Panel
2- Front Vent
3- Rear Vent
4- Foot Vent
5- Defroster Vent
6- Blower OFF Switch
7- Blower Switch
8- Liquid-Cristal 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

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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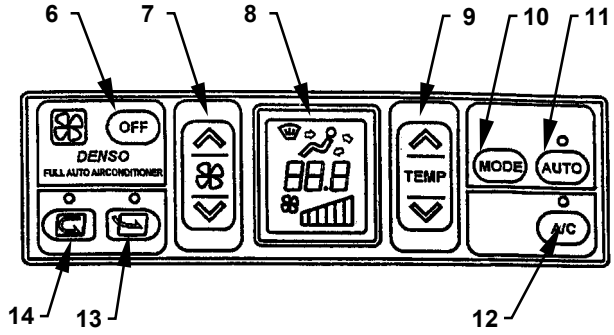
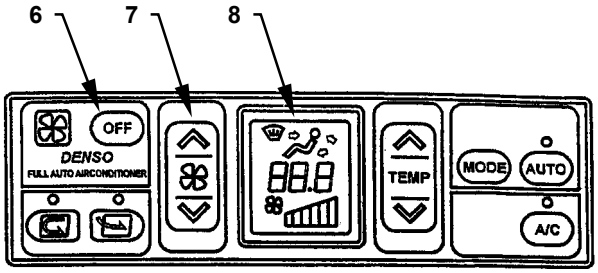


M178-01-017

Controller Part Name and Function



M178-01-017

- 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 "∨" on blower switch (7) is pressed, the blower speed is decreased by one increment.

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

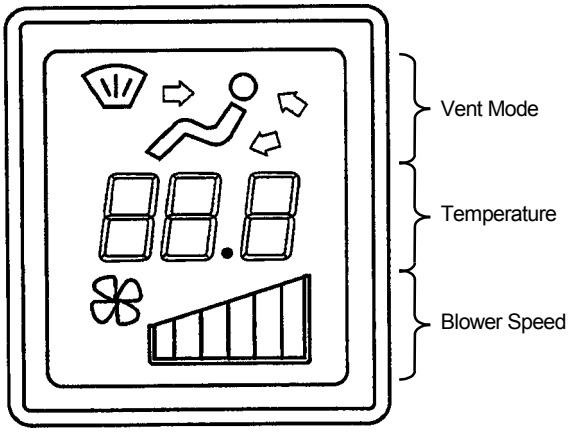
- LCD (8)
  Displays the set-status of the air conditioner operating temperature, fan speed, and vent mode.
  - Temperature Display
    Indicates the set-temperature (18 to 32.0 °C, 65 to 90 °F) by 0.5 °C (0.9 °F) increments at the panel center.
  - Blower Speed Display
    Indicates the blower speed 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:

 : Front/Defroster Vent Mode

 : Front/Rear/ Defroster Vent Mode

 : Front/Rear/Foot/ Defroster Vent Mode

 : Foot Vent Mode



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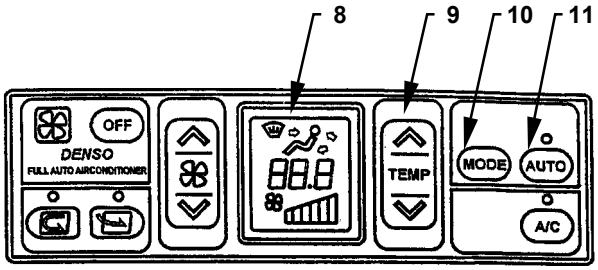


M178-01-017

- 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 "∨" on temperature control switch (9) is pressed, the set-temperature is decreased by 0.5 °C (0.9 °F) increments.
  - 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

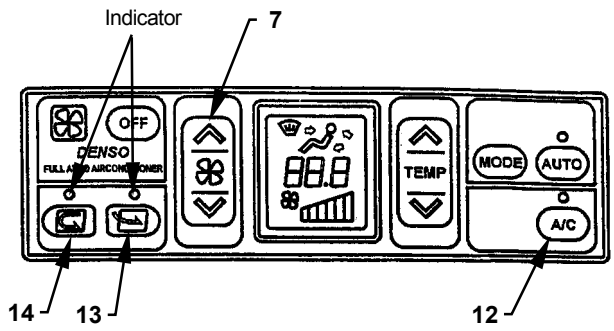
    : Foot Vent Mode

- 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.

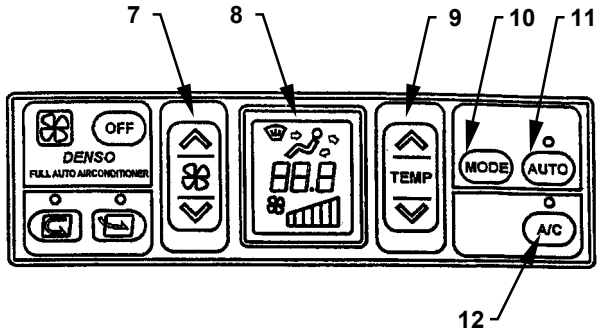
• Circulation Mode Switch (14)
When circulation mode switch (14) is pressed (indicator on), the fresh air vent will be closed.
Re-circulate the air inside the cab.



M178-01-017

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.
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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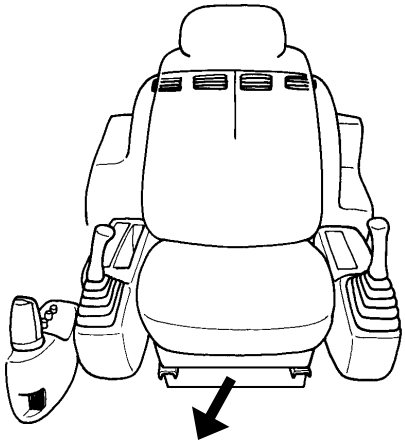
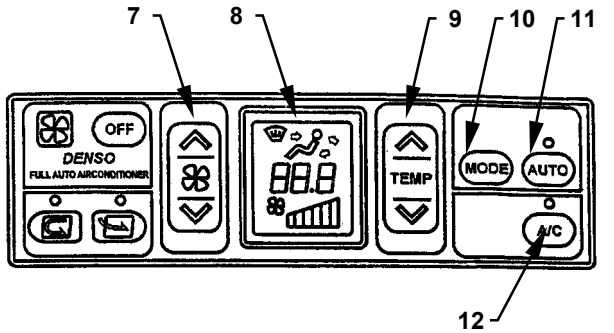

M157-01-028

COOLING OPERATION

(Although cool air will flow out of the front/defroster vent , front/rear/defroster vent, or front/rear/foot/de-froster 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. (The louver on the defroster vent can be closed by hand.)



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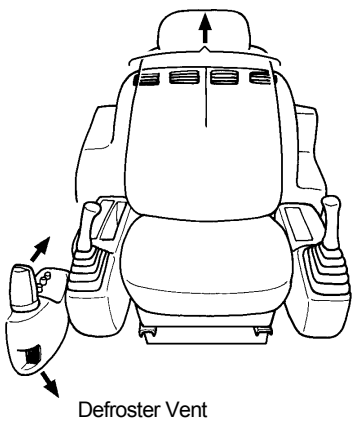


M157-01-068

DEFROSTER OPERATION

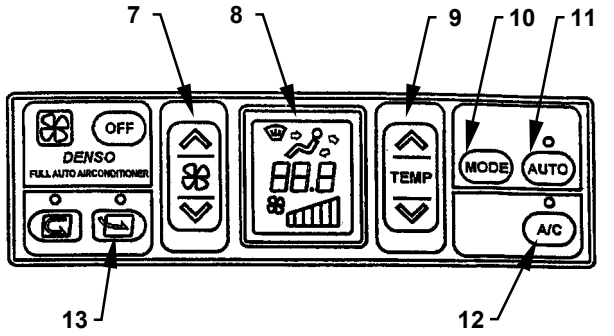
Select either the front/defroster vent mode or the front/rear/defroster vent mode by operating mode switch (10). Set the maximum heating temperature (32.0 °C, 90 °F) using temperature control switch (9). Press fresh air mode switch (13) to turn the indicator ON.

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 and defroster vent as required.

The blower speed can be adjusted manually using blower switch (9).

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



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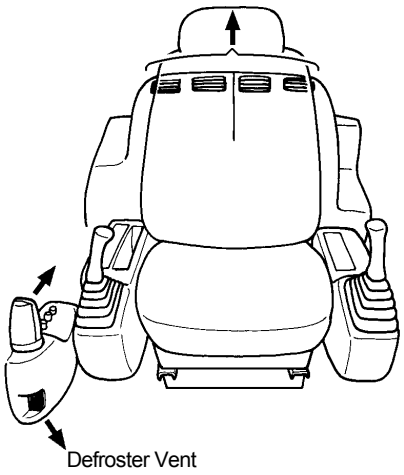

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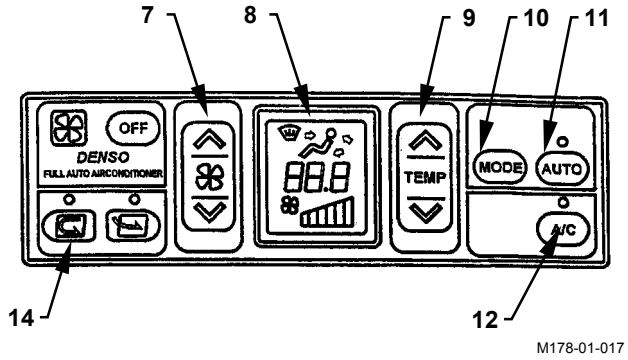
TIPS FOR OPTIMAL AIR CONDITIONER USAGE



M178-01-017

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.

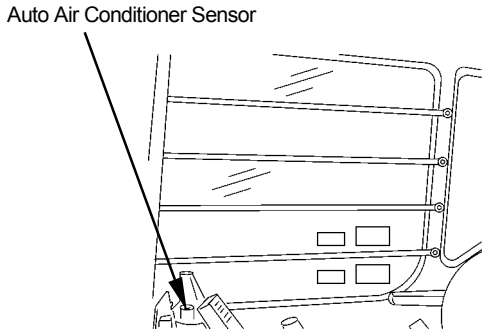
When Windows Become Clouded

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.

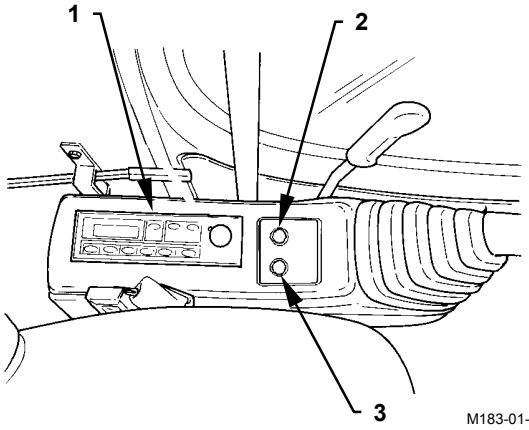
IMPORTANT:
- **Do not suddenly increase the engine speed.**
- **Refer to the item "Check Air Conditioner Filter" in the Maintenance Section for maintenance of the air conditioner filters.**
- **Always clean the auto air conditioner sensor for effective air conditioner performance. Avoid placing any obstructions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



SS-2024

LEFT CONSOLE

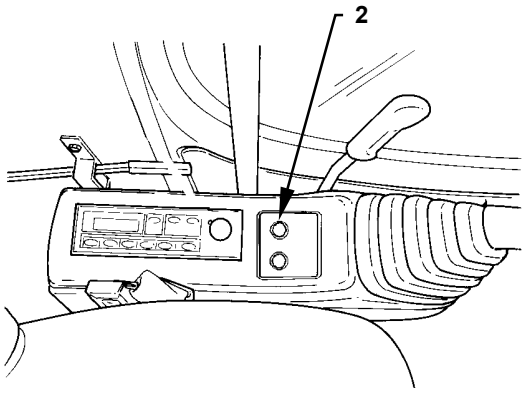
1- RADIO/CLOCK
2- Preheat Switch
3- Step Light Switch



M183-01-035

PREHEAT SWITCH

Preheat the engine when turn preheat switch (2) to ON in cold weather. Preheat indicator (4) will come on.



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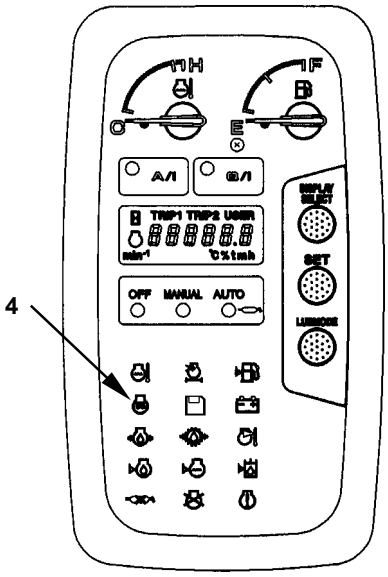

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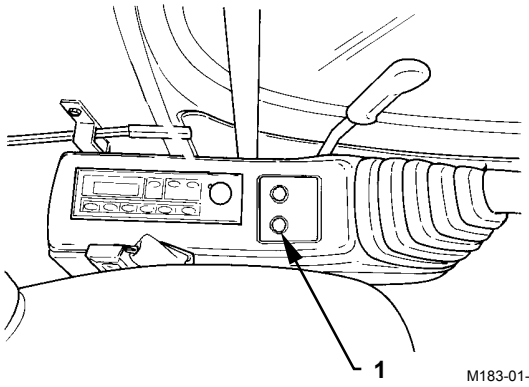
STEP LIGHT SWITCH

Press step light switch (1) to turn on step light (2) located on the top of the cab.



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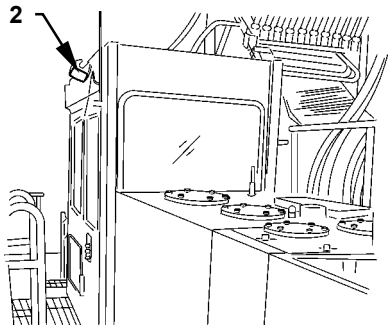
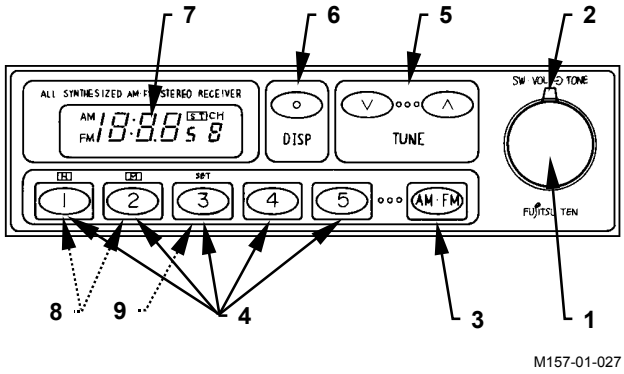


M183-01-036

AM/FM RADIO OPERATION



M157-01-027

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
9- Set Switch

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 (∧) to increase the frequency.
  Tap the tuning switch (∨) to decrease the frequency.

  Digital display (7) will return to the setting (the clock or the frequency, whichever one is set by the display mode change switch) approximately 5 seconds after tuning switches (5) are no longer tapped or pressed.

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

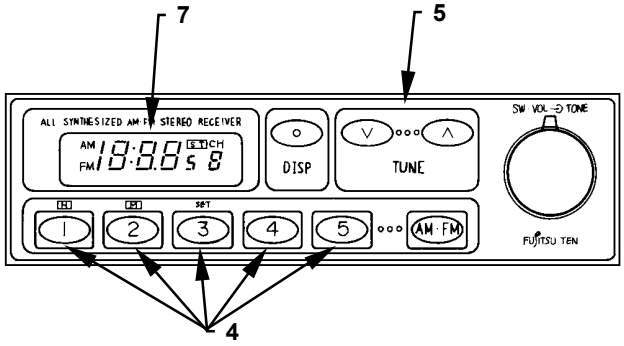
  To go up to the next higher frequency station, press and hold the tuning switch (∧).
  To go down to the next lower frequency station, press and hold the tuning switch (∨).

  After displaying the next frequency station, digital display (7) will return to the setting (the clock or the frequency, whichever one is set by the display mode change switch) in approximately 5 seconds.
  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.

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 2 seconds 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 2 seconds).



M157-01-027

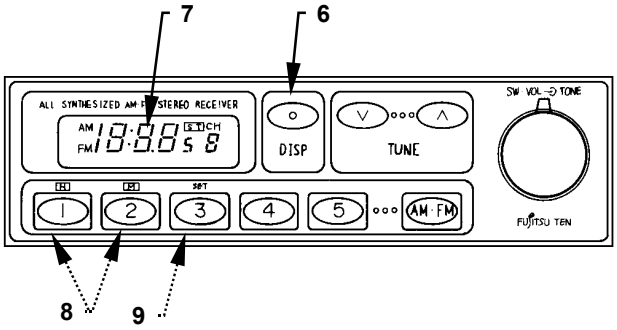
DIGITAL CLOCK SETTING PROCEDURE

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

1. Press and hold display mode change switch (6). While holding display mode change switch (6), use time set switches (8) and/or set switch (9) to set the clock.
   The functions of time set switches (8) and set switch (9) are as follows:
   - Time Set Switch (H): Each time set switch (H) is pressed, the hour display will increase by one.
   - Time Set Switch (M): Each time set switch (M) is pressed, the minute display will increase by one. (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.
   - Set Switch (SET) (9): If set switch (SET) (9) is pressed, the minute display will be reset to "00."
   - If the minute display is "29" or smaller when set switch (SET) (9) is pressed, the display will be reset to "00" without changing the hour display.
   - If the minute display is "30" or larger when set switch (SET) (9) is pressed, the hour display will be increased by one and the minute display will be reset to "00."

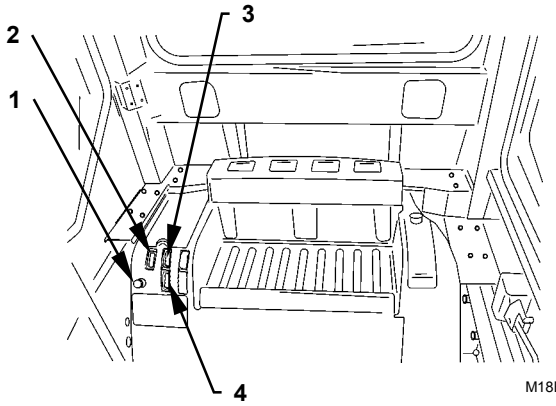
   For example, if set switch (SET) (9) is pressed when the clock display is "10:29" and "10:30", the clock display will change to "10:00" and "11:00" respectively.



M157-01-027

REAR CONSOLE

1- Cigar Lighter
2- Engine Diagnostic Switch
3- Buzzer Stop Switch
4- Travel Alarm Stop Switch (Optional)



M18E-01-007

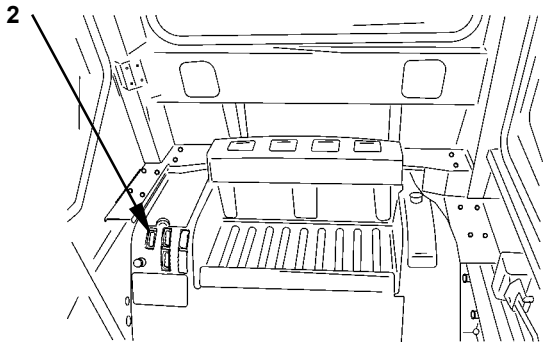
ENGINE DIAGNOSTIC SWITCH

If any trouble occurs in the engine or engine related parts engine stop indicator (6) or engine warning indicator (5) will come ON or stay ON. In this case, the fault code (indicating the kind of engine trouble with three digit figures) can be displayed, using engine diagnostic switch.

Refer to the Mitsubishi Engine Operation Manual for details.

If indicator (5) and/or (6) comes and stays ON when the key switch is turned ON or while the engine is running, immediately turn the key switch OFF. Then, contact the HITACHI authorized dealer.

NOTE: The indicators go OFF approximately 2 seconds after the key switch is turned ON, this is normal.



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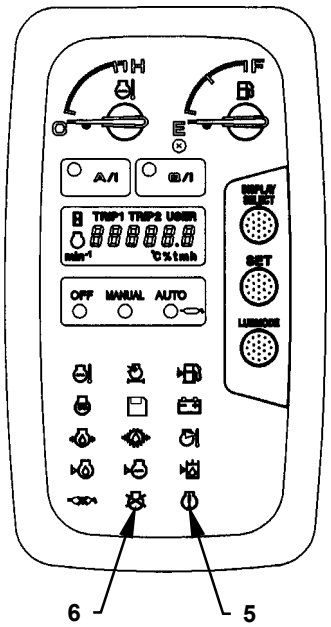
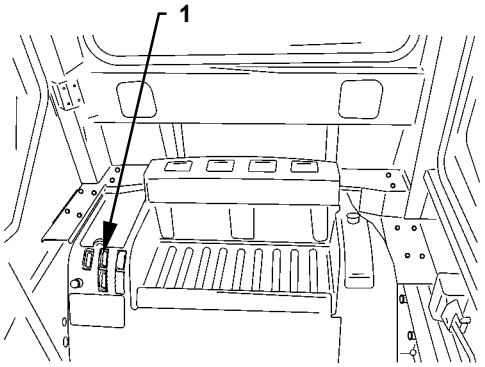


T183-01-02-013

BUZZER AND BUZZER STOP SWITCH



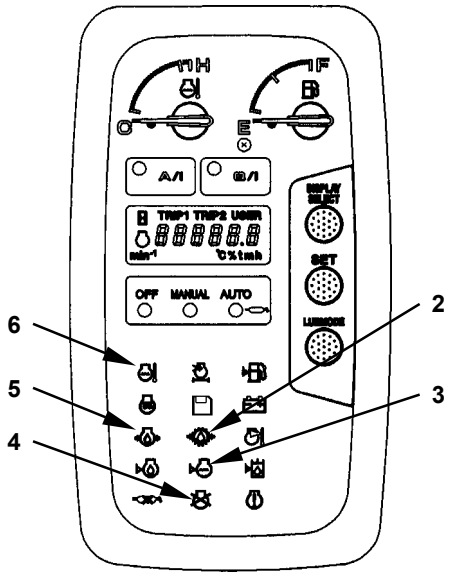
M18E-01-007

THE BUZZER SOUNDS WHEN:

- Engine oil pressure is low.
  (Engine oil pressure indicator (5) lights also.)
- Coolant level is low.
  (Coolant level indicator (3) (warning) lights also.)
- Engine coolant overheats.
  (Overheat indicator (6) lights also.)
- Pump transmission oil pressure is low.
  (Pump transmission oil pressure indicator (2) lights also.)

When engine oil pressure is low, when the engine overheats, or when engine coolant level is low, engine stop indicators (4) will come on and a buzzer will sound.
If a buzzer sounds, press buzzer stop switch (1) to stop the buzzer. The buzzer function will be automatically reset after releasing buzzer stop switch (1). (In other words, a buzzer will sound if an another trouble occurs.)

When pump transmission oil pressure is low, pump transmission oil pressure indicator (2) will come on and a buzzer will sound.
If pump transmission oil pressure indicator (2) come on, the buzzer will not stop sounding even after pressing buzzer stop switch (1).

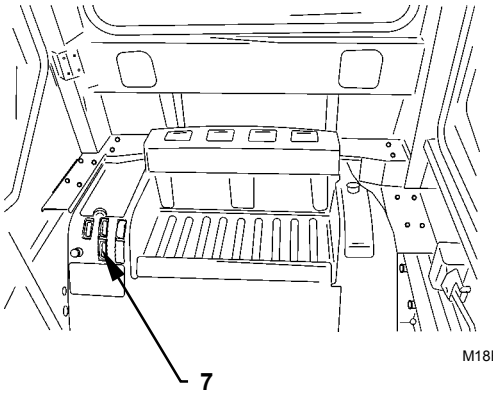


T183-01-02-013

TRAVEL ALARM STOP SWITCH (Optional)

Push travel alarm stop switch (7) to stop the travel alarm.

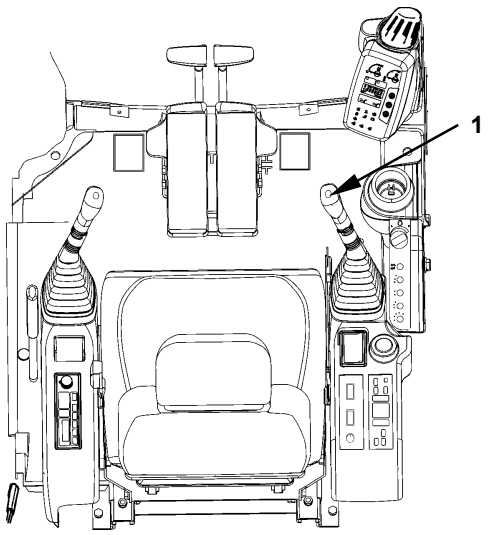
NOTE: The alarm can not be stopped within the first 13 seconds of traveling, even when the travel alarm stop switch (7) is pushed.



M18E-01-007

QUICK IDLE SWITCH

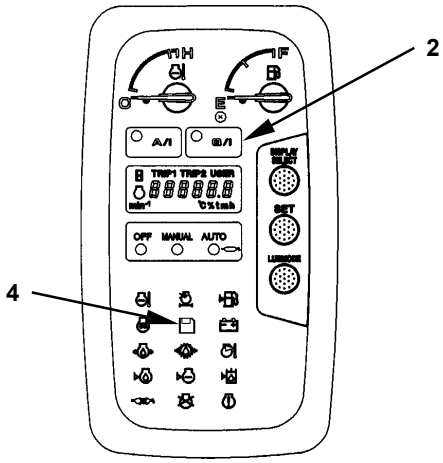
Quick idle switch (1) is located on top of the right control lever. Engine speed will decrease to the slow idle speed when switch (1) is pressed. Quick idle indicator (2) on the monitor panel will come on at the same time.
Engine speed will increase to the engine-control-dial set speed by pressing it again. The quick idle indicator will go out at the same time.



M183-01-050

DOWNLOAD INDICATOR

Refer to the Super Large Size Hydraulic Excavator Monitoring System General Manual issued separately for Download (4).

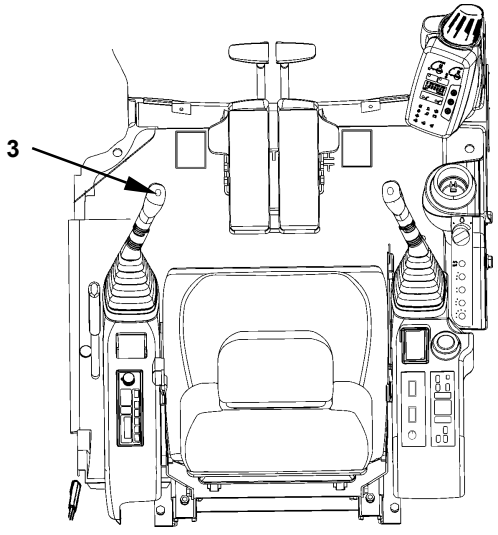


T183-01-02-013

HORN SWITCH

A horn switch (3) is provided on the top of the left control lever. The horn continuously sounds as long as the switch is pressed.

CAUTION: If the horn does not sound when pushed, immediately stop the engine and contact your authorized dealer for repair. Operating the machine with a malfunctioning horn may result in personal injury or death.



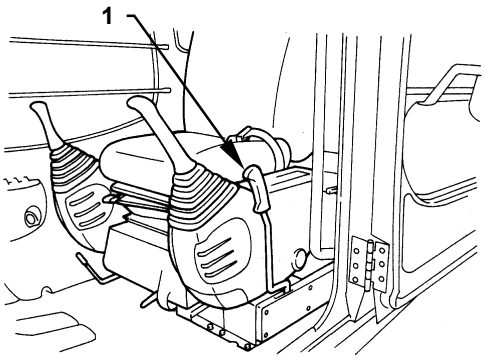
M183-01-050

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.

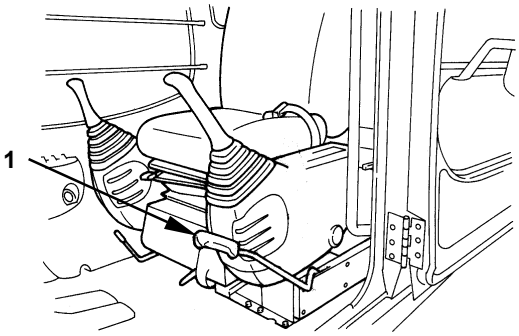
CAUTION:

1. **Pilot control will not be shut-off unless pilot control shut-off lever (1) is completely pulled-up to the LOCK position.**
2. **Before leaving the operator's seat, always stop the engine and pull the pilot control shut-off lever up to the LOCK position.**
3. **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.**
4. **Confirm that the pilot control shut-off lever is in the LOCK position before starting the engine.**



LOCK Position

M162-05-001

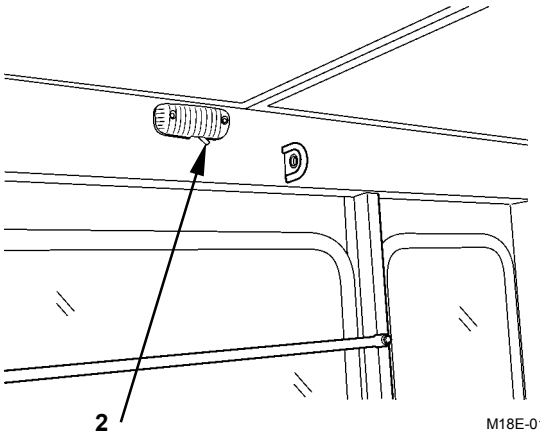


UNLOCK Position

M162-05-002

CAB LIGHT

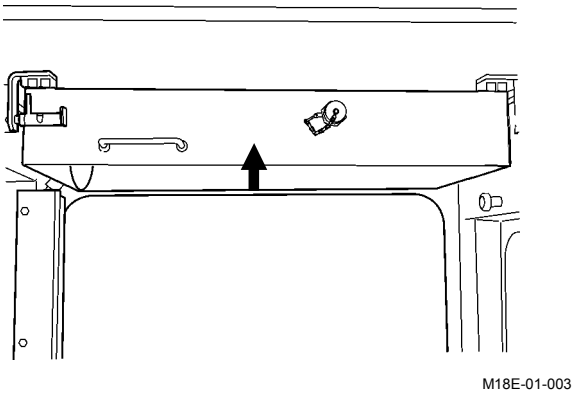
Move switch (2) to turn the inside cab light on or off.



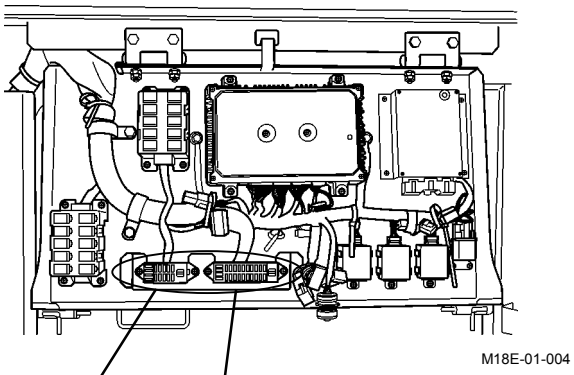
M18E-01-002

FUSE BOX (Left)

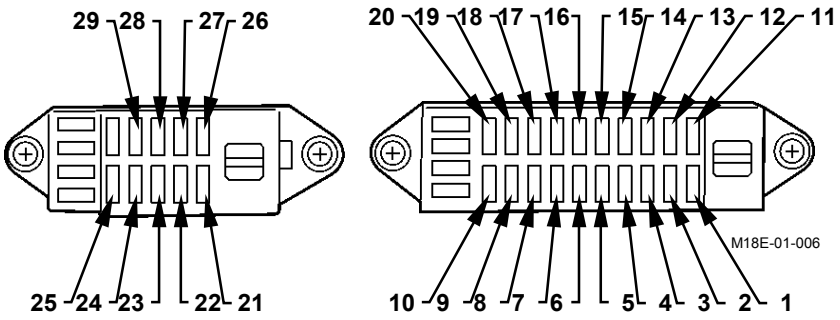
1-	BACK UP	5A
2-	CONTROLER	5A
3-	POWER ON	5A
4-	CONVERTOR	20A
5-	MCX SOLENOID	10A
6-	TRAVEL ALARM	5A
7-	SW BOX	5A
8-	ENTRANCE LIGHT	5A
9-	AIRCON	5A
10-	BATTERY RELAY	5A
11-	LAMP	20A
12-	WIPER	20A
13-	HEATER	20A
14-	SOLENOID	15A
15-	RADIO	5A
16-	LIGHTER	10A
17-	ROOM LAMP	5A
18-	HORN	10A
19-	START REPEATING RELAY	5A
20-	ECM ENG. START SIGNAL	5A



M18E-01-003



M18E-01-004



M18E-01-006

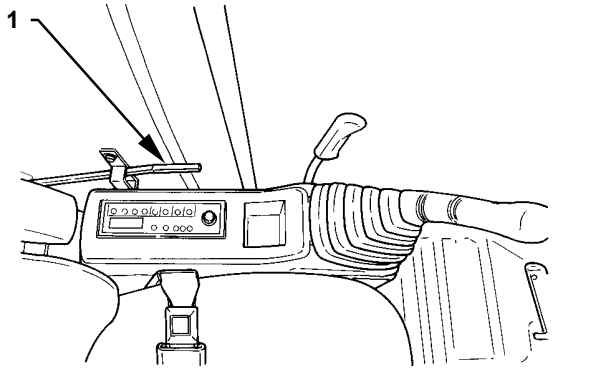
FUSE BOX (Right)

21-	E.C.M MAIN	20A
22-	PREHEAT SW	5A
23-	STOP SOL. RELAY	5A
24-	E.C.M RELAY	5A
25-	DLU MAIN	5A
26-	DLU DOWN LOAD	5A
27-	OPTION	20A
28-	OPTION	20A
29-	COOLANT LEVEL SW	5A

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.

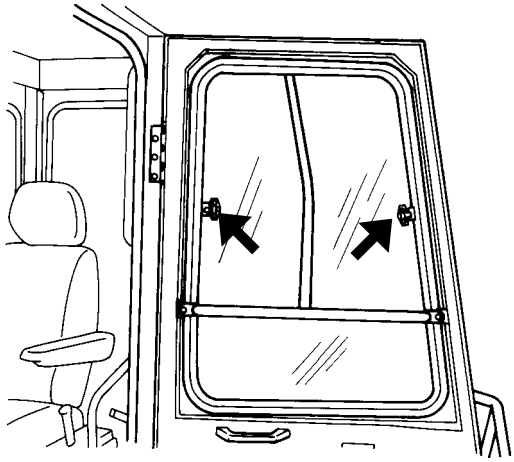
To unlock the door from this position, push down on lever (1).



M157-01-152

OPENING CAB DOOR WINDOW

Slide front pane at the rear and/or rear pane to the front.



M142-01-050

EMERGENCY EXIT

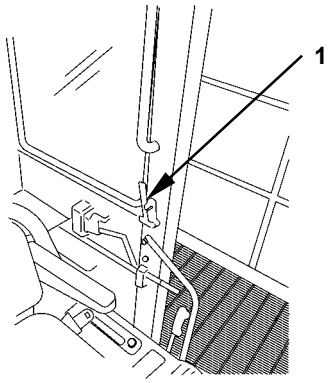
If the operator's cab door will not open in an emergency, escape using the following methods:

CAUTION: Be sure to wear safety glasses before breaking the window glass.

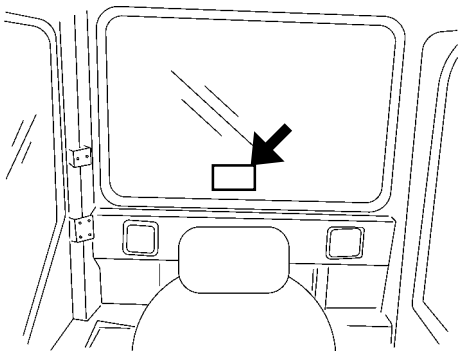
1. Break the left window glass using emergency evacuation tool (1). Then, escape through the broken window.

2. If the left window is difficult to open, break the rear window glass using the emergency evacuation tool (1). Then, escape through the broken window.

NOTE: The emergency exit decals are affixed to the rear window.



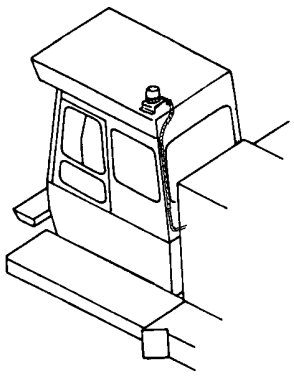
M183-01-005



M183-01-006

HAZARD WARNING LAMP --- LOCATION

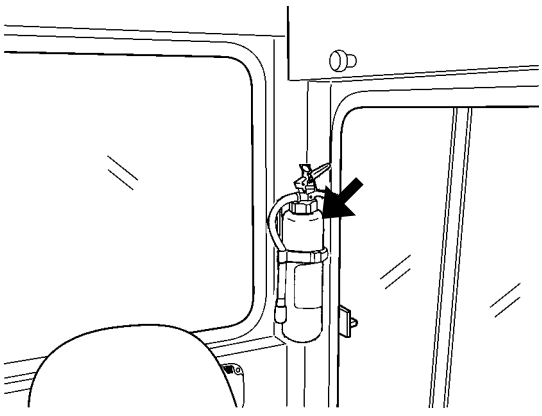
When a hazard warning lamp (rotating lamp) is required, install it in the position shown on the cab. The electrical power source is available at the connector of harness; wire under the cab.
Route the wiring as illustrated.



M113-01-066

EXTINGUISHER --- IF EQUIPPED

Provide an extinguisher in the operator's cab to fight a fire at the initial stage of an outbreak. Secure the extinguisher in back of the cab with a band as illustrated.



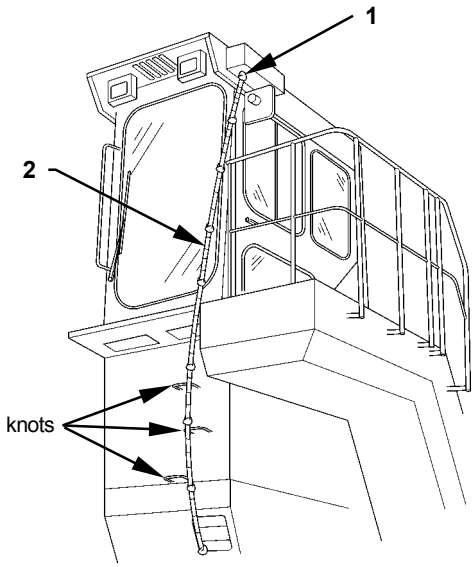
M18E-01-005

EMERGENCY EXIT (Elevated Cab)

A fire on the machine can result in serious personal injury or death.
Avoid the risk of injury or death while evacuating from the machine during a fire by checking the following regularly:

Inspect emergency rope (2) and rope mounting hardware (1) every shift as part of regular inspection and maintenance and replace when the rope is worn or frayed and will not sustain 400 kg (880 lb) of weight.
Replace the rope and rope mounting hardware with genuine Hitachi parts periodically.

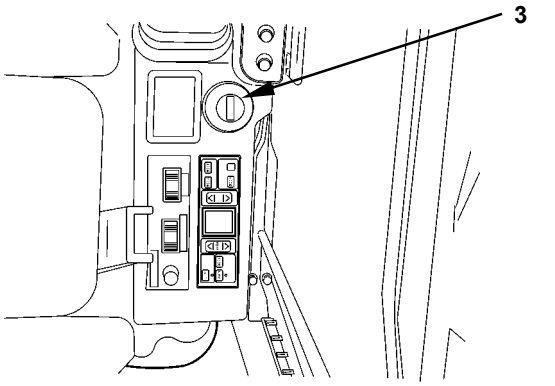
- Before operating the machine for the first time, all new operators must practice evacuating with this rope at least once.



M17F-01-001

If a fire breaks out, evacuate the machine in the following way:

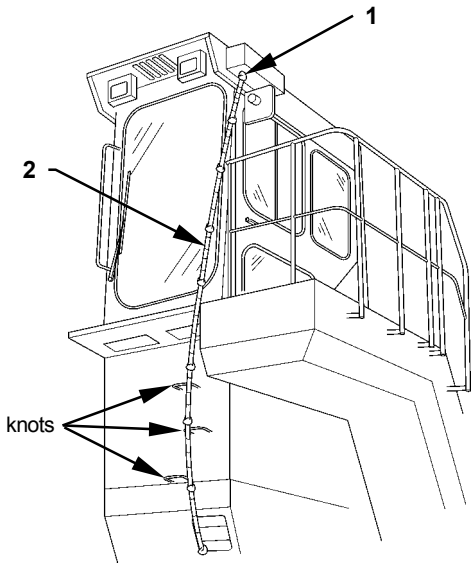
- Stop the engines by turning key switch (3) to the OFF (Engine off) position if there is time.
- Use a fire extinguisher if there is time.



M183-01-030

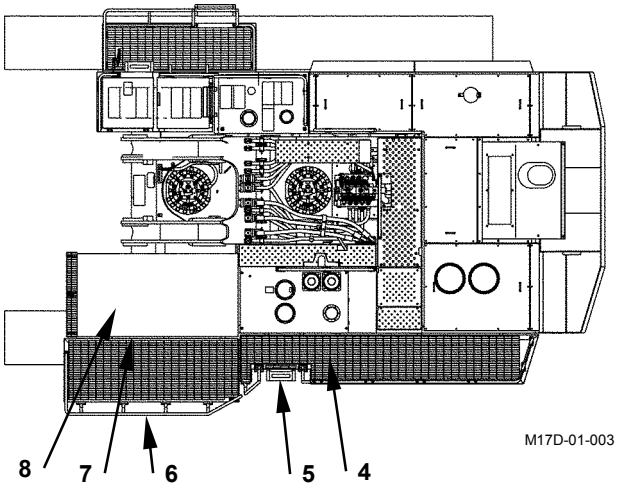
• Exit the machine in the following manner, depending on the location of the fire.

1. If fender (4) is not on fire, evacuate from the machine to the ground through cab door (7) cab side fender (6), fender (4) and ladder (5).
2. If fender (4) is on fire, first evacuate from cab (8) through cab door (7) to cab side fender (6). Then, get off the machine using emergency rope (2). Emergency rope (2) is provided in the case located on the left outside wall of the cab. (see the "EMERGENCY ROPE" chapter)
3. If the cab door (7) can not be opened, refer the explanation page on the Emergency Exit.

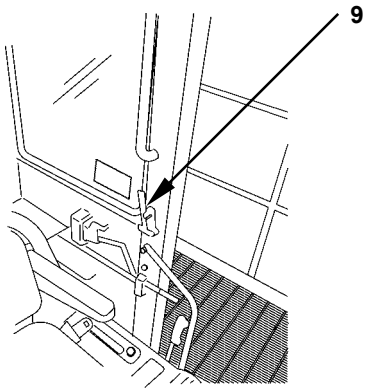


M17F-01-001

CAUTION: Avoid possible injury to your eyes. Wear a pair of safety glasses or goggles when breaking windowpane with emergency evacuation tool (9).

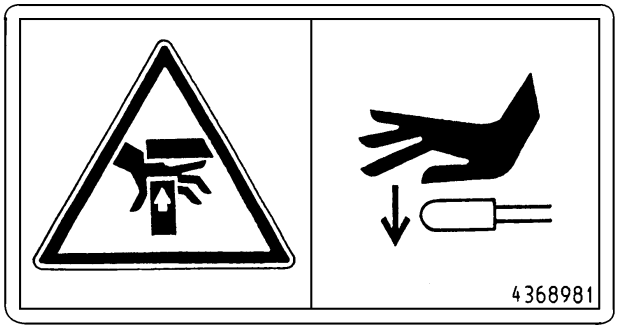


M17D-01-003



M17F-01-002

ADJUSTING THE SEAT



Caution: Possibility of pinched fingers

Push down with the palm. SS-747

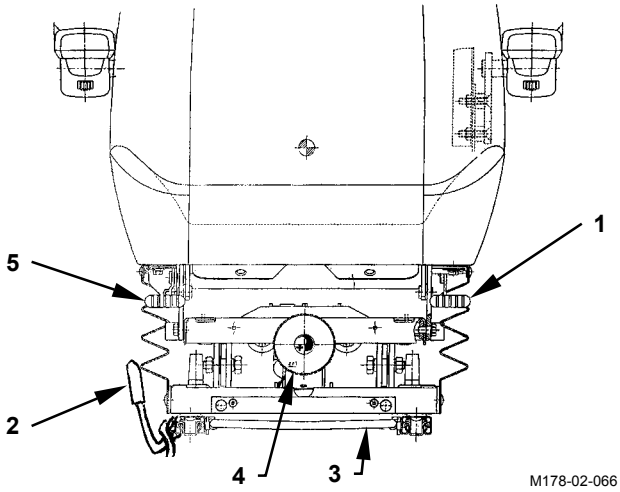
Seat Height and Angle Adjustment

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.

CAUTION: 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).



M178-02-066

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 the right to unlock the seat from both consoles. With lever held to the right, 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

Turn knob (4) clockwise to increase suspension stiffness.
Turn knob counterclockwise to decrease suspension stiffness.

Backrest Adjustment

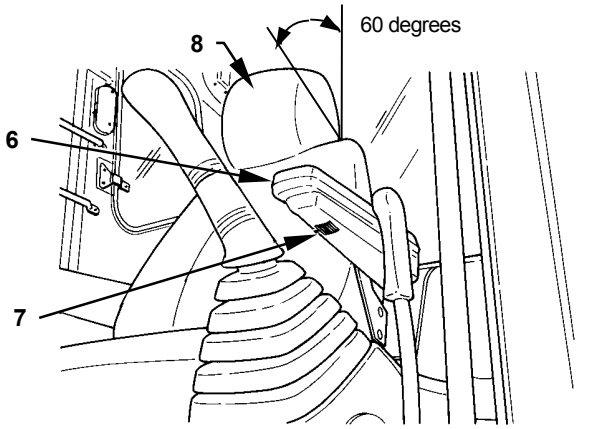
Pull up lever (5) to release backrest lock. Move backrest to the desired position and release the lever.

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).

Headrest

Headrest height and angle can be adjusted.
Pull headrest (8) upward or push downward to the desired position. (Height adjustment range: 50 mm (2.0 in))
Headrest (8) can be adjusted 60 degrees forward from the upright position. Move headrest by hands to the desired angle.

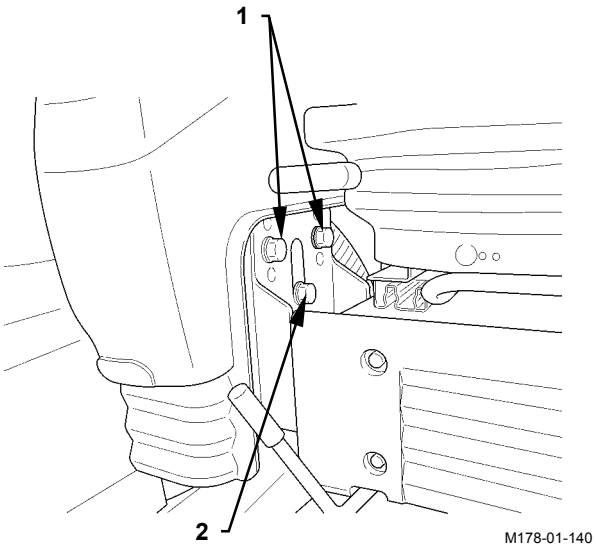


M157-01-040

ADJUSTING CONSOLE HEIGHT

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

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



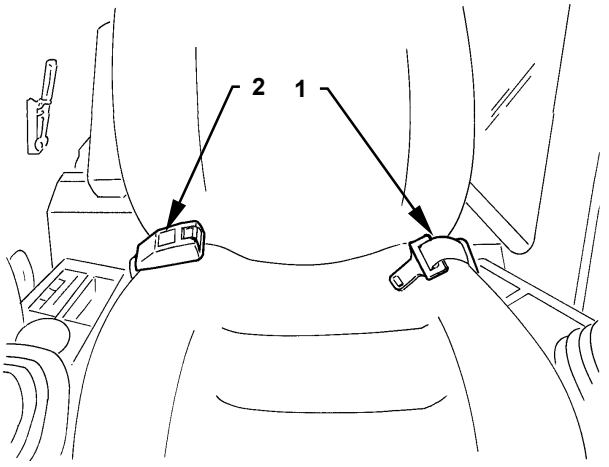
M178-01-140

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)

SEAT BELT

CAUTION: 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.



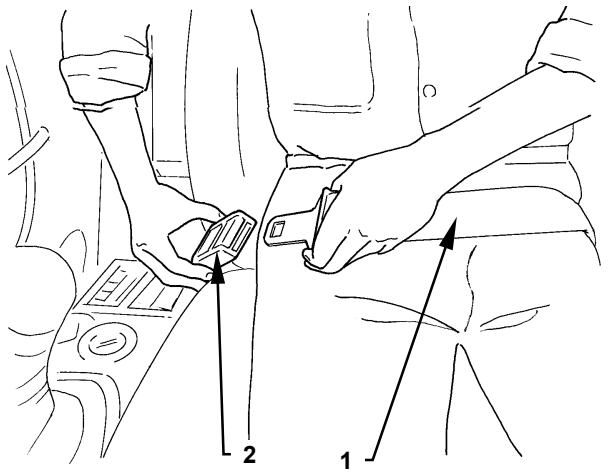
M166-01-030

Seat Belt

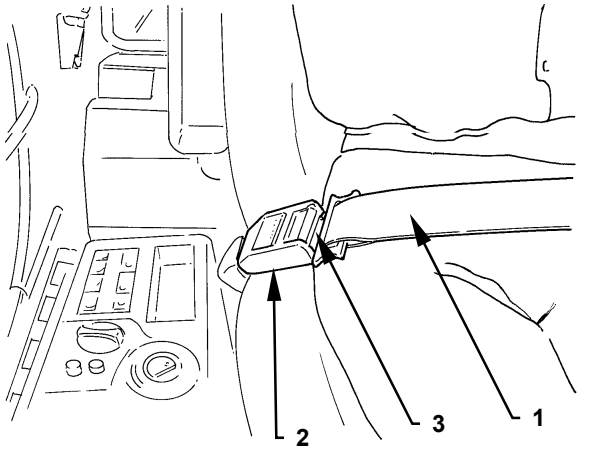
1. Confirm that seat belt (1) is not twisted. Securely insert the end of seat belt (1) into buckle (2).
   Lightly pull on the belt to confirm that the buckle latches securely.

2. Automatically be adjusted, seat belt (1).

3. Push button (3) on buckle (2) to unfasten seat belt (1).



M166-01-031



M166-01-032

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.**
- **Do not attempt to travel the machine at full speed before the break-in period is over, as the lower rollers and front idlers may seize. For the first 200 hours of operation, operate the machine with the travel speed switch set to the slow speed mode.**
- **When moving the machine to the jobsite after completion of local reassembly, be sure to operate the machine with the travel speed switch set to the slow speed mode.**
  Check lower rollers and front idlers every 10 minutes for excessively high temperature.
- **Perform correct break-in procedures for the front-attachment pins.**

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 10 HOURS OR DAILY

1. Perform 10-hour or daily service. (See Maintenance guide -- 10 hours.)
2. Watch for fluid leaks.
3. Lubricate working tool pivots every 10 hours, and every 5 hours when working in mud and water.

AFTER THE FIRST 50 HOURS

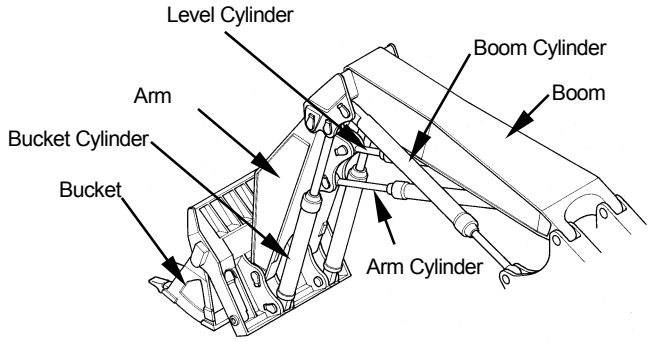
1. Perform 50-hour service. (See Maintenance guide -- 50 hours.)
2. Check accessible hardware torque. (See Hardware Torque Specifications in Maintenance chapter.)

MEMO

OPERATING THE ENGINE

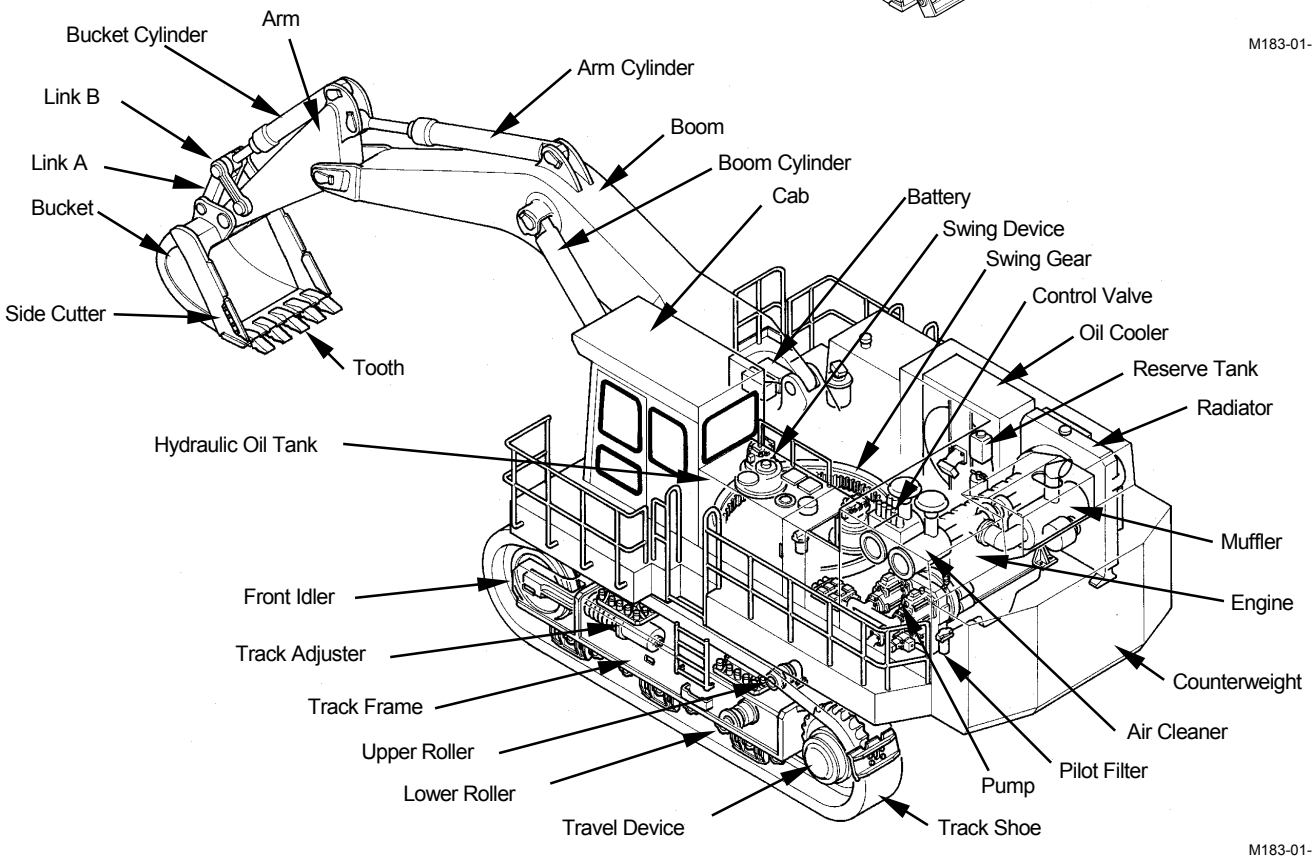
INSPECT MACHINE DAILY BEFORE STARTING

Loading Shovel Front Attachment



M183-01-058

Backhoe Front Attachment



M183-01-059

For other inspection and maintenance procedures, refer to the MAINTENANCE Section.

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

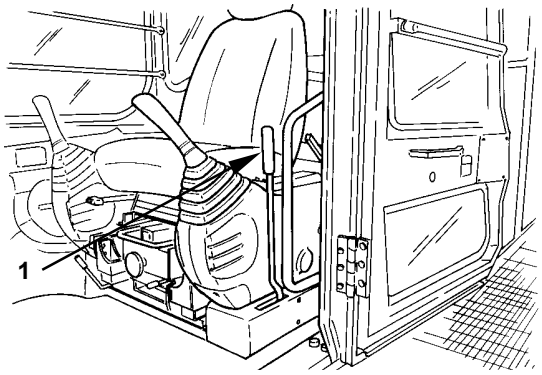
Walk around machine to clear all bystanders/obstacles from machine area.

BEFORE STARTING ENGINE

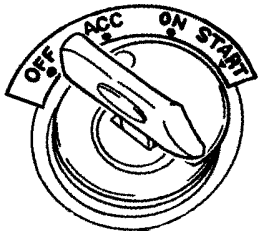
1. Confirm that pilot control shut-off lever (1) is in the LOCK position.
2. Confirm that all control levers are placed in neutral.
3. Check indicator bulbs as follows:

   Turn key switch to ON position. All indicator lights and warning lamps will come on. They will stay on for approximately 3 seconds, except for alternator (2) and pump transmission oil pressure (3) indicator, which will continue to stay on further. If any lamp fails to light, the bulb may be burned out.
4. Adjust the seat to allow full pedal and control levers stroke with operator's back against the backrest. Fasten the seat belt.

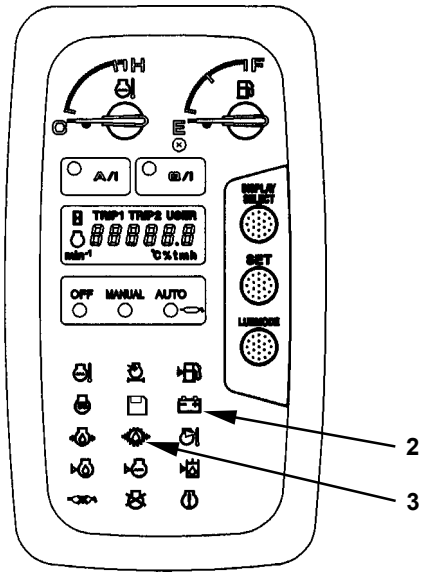
NOTE: Use a wet cloth when wiping dust off monitor or switch panels to prevent damaging the panel face.
Rubber is used on the switch parts. Take care not to tear the rubber-made parts with sharp-edged tool, such as a screwdriver.



LOCK Position M142-01-016



M183-01-034

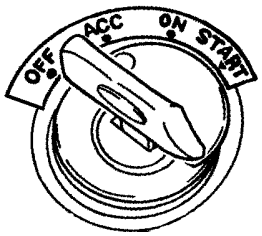


T183-01-02-013

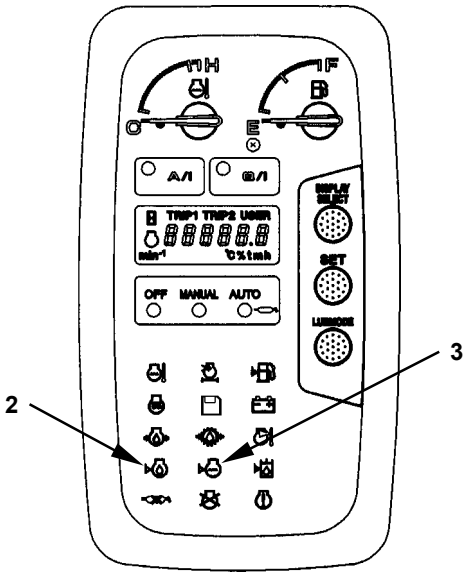
LEVEL CHECK

1. Turn key switch to the ON position.
2. Coolant level (3) and engine oil level (2) indicators will light if levels are adequate for operation.

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.



M183-01-034



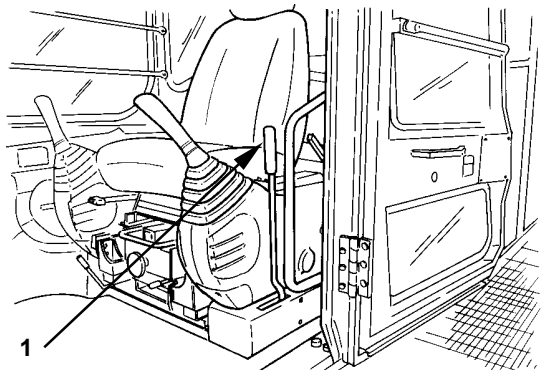
T183-01-02-013

STARTING THE ENGINE IN ORDINARY TEMPARATURE

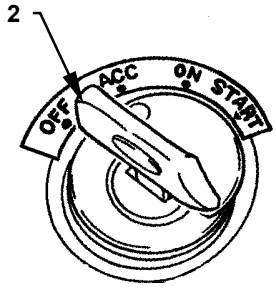
1. Pull the pilot control shut-off lever (1) up to the LOCK position.
2. Turn key switch (2) to ACC or ON position.
3. Sound horn to alert bystanders.
4. Turn engine control dial (3) to the slow idle position.

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.

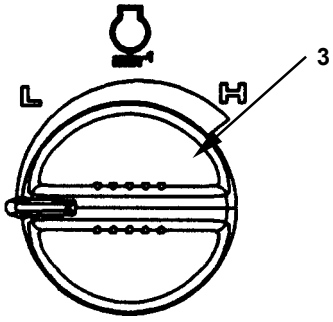
5. Turn key switch (2) to start engine. Release key switch. It will return to ON position.



LOCK Position M142-01-016



M183-01-034



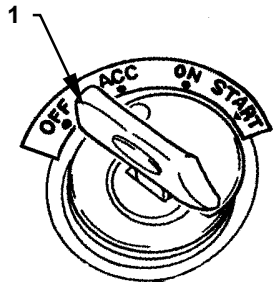
M183-01-052

STARTING THE ENGINE IN COLD WEATHER

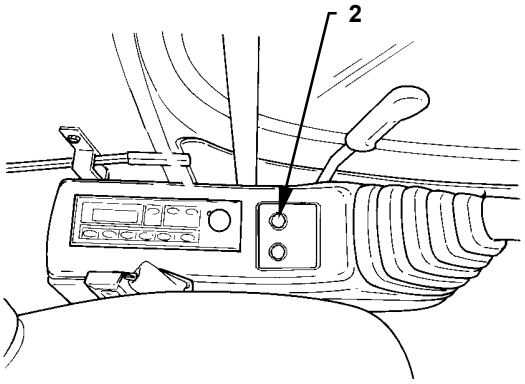
1. Turn key switch (1) to the ACC position.

2. Turn preheat switch (2) ON. Preheat indicator (3) comes ON, starting preheating the engine intake air. At the same time, the engine governor is set so that the fuel injection amount is controlled to the most proper condition for starting in cold weather.

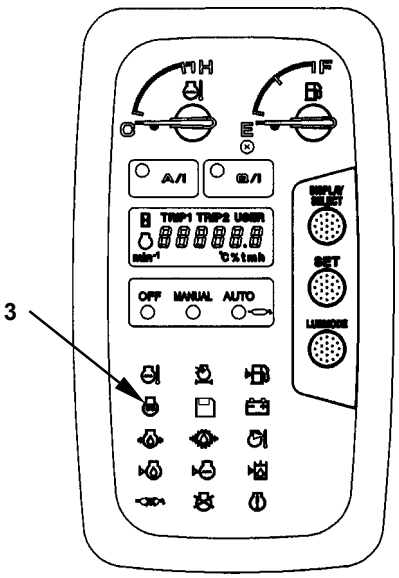
3. Within one minute after starting preheating, turn key switch (1) ON and to the START position and hold it in that position until the engine starts. Preheating will automatically be complete and preheat indicator (3) will go OFF.



M183-01-034



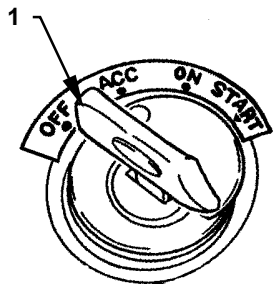
M183-01-035



T183-01-02-013

CAUTION: Preheating system doesn't operate unless key switch (1) is in the ACC position. When preheat switch (2) is turned ON, preheating is continuously performed for approx. 1 minute with key switch (1) in the ACC position. If key switch (1) is turned to a position other than the ACC position before preheating is complete, preheating will be automatically completed, extinguishing preheat indicator (3). In case preheating is performed for longer than 1 minute, preheat indicator goes OFF, automatically completing preheating.
If preheating is required again, turn preheat switch (2) OFF. Wait for more than 5 minutes and then, turn preheat switch (2) ON again. The preheating system will not be activated unless the 5 minutes interruption is performed to protect the engine.

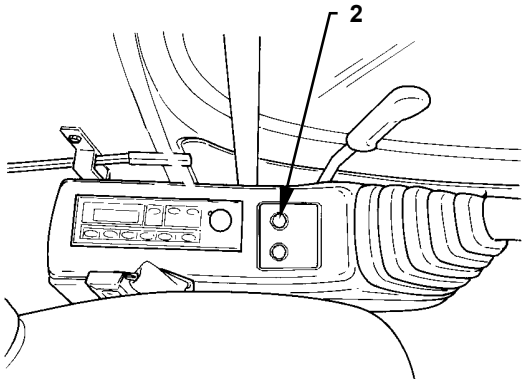
4. As soon as the engine stars, release key switch (1). The key will automatically return to the ON position.
5. Turn preheat switch (2) OFF.



M183-01-034

IMPORTANT: Preheating uses a large amount of current so that the batteries will be quickly discharged if preheating is frequently performed. Perform proper preheating corresponding to the ambient temperature table below for proper preheating time when the atmospheric temperature is below –5°C (23°F).

Ambient Temperature	−15 to −5°C (5 to 23°F)	−15°C (5°F) or less
	15 to 30 s	30 to 60 s



M183-01-035

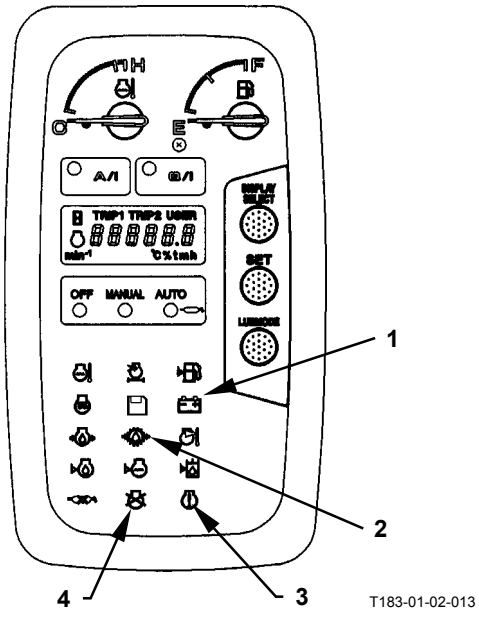
CHECK INSTRUMENTS AFTER STARTING

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

Check that

1. Alternator indicator (1) is off.
2. Pump transmission oil pressure indicator (2) is off.
3. Engine warning indicator (3) is off.
4. Engine stop indicator (4) is off.
5. Engine noise and exhaust gas are normal.

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



USING BOOSTER BATTERIES

CAUTION:

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

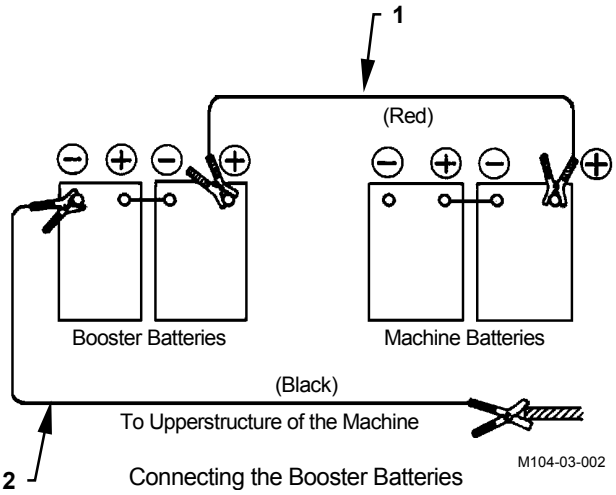
SA-032

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.

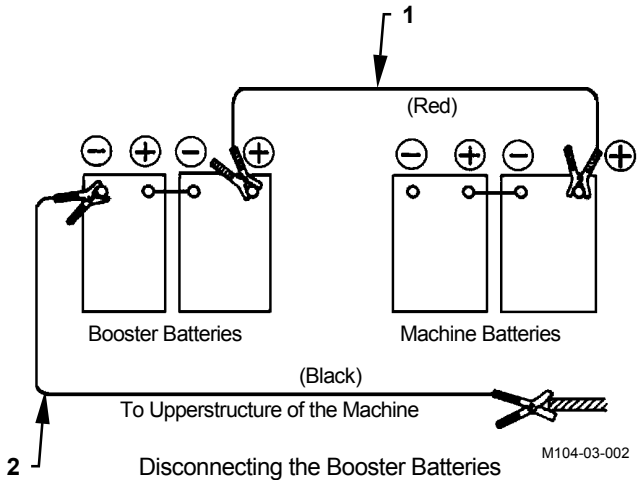


M104-03-002

Connecting the Booster Batteries

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.



Disconnecting the Booster Batteries

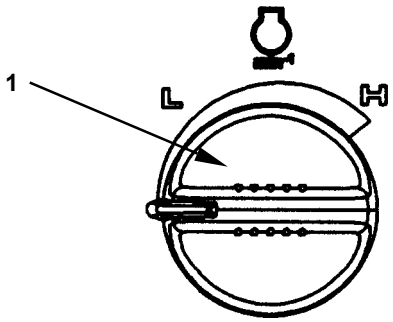
STOPPING THE ENGINE

Engine stop procedure

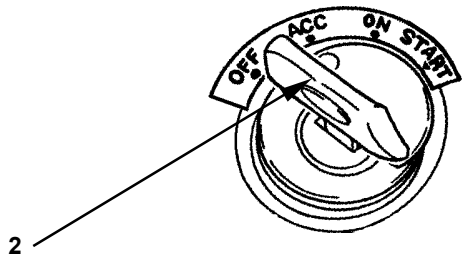
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn engine control dial (1) to the slow idle position and run the engine for 5 minuets to cool the engine.

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.



M183-01-052



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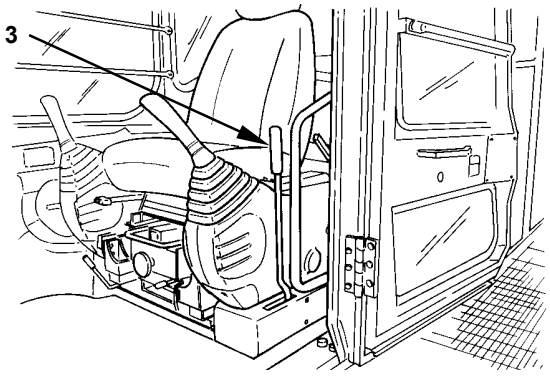


M142-01-016

LOCK position

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.

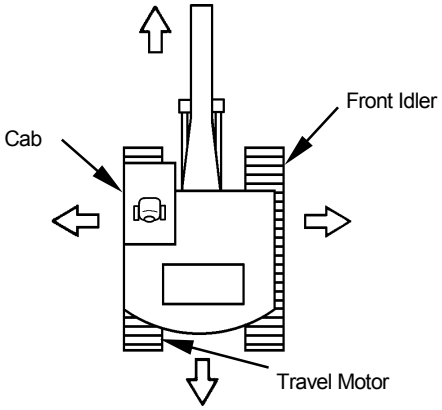
When driving over rough terrain, reduce engine speed to lessen possibility of undercarriage damage.

STEERING THE MACHINE USING PEDALS

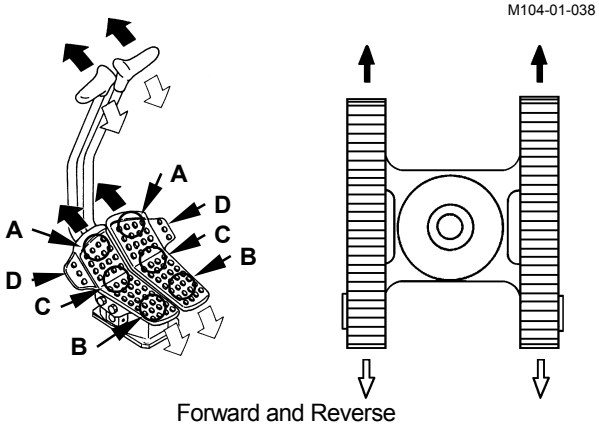
CAUTION: In the standard travel position, the front idlers are positioned at the front of the machine and the travel motors at the rear. If the travel motors are positioned at the front of the machine, the control actions of the travel pedals will be reversed. Be sure to confirm the position of the travel 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.
Travel lever dampers are provided for smooth control. In extremely cold weather, lever effort will increase. Operate levers several times with pilot control shut-off lever in the LOCK position.

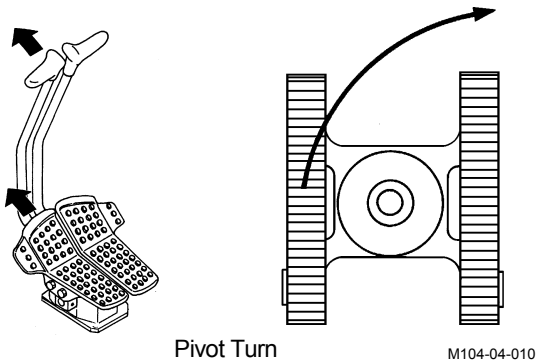


M104-01-038



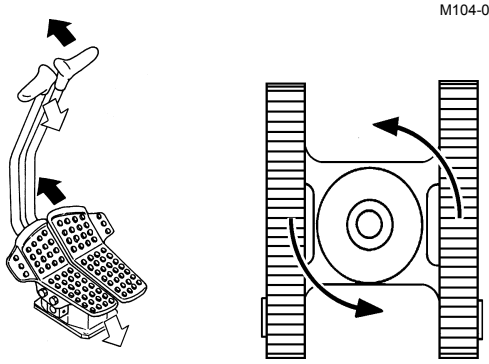
Forward and Reverse

M104-04-009
M104-04-003



Pivot Turn

M104-04-010
M104-04-003



Spin Turn

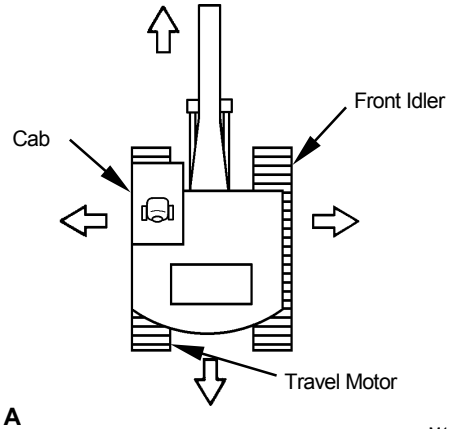
M104-04-011
M104-04-007

STEERING THE MACHINE USING LEVERS

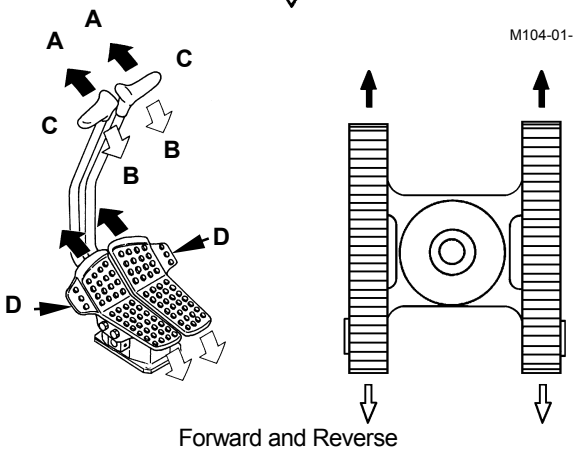
CAUTION: In the standard travel position, the front idlers are positioned at the front of the machine and the travel motors at the rear. If the travel motors are positioned at the front of the machine, the control actions of the travel levers will be reversed. Be sure to confirm the position of the travel 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.
Travel lever dampers are provided for smooth control. In extremely cold weather, lever effort will increase. Operate levers several times with pilot control shut-off lever in the LOCK position.

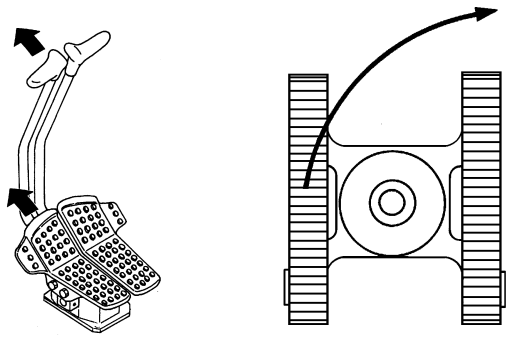


M104-01-038



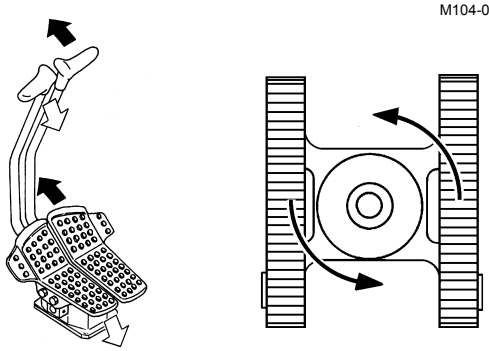
Forward and Reverse

M104-04-009
M104-04-003



Pivot Turn

M104-04-010
M104-04-005



Spin Turn

M104-04-011
M104-04-007

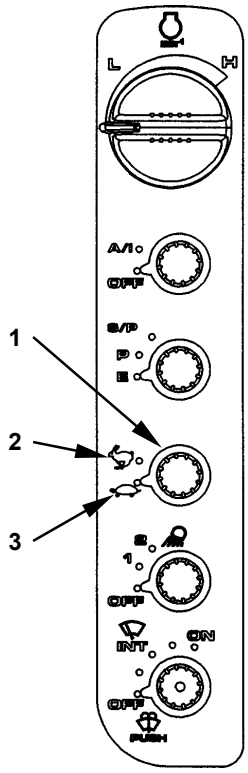
TRAVEL MODE SWITCH

CAUTION: 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.

Use travel mode switch (1) to change the travel mode between fast speed mode and slow speed mode.
Turn travel mode switch (1) to mark (2) to change the travel mode to the fast speed mode.
Turn travel mode switch (1) to mark (3) to change the travel mode to the slow speed mode.

2: Mark (Fast Speed Mode)

3: Mark (Slow Speed Mode)



M183-01-051

TRAVEL ALARM (OPTIONAL)

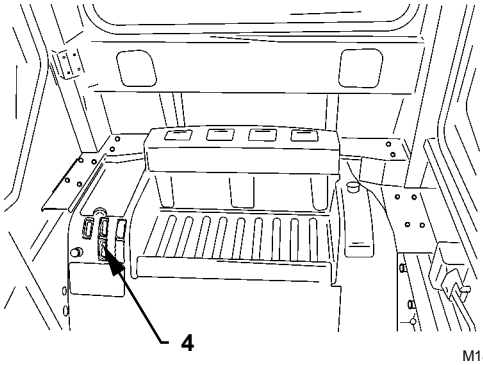
The travel alarm functions to alert co-workes and/or bystanders to movement of the machine, both forward and reverse. Travel alarm (5) sounds when any travel pedal or lever is operated and will continue to sound as long as the tracks are moving.

CAUTION: If the travel alarm (5) does not sound when traveling, immediately stop the engine and contact your authorized dealer for repair. Operating the machine with a malfunctioning travel alarm may result in personal injury or death.

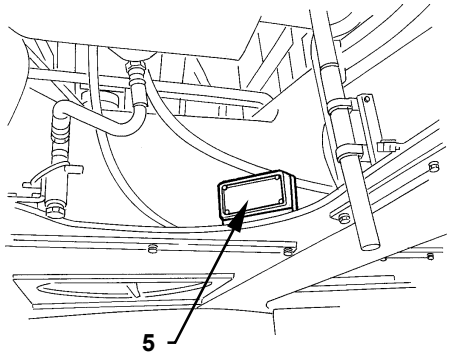
Alarm (5) can be canceled after 13 seconds by pushing travel alarm stop switch (4).

NOTE: Alarm (5) can not be canceled within the first 13 seconds of traveling, even when travel alarm cancel switch (4) is pushed.

When travel alarm stop switch (4) automatically resets.



M18E-01-007

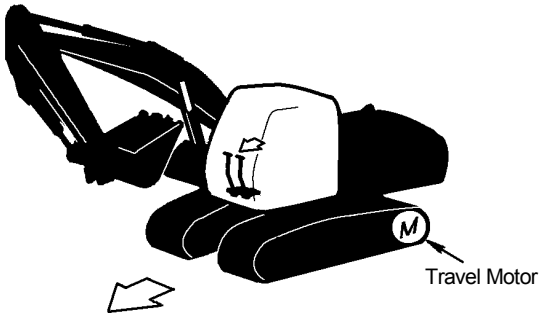


M183-01-090

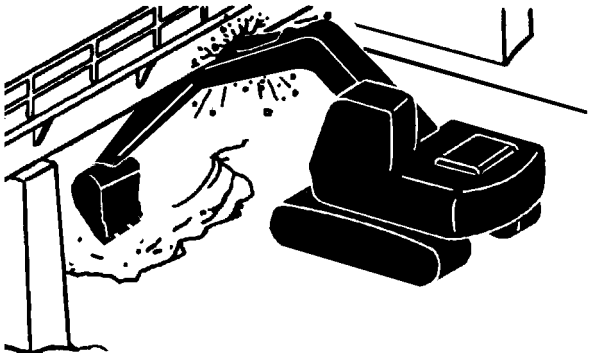
TRAVELING

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



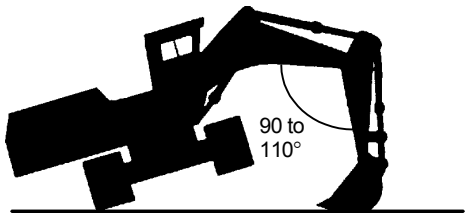
M104-05-008



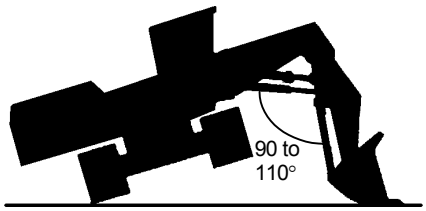
SA-011

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.)



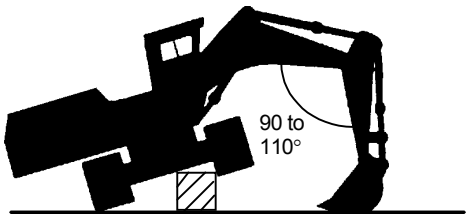
M145-05-007



M145-05-025

RAISE ONE TRACK USING BOOM AND ARM

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

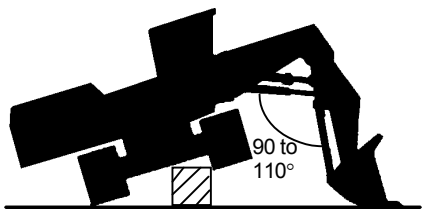


M145-05-007

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

Place blocks under machine frame to support the machine.

NOTE: Before raising the machine above the ground, turn the raising-up function deactivation switch OFF.



M145-05-025

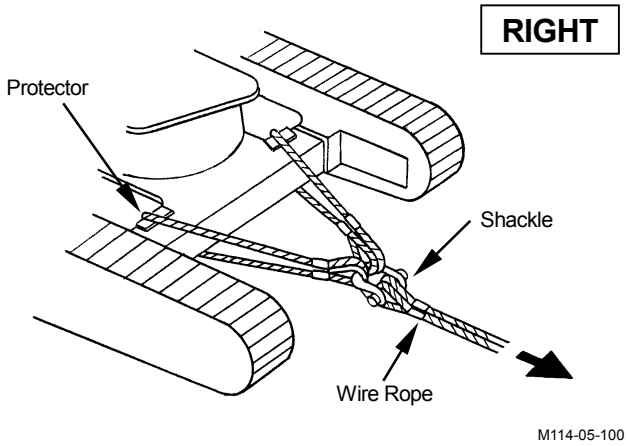
IMPORTANT: When the machine is equipped with the loading shovel front attachment, don't raise the machine off the ground by bucket tooth force with the bucket cylinder fully retracted. Failure to do so will cause excessive loads to be applied to the bucket pins and cylinders so that damage to the pins may result.

M146-05-001

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.

Max. Traction Force:618 kN (63000 kgf, 138900 lbf)
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.



IMPORTANT:
- **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.**

OPERATING IN WATER OR MUD

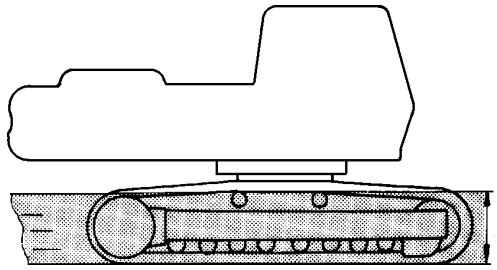
The machine can be operated in water up to the upper edge of the upper rollers only if worksite footing has sufficient strength to prevent the machine from sinking past the upper edge of the upper roller, and only if the water is flowing slowly.

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.

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



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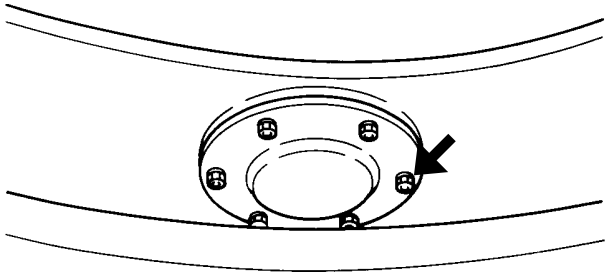
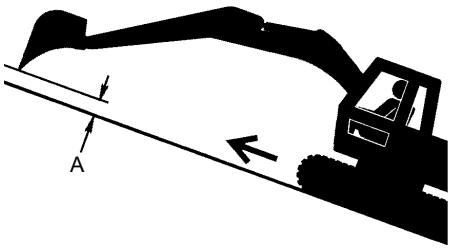


M142-07-050

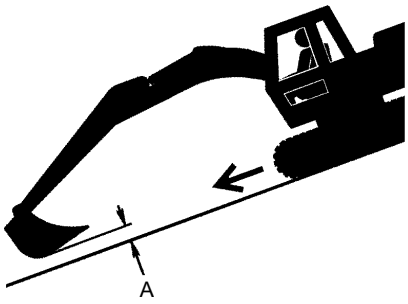
PRECAUTIONS FOR TRAVELING ON SLOPES

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

1. Never attempt to ascend or descend 30 degrees or steeper slopes.
2. Be sure to fasten the seat belt.
3. Keep the bucket pointed in the direction of travel, approximately 0.5 (1′ 8″) to 1.0 (3′ 3″) m (A) above the ground. If the machine starts to skid or becomes unstable, lower the bucket immediately.
4. 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.
5. 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.
6. If the engine stalls on a slope, immediately lower the bucket to the ground. Return the control levers to neutral. Then, restart the engine.
7. Be sure to thoroughly warm up the machine before ascending steep slopes. If hydraulic oil has not warmed up sufficiently, sufficient performance may not be obtained.



SA-657



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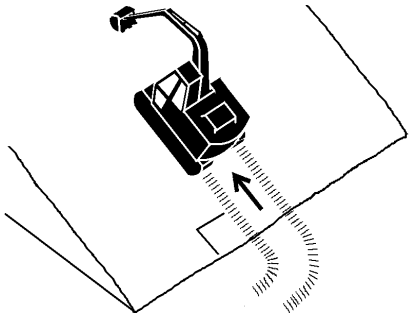

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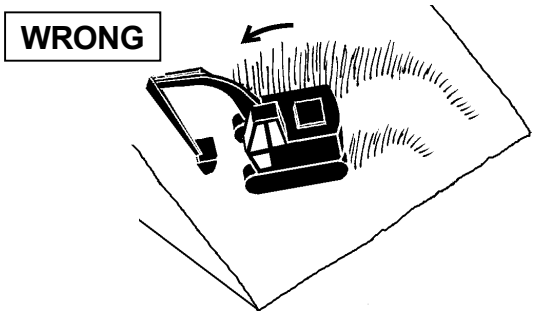
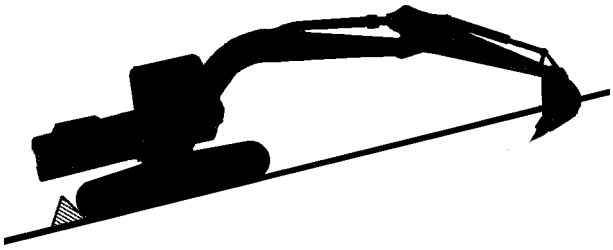


SA-442

PARKING THE MACHINE ON SLOPES

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



M104-05-014

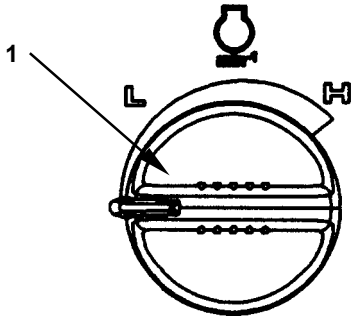
If parking the machine on a slope is unavoidable:

- 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.

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.

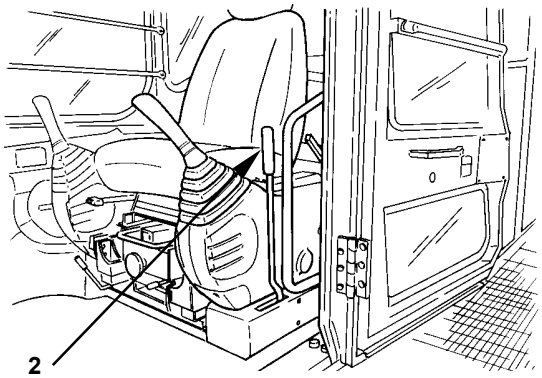
IMPORTANT: Turbocharger may be damaged if the engine is not properly shut down.



M183-01-052

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.



LOCK position

M142-01-016

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

CONTROL LEVER (ISO PATTERN BACKHOE)

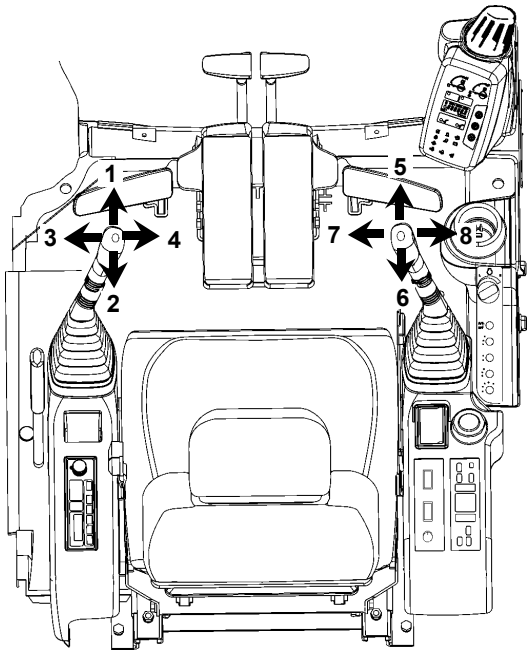
CAUTION: Never place any part of body beyond window frame. It could be crushed by the boom if boom control lever is accidentally bumped or otherwise engaged. If window is missing or broken, replace immediately.
Prevent possible injury from unexpected machine movement.
Make sure you know the location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

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

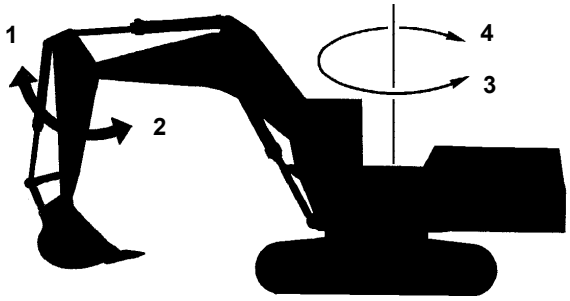
IMPORTANT: When digging, avoid hitting tracks with boom cylinders.
When digging over the end of the tracks, travel motors should be at the rear to maximize machine stability and lift capacity.

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

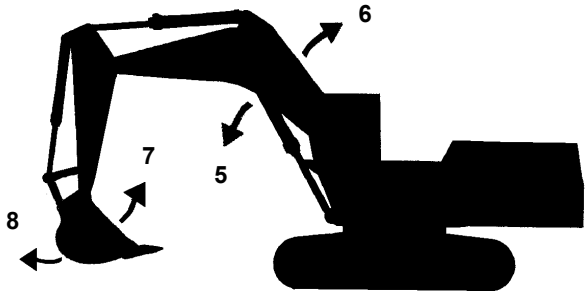
1- Arm Roll-Out
2- Arm Roll-In
3- Swing Left
4- Swing Right
5- Boom Lower
6- Boom Raise
7- Bucket Roll-In.
8- Bucket Roll-Out.



M183-01-007



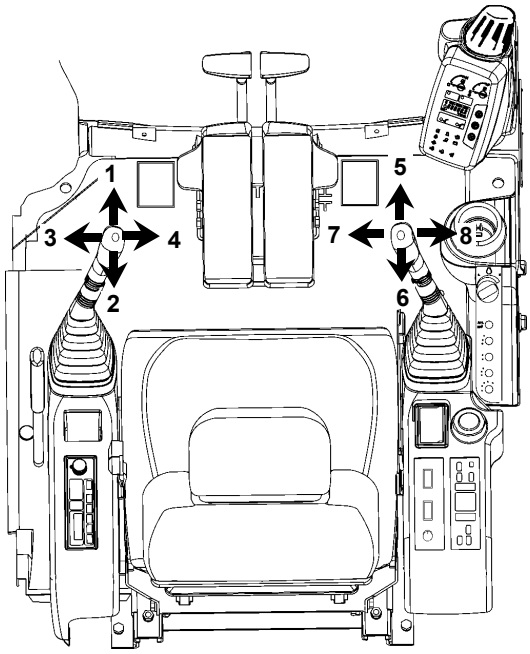
M142-05-002



M142-05-003

CONTROL LEVER (ISO PATTERN LOADING SHOVEL)

CAUTION: 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.



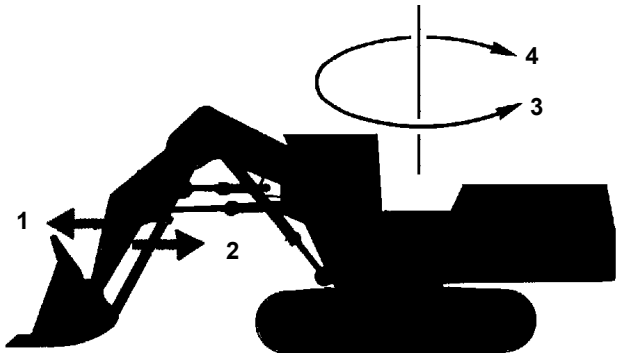
M183-01-050

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

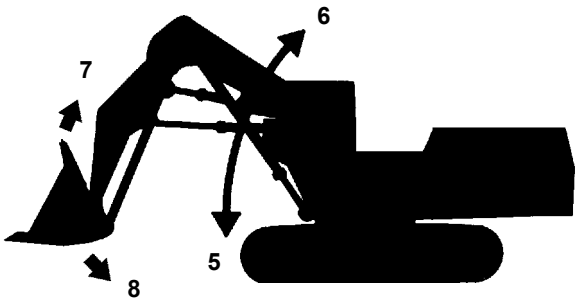
IMPORTANT: When digging, avoid hitting tracks with boom cylinders.
When digging over the end of the tracks, travel motors should be at the rear to maximize machine stability and lift capacity.

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

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



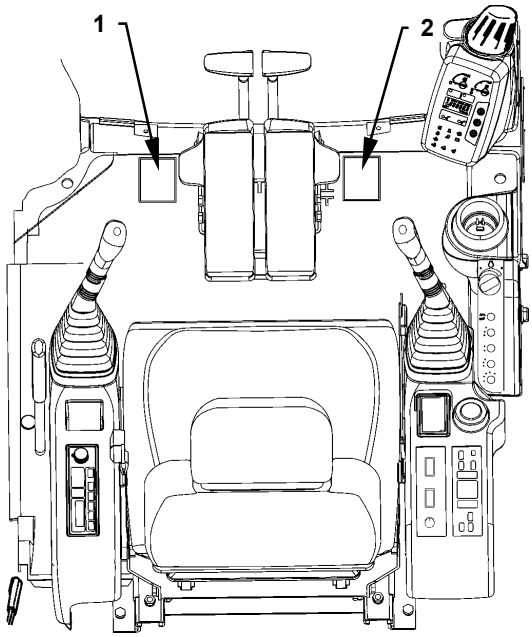
M117-05-027



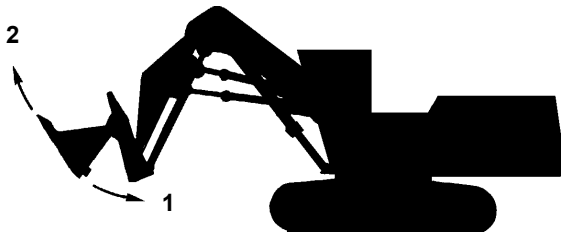
M117-05-025

BUCKET OPEN-CLOSE PEDALS (LOADING SHOVEL)

1 – Bucket Closing
2 – Bucket Opening



M183-01-050



M117-05-031

CONTROL LEVER (HITACHI PATTERN BACK-HOE)

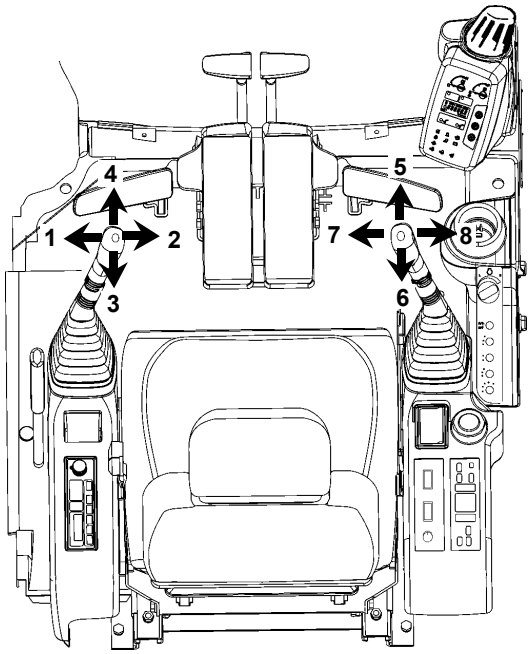
CAUTION: Never place any part of body beyond window frame. It could be crushed by the boom if boom control lever is accidentally bumped or otherwise engaged. If window is missing or broken, replace immediately.
Prevent possible injury from unexpected machine movement.
Make sure you know the location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

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

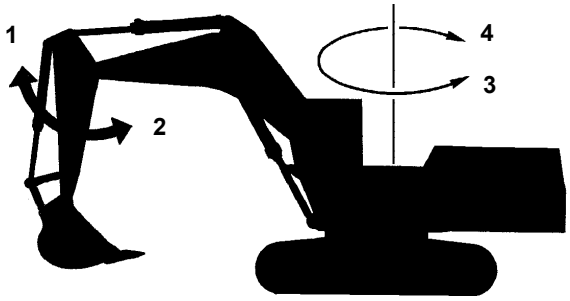
IMPORTANT: When digging, avoid hitting tracks with boom cylinders.
When digging over the end of the tracks, travel motors should be at the rear to maximize machine stability and lift capacity.

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

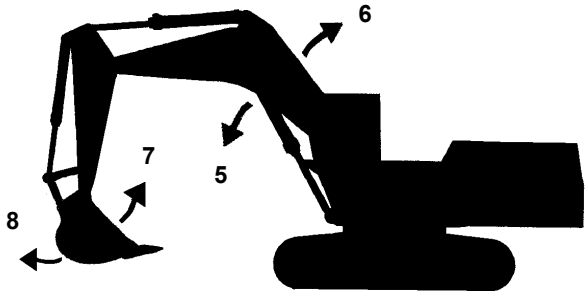
1- Arm Roll-Out
2- Arm Roll-In
3- Swing Left
4- Swing Right
5- Boom Lower
6- Boom Raise
7- Bucket Roll-In.
8- Bucket Roll-Out.



M183-01-007



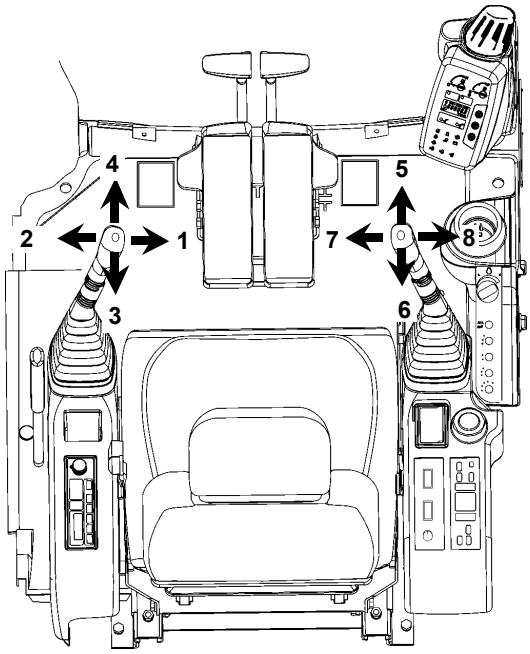
M142-05-002



M142-05-003

CONTROL LEVER (HITACHI PATTERN LOADING SHOVEL)

CAUTION: 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.



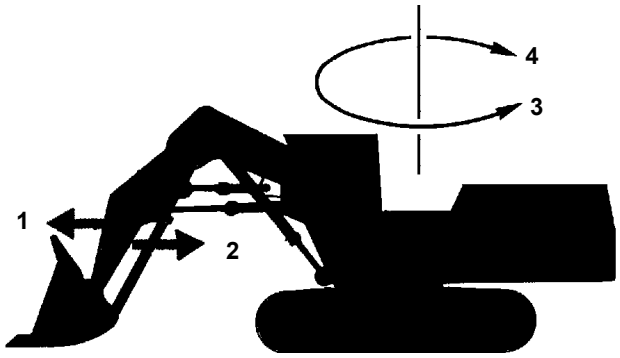
M183-01-050

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

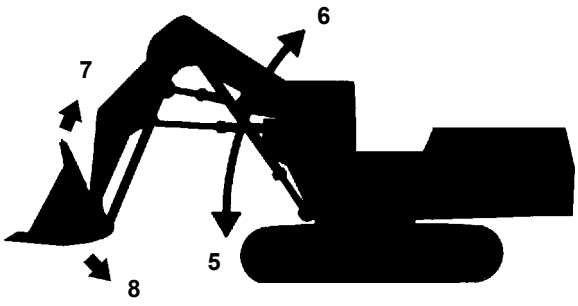
IMPORTANT: When digging, avoid hitting tracks with boom cylinders.
When digging over the end of the tracks, travel motors should be at the rear to maximize machine stability and lift capacity.

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

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



M117-05-027



M117-05-025

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.

CAUTION:

- **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.

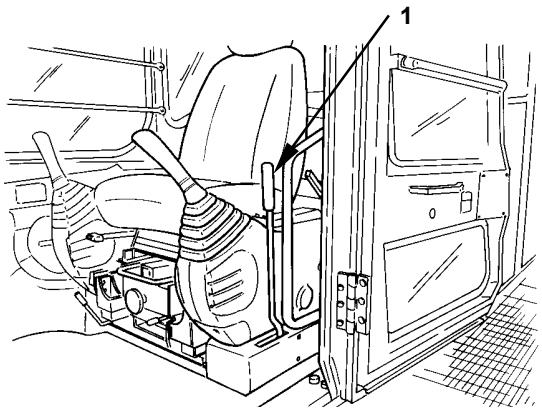
Before Starting Operation:

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

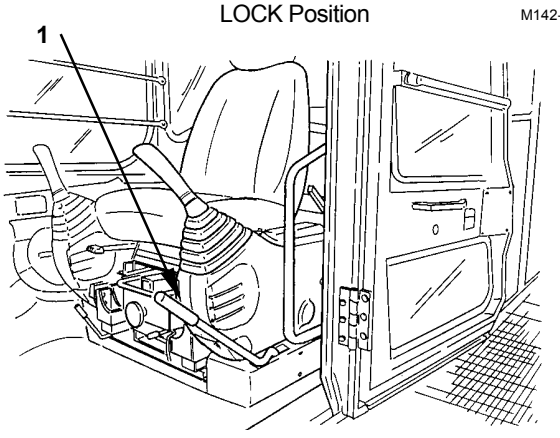
After starting the engine:

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 malfuntioning. Immediately pull the pilot control shut-off lever back to the LOCK position, and stop the engine. Then, see your authorized dealer.



LOCK Position M142-01-016

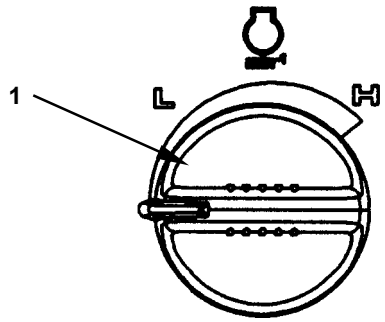


UNLOCK Position M142-05-001

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.



M183-01-052

Hydraulic Oil Warm–up Operation

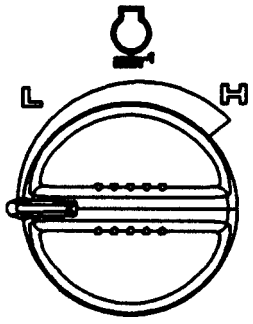
IMPORTANT: Hydraulic components may be seriously damaged if the machine is operated with hydraulic oil temperature below 30°C (86°F). Always warm hydraulic oil to specifications before operating the machine.

1. Increase the engine speed to middle speed by operating the control dial (1). Run the engine for 5 minutes with the bucket held in the rolled-out (titled-out) position. (Do not operate other functions than the bucket at this time)
2. Increase the engine speed to the maximum speed. Run the engine for 5 to 10 minutes with the bucket rolled-in (titled-in) or arm rolled-in (cylinder extend). (Do not operate other functions than the bucket or arm at this time)

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.**



M183-01-052

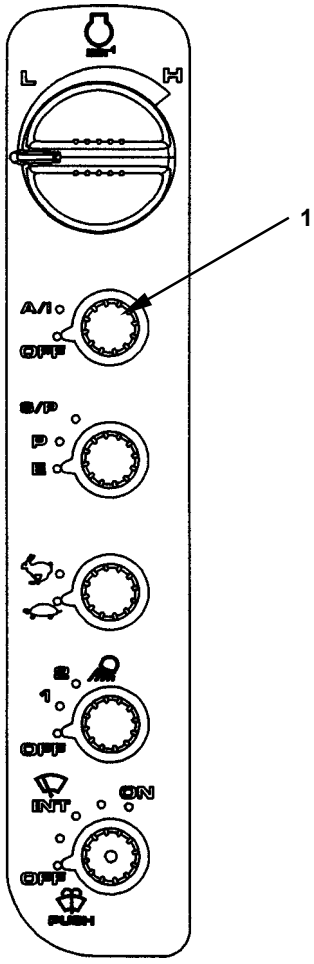
1. Turn engine control dial (1) to the medium position.
2. Operate the boom, arm and bucket cylinders slowly to each stroke end several times.
3. Operate travel and swing functions slowly, initially moving only short distances.
4. Continue to repeat steps 2 and 3 until bucket cycle time is normal.

AUTO-IDLE

With auto-idle switch (1) turned to A/I position, approximately 4 seconds after all control levers are returned to neutral, the engine speed decreases to the auto-idle setting to save fuel consumption. The engine speed will immediately increase to the speed set by the engine control dial when any control lever is operated.

CAUTION:

- **Always check if auto-idle indicator (2) 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 switch (1) is turned to A/I position. If the engine speed is set high with engine control dial, 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.**
- **Prevent the machine from unexpected movement. Be sure to turn off auto-idle switch (1) when unexpected machine movement is undesirable, especially when loading/unloading the machine for transportation.**

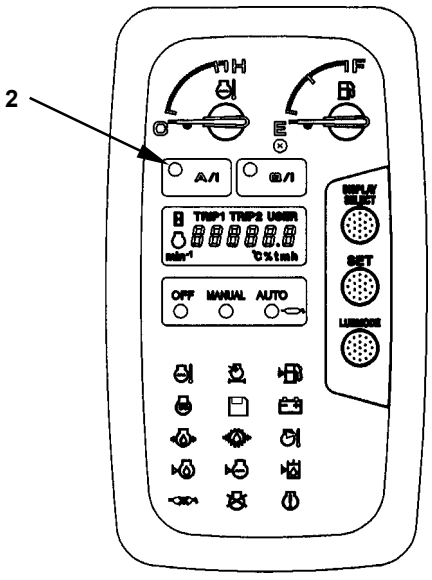


M183-01-051

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 to A/I position or OFF position with auto-idle indicator (2).

Auto-Idle Function ON : Auto-Idle Indicator (2) ON
Auto-Idle Function OFF : Auto-Idle Indicator (2) OFF

- In order to deactivate the auto-idle function, simply turn auto-idle switch (1) to OFF position when auto-idle indicator (2) is turned on. Auto-idle indicator (2) will go out.



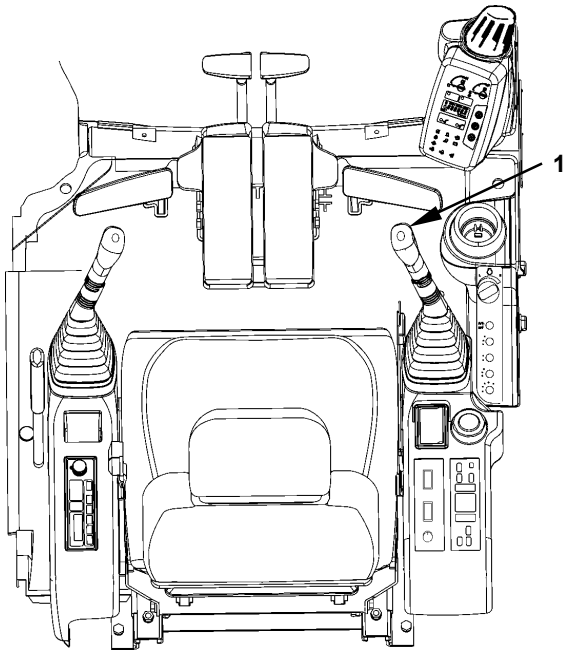
T183-01-02-013

QUICK IDLE

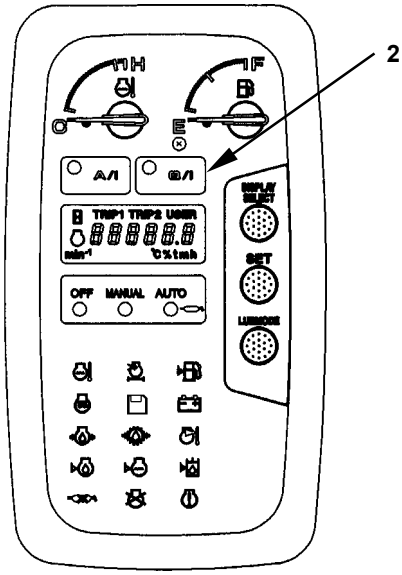
Fuel consumption is reduced by operating the engine at slow idle speed regardless of engine speed setting by the engine control dial.
When the machine is standing, for example, waiting for a dump truck, use this function effectively.

- Push quick idle switch (1). The engine speed is quickly reduced to slow idle speed and quick idle indicator (2) on the monitor panel comes ON at the same time.

- To deactivate quick idle function, push quick idle switch (1) with quick idle indicator (2) turned ON. Indicator (2) goes OFF and the engine speed is restored to the speed set by engine control dial immediately.



M183-01-007

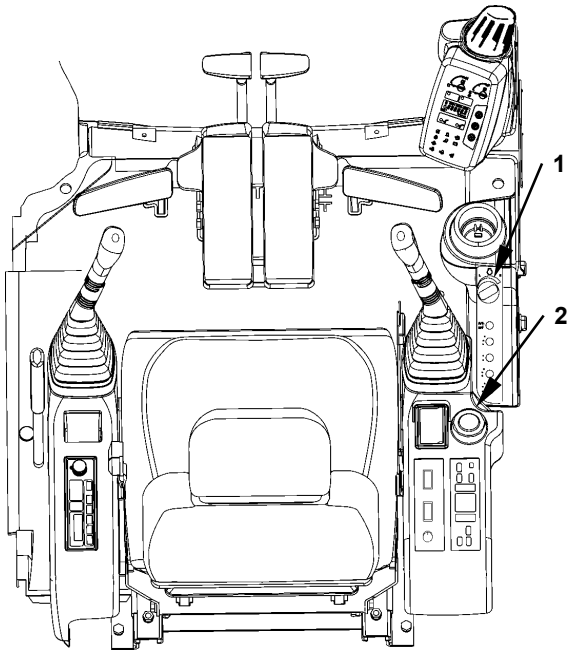


T183-01-02-013

ENGINE SPEED CONTROL

Increase and decrease the engine speed using engine control dial (1) located on the switch panel 2, as illustrated.

- Turn engine control dial (1) clockwise to increase the engine speed. Turn engine control dial (1) counter-clockwise 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 (2) to OFF position to stop the engine.



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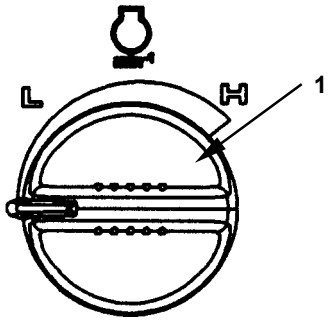


M183-01-052

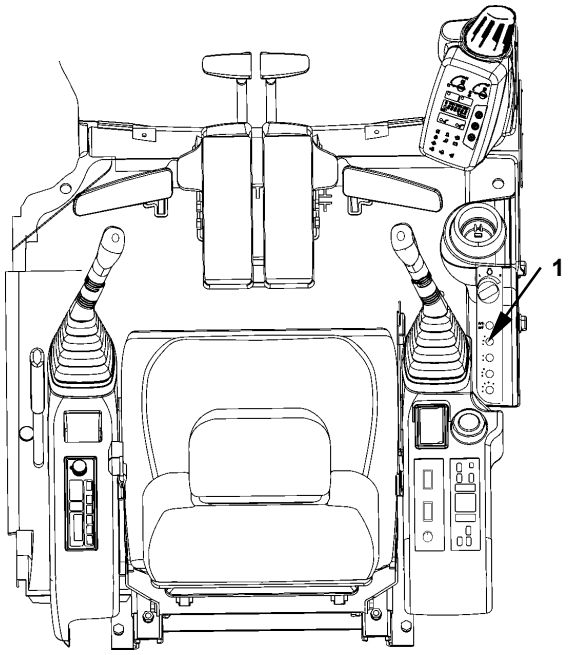
POWER MODE

Three power modes can be selected for the work to be performed by operating power mode switch (1).

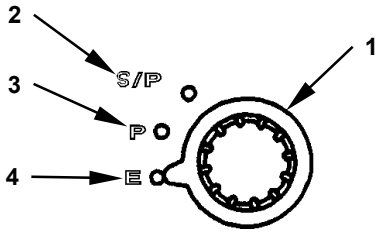
2- S/P (Super Power Mode)

3- P (Power Mode)

4- E (Economy Mode)



M183-01-007



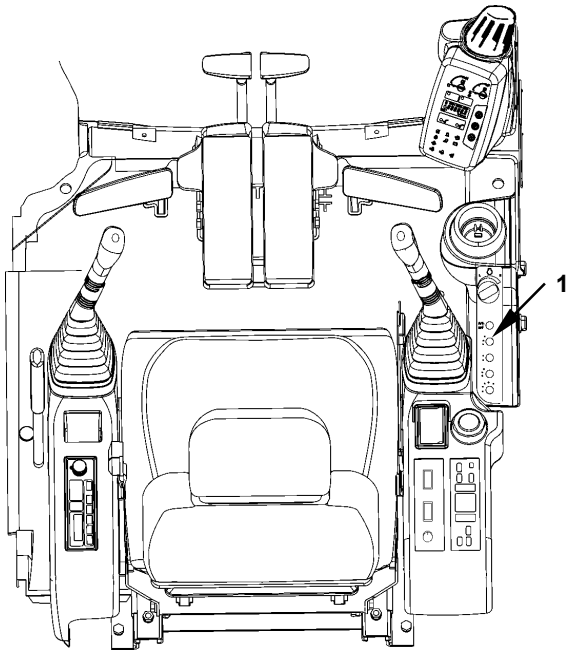
M183-01-054

E (ECONOMY) MODE

Use the E mode when the priority is given to fuel consumption performance rather than work performance.

The digging power is the same as that of the standard mode*. The work performance will decrease somewhat, but fuel consumption will also decrease, improving fuel efficiency and decreasing noise level.

When power mode switch (1) is turned to E position (2), the power mode will be changed to E mode.



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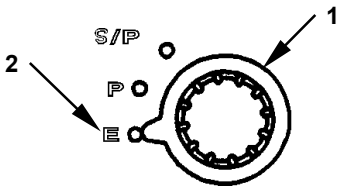
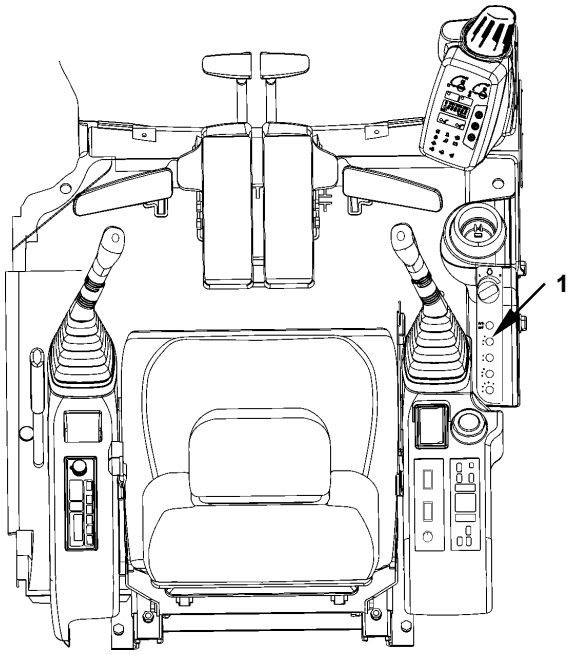


M183-01-054

P (POWER) MODE

Use the P mode for general digging and truck loading.

When turn power mode switch to P position (2), the power mode will be changed to P mode.



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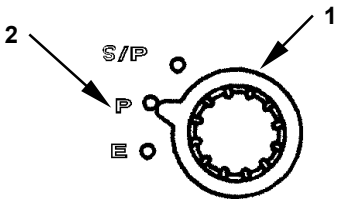
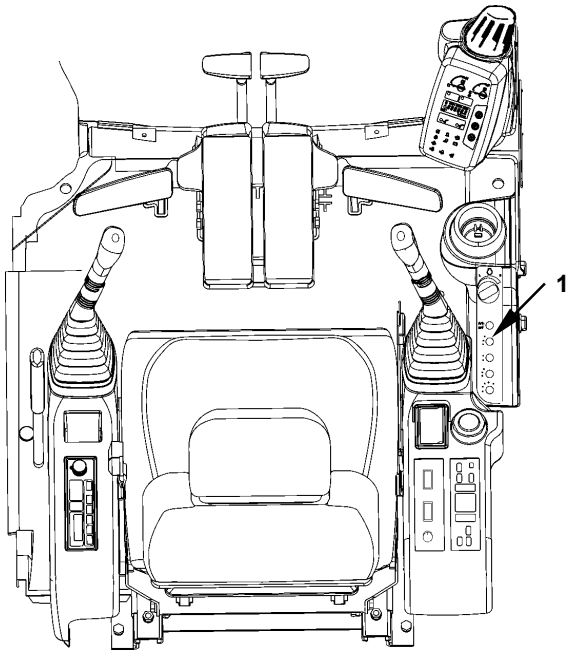


M183-01-100

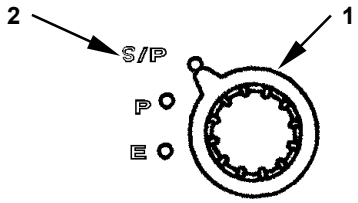
S/P (SUPER POWER) MODE

Use the S/P mode when extra horsepower is needed a faster speed and/or a large production.

When turn power mode switch to S/P position (2), the power mode will be changed to S/P mode.



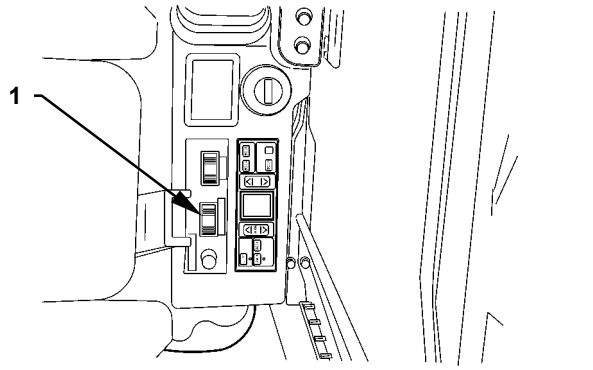
M183-01-007



M183-01-101

HEAVY LIFT

The heavy lift function reduces the front attachment speed to allow an increase of the arm and boom power.
Use heavy lift switch (1) when a heavy load must be moved slowly.



M183-01-030

CAUTION: If heavy lift switch (1) is turned OFF while moving a load, the front operation speed is suddenly increased, causing possible personal injury. Be sure to turn heavy lift switch (1) OFF after the load is completely stopped.

1. Push the front side of heavy lift switch (1).
2. Operate either the boom or arm.
3. The front operation speed is automatically reduced to one third (1/3) of the normal operation speed.
4. Push the rear side of heavy lift switch (1) to deactivate the heavy lift function. The front operation speed is restored to the normal one.

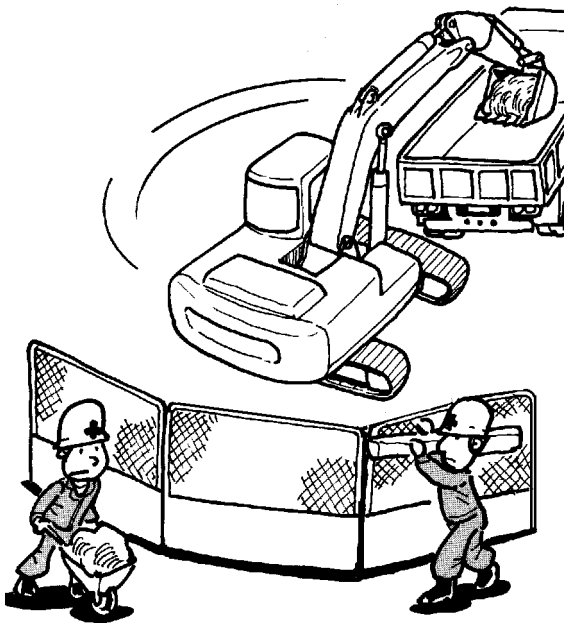
PRECAUTIONS FOR OPERATIONS

CAUTION: Investigate the work site before starting operations.

- **Be sure to install an overhead cab guard when operating in a work site which has a possibility of falling objects.**
- **If operation on soft ground is required, sufficiently reinforce the ground beforehand.**

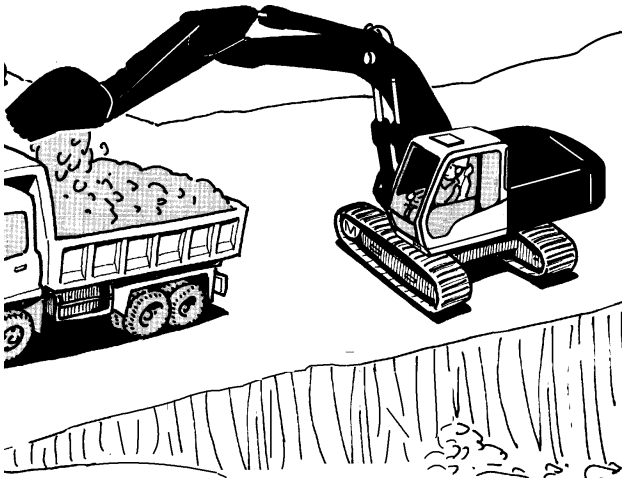
- Be sure to wear close fitting clothing and safety equipment appropriate for the job, such as a hard hat, etc. when operating the machine.
- Clear all persons and obstacles from area of operation and machine movement.
  Always beware of the surroundings while operating. When working in a small area 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.

NOTE: The standard machine is equipped with a head guard integrated cab.



M104-05-015

OPERATE THE MACHINE SAFELY



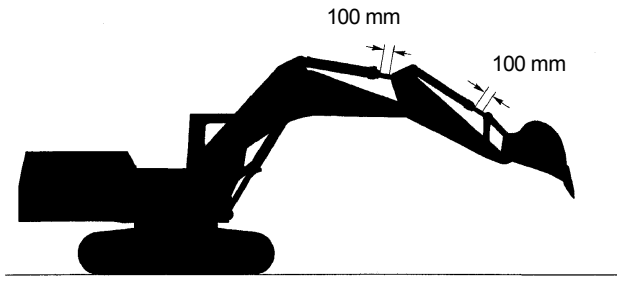
M104-05-016

CAUTION: Prevent the machine from tipping over and from being involved in a ground collapse. Take the necessary precautions as follows:

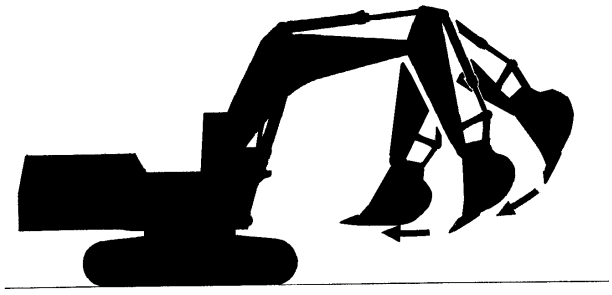
- **Make sure the worksite has sufficient strength to firmly support the machine.**
  When working close to an excavation or at road shoulders, operate the machine with the tracks positioned perpendicular to the cliff face with travel motors at the rear, so that the machine can more easily evacuate if 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.**

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.



M145-05-008



M145-05-009

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

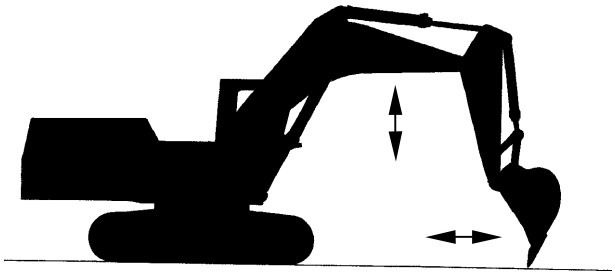
IMPORTANT: Do not pull or push dirt with the bucket when traveling.

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.

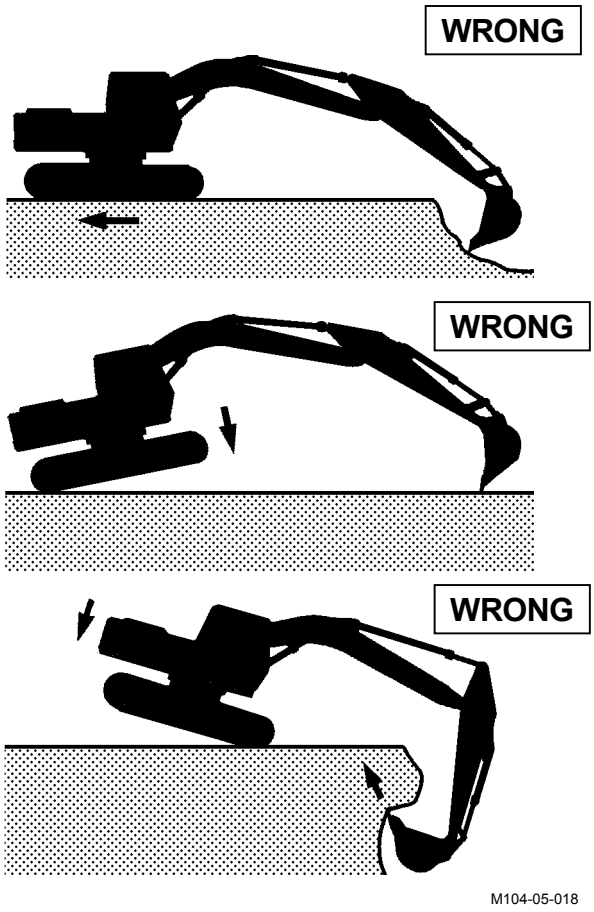


M145-05-010

AVOID ABUSIVE OPERATION

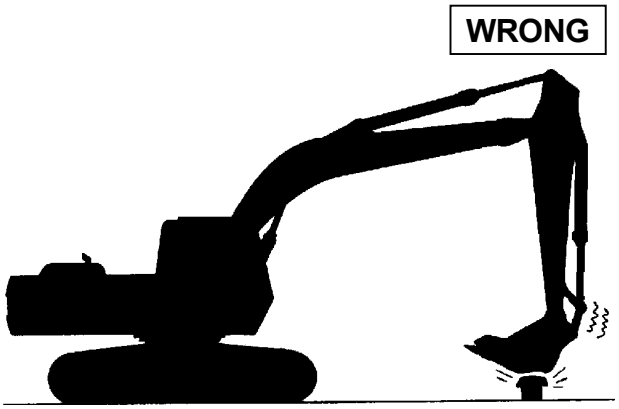
Do not use travel as an additional digging force. Severe machine damage may result.

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 TIPS



M104-05-019

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.

IMPORTANT: 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.

IMPORTANT: 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.

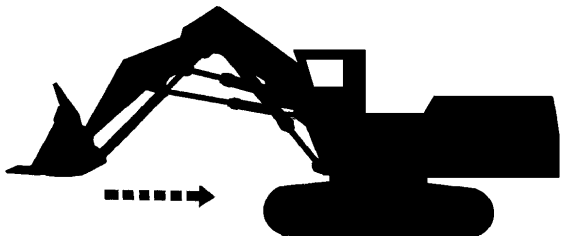
LOADING SHOVEL OPERATION

- To dig, position the bucket bottom parallel to and touching the ground and extend the arm while crowding the bucket.

- Digging force increases as the arm is extended. Try to dig with the arm extended where strong digging forces are required.

- Straight Retraction
  When the arm cylinder is retracted, the arm top moves horizontally, as oil escaping from the level cylinder flows to the bottom end of the boom cylinders, raising the boom.

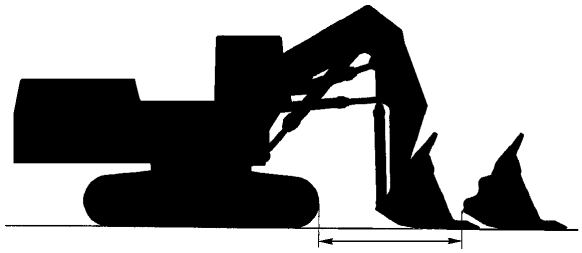
  When the bucket cylinders are fully extended and the bucket comes into contact with the stopper, the straight retraction cannot be performed. To perform the straight retraction, retract the arm cylinder after dumping the bucket slightly.



M145-05-015

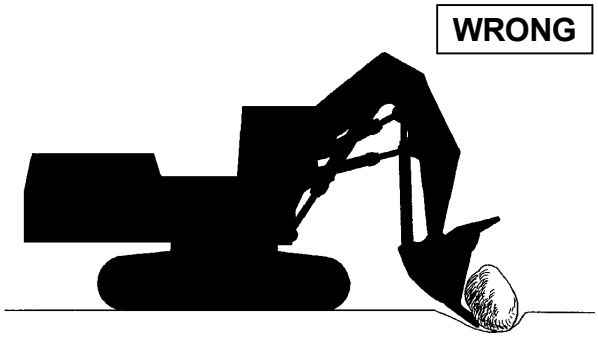
PROHIBITED OPERATION

- Never dig with the bucket retracted too closely to the undercarriage, as the machine components will be subjected to excessive force. If closely retracted digging is unavoidable, keep a distance of at least 3 m between the rear end of the bucket and the front end of the undercarriage.



M117-05-017

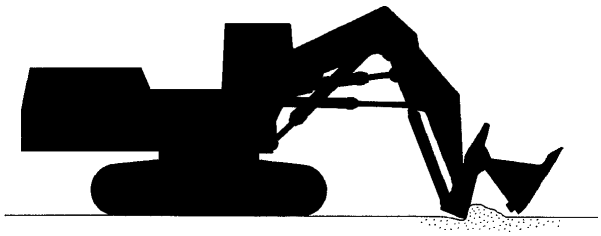
- Never dig with the bucket fully retracted and the bucket teeth stuck in the ground as the front attachment will be subjected to excessive force.



M117-05-018

- Do not use the rear of the bucket for grading operation, as this will damage it.

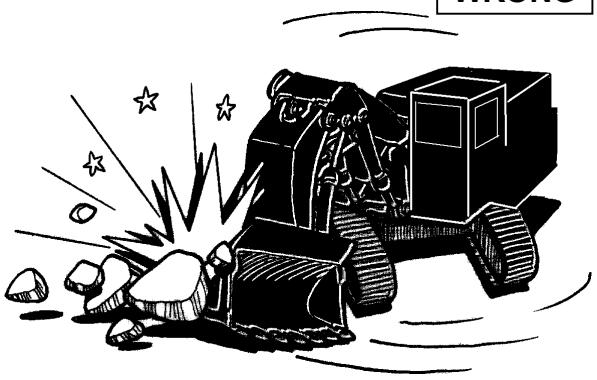
WRONG



M117-05-019

- Do not push rocks or other heavy materials with the side of the bucket (using the swing movement of the upperstructure), as this may damage the front attachment. If such pushing is unavoidable, be sure to do it slowly and carefully.

WRONG



M117-05-020

CAUTION: When excavating with boom extended to high levels, do not tilt bucket back, as materials will spill on operator's cab. Dump bucket slightly to prevent spilling.

WRONG

M117-05-021

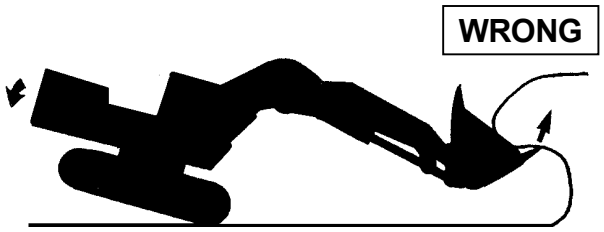
IMPORTANT:

- **When digging with the upperstructure at an angle to the undercarriage, avoid striking the tracks with the bucket.**
- **Avoid further extension of the bucket cylinder after the bucket comes into contact with the stopper, as the arm cylinder will be extended, moving the bucket forward.**

WRONG

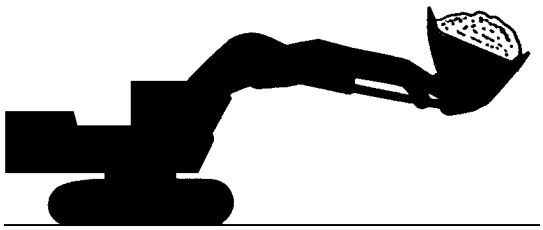
M145-05-026

- Do not use the weight of the base machine to pry earth as illustrated.
  Doing so will damage the base machine and may cause personal injury.

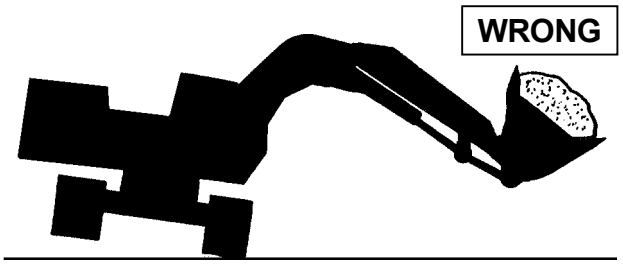


M117-05-009

- Machine stability is greater when the load is positioned parallel with the tracks.
  Machine stability is reduced when the load is swung to the side and when operating the front attachment perpendicular to the tracks.
  Sudden stop of boom lowering movement is especially likely to cause tipping over.
  When working on weak/soft surfaces or when loading high-density materials, operate the machine at reduced bucket loads.

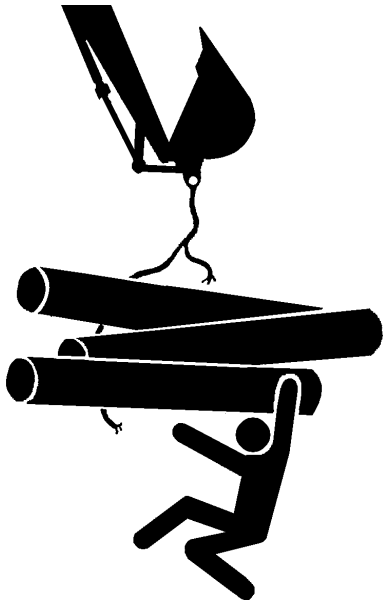


M117-05-010



M117-05-011

OBJECT HANDLING --- IF EQUIPPED



SA-014

CAUTION: When you use machine for object handling, be sure to comply with all local regulations.
Cables, straps, or ropes can break, causing serious injury. Do not use damaged chains, frayed cables, slings, straps, or ropes to crane.

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

Keep all persons away from wire-rope-attached load, lifted or sitting on the ground unless it is securely sitting on blocks or on the ground.

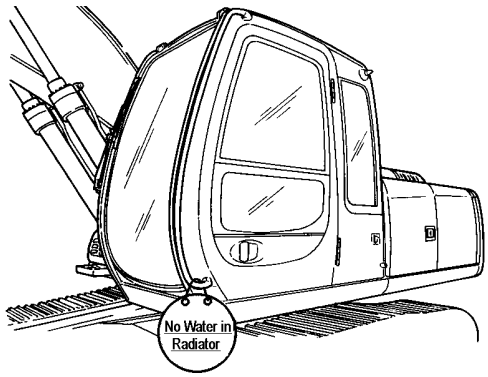
Position upperstructure so that the travel motors are at the rear.

Do not attach sling/chain to the bucket teeth.

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

OVERNIGHT STORAGE INSTRUCTIONS

- 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.
- Fill the fuel tank with fuel.
- Clean the machine.
- 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 "No Water in Radiator" tag in a visible place if the coolant has been drained.



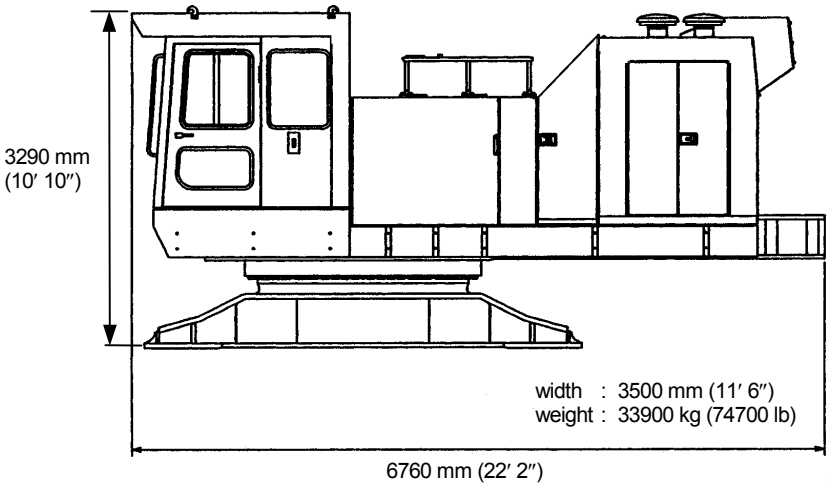
M157-05-151

MEMO

PACKING DIMENSIONS AND WEIGHTS FOR TRANSPORTATION

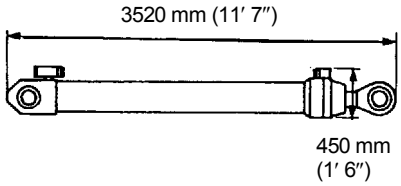
Base Machine

Base Machine



M183-06-001

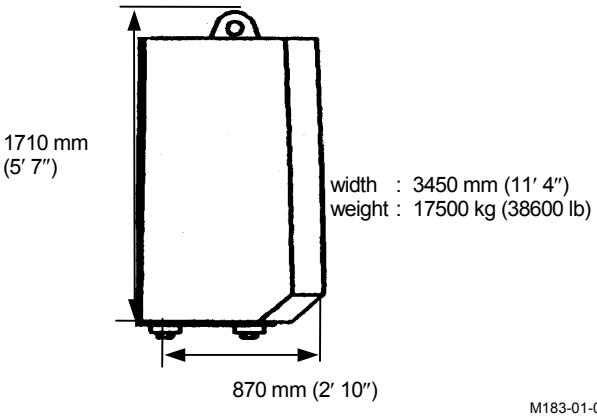
Boom Cylinder



width : 360 mm (1′ 2″)
weight : 1170 kg (2580 kb) × 2

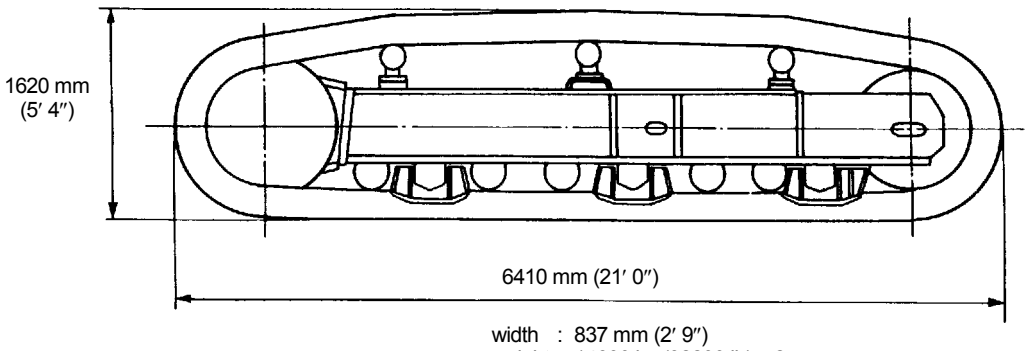
M113-06-003

Counterweight



M183-01-002

Track



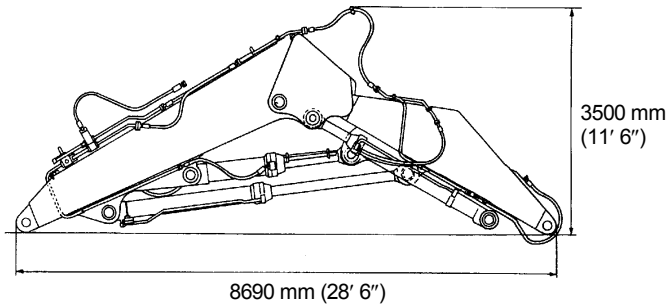
width : 837 mm (2′ 9″)
weight : 14600 kg (32200 lb) × 2

M113-06-011

Loading Shovel Attachment

Linkage

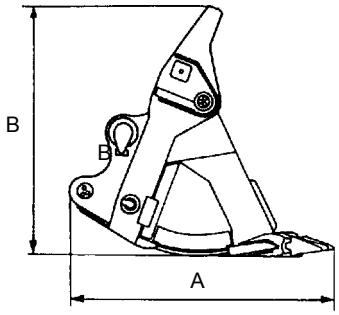
width : 1620 mm (5′ 4″)
weight : 15200 kg (33500 lb)



M113-06-006

Loading Shovel Bucket

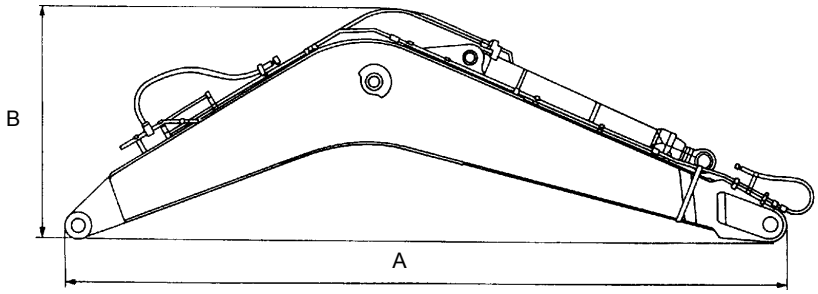
Bucket Capacity (PCSA Heaped) m^3	A mm	B mm	width mm	weight kg
5.9	2770 (9′ 1″)	2480 (8′ 0″)	2690 (8′ 10″)	9780 (21560 lb)
6.5	2770 (9′ 1″)	2680 (8′ 10″)	2890 (9′ 6″)	9200 (20280 lb)



M113-06-007

Backhoe Attachment

Boom

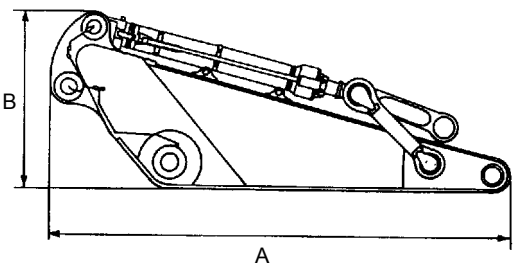


M113-06-008

	Boom length	A	B	Width	Weight
EX1200-5	9.1 m (29′ 10″)	9500 mm (31′ 2″)	3100 mm (10′ 2″)	1460 mm (4′ 9″)	11600 kg (25570 lb)
EX1200-5 BE-boom	7.55 m (24′ 9″)	7960 mm (16′ 3″)	3400 mm (11′ 2″)	1460 mm (4′ 9″)	11100 kg (24470 lb)

Arm

	Arm length	A	B	Width	Weight
EX1200-5	3.4 m (11′ 2″)	4880 mm (16′ 0″)	1850 mm (6′ 1″)	960 mm (3′ 2″)	6020 kg (13270 lb)
	4.5 m (14′ 9″)	5975 mm (19′ 7″)	1700 mm (5′ 7″)	960 mm (3′ 2″)	6520 kg (14370 lb)
	5.8 m (19′ 0″)	7220 mm (23′ 8″)	1750 mm (5′ 9″)	985 mm (3′ 3″)	6150 kg (13560 lb)
EX1200-5 BE-arm	3.4 m (11′ 2″)	4880 mm (16′ 0″)	1850 mm (6′ 1″)	960 mm (3′ 2″)	6100 kg (13450 lb)

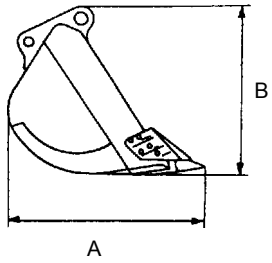


M113-06-009

Backhoe Bucket

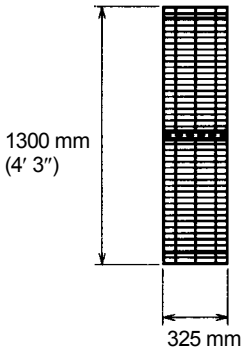
Capacity		A	B	Width	Weight
PCSA heaped	CECE heaped				
*2.8 m^3 (3.66 yd^3)	2.5 m^3	1890 mm (6′ 2″)	2310 mm (7′ 7″)	1700 mm (5′ 7″)	2950 kg (6500 lb)
3.2 m^3 (4.19 yd^3)	2.8 m^3	1890 mm (6′ 2″)	2310 mm (7′ 7″)	1840 mm (6′ 0″)	3100 kg (6840 lb)
*3.3 m^3 (4.32 yd^3)	3.0 m^3	2300 mm (7′ 7″)	2480 mm (8′ 2″)	1460 mm (4′ 9″)	4000 kg (8820 lb)
3.8 m^3 (4.97 yd^3)	3.4 m^3	2280 mm (7′ 6″)	2480 mm (8′ 2″)	1660 mm (5′ 5″)	3700 kg (8160 lb)
*4.5 m^3 (5.89 yd^3)	4.0 m^3	2300 mm (7′ 7″)	2480 mm (8′ 2″)	1810 mm (5′ 11″)	4650 kg (10250 lb)
5.0 m^3 (6.54 yd^3)	4.4 m^3	2460 mm (8′ 1″)	2250 mm (7′ 5″)	2100 mm (6′ 11″)	4490 kg (9900 lb)
*5.0 m^3 (6.54 yd^3)	4.4 m^3	2560 mm (8′ 5″)	2280 mm (7′ 6″)	1960 mm (6′ 5″)	5500 kg (12100 lb)
*5.6 m^3 (7.32 yd^3)	4.9 m^3	2630 mm (8′ 8″)	2260 mm (7′ 5″)	2240 mm (7′ 4″)	6510 kg (14300 lb)
6.5 m^3 (8.50 yd^3)	5.7 m^3	2710 mm (8′ 11″)	2240 mm (7′ 4″)	2310 mm (7′ 7″)	6350 kg (14000 lb)

* Rock bucket



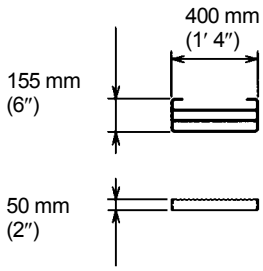
M113-06-010

Step



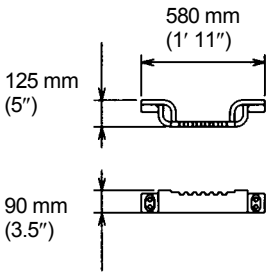
Weight: 20.6 kg (45.4 lb)

Step (Battery cover)



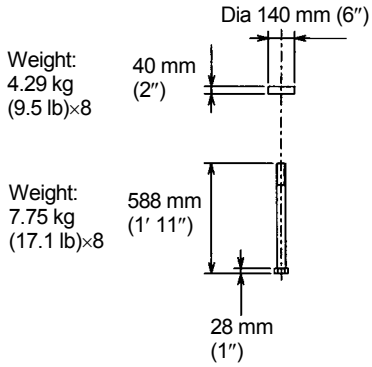
Weight: 3.58 kg (7.9 lb)

Step (Track)

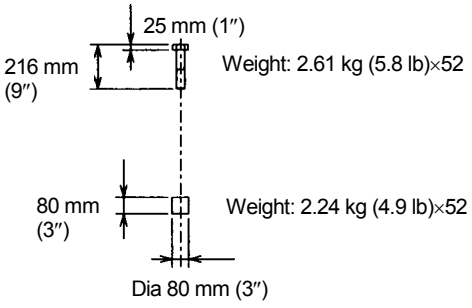


Weight: 13.2 kg (29.1 lb)×2

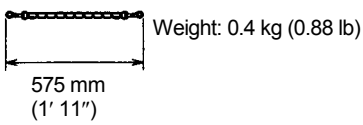
Washer and Bolt



Washer and Bolt

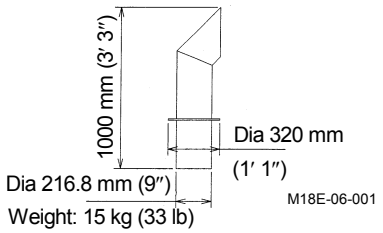


Chain



M113-06-020

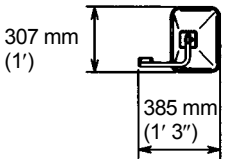
Exhaust Pipe



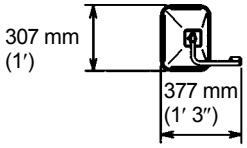
M18E-06-001

Weight: 15 kg (33 lb)

Mirror Assy

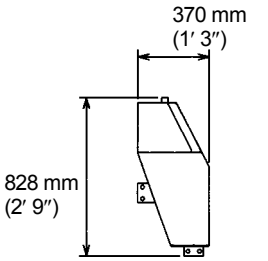


Weight: 2.18 kg (4.8 lb)



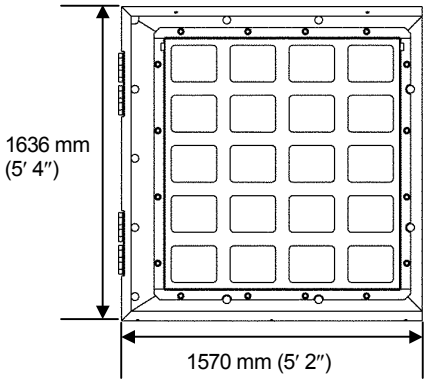
Weight: 2.39 kg (5.3 lb)

Cover



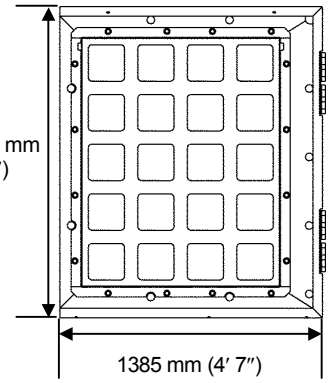
Weight: 23.5 kg (51.8 lb)

Side Cover (Radiator)



Width: 565 mm (22″)
Weight: 221 kg (487 lb)

Side Cover (Oil cooler)

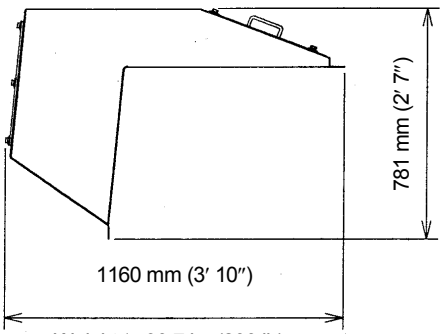


Width: 565 mm (22″)
Weight: 203 kg (448 lb)

M113-06-021

M17F-06-002

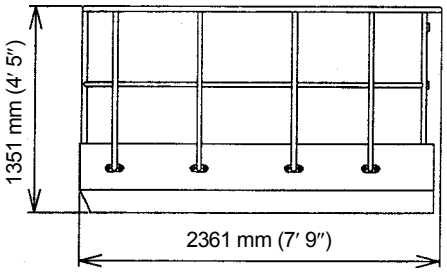
Muffler Cover



Weight: 90.7 kg (200 lb)
Width: 1390 mm (4′ 7″)

M18E-06-010

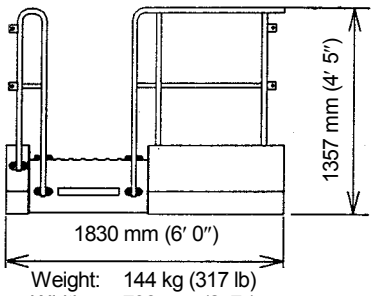
Fender (Left front side)



Weight: 213 kg (467 lb)
Width: 1041 mm (3′ 5″)

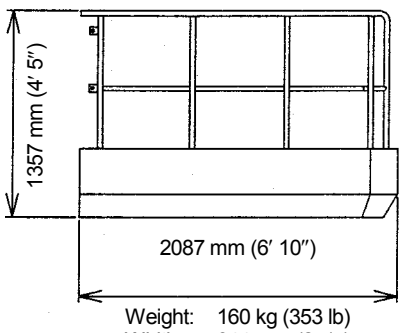
M18E-06-002

Fender (Left rear side)



Weight: 144 kg (317 lb)
Width: 798 mm (2′ 7″)

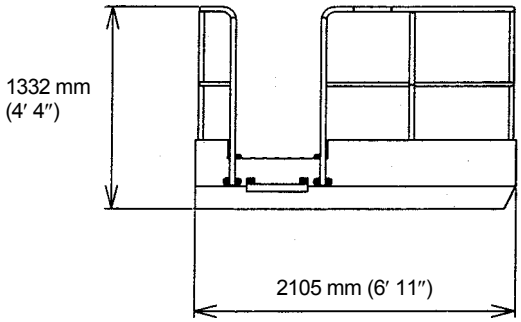
M18E-06-003



Weight: 160 kg (353 lb)
Width: 644 mm (2′ 1″)

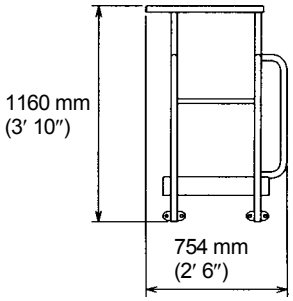
M18E-06-004

Fender (Right side)



Width: 834 mm (2′ 9″)
Weight: 180 kg (397 lb)

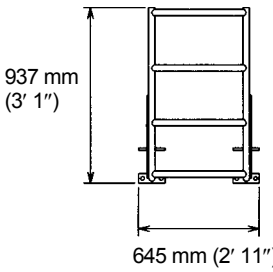
Hand Rail



Width: 192 mm (8″)
Weight: 18.1 kg (40 lb)

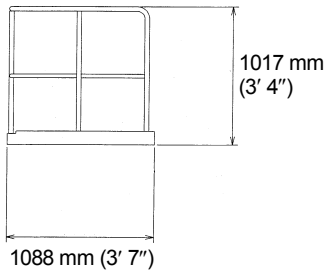
M18E-06-005
M113-06-022

Radder



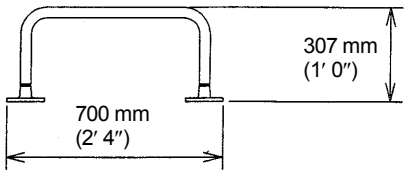
Width: 302 mm (1′ 0″)
Weight: 19.6 kg (43 lb)

Hand Rail



Width: 587 mm (1′ 11″)
Weight: 22.6 kg (50 lb)

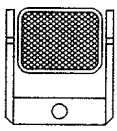
Hand Rail



Width: 50 mm (2″)
Weight: 3.95 kg (8.7 lb)

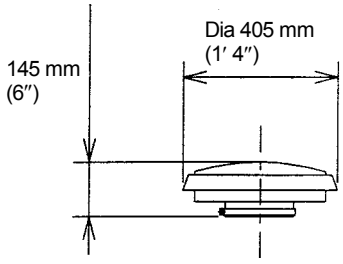
M113-06-022
M18E-06-006
M18E-06-007

Lamp Assembly



Weight: 1.00 kg (2.2 lb)

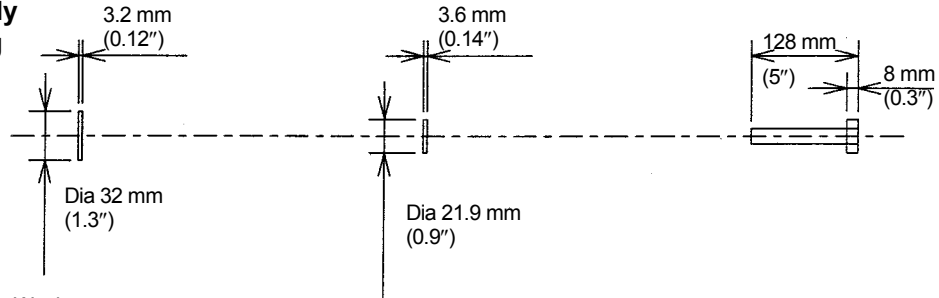
Cap



Weight: 0.75 (1.7 lb)

M18E-06-008
M18E-06-009

Bolt Assembly (for Installing Duct)



Washer
P/No. Z449490
Weight: 0.02 kg (0.04 lb)

Spring Washer
P/No. A590912
Weight: 0.01 kg (0.02 lb)

Bolt
P/No. J901204
Weight: 0.10 kg (0.2 lb)

M18E-06-011

MEMO

CORRECT MAINTENANCE AND INSPECTION PROCEDURES

SA-005

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.

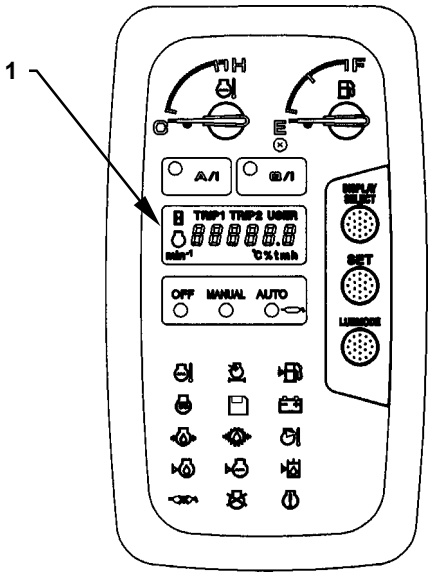
If there is any problem with your machine, repair it before operating or contact your authorized dealer.

IMPORTANT:

- **Use only recommended fuel and lubricants.**
- **Use only genuine HITACHI parts.**
- **Be sure to use only genuine Hitachi parts. Failure to do so may result in serious injury or death and/or machine breakdown.**
- **Failure to use recommended fuel, lubricants, and genuine Hitachi parts will result in loss of Hitachi product warranty.**
- **Never adjust engine governor or hydraulic system relief valve.**
- **Protect electrical parts from water and steam.**
- **Never disassemble electrical components such as main controller, sensors, etc.**

CHECK THE HOUR METER REGULARLY

- Check hour meter or trip meter (1) to determine when your machine needs periodic maintenance.
- 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 chart located on the inside of the battery cover (and on the following pages).



T183-01-02-013

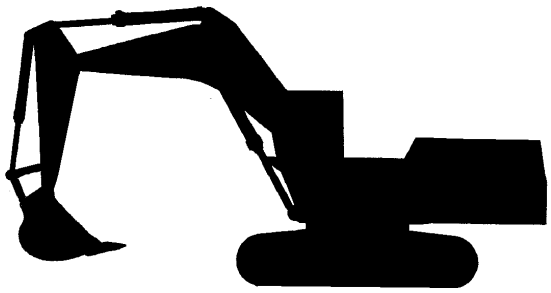
USE CORRECT FUELS AND LUBRICANTS

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

PREPARE MACHINE FOR MAINTENANCE

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

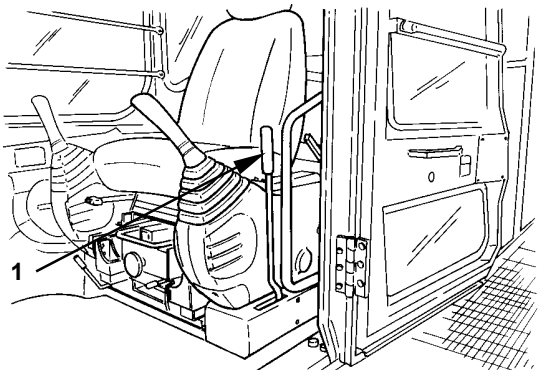
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.



M142-05-003

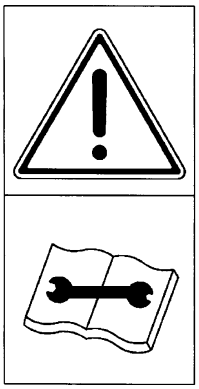
IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Turn the key switch OFF. Remove key from switch. (If maintenance must be performed with engine running, do not leave machine unattended.)
6. Pull 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.



LOCK Position

M142-01-016

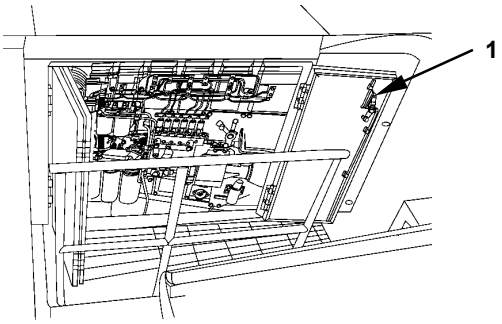


SS2045102

HOOD AND ACCESS COVERS

CAUTION:

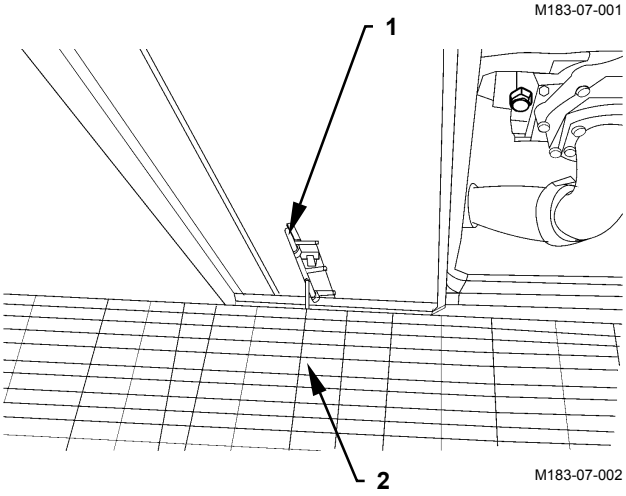
- **Do not keep the hood and access covers open when the machine is parked on a slope, or while the wind is blowing hard. The hood or access covers may close accidentally, possibly resulting in personal injury.**
- **When opening or closing the hood and access covers, take extra care not to catch fingers between the base machine and the hood or access covers.**
- **If an access cover is damaged, missing, or kept open, hose(s) may become damaged, possibly causing fire. Be sure to repair or replace the damaged and/or missing access cover and always close the access cover before operating the machine.**



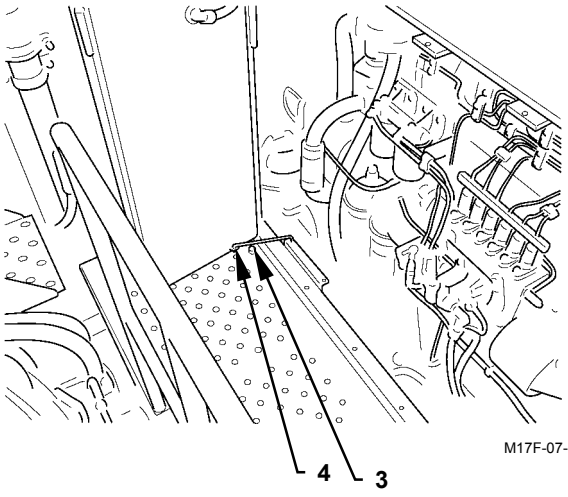
M183-07-001

- Secure Access Covers in Position
  Open the each access cover. Insert the end of rod (1) into fender (2) to lock the access cover in position.

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



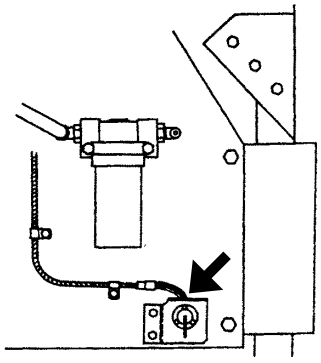
M183-07-002



M17F-07-004

USE ELECTRICAL OUTLET

When using an inspection lamp during maintenance work, use electrical outlet provided in the position shown in the picture.

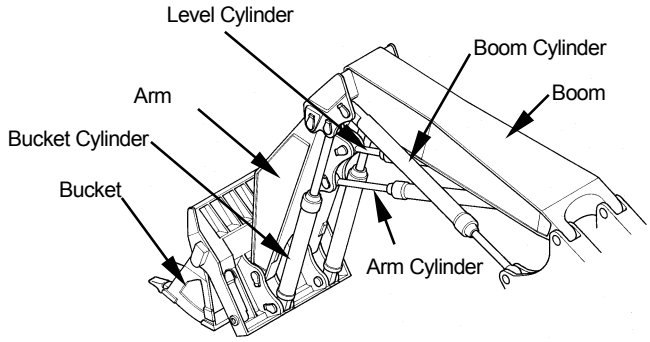


M17F-07-001

MEMO

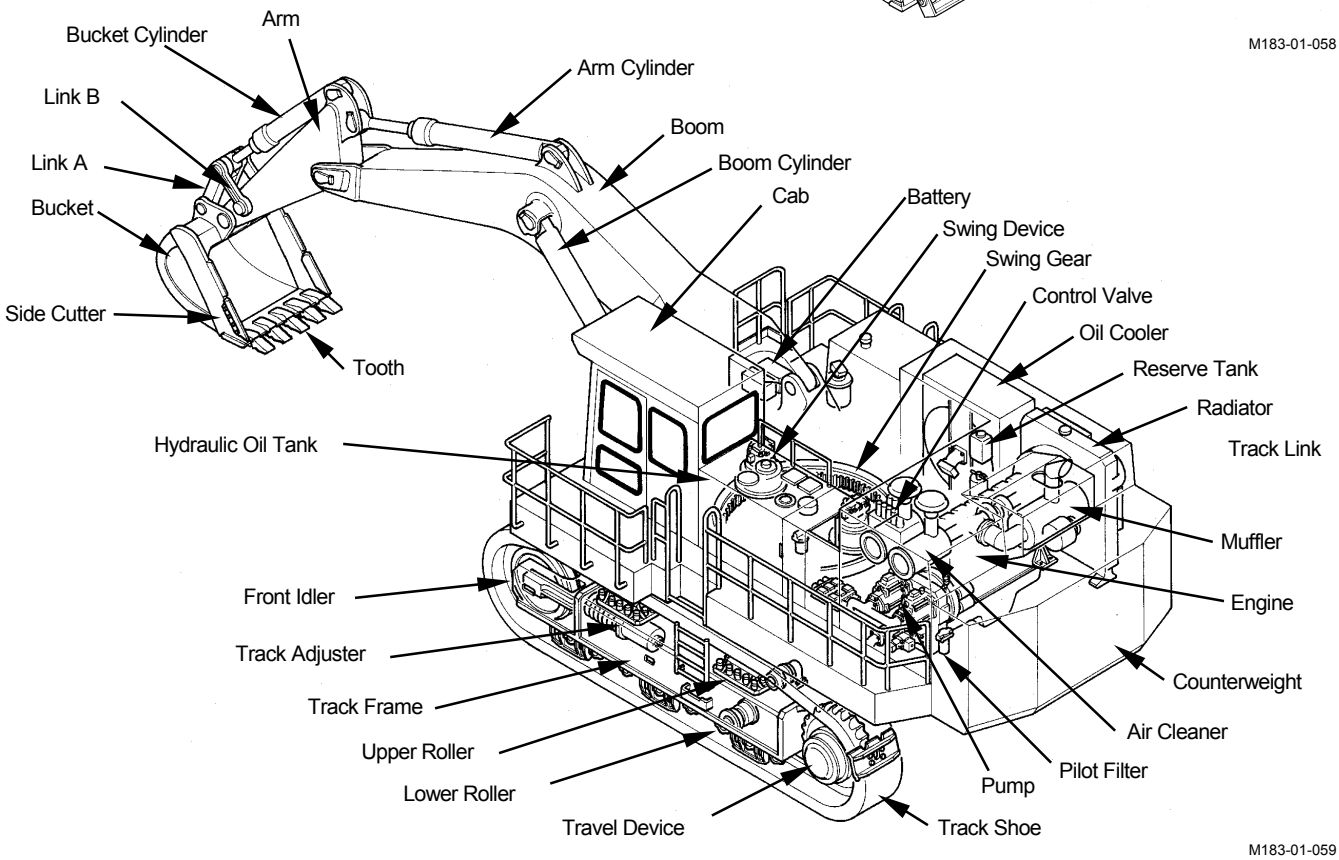
CONSTRUCTION OUTLINE

Loading Shovel Front Attachment



M183-01-058

Backhoe Front Attachment



M183-01-059

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 function.

- 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 any control levers are operated. When the control lever is placed in NEUTRAL, the brake is automatically applied.

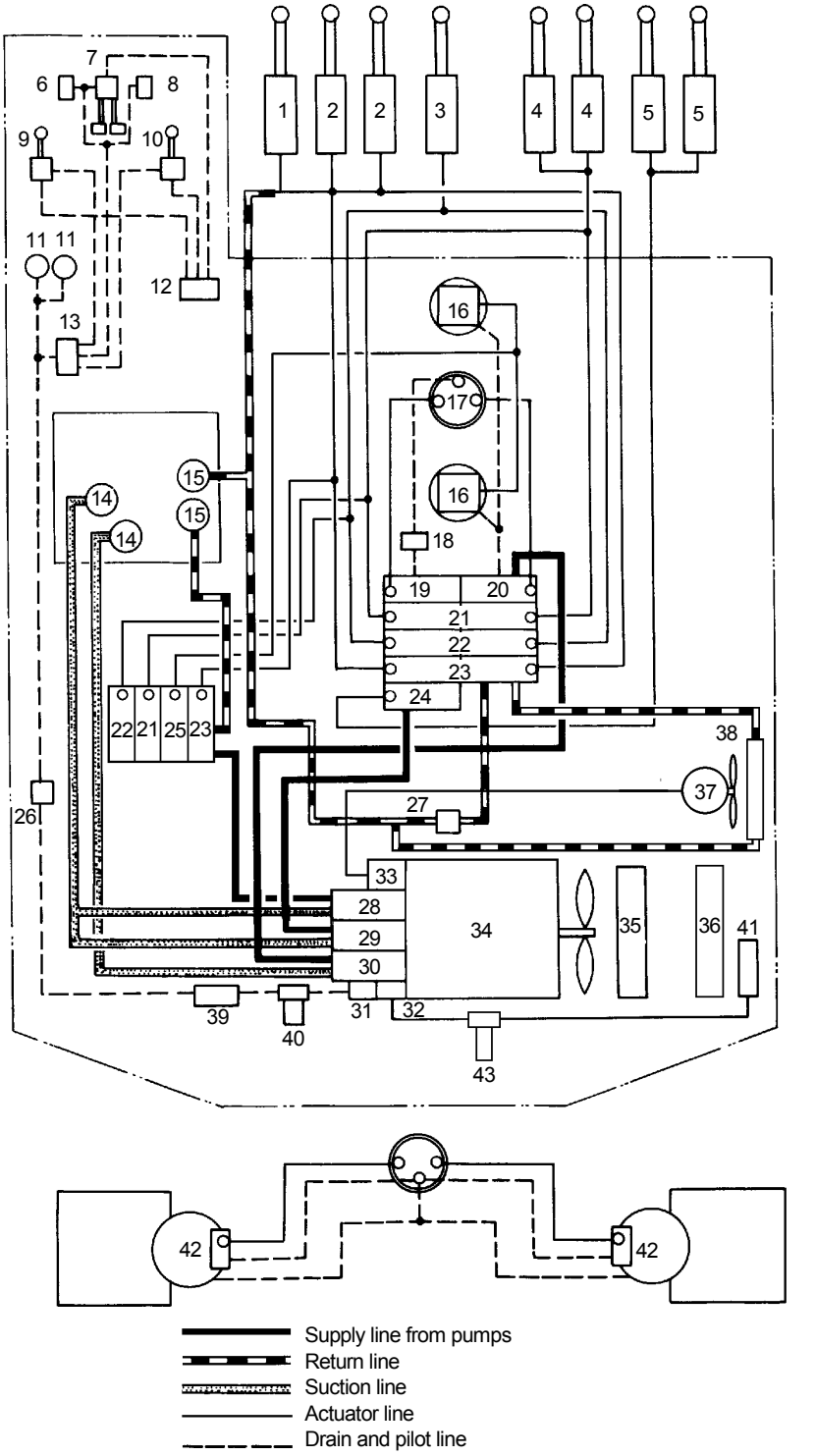
- Swing parking brake is automatically released when any control levers are operated. When the control lever is placed in NEUTRAL, the brake is automatically applied.

- 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.

- The excavator is equipped with an independent oil cooler and circulation pump for the pump transmission, which functions to cool pump transmission oil.

LOADING SHOVEL

1- Level Cylinder
2- Boom Cylinder
3- Arm Cylinder
4- Bucket Cylinder
5- Dump Cylinder
6- Bucket Close Pedal
7- Travel Pilot Valve
8- Bucket Open Pedal
9- Pilot Valve (L)
10- Pilot Valve (R)
11- Accumulator
12- Shockless Valve
13- Lock Valve
14- Suction Filter
15- Full-Flow Filter
16- Swing Motor
17- Center Joint
18- Solenoid Valve (travel)
19- Control Valve (left travel)
20- Control Valve (right travel)
21- Control Valve (bucket)
22- Control Valve (arm)
23- Control Valve (boom)
24- Control Valve (bucket open / close)
25- Control Valve (swing)
26- Check Valve
27- Bypass Check Valve
28- Main Pump (no.3)
29- Main Pump (no.1)
30- Main Pump (no.2)
31- Pilot Pump
32- Oil Pump (pump transmission)
33- Fan Drive Pump
34- Engine
35- Radiator
36- Inter Cooler
37- Fan Drive Motor
38- Oil Cooler
39- Solenoid Valve (triple)
40- Pilot Filter
41- Transmission Cooler
42- Travel Motor
43- Transmission Oil Filter



M183-07-050

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.

1. 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 function.

2. 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.

3. Travel parking brake is automatically released when any control levers are operated. When the control lever is placed in NEUTRAL, the brake is automatically applied.

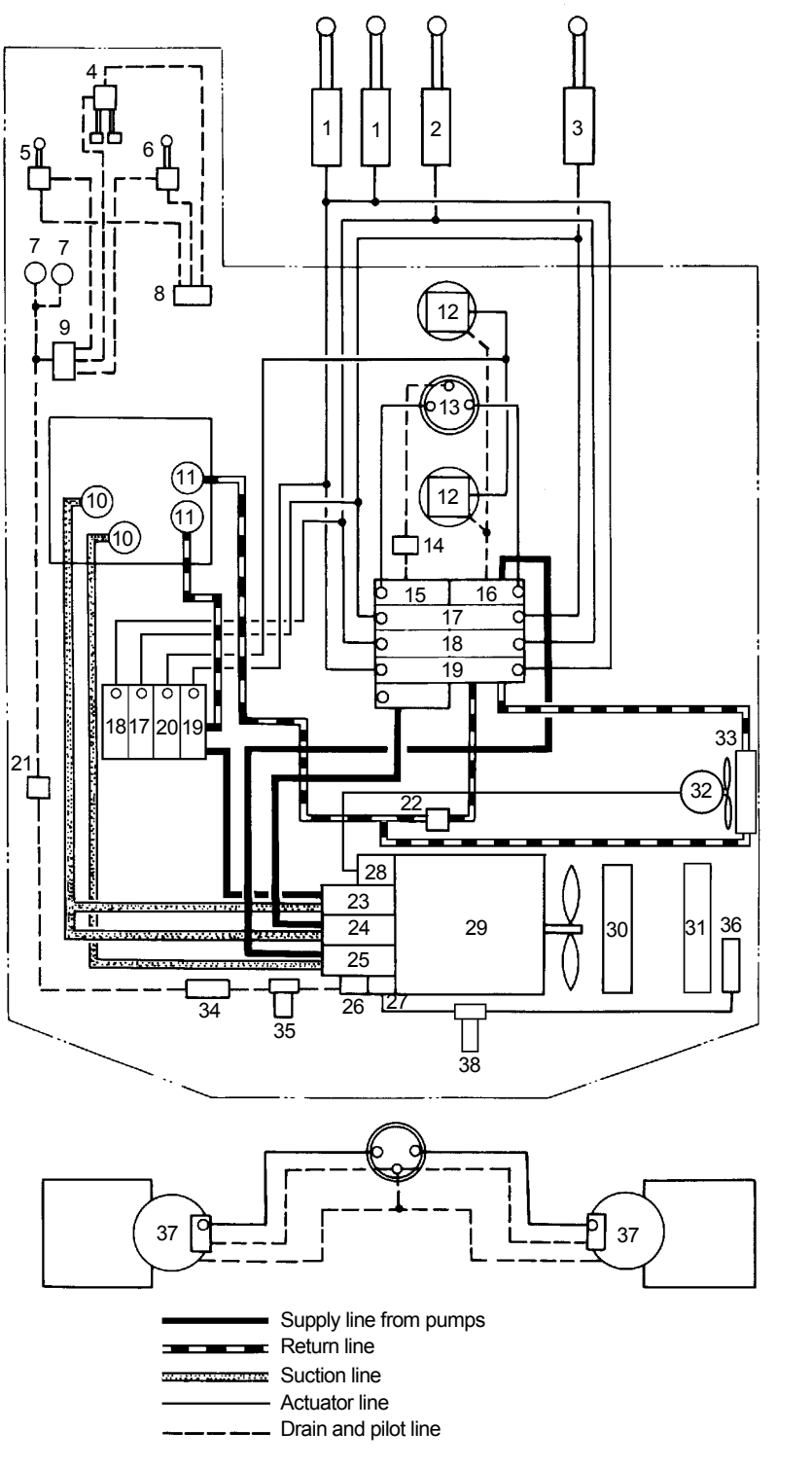
4. Swing parking brake is automatically released when any control levers are operated. When the control lever is placed in NEUTRAL, the brake is automatically applied.

5. 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.

6. The excavator is equipped with an independent oil cooler and circulation pump for the pump transmission, which functions to cool pump transmission oil.

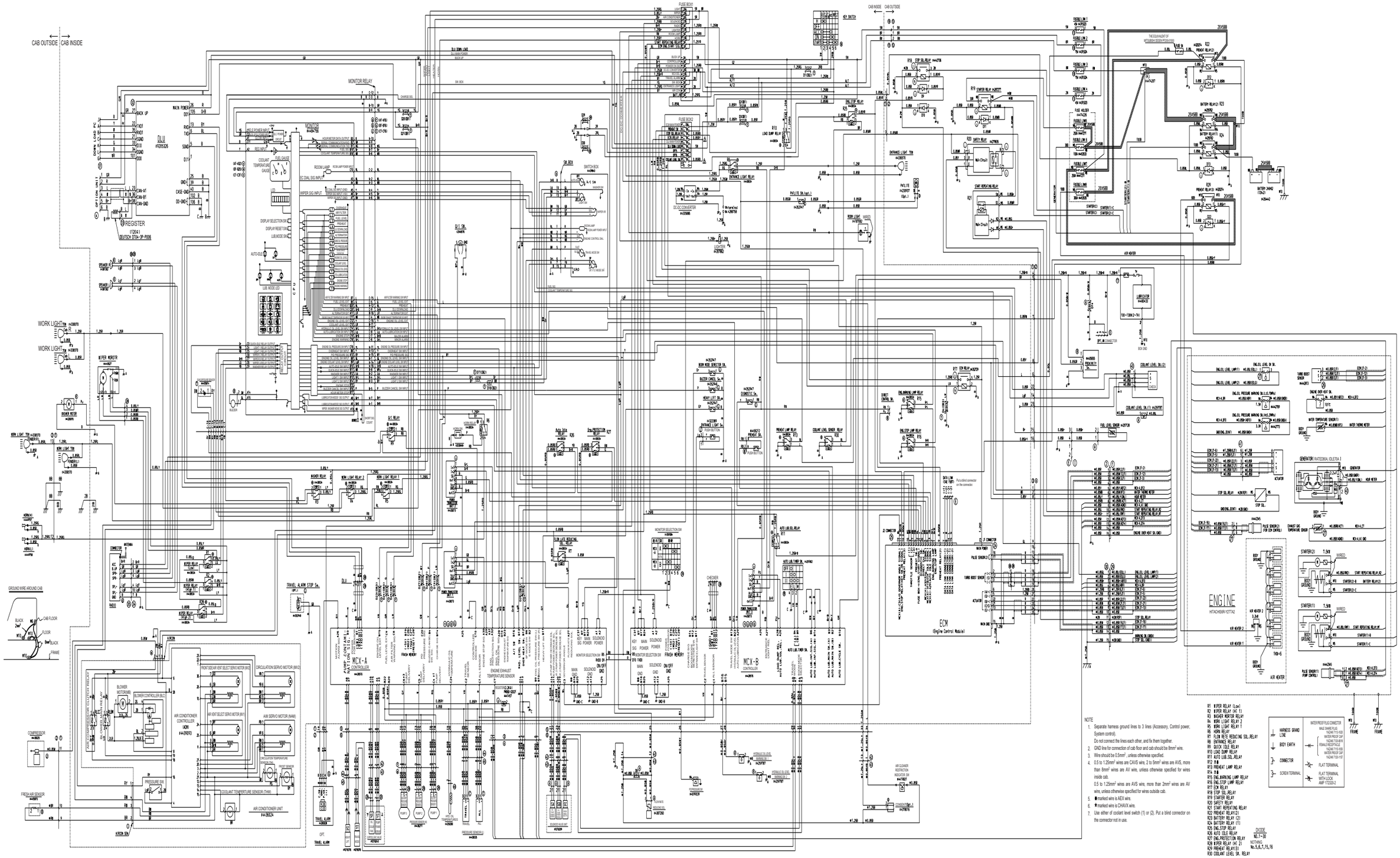
BACKHOE

1- Boom Cylinder
2- Arm Cylinder
3- Bucket Cylinder
4- Travel Pilot Valve
5- Pilot Valve (L)
6- Pilot Valve (R)
7- Accumulator
8- Shockless Valve
9- Lock Valve
10- Suction Filter
11- Full-Flow Filter
12- Swing Motor
13- Center Joint
14- Solenoid Valve (travel)
15- Control Valve (left travel)
16- Control Valve (right travel)
17- Control Valve (bucket)
18- Control Valve (arm)
19- Control Valve (boom)
20- Control Valve (swing)
21- Check Valve
22- Bypass Check Valve
23- Main Pump (no.3)
24- Main Pump (no.1)
25- Main Pump (no.2)
26- Pilot Pump
27- Oil Pump (pump transmission)
28- Fan Drive Pump
29- Engine
30- Radiator
31- Inter Cooler
32- Fan Drive Motor
33- Oil Cooler
34- Solenoid Valve (triple)
35- Pilot Filter
36- Transmission Cooler
37- Travel Motor
38- Transmission Cooler



M183-07-051

EX1200-5 ELECTLICAL CIRCUIT DIAGRAM



NOTE

1. Separate harness ground lines to 3 lines (Accessory, Control power, System control).
   Do not connect the lines each other, and fix them together.
2. GND line for connection of cab floor and cab should be 8mm² wire.
3. Wire should be 0.5mm², unless otherwise specified.
4. 0.5 to 1.25mm² wires are CAVS wire, 2 to 5mm² wires are AVS, more than 8mm² wires are AV wire, unless otherwise specified for wires inside cab.
   0.5 to 1.25mm² wires are AVS wire, more than 2mm² wires are AV wire, unless otherwise specified for wires outside cab.
5. ● marked wire is AEX wire.
6. ▼ marked wire is CHAVX wire.
7. Use either of coolant level switch (1) or (2). Put a blind connector on the connector not in use.

R1 WIPER RELAY (Low)
R2 WIPER RELAY (HI 1)
R3 WASHER MOTOR RELAY
R4 WORK LIGHT RELAY 2
R5 WORK LIGHT RELAY 1
R6 HORN RELAY
R7 FLOW RATE REDUCING SOL.RELAY
R8 ENTRANCE RELAY
R9 QUICK IDLE RELAY
R10 LOAD DUMP RELAY
R11 AUTO LUB.SOL.RELAY
R12 2nd
R13 PREHEAT LAMP RELAY
R14 2nd
R15 ENG.WARNING LAMP RELAY
R16 ENG.STOP LAMP RELAY
R17 ECM RELAY
R18 STOP SOL.RELAY
R19 STARTER RELAY
R20 SAFETY RELAY
R21 START REPEATING RELAY
R22 PREHEAT RELAY(2)
R23 BATTERY RELAY (2)
R24 BATTERY RELAY (1)
R25 ENG.STOP RELAY
R26 AUTO IDLE RELAY
R27 ENG.PROTECTION RELAY
R28 WIPER RELAY (HI 2)
R29 PREHEAT RELAY(1)
R30 COOLANT LEVEL SR. RELAY

HARNESS BRAND
LINE
BODY EARTH
CONNECTOR
SCREW TERMINAL
WATER PROOF PLUG CONNECTOR
MALE SHAPE PLUG
YAZAKI 7115-1020
WATER PROOF CAP
YAZAKI 7120-8181
FEMALE RECEPTACLE
YAZAKI 7115-1030
WATER PROOF CAP
YAZAKI 7120-1157
FLAT TERMINAL
FLAT TERMINAL WITH LOCK
AMP 172320-2

DIODE
NO.1~30
NOTHING
No.5,6,7,15,16

MEMO

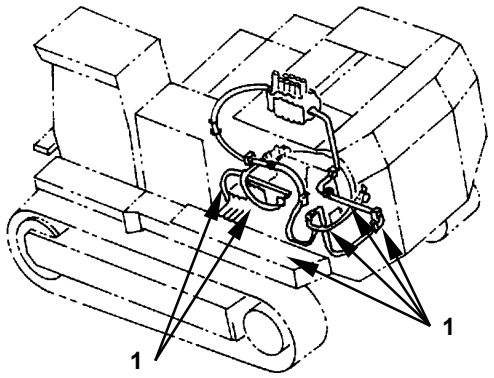
PERIODIC REPLACEMENT OF PARTS

Every 2 years or every 8000 hours

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.

1. Hydraulic Hoses

Kinds of Hoses	Q'ty in Use
Hydraulic Hoses:	6
Pump delivery hoses (1)	
Pump to control valve 1	
Pump to control valve pipes 2	
Pump to brackets 3	
Swing motor hoses (2)	4
(Control valve to blocks)	
Loading shovel front hoses (3)	11
(Main frame to boom)	
Backhoe front hoses (4)	11
(Main frame to boom)	



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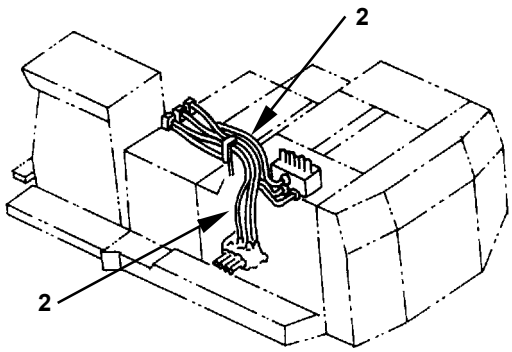

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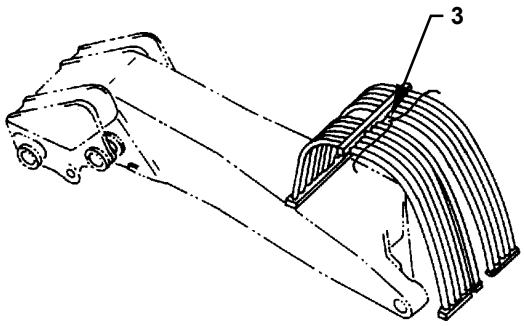

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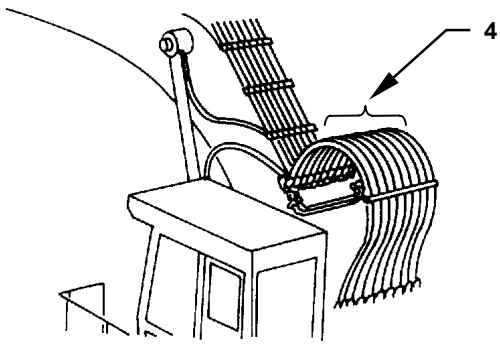

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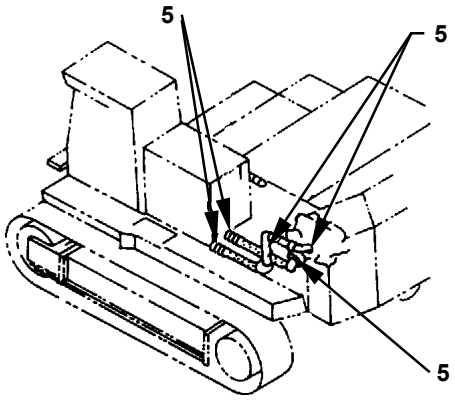
Kinds of Hoses	Q'ty in Use
Suction hoses (5)	8
Pilot hoses (in the engine compartment) (6)	2



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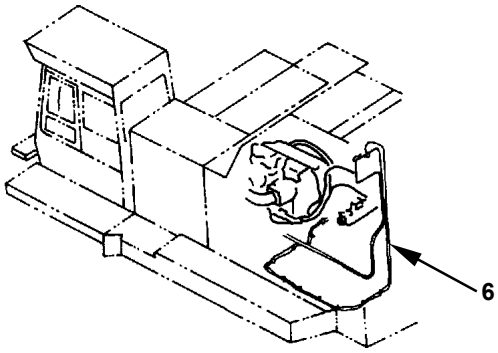
2. Pump Transmission Gear Oil Hoses

Kinds of Hoses	Q'ty in Use
Pump Transmission Lubrication Hoses (7) (in the engine compartment) (Pump transmission to oil cooler)	4



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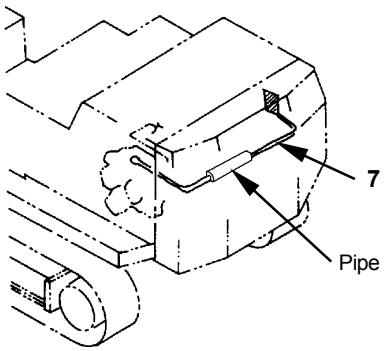
3. Fuel Hoses

Kinds of Hoses	Q'ty in Use
Fuel Hoses (8) Fuel tank to water separator filter.....1 Water separator filter to fuel injection pump .....1 Engine to fuel tank 1	3



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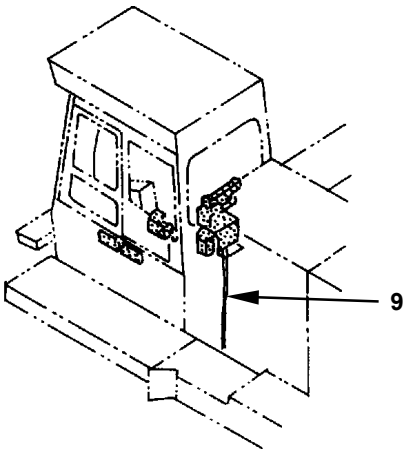
4. Heater Hoses

Kinds of Hoses	Q'ty in Use
Heater hoses (in the engine compartment) (9) (Engine to heater)	2



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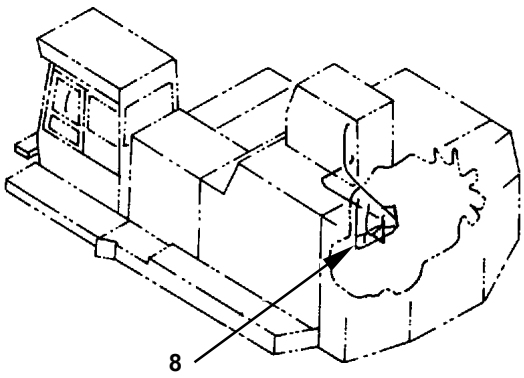

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MAINTENANCE INTERVAL GUIDE

A. GREASING (See Page 7-19)

Parts			Quantity	Interval (hours)					
				5	10	100	250	500	1000
1. Front Joint Pins	LD	Bucket ✳	6	★					
		Others ✳	18						
	BH	Bucket	11	★					
		Others ✳	11						
2. Swing Bearing			4						
3. Swing Internal Gear			1						

NOTE: ★ Apply grease every 5 hours when operating in water or mud.
✳ Auto-lubrication is avaliable. Greasing intervals shown in the above table are applied to manual lubrication.

B. ENGINE (See Page 7-28)

Parts		Quantity	Interval (hours)							
			10	50	250	500	1000	1500	2000	4000 -6000
1. Engine Oil	Check Oil Level	1								
2. Engine Oil	Change	118 L (31.2 US gal)								
3. Replace Engine Oil Main Filter		2								
4. Replace Engine Oil Bypass Filter		1								
5. Check Injection Nozzle		–							※	
6. Inspect Bolts and Nuts Outside Engine		–		✳					※	
7. Inspect and Adjust Valve Clearance		–							※	
8. Check Fuel Injection Timing		–							※	
9. Check Starter and Alternator		–								※
10. Check Turbocharger		–								※

NOTE: ✳ First time only.
※ See your authorized dealer.

C. TRANSMISSION (See Page 7-33)

Parts		Quantity	Interval (hours)						
			10	50	250	500	1000	1500	2000
1. Pump Transmission Gear	Check Oil Level	1	✳						
	Change Oil	15 L (4.0 US gal)		✳					
	Replace Filter	1							
	Clean Breather	2							
2. Swing Reduction Gear	Check Oil Level	–	✳						
	Change Oil	25 L (6.6 US gal)×2							
3. Travel Reduction Gear	Check Oil Level	–							
	Change Oil	43 L (11.4 US gal)×2							

NOTE: ✳ First time only.

D. HYDRAULIC SYSTEM (See Page 7-41)

Parts		Quantity	Interval (hours)							
			10	50	250	500	1500	2000	2500	4000
1. Check Hydraulic Oil Level		1	■							
2. Drain Hydraulic Oil Tank Sump		1			■					
3. Change Hydraulic Oil		1350 L (357 US gal)						★	★	★
4. Suction Filter Cleaning		2	When changing hydraulic oil							
5. Replace Drain Filter Element		1		✳		■				
6. Replace Full-Flow Filter Element		2				■				
7. Replace Pilot Oil Filter Element		1				■				
8.	Check Hoses and Lines (for leak, loose)	–	■							
	Check Hoses and Lines (for crack, bend, etc.)	–			■					

NOTE: ★ Hydraulic oil changing intervals differ according to kind of hydraulic oil used. See recommended oil chart.
✳ First time only.

E. FUEL SYSTEM (See Page 7-62) Tank capacity 1400 L (370 US gal)

Parts		Quantity	Interval (hours)						
			10	50	250	500	1000	1500	2000
1. Drain Fuel Tank Sump		1	■						
2. Drain Water Separator Filter Sediment		1	■						
3. Replace Water Separator Filter		1					■		
4. Replace Fuel Filter		2					■		
5.	Check Fuel Hoses (for leak, loose)	–	■						
	Check Fuel Hoses (for crack, bend, etc.)	–			■				

F. AIR CLEANER (See Page 7-71)

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

G. COOLING SYSTEM (See Page 7-73)

Parts	Quantity	Interval (hours)						
		10	50	250	500	1000	1500	2000
1. Check Coolant Level	1	■						
2. Check Fan Belt for Wear	–	■						
3. Change Coolant	113 L (30 US gal)	Twice a year, in spring and autumn ✳						
4. Clean Radiator, Oil Cooler Core	1				■			
5. Clean Inter Cooler Front Screen	1				★			

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

H. AIR CONDITIONER (See Page 7-80)

Parts		Quantity	Interval (hours)						
			10	50	250	500	1000	1500	2000
1. Recirculation Air Filter	Cleaning	1	As required						
	Replacement	1	Replace per 4 cleaning						
2. Ventilation Air Filter	Cleaning	1	As required						
	Replacement	1	Replace per 4 cleaning						
3. Check Refrigerant Quantity		1							
4. Check Compressor Belt Tension		1							
5. Clean Condenser Core		1				★			
6. Check Tightening Torque		–		✳					
7. Seasonal Maintenance		–	Twice a year						

NOTE: ✳ *First time only.*
★ *Shorten maintenance interval when the machine is operated in dusty areas.*

I. ELECTRICAL SYSTEM (See Page 7-86)

J. MISCELLANEOUS (See Page 7-95)

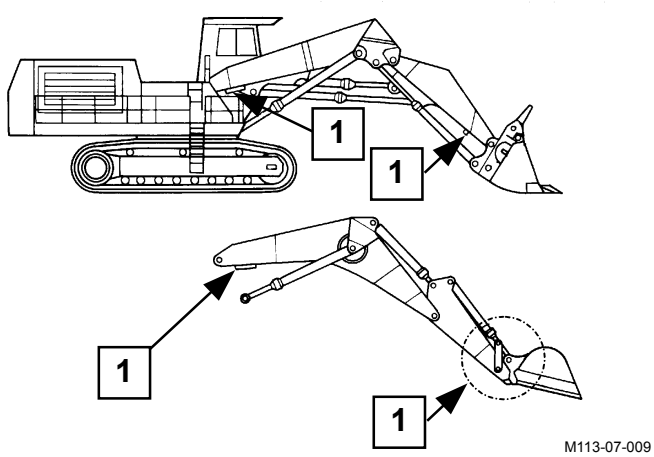
Parts		Quantity	Interval (hours)						
			10	50	100	250	500	1000	2000
1. Check Bucket Teeth									
2. Change Bucket		–	As required						
3. Seat Belt	Check	1							
	Replacement	1	At least once every 3 years						
4. Check Windshield Fluid Level		1	As required						
5. Check and Adjust Track Sag		2							
6. Auto-Lubrication System									
7. Check Tightening Torque				✳					

NOTE: ✳ *First time only.*

A. GREASING

Parts			Quantity	Interval (hours)						
				5	10	100	250	500	1000	1500
1. Front Joint Pins	LD	Bucket ✳	6	★						
		Others ✳	18							
	BH	Bucket	11	★						
		Others ✳	11							
2. Swing Bearing			4							
3. Swing Internal Gear			1							

NOTE: ★ Apply grease every 5 hours when operating in water or mud.
✳ Auto-lubrication is available. Greasing intervals shown in the above table are applied to manual lubrication.



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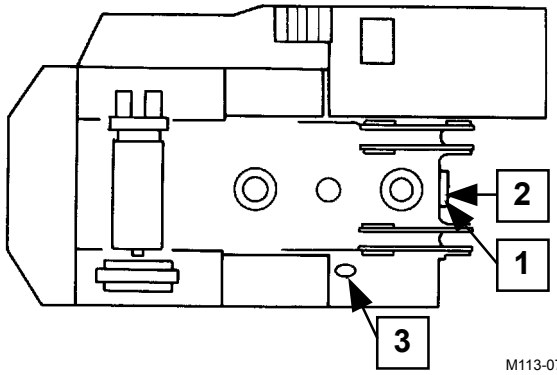

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Brand Names of Recommended Grease

Where to be applied / Manufacturer	Bucket, Arm and Boom, Swing Gear, Swing Bearing, etc.
	–20 to 40 °C (–4 to 104 °F)
Nippon Koyu	SEP 2 ✳1
Idemitsu Kosan	Daphne Coronex Grease EP No 2
Kyodo Oil	Kyoseki Lithonic EP Grease 2
Daikyo Oil	Dynamic Grease EP 2
Nippon Oil	Epinoc Grease AP 2
Maruzen Oil	Maruzen Grease EP 2
Mitsubishi Oil	Diamond Multi-Purpose EP Grease 2
Caltex Oil	Multifax EP 2
Esso	Beacon EP 2
Kygnus Oil	Kygunas EP Grease No. 2
Mobile Oil	Mobilux EP 2
Shell Oil	Shell Alvania EP Grease 2 ✳2

NOTE: The machine is shipped from the factory is filled with lubricants.
✳1 Swing Gear
✳2 Front Joint Pin and Swing Bearing

1 **Front Joint Pins --- every 10 hours**

Loading Shovel Front

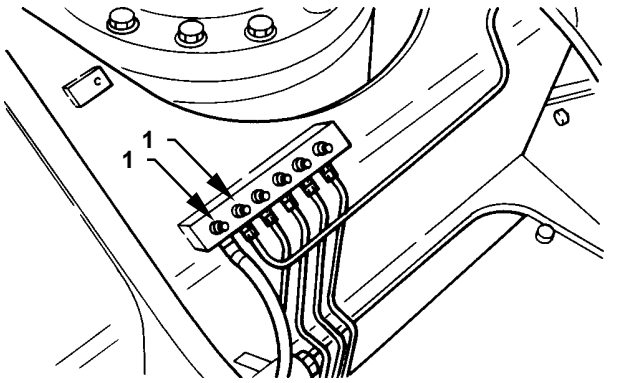
Add grease to all fittings show below every 10 hours. Most of the fittings are grouped, as shown, for quick and safe lubrication.

NOTE: Auto-lubrication can be used for the fittings on the loading shovel front.

Manually greasing pleces are as illustrated below.

- Boom Cylinder Rod Pins (1)
- Grouped Grease Fittings (2) --- Boom

↗: Lubrication points



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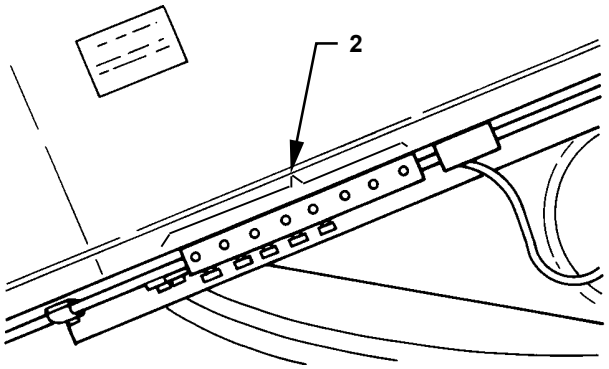

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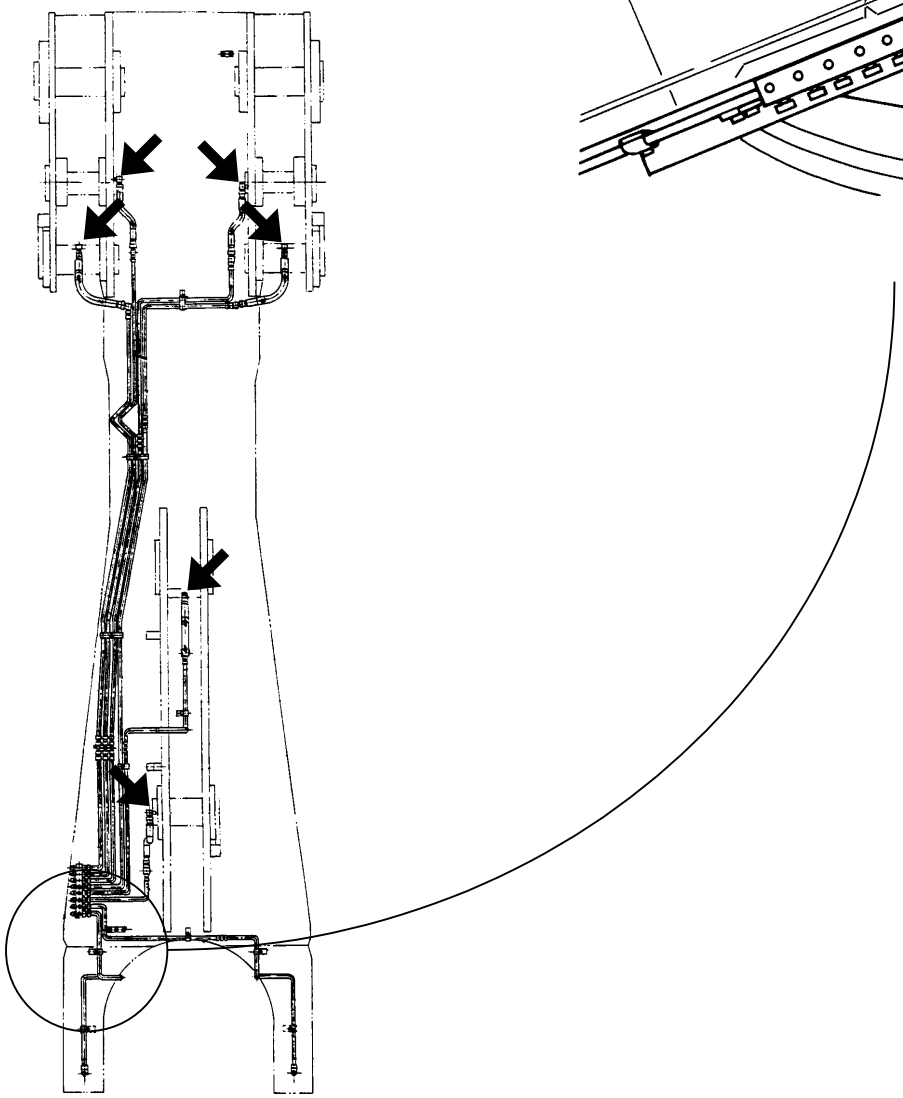

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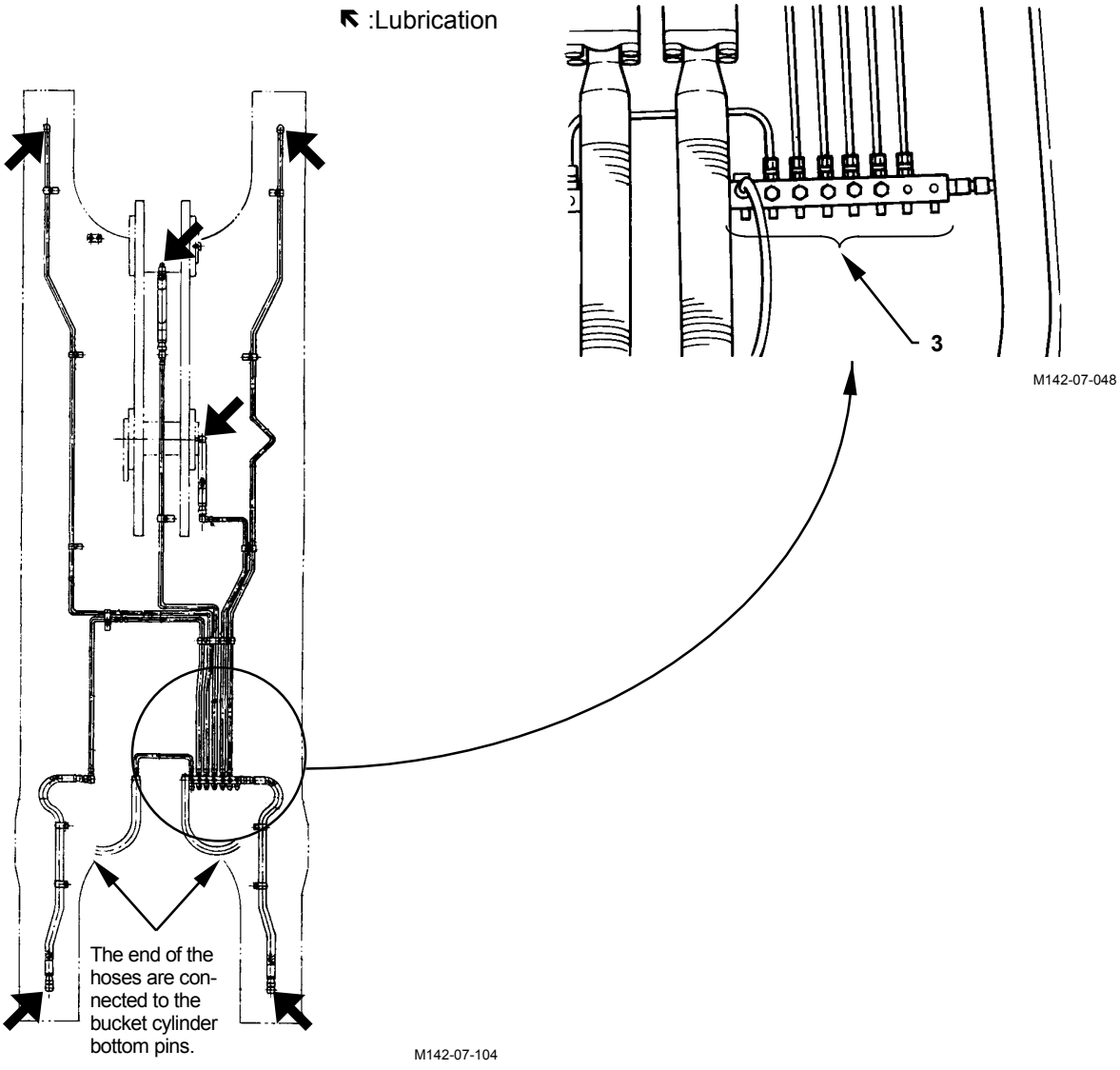
• Grouped Grease Fittings (3) --- Arm

↖ :Lubrication



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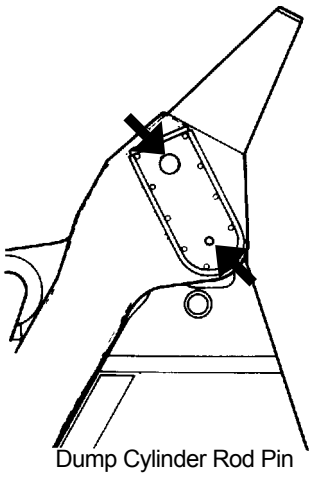
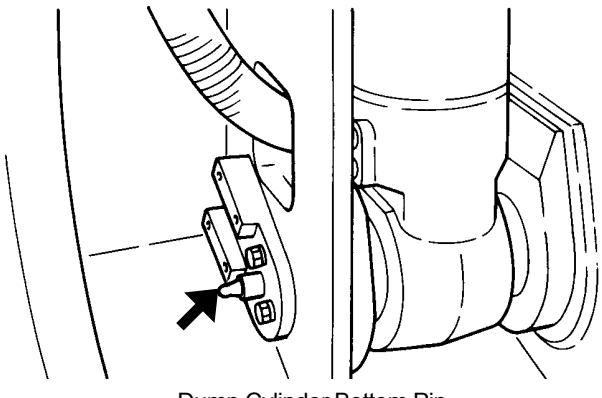
• Bucket Pins



Dump Cylinder Rod Pin
Bucket Joint Pin

M113-07-012



Dump Cylinder Bottom Pin

M142-07-042

Backhoe Front

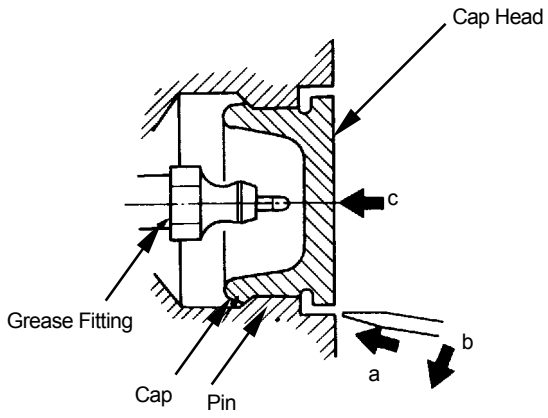
• Bucket and Link Pins

Each grease fitting is provided with a protective cap. Remove cap as shown below before greasing.

Removing/installing procedure:

Insert a screw driver into the cap cavity along the arrow “a” direction, and scoop out the cap by applying force in the arrow “b” direction.

When installing, push the cap by hand in the arrow “c” direction until it bottoms or tap using screw driver grip.



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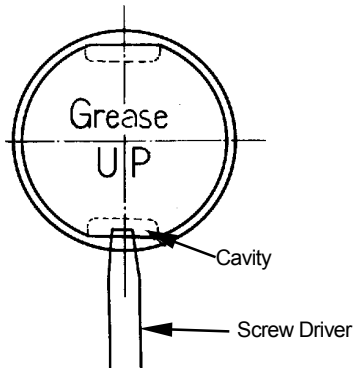

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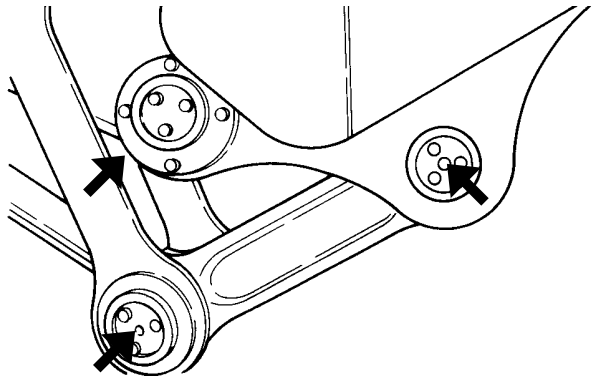

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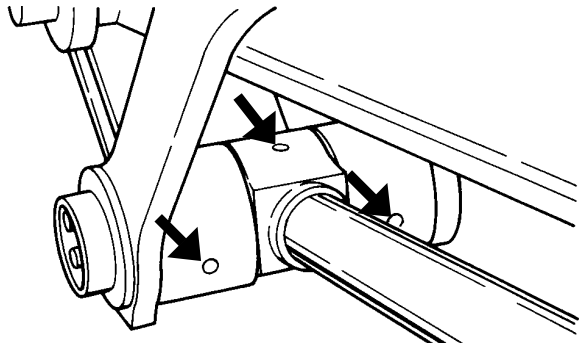

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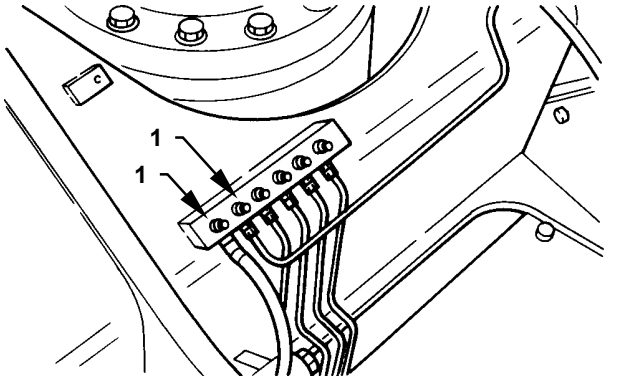
Add grease to all fittings show below every 10 hours. Most of the fittings are grouped, as shown, for quick and safe lubrication.

NOTE: Auto-lubrication can be used for the fittings on the loading shovel front.

Manually greasing pleces are as illustrated below.

- Boom Cylinder Rod Pins (1)



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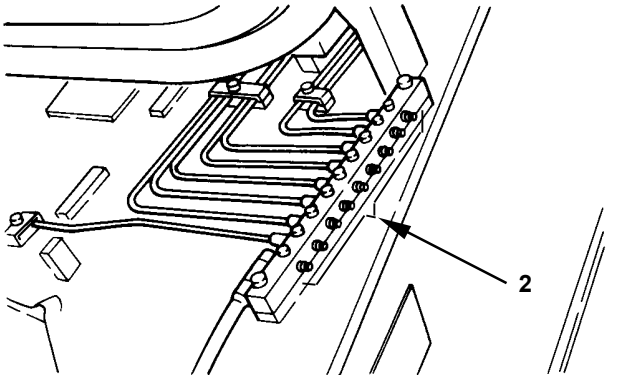
- Grouped Grease Fittings (2) --- Boom/Arm



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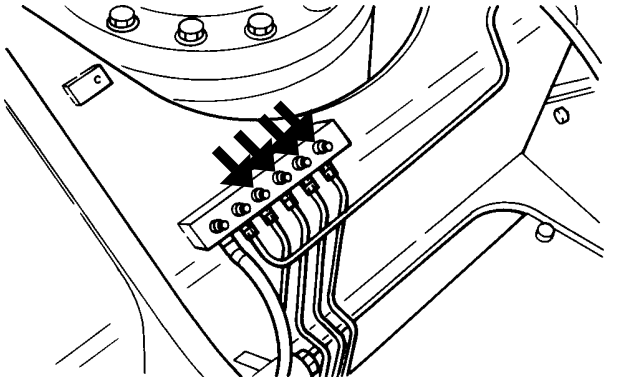
2 **Swing Bearing --- every 250 hours**



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

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.

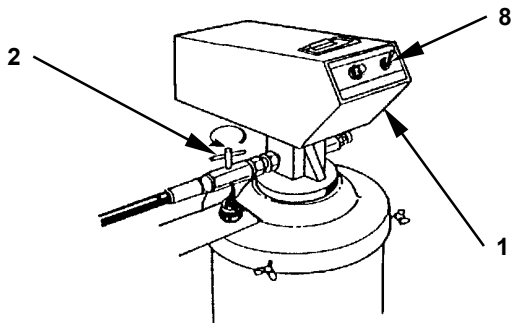
IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

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 two grease fittings.
8. Start the engine. Raise the bucket several inches off the ground and rotate the upperstructure 45° (1/8 turn).
9. Lower the bucket to the ground.
10. Repeat the procedure three times, beginning with step 3.
11. Apply grease to the swing bearing until grease can be seen escaping from the swing bearing seals.
12. Take care not to supply excessive grease.

LUBRICATOR

Lubricator Operation

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



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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.

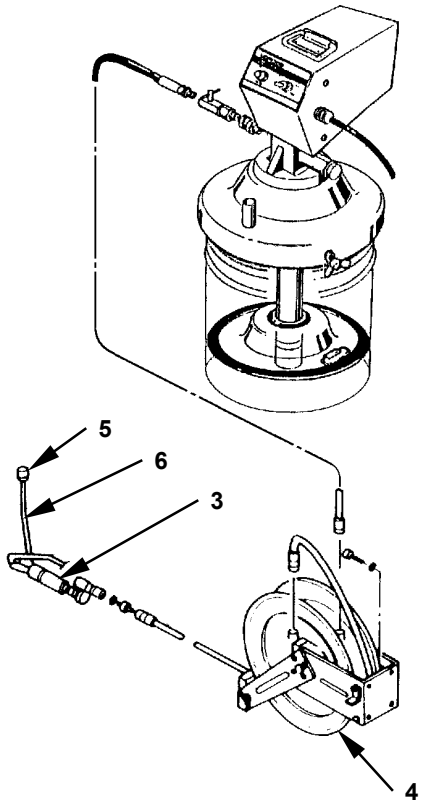
2. Grab high-pressure grease gun (3) and pay out the hose from hose reel (4) to the length required.

3. Press hydro-chuck (5) protruding from high-pressure grease gun (3) into a grease nipple and pull the lever to discharge grease.

4. Release the lever when greasing is complete; grease discharge will stop.

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

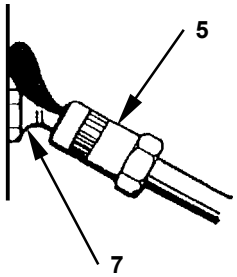
- **Tip nozzle (6) a little so as to release the connecting pressure applied to hydro-chuck (5).**
- **Slowly detach hydro-chuck (5) from nipple (7).**



M111-07-012

5. 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.

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.



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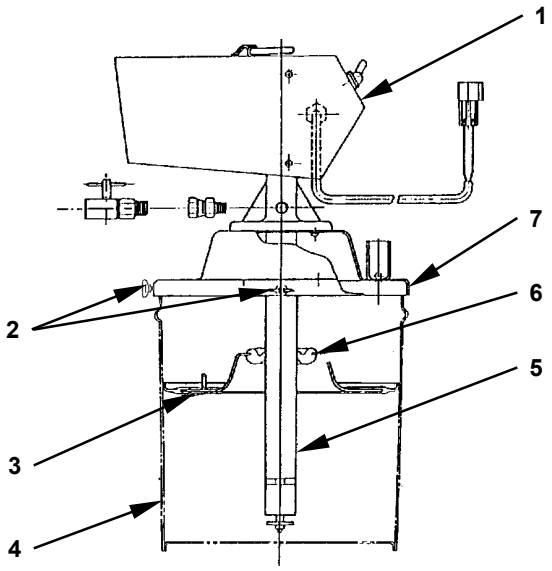
Grease Container Replacement

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).



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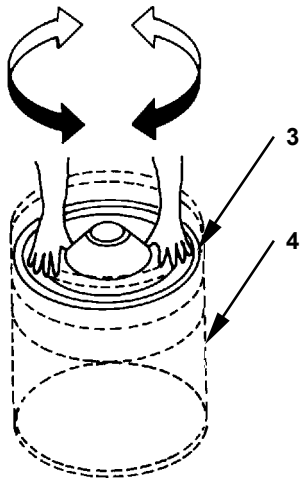
2. Remove the cover from the new grease container.

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.



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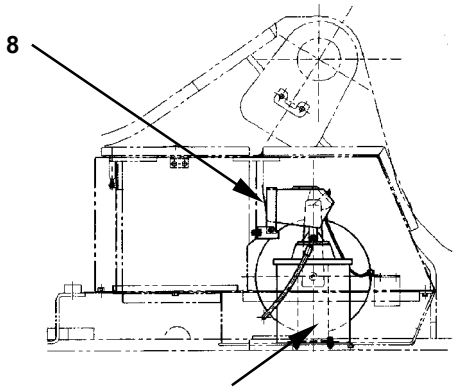
IMPORTANT: Be careful not to damage seal packing (6) by the end of suction tube (5) when inserting it.

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, secure the lubricator unit with bracket (8).



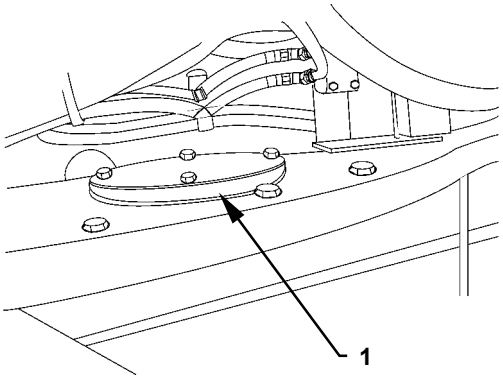
M166-07-103

Grease Container

3 **Swing Internal Gear --- every 1000 hours**

CAUTION: 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.**

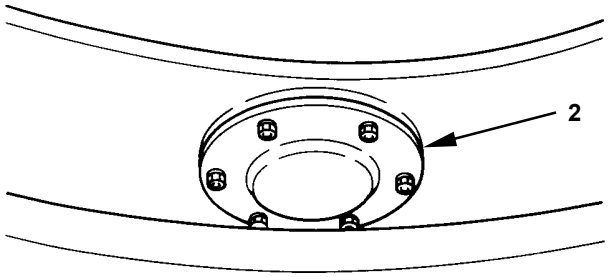


M183-07-003

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 engines at slow idle speed without load for five minutes.
5. Turn the key switches OFF. Remove the key from the key switches.
6. Pull the pilot control shut-off lever to the LOCK position.
7. Remove cover (2) on the under side of the swing gear housing, located near the center joint and thoroughly remove old grease from the swing gear.
8. Install cover (2).
9. Remove cover (1) on the upperstructure.
10. In order to add new grease evenly to the swing gear, swing the upperstructure twelve 30° intervals (one full turn) and add grease at each interval using a putty knife.
11. Install cover (2).



M142-07-050

NOTE: Excessive swing gear grease will contaminate the swing gear oil. Do not apply excessive grease. Apply the same quantity grease as removed.

B. ENGINE

Parts		Quantity	Interval (hours)							
			10	50	250	500	1000	1500	2000	4000 -6000
1. Engine Oil	Check Oil Level	1								
2. Engine Oil	Change	118 L (31.2 US gal)								
3. Replace Engine Oil Main Filter		2								
4. Replace Engine Oil Bypass Filter		1								
5. Check Injection Nozzle		–							※	
6. Inspect Bolts and Nuts Outside Engine		–		✳					※	
7. Inspect and Adjust Valve Clearance		–							※	
8. Check Fuel Injection Timing		–							※	
9. Check Starter and Alternator		–								※
10. Check Turbocharger		–								※

NOTE: ✳ *First time only.*
※ See your authorized dealer.

Recommended Brands of Oils

CAUTION: Avoid mixing oils of different brands. In most cases, different brands are not compatible with each other and, when mixed, can seize parts such as piston rings, cylinders, etc., or abnormally wear moving parts. It is best to stick with one and the same brand of oil at successive service intervals.

Recommended brands of Class CD oils (API Service Classification) are shown in the chart below.
If any oil other than these recommended oils is used, the oil must be Class CD or CF (API Service Classification) and meet the MILL2104C specifications (US military specifications).

Recommended Brands of Oils (Reference)

Manufacturer	Brands
Nippon Mitsubishi Oil Co., Ltd.	Diamond HDS-3 Engine Oil Hi-Diesel S-3
Idemitsu Kosan	Apolloil Disel Motive Custom
Japan Energy	JOMO Delstar DX
Cosmo Oil	Cosmo Diesel CD
Showa Shell Sekiyu	Rymla D
Mobil Sekiyu	Mobil Delvac 1300
Esso Sekiyu	Exxon D-3
General Sekiyu	General Gemico Super S-3

NOTE: The machine shipped from the factory is filled with Hi-Diesel S-3 15W-40.

Replenish Engine Oil

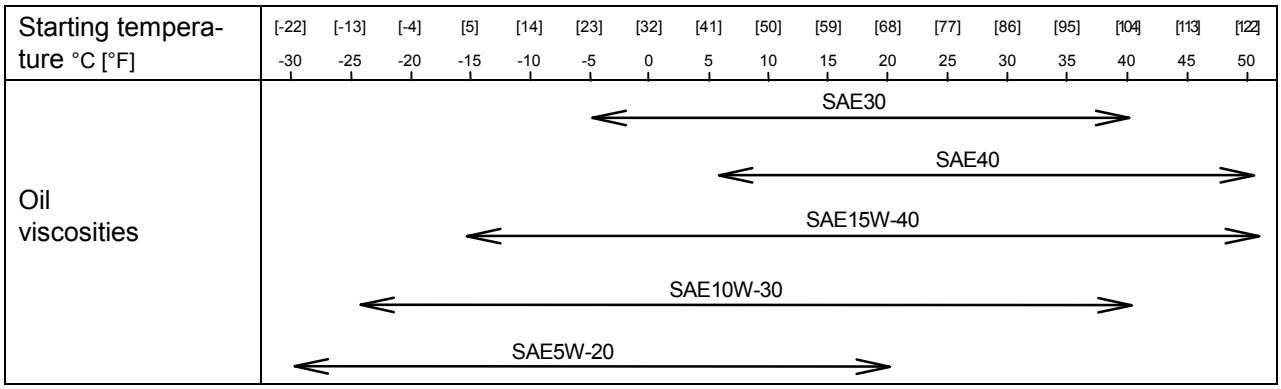
CAUTION:

- **Shut down the engine when fueling. Do not smoke while fueling — or when handling fuel containers.**
- **Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.**
- **After fueling, secure filler cap.**

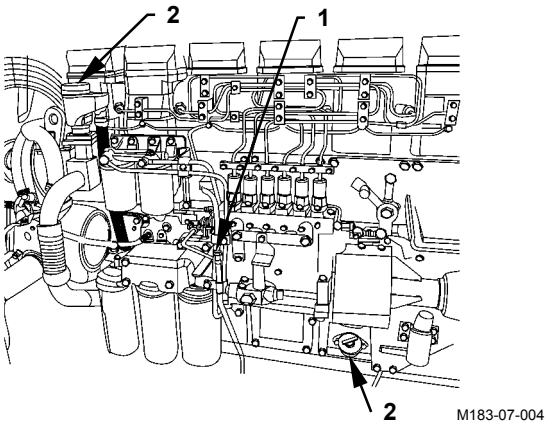
Recommended Oil Viscosities

Two important considerations related to satisfactory engine operation under ambient temperature conditions — (1) the ability to crank the engine fast enough to assure starting, and (2) adequate lubrication of internal wearing surfaces during starting and warm-up.
Recommended oil viscosities are SAE15W-40 for all seasons, shown in the chart below:

Recommended Oil Viscosities



1 **Engine Oil Level --- every 10 hours**



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).

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.

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

3 **Replace Engine Oil Main Filters --- every 500 hours**

4 **Replace Engine Oil Bypass Filters --- every 500 hours**

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.

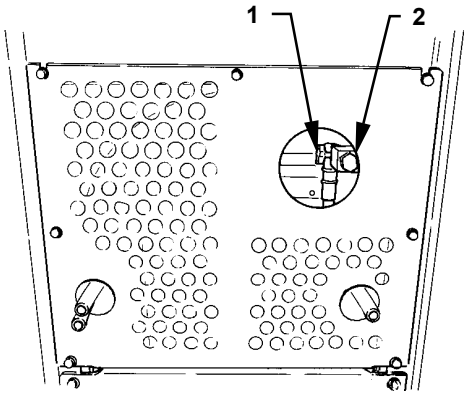
IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

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.

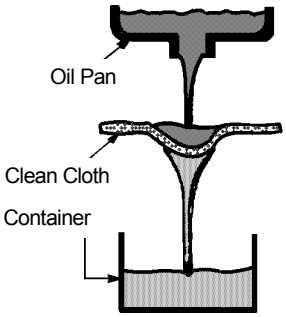
CAUTION: Engine oil may be hot. Take extra care to avoid burns.

8. Remove drain plug (2).
9. Loosen drain cock (1). Allow oil to drain through a clean cloth into a 120 liter (31.7 US gal) container.
10. After all oil has drained, inspect cloth for any debris such as small pieces of metal.
11. Install and tighten drain plug (2). Close drain cock (1).
12. Remove the filter cartridges of engine oil filters (5), (6) by turning them counterclockwise with filter wrench.
13. Clean the filter gasket contact area on the engine.
14. Fill the new filters with lubricating oil to prevent crankshaft or bearing damage. Apply a thin film of clean oil to the gasket of the new filter.
15. 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.
16. Tighten engine oil filters (5), (6) 1/2 to 3/4 turn more using filter wrench.
    Be careful not to overtighten.
17. Remove oil filler cap (3). Fill the engine with recommended oil. Check that oil level is between the circle marks on the dipstick after 15 minutes.

    Engine oil capacity: 118 L (31.2 US gal)
18. Install the oil filler cap.
19. Start the engine. Run the engine at slow idle for 5 minutes.
20. Check that the engine oil pressure indicator on the monitor panel goes out immediately. If not, stop the engine immediately and find the cause.
21. Stop the engine. Remove the key from the key switch.
22. Check for any leakage at the drain plug.
23. Check oil level on the dipstick (4).



M142-07-110



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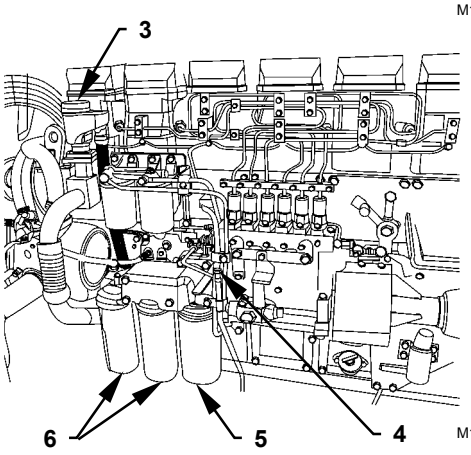


M183-07-004

5 **Check Injection Nozzle**
--- every 2 000 hours

See your authorized dealer.

6 **Inspect Bolts and Nuts Outside Engine**
--- every 2 000 hours (first time after 50 hours)

See your authorized dealer.

7 **Inspect and Adjust Valve Clearance**
--- every 2 000 hours

See your authorized dealer.

8 **Check Fuel Injection Timing**
--- every 2 000 hours

See your authorized dealer.

9 **Check Starter and Alternator**
--- every 4 000—6 000 hours

See your authorized dealer.

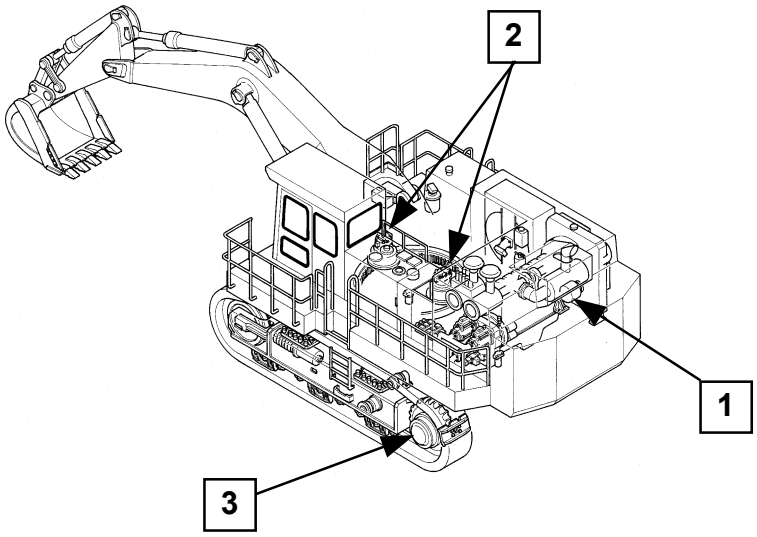
10 **Check Turbocharger**
--- every 4 000—6 000 hours

See your authorized dealer.

C. TRANSMISSION

Parts		Quantity	Interval (hours)						
			10	50	250	500	1000	1500	2000
1. Pump Transmission Gear	Check Oil Level	1	✳						
	Change Oil	15 L (4.0 US gal)		✳					
	Replace Filter	1							
	Clean Breather	2							
2. Swing Reduction Gear	Check Oil Level	2	✳						
	Change Oil	25 L (6.6 US gal)×2							
3. Travel Reduction Gear	Check Oil Level	2							
	Change Oil	43 L (11.4 US gal)×2							

NOTE: ✳ First time only.



M183-01-059

Brand Names of Recommended Oil

Application / Kind of Oil / Air Temp. / Manufacturer	Swing and Travel Reduction Gear		Pump Transmission		
	Gear oil		Engine Oil		
	–20 to 40°C (–4 to 104°F)		–20 to 0°C (–4 to 32°F)	–10 to 35°C (14 to 95°F)	25 to 40°C (77 to 104°F)
British Petroleum	BP Gear oil	SAE90EP	BP Vanellus C3		
			10W	30	40
Caltex Oil	Universal Thuban	SAE 90	RPM DELO 300 Oil		
			10W	30	40
Esso	Esso Gear Oil	80W-90, 85W-90	Essolube D-3		
			10W	30	40
Idemitsu Kosan	Apollo Gear	HE90	Apolloil diesel motive		
			S-310	S-330	S-340
Mobil Oil	Mobilube	GX90	Mobil Delvac		
			1310	1330	1340
Nippon Oil	Hypoid Gear Oil 90	(Swing and travel reduction device)	Hidiesel S3		
			–10 to 40 °C (14 to 104 °F) 15W-40	–20 to 35 °C (–4 to 95 °F) 10W-30	
Shell Oil	Shell Spirax	EP90	Shell Rymla D		
			10W	30	40
Remarks	API GL 4 Class		API CD Class		

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

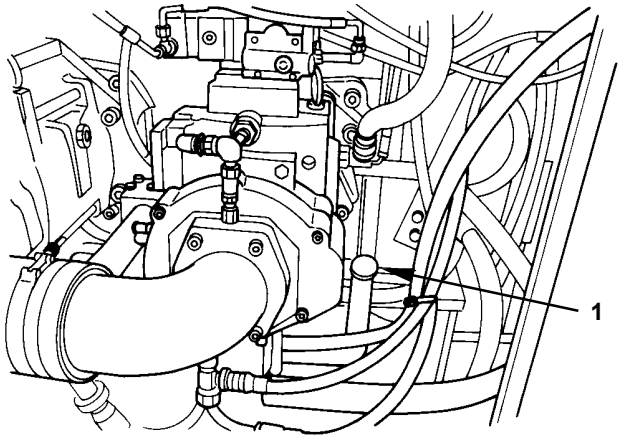
1 **Pump Transmission**

Check Oil Level --- every 50 hours (first time after 10 hours)

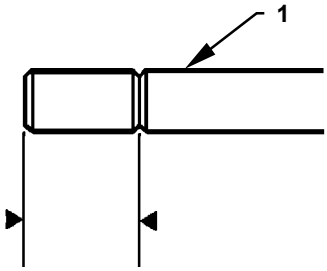
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

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.
7. Remove dipstick (1). Oil must be within the specified range.
8. If necessary, remove dipstick (1) and add oil. (See gear oil chart)
9. Recheck oil level.



M142-07-088



M114-07-181

Change Oil --- every 500 hours
(first time after 50 hours)
Clean Strainer and Breather --- every 500 hours

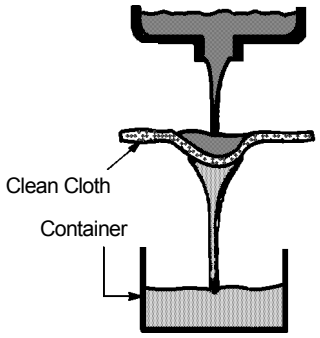
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

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

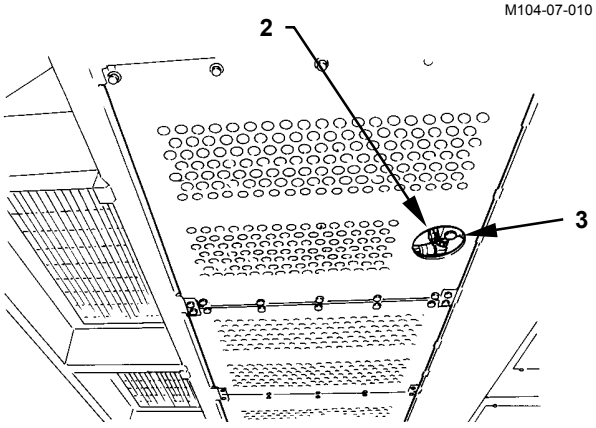
4. Run the engines at slow idle speed without load for five minutes.
5. Stop the engines. Remove the key from the key switches.
6. Pull the pilot control shut-off lever to the LOCK position.

CAUTION: Oil may be hot. Wait for oil to cool before starting work.

7. Prepare a container of 15 liter (4.0 US gal) or more capacity for the drain oil.
8. Remove under cover, located on the left of underside of the upperstructure.
9. Remove drain plug (3), and loosen cock (2) to drain the oil.
10. Check if foreign material like metal particles are included in the drain oil by filtering it with a clean cloth.



M104-07-010

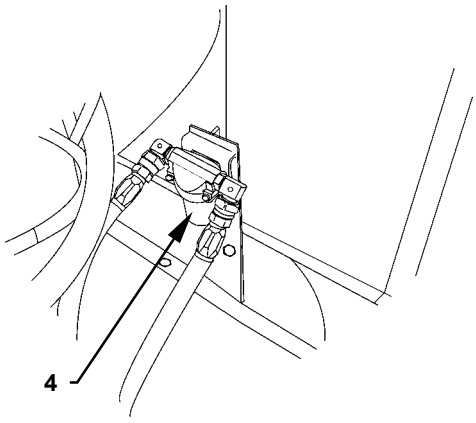


M142-07-009

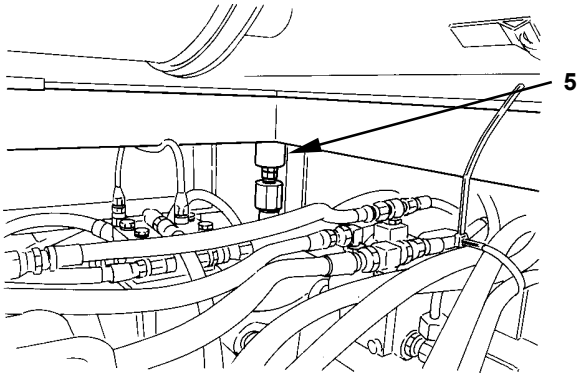
11. Remove filter element (4) by turning it counterclockwise with filter wrench.

12. Install new filter element (4) and new O-ring.

13. Remove breather cap (5) and clean the element. After cleaning, apply LOCTITE to the threads of the air breather cap. Then, tighten it.



M183-07-005



M142-07-011

2 **Swing Reduction Gear**

Check Oil Level --- every 50 hours (first time after 10 hours)

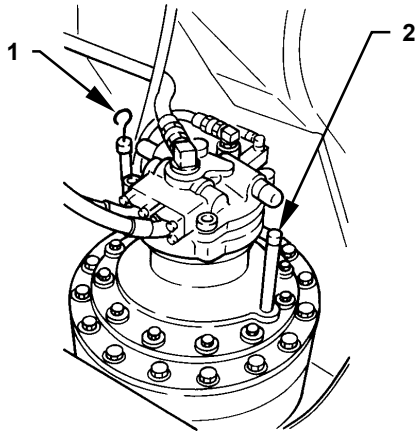
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

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

4. Run the engines at slow idle speed without load for five minutes.
5. Stop the engines. Remove the key from the key switches.
6. Pull the pilot control shut-off lever to the LOCK position.

CAUTION: Gear oil may be hot. Wait for gear oil to cool before starting work.

7. Remove dipsticks (1). Oil must be between marks.
8. If necessary, add oil via filler tube (2). (See oil chart)
9. Recheck oil level.



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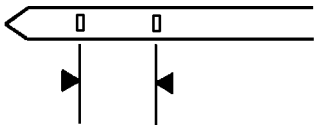


M104-07-017

Change Gear Oil --- every 1000 hours (first time after 50 hours)

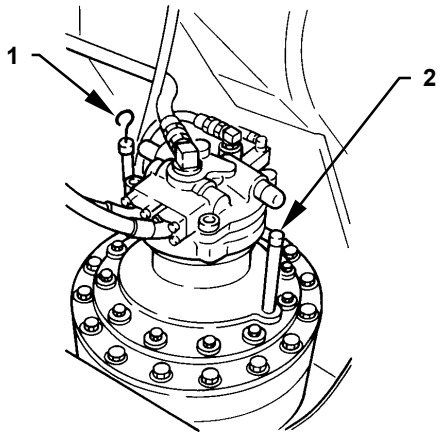
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

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

4. Run the engines at slow idle speed without load for five minutes.
5. Stop the engines. Remove the key from the key switches.
6. Pull the pilot control shut-off lever to the LOCK position.

CAUTION: Gear oil may be hot. Wait for gear oil to cool before starting work.

7. Prepare a container of 25 liter (6.6 US gal) or more capacity for the drain oil.
8. Remove two swing gear box drain plugs (3), located at boom foot and under the engine rear end and open drain cocks (4) to drain oil.
9. Tighten drain cocks (4) and drain plugs (3). Fill gear boxes with oil via filler tubes (2).
10. Confirm that the oil level is between the notches on dipstick (1). Add oil if necessary.



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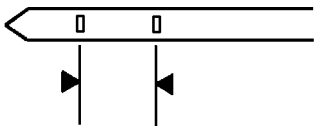

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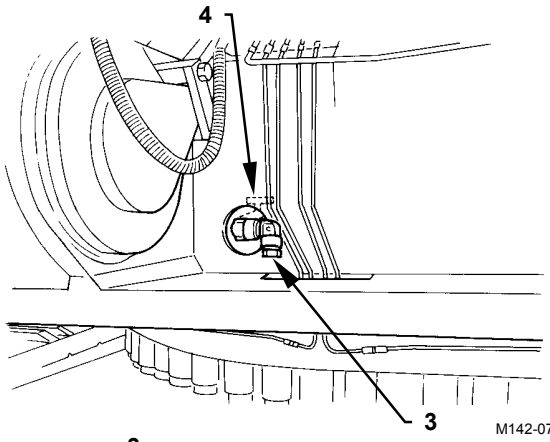

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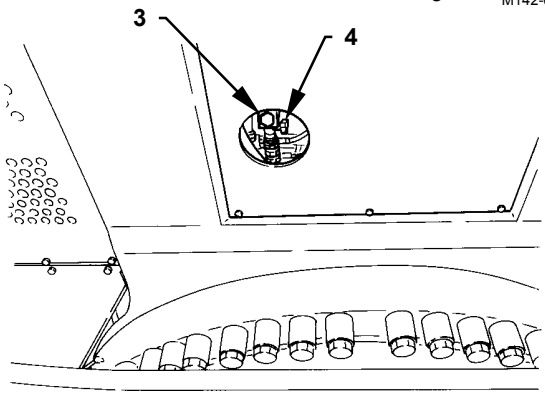


M142-07-013

3 Travel Reduction Gear

Check Oil Level --- every 250 hours

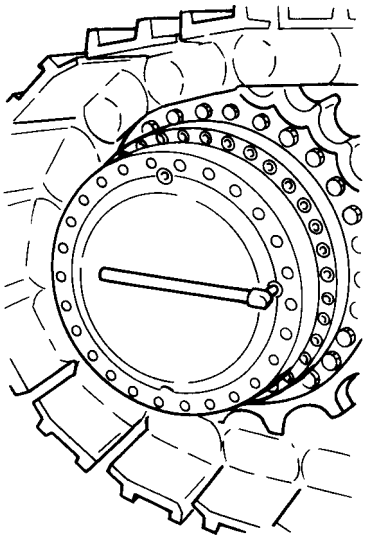
1. Park the machine on a level surface.
2. Rotate the travel motor until the imaginary line through plug (1) and plug (3) is vertical.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

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 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.

CAUTION: 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 oil level check plug (2). Oil must be up to the bottom of hole.
10. If necessary, after oil supply plug (1) have been removed, add oil until oil flows out of the oil level check plug (2) hole. (See gear oil chart)
11. Wrap the plug threads with sealing-type tape. Tighten plugs (1) and (2) to 69 N·m (7 kgf·m, 51 lbf·ft)
12. Check the gear oil level in the other travel reduction gear.



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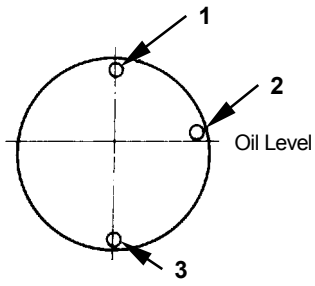


M113-07-040

Change Gear Oil --- every 2000 hours

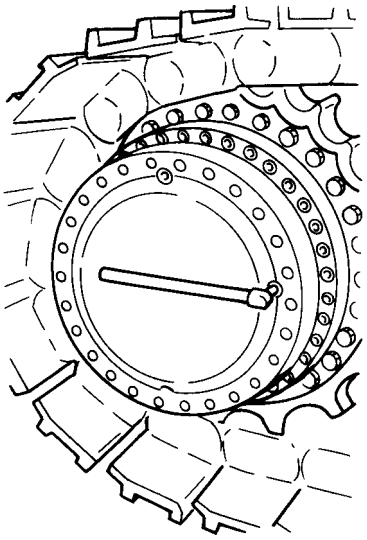
1. Park the machine on a level surface.
2. Rotate the travel motor until the imaginary line through plug (1) and plug (3) is vertical.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

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 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.

CAUTION: 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, and temporarily re-tighten plug (1).
9. Prepare a container of 50 liter (13.2 US gal) or more capacity for the drain oil. Remove drain plug (3).
10. Clean drain plug (3). Wrap the threads of the drain plug with sealing-type tape. Install the plug. Tighten the plug to 69 N·m (7 kgf·m, 51 lbf·ft).
11. Remove oil level check plug (2) and oil supply plug (1).
12. Add oil until oil flows out of the oil level check plug (2) hole. (See gear oil chart)
13. Clean plugs (1) and (2). 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 69 N·m (7 kgf·m, 51 lbf·ft).
14. Repeat steps 8. to 13. for the other travel reduction gear.



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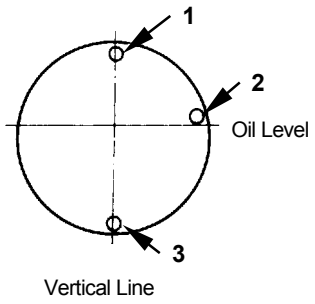


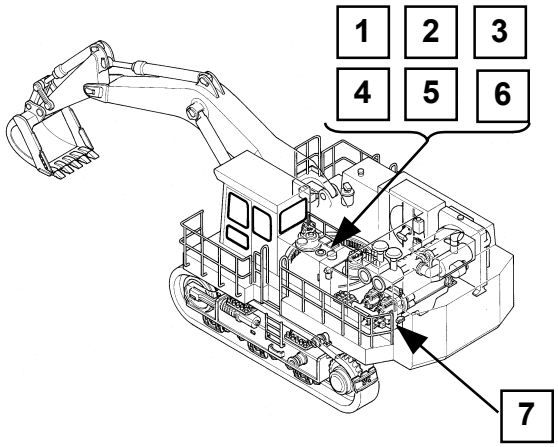
M113-07-040

D. HYDRAULIC SYSTEM

Parts		Quantity	Interval (hours)							
			10	50	250	500	1500	2000	2500	4000
1. Check Hydraulic Oil Level		1	■							
2. Drain Hydraulic Oil Tank Sump		1			■					
3. Change Hydraulic Oil		1350 L (357 US gal)						★	★	★
4. Suction Filter Cleaning		2	When changing hydraulic oil							
5. Replace Drain Filter Element		1		✳		■				
6. Replace Full-Flow Filter Element		2				■				
7. Replace Pilot Oil Filter Element		1				■				
8.	Check Hoses and Lines (for leak, loose)	–	■							
	Check Hoses and Lines (for crack, bend, etc.)	–			■					

NOTE: ★ Hydraulic oil changing intervals differ according to kind of hydraulic oil used. See recommended oil chart.

✳ First time only.



M183-01-059

Brand Names of Recommended Hydraulic Oil

Kind of Lubricant	Hydraulic Oil					
Where to be applied	Hydraulic System					
Change Interval	4000 hours		2500 hours		2000 hours	
Environmental Temp. / Manufacturer	–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)
Hitachi	Super EX 46HN					
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 ■ .

INSPECTION AND MAINTENANCE OF HYDRAULIC EQUIPMENT

CAUTION: 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.

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:

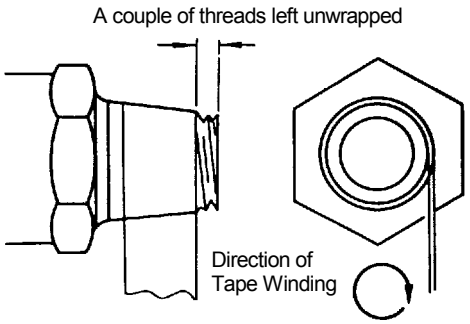
4.1 Wash hoses, pipes, and the tank interior with a washing liquid and thoroughly wipe it out before reconnecting them.

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 overtighten them.

4.5 When connecting screw type joints, apply seal tape to the threads of male screw. Be sure to leave a couple of threads at the male screw top unwrapped, as shown. Do not overwrap. Apply seal tape around threads as shown, so that the tape does not loosen when the female screw is tightened.



M114-07-041

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. Only 50 to 60% of the total hydraulic circuit oil on a large size excavator can be replaced at a time. Accordingly, conduct minimum flushing twice.
8. In case the machine is used for dredging operations, replace the hydraulic oil at a 2000 hour interval regardless of the oil brand used.
9. If any other hydraulic oil (having a different replacement interval) is unavoidably used, replace the oil in accordance with the individual replacement interval standard.
10. Never run the engine without oil in the hydraulic oil tank.

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. Position the machine as illustrated on the right.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.

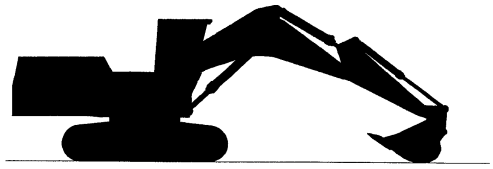
IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

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. Check oil level with level gauge (1) on hydraulic oil tank. Oil must be between marks on the gauge. If necessary, add oil.

CAUTION: The hydraulic oil tank is pressurized. Keep body and face away from cap (2). Turn cap (2) slowly and remove the cap only after releasing the internal pressure completely.

To add oil:

9. Insert the wrench as shown and turn the wrench clockwise and hold the wrench.
10. Turn cap (2) counterclockwise about 30°, at which point stop cap (2) to release the air.
11. Turn cap (2) further and remove cap (2).
12. Align the projected part of cap (2) with the projected part of the case and install cap (2).
13. Add oil. Recheck oil level gauge (1).



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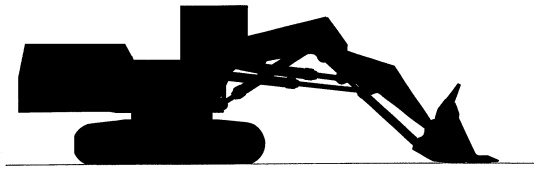

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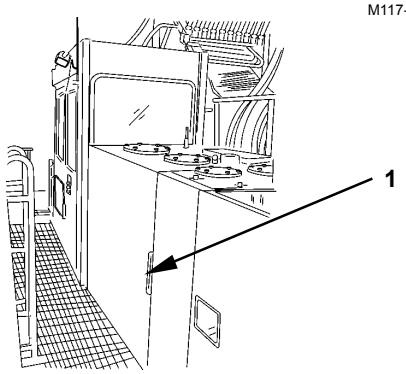

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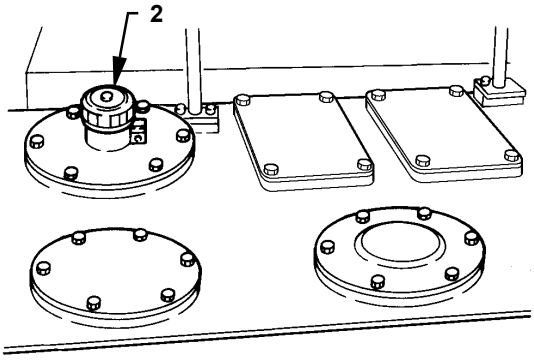

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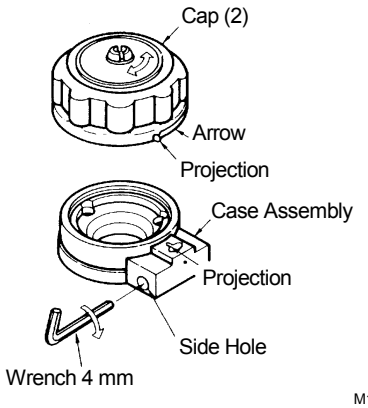


M110-07-022

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

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.

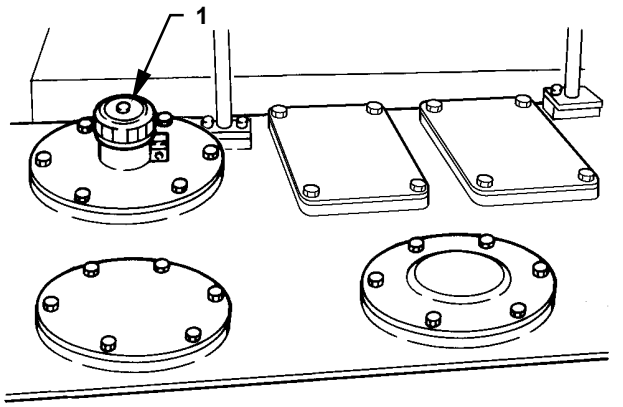
4. Run the engine at slow idle speed without load for five minutes.
5. Turn the key switch OFF. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.

CAUTION: The hydraulic oil tank is pressurized. Keep body and face away from cap (1). Turn cap (1) slowly and remove the cap only after releasing the internal pressure completely.

7. Insert the wrench as shown and turn the wrench clockwise and hold the wrench.
8. Turn cap (1) counterclockwise about 30°, at which point stop cap (1) to release the air.
9. Turn cap (1) further and remove cap (1).
10. Align the projected part of cap (1) with the projected part of the case and install cap (1).

CAUTION: Do not loosen the drain plug until oil is cool. Hydraulic oil may be hot, potentially causing serious injury.

11. After oil is cool, remove drain plug (3) and open drain cock (2) to drain water and sediment.
12. After draining water and sediment, close drain cock (2) securely.
13. Install and tighten plug (3).



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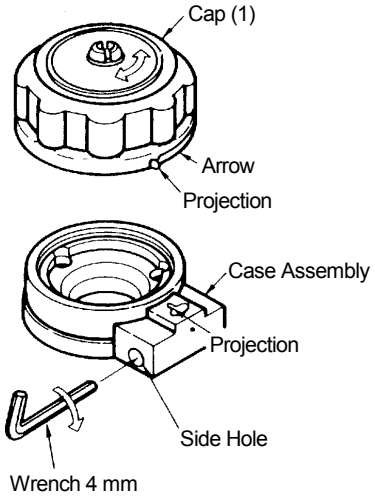

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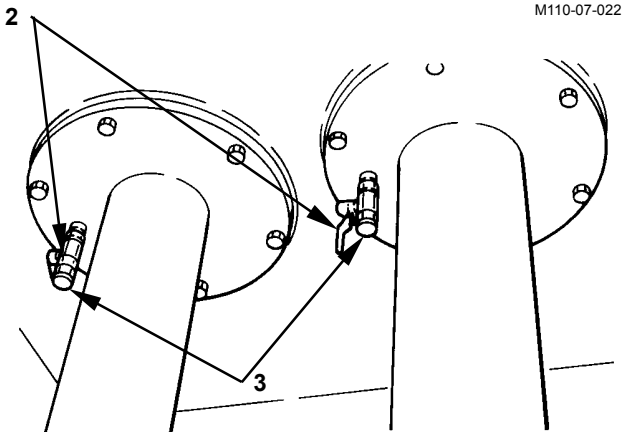
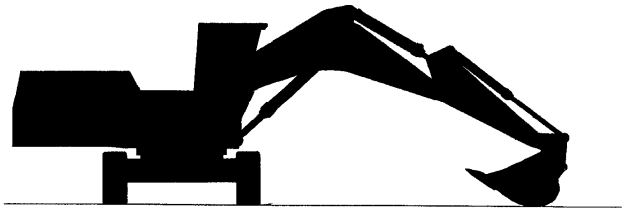


M142-07-053

3 **Change Hydraulic Oil --- every 4000 hours, 2500 hours or 2000 hours**

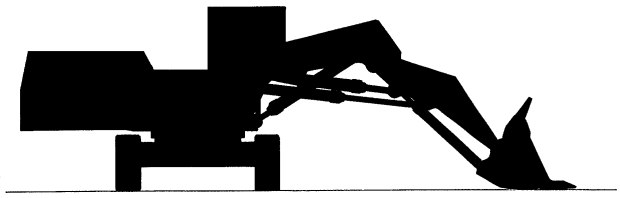


M142-07-092

CAUTION: 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)

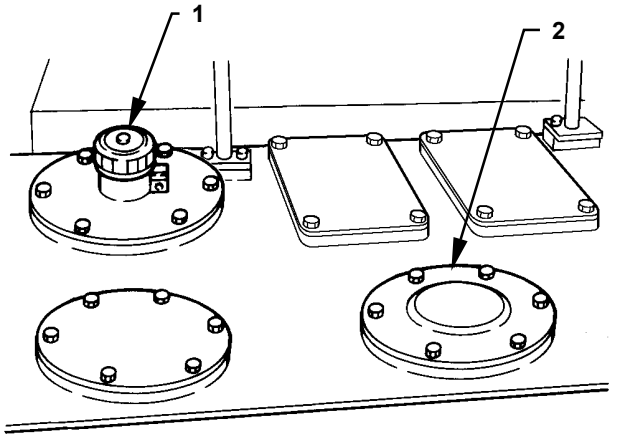
1. Park the machine on a level surface with the upperstructure rotated 90° for easier access.
2. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended.
3. Lower the bucket to the ground.
4. Turn the auto-idle switch off.



M117-07-126

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

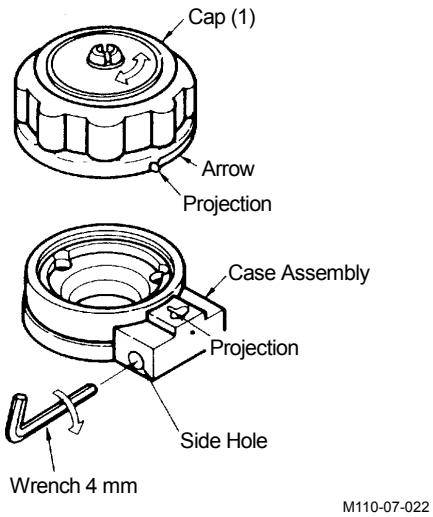
5. Run the engine at slow idle speed without load for five minutes.
6. Stop the engine. Remove the key from the key switch.
7. Pull the pilot control shut-off lever to the LOCK position.
8. Clean the top of the hydraulic oil tank to keep dirt out of the hydraulic system.



M183-07-052

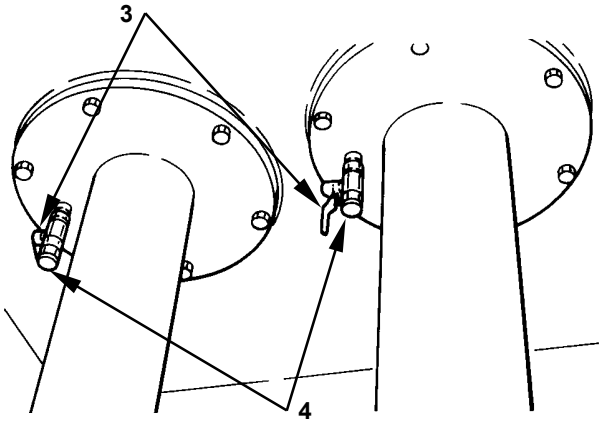
CAUTION: The hydraulic oil tank is pressurized. Keep body and face away from cap (1). Turn cap (1) slowly and remove the cap only after releasing the internal pressure completely.

9. Insert the wrench as shown and turn the wrench clockwise and hold the wrench.
10. Turn cap (1) counterclockwise about 30°, at which point stop cap (1) to release the air.
11. Turn cap (1) further and remove cap (1).
12. Align the projected part of cap (1) with the projected part of the case and install cap (1).
13. Remove cover (2).
14. Prepare a container of 1350 liters (357 US gal) or more capacity for the drain oil.
15. Remove oil using a suction pump. The hydraulic oil tank capacity, up to specified oil level, is approximately 1350 liters (357 US gal).



M110-07-022

16. Remove drain plug (4) on the underside of the hydraulic oil tank and loosen drain valve (3) to drain oil.
17. Tighten drain valve (3).
18. Install and tighten drain plug (4).
19. Add oil via covers (2) hole until it is between the mark on the level gauge (5).
20. Be sure to bleed air from the system following the procedures shown next page.



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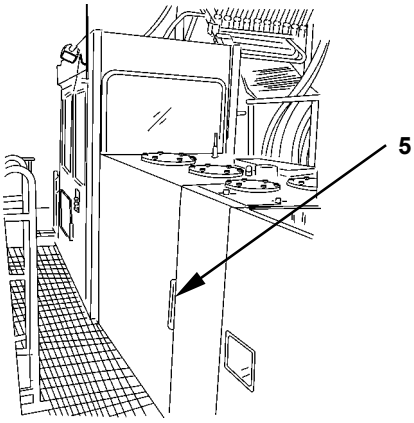


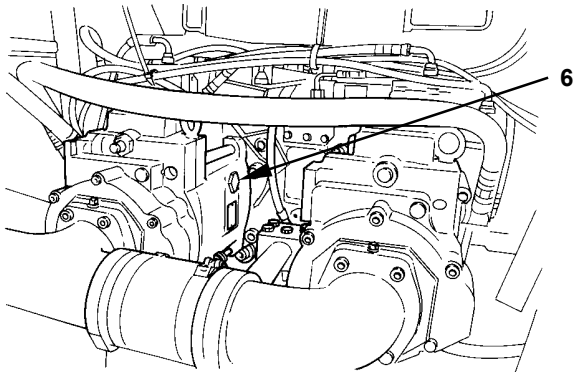
M183-07-006

Air Bleeding Procedures

IMPORTANT: If the hydraulic pump is not filled with oil, it will be damaged when the engine is started.

The machine is equipped with three main pumps. Bleed air from these pumps after changing hydraulic oil.

1. Remove air bleed plugs (6) (three for upper pumps and lower pump) on side of each pumps.
2. Fill the pump with oil through air bleed plugs (6) port on side of each pumps until oil flows out of air bleed plug (6) hole.
3. Temporarily tighten air bleed plugs (6) on each pumps, start the engine and run at slow idle. Loosen one of air bleed plugs (6) slightly until oil flows from plug port to release trapped air completely. Tighen air bleed plug (6). Repeat this step for the rest of plugs.
4. Purge air from the hydraulic system by running the engines at slow idle and operating the control levers slowly and smoothly for 15 minutes.
5. Position the machine as illustrated in the oil level checking procedure.
6. Lower the bucket to the ground.
7. Turn the auto-idle switch off.
8. Stop the engines. Remove the key from the key switches.
9. Pull the pilot control shut-off lever to the LOCK position.
10. Check the hydraulic oil tank gauge. Add oil if necessary.



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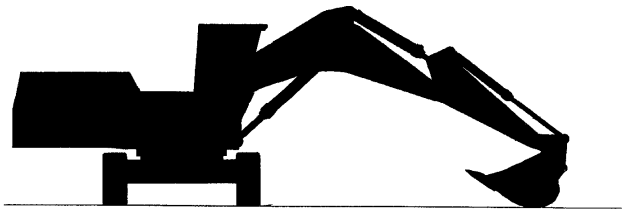

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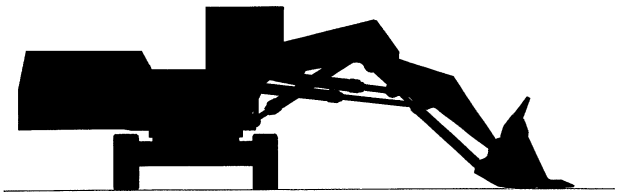
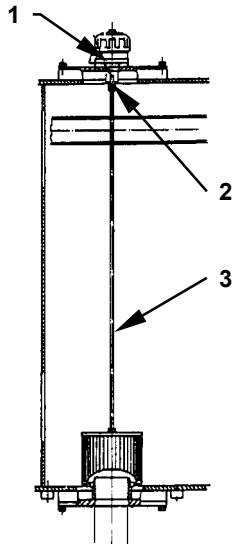


M117-07-126

4 **Suction Filter Cleaning**
--- When changing hydraulic oil

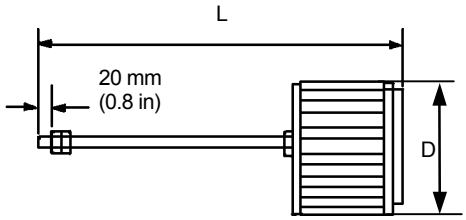
Inside hydraulic oil tank are provided two strainers on the bottom. Be sure to clean these strainers when changing hydraulic oil.

1. After draining hydraulic oil, remove two tank top covers (1) positioned towards the upperstructure rear end.
2. Remove filter and rod (3) assembly.
3. Clean filter and tank interior.
4. Install filter and rod (3) assembly. Make sure the filter is positioned correctly in support (2).
5. Install cover (1). Make sure rod top is correctly inserted into cover center hole (1). Tighten the bolts.
6. Discriminate two filters referring to the dimensions shown below.



M113-07-050

Type	D	L	Remarks
A	200 mm (8″)	965 mm (3′ 2″)	The other one
B	150 mm (6″)	975 mm (3′ 2-1/2″)	Located below breather cap



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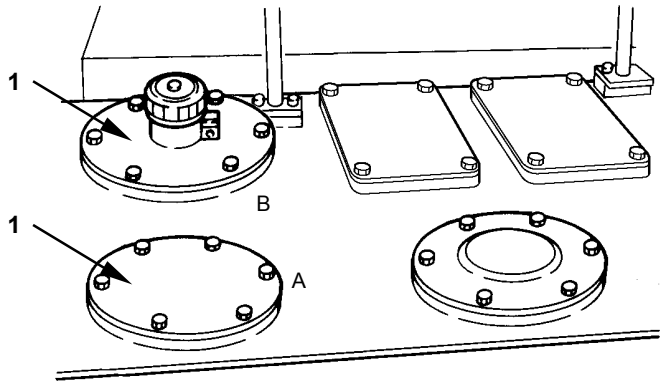


M183-07-052

5 **Replace Drain Filter Element**
--- every 500 hours
(first time after 50 hours)

CAUTION: Hydraulic oil and components may be hot. Be sure to allow oil and components to cool before starting work.

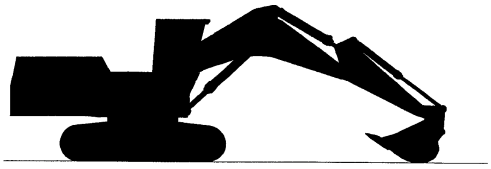
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

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

4. Run the engines at slow idle speed without load for five minutes.
5. Stop the engines. Remove the key from the key switches.
6. Pull the pilot control shut-off lever to the LOCK position.

CAUTION: The hydraulic oil tank is pressurized. Keep body and face away from cap (1). Turn cap (1) slowly and remove the cap only after releasing the internal pressure completely.

7. Insert the wrench as shown and turn the wrench clockwise and hold the wrench.
8. Turn cap (1) counterclockwise about 30°, at which point stop cap (1) to release the air.
9. Turn cap (1) further and remove cap (1).
10. Align the projected part of cap (1) with the projected part of the case and install cap (1).



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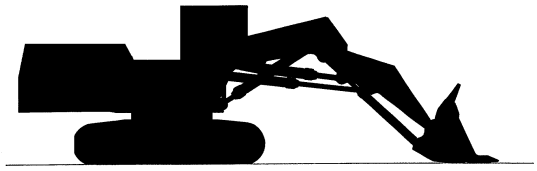

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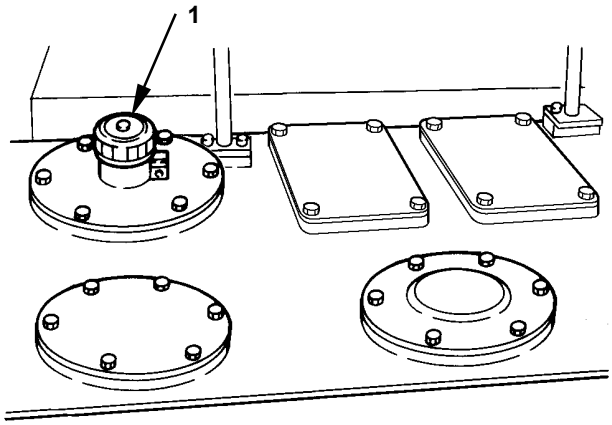

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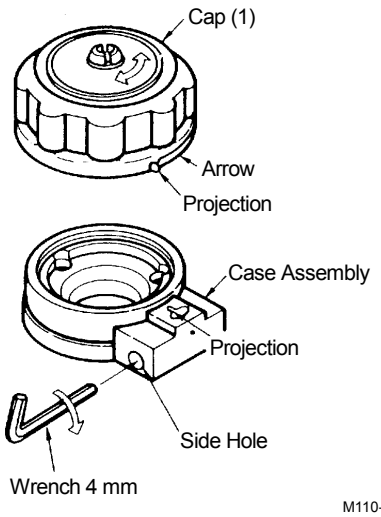


M110-07-022

IMPORTANT:
- **When old element is removed, check it for any foreign matter, such as small pieces of metal.**
- **Replace the element periodically.**
- **Clean the drain filter and the surrounding area.**

11. The drain filter is located behind the hydraulic oil tank.

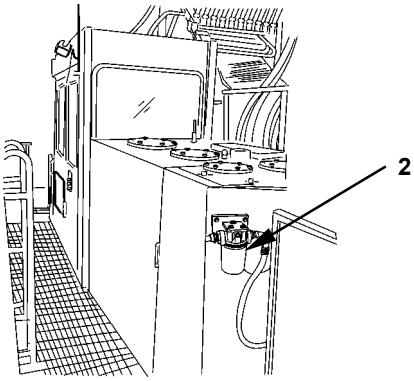
12. Turn cartridge-type drain filter element (2) counterclockwise using a filter wrench to remove it from the filter head. Take care not to damage the O-ring when removing element (2).

13. Install new element (2) onto the filter head by turning it clockwisely by hand until it comes in contact with the filter head.

14. Turn new element (2) 2/3 of a turn further using a filter wrench. Take care not to tighten excessively. The cartridge may be deformed.

15. Start the engine. Check for any oil leakage.

NOTE: If any evidence of metal powder is found from drain oil in the drain filter, consult your authorized dealer.



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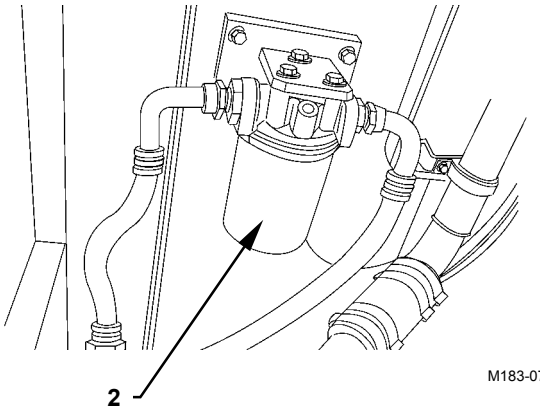
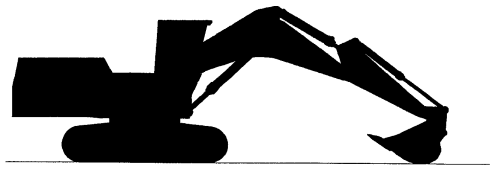


M183-07-008

6 **Replace Full-Flow Filter**
--- every 500 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.



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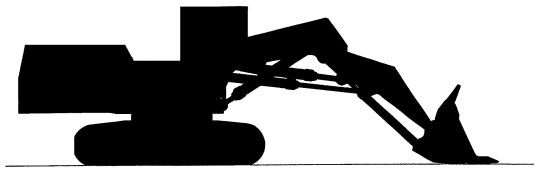
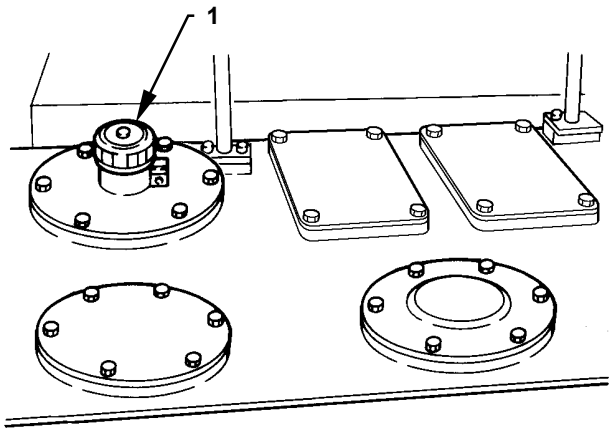
4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.



M117-07-127

6. Pull the pilot control shut-off lever to the LOCK position.

CAUTION: The hydraulic oil tank is pressurized. Keep body and face away from cap (1). Turn cap (1) slowly and remove the cap only after releasing the internal pressure completely.



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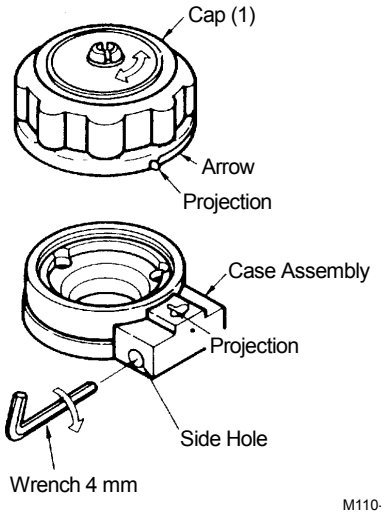
7. Insert the wrench as shown and turn the wrench clockwise and hold the wrench.
8. Turn cap (1) counterclockwise about 30°, at which point stop cap (1) to release the air.
9. Turn cap (1) further and remove cap (1).
10. Align the projected part of cap (1) with the projected part of the case and install cap (1).



M110-07-022

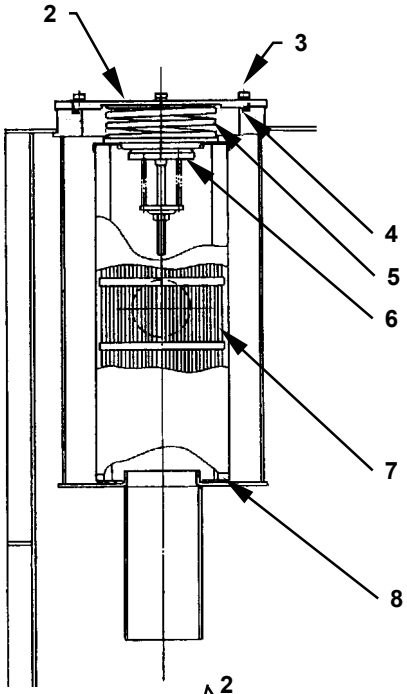
NOTE: There is spring tension under cover. Hold down cover when removing last two bolts.

11. Hold down filter cover (2) against light spring load when removing the last two bolts (3). Remove filter cover (2) and O-ring (4).

12. Remove spring (5), valve (6) and element (7).

13. Discard element (6) and O-ring (4). Install a new element (7), the valve (6) and spring (5). Before installing new element (7), be sure to check that rubber (8) is installed.

14. Install filter cover (2) with new O-ring (4). Install and tighten bolts (3) to 49 N·m (5 kgf·m, 36 lbf·ft).



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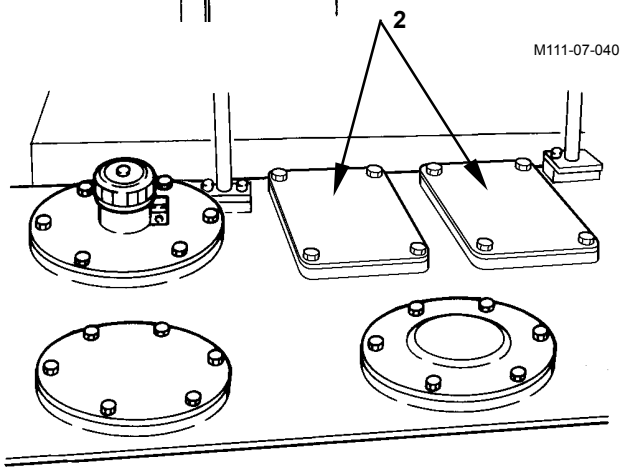


M183-07-052

7 **Replace Pilot Oil Filter Element**
--- every 500 hours

CAUTION: Hydraulic oil and components may be hot. Be sure to allow oil and components to cool before starting work.

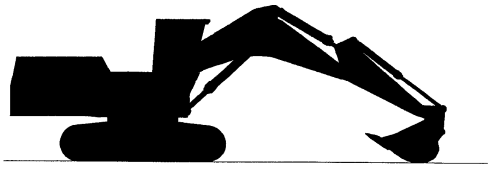
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

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

4. Run the engines at slow idle speed without load for five minutes.
5. Stop the engines. Remove the key from the key switches.
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.

CAUTION: The hydraulic oil tank is pressurized. Keep body and face away from cap (1). Turn cap (1) slowly and remove the cap only after releasing the internal pressure completely.

8. Insert the wrench as shown and turn the wrench clockwise and hold the wrench.
9. Turn cap (1) counterclockwise about 30°, at which point stop cap (1) to release the air.
10. Turn cap (1) further and remove cap (1).
11. Align the projected part of cap (1) with the projected part of the case and install cap (1).



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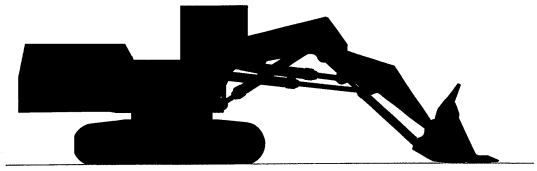

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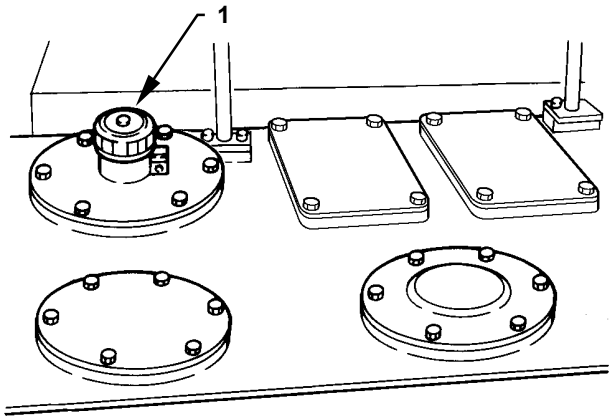

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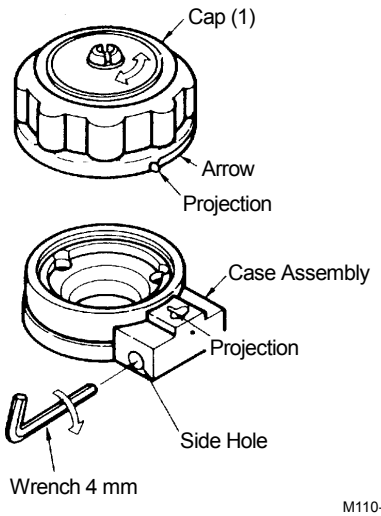
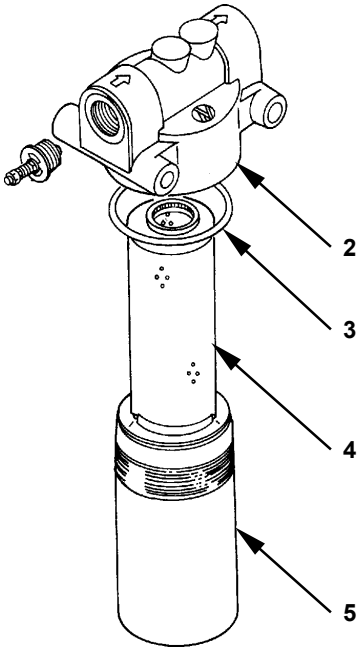


M110-07-022

12. Unscrew filter case (5) and pull down to remove it.
13. Remove filter element (4) by moving it back and forth while pulling down on it.
14. Replace O-ring (3) with a new one.
15. Insert O-ring (3) into the groove inside the head cover. Be sure the O-ring seats well.
16. Before inserting new filter element (4) into head cover (2), apply a film of clean hydraulic oil to the small ring that fits into the head cover. Work the element back into the head cover.
17. Do not allow dirt, dust or water to enter the filter case.
18. Reinstall filter case (5) to a torque of 20 to 29 N·m (2 to 3 kgf·m, 14 to 22 lbf·ft).
19. After replacing filter case (5), check the oil level and purge air from the system. Failure to do so can damage the pump.
20. Clean and replace this element regularly in order to maintain clean hydraulic oil, and, as a result, to lengthen the lifetime of the hydraulic equipment.



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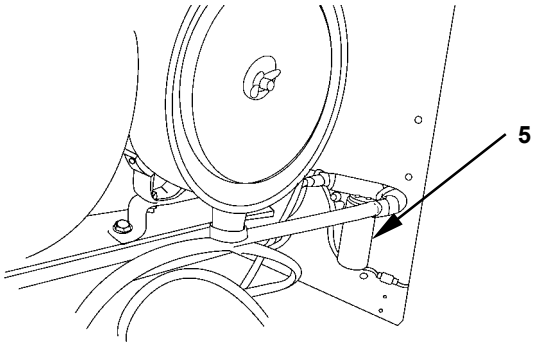
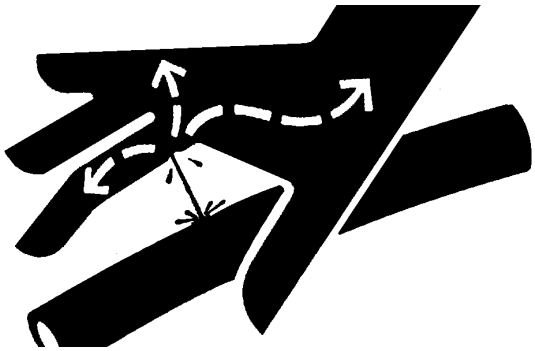


M183-07-009

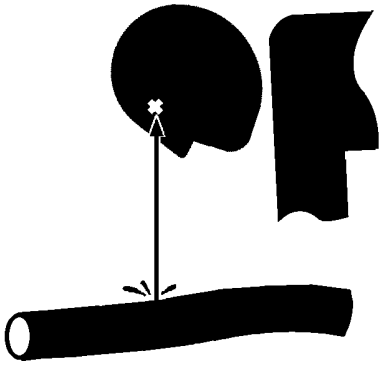
8

Check Hoses and Lines
--- daily
--- every 250 hours



SA-031

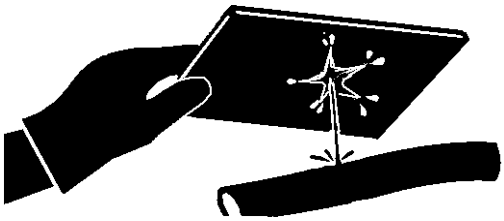
CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury.
To avoid this hazard, search for leaks with a piece of cardboard.
Take care to protect hands and body from high-pressure fluids.
If an accident occurs, see a doctor familiar with this type of injury immediately.
Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.



SA-292

CAUTION: 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.**

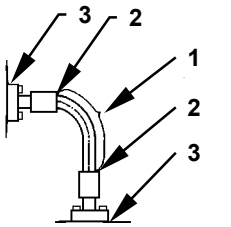


SA-044

Table 1. Hoses

Interval(hours)	Check Points	Abnormalities	Remedies
Every 10 hours	Hose covers	Leak (1)	Replace
	Hose ends	Leak (2)	Replace
	Fittings	Leak (3)	Retighten or replace hose or O-ring
Every 250 hours	Hose covers	Crack (4)	Replace
	Hose ends	Crack (5)	Replace
	Hose covers	Exposed reinforcement (6)	Replace
	Hose covers	Blister (7)	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.



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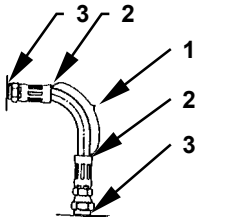

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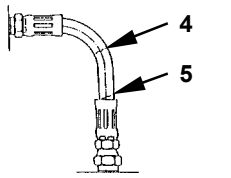

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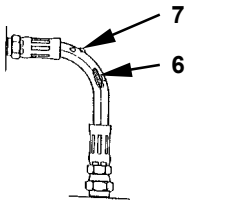

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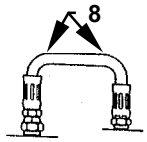

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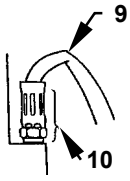
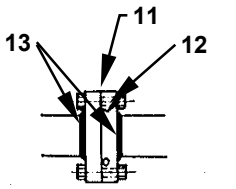


M115-07-149

Fig.1

Table 2. Lines

Interval(hours)	Check Points	Abnormalities	Remedies
Every 10 hours	Contact surfaces of flange joints	Leak (11)	Replace O-ring and/or retighten bolts
	Clamps	Loose	Retighten
	Welded surfaces on joints	Leak (12)	Replace
Every 250 hours	Welded surfaces on joints	Crack (13)	Replace
	Clamps	Missing	Replace
		Deformation	Replace
		Loose	Retighten



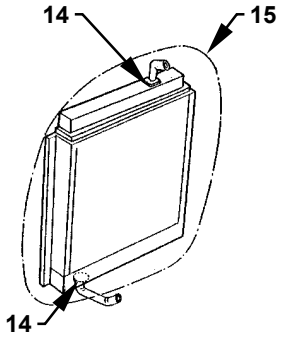
M115-07-150

Fig. 2

NOTE: Refer to the illustrations in Fig.2 for each check point location or for a description of the abnormality. Use genuine Hitachi parts.

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	Leak (15)	Replace



M115-07-151

Fig. 3

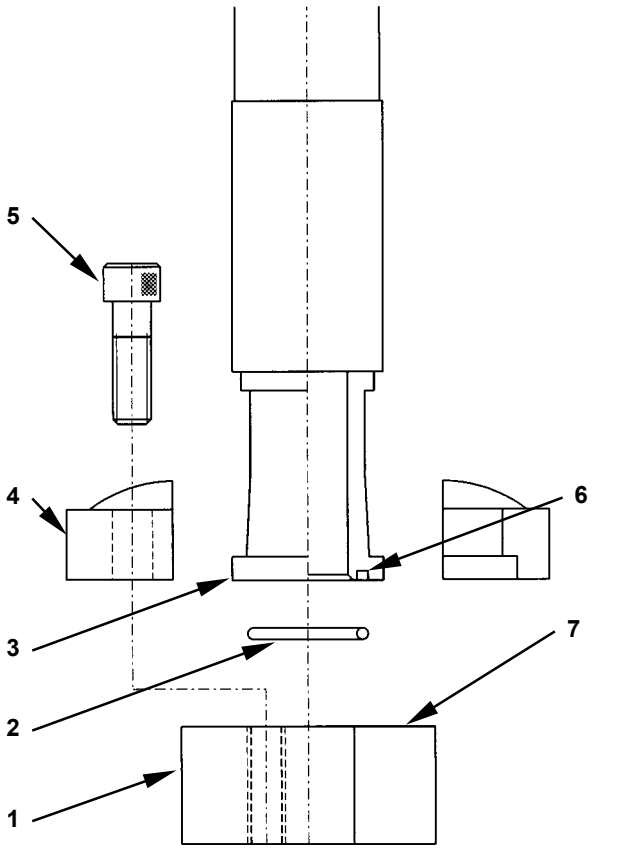
NOTE: Refer to the illustrations in Fig.3 for each check point location .

SERVICE RECOMMENDATIONS FOR HYDRAULIC FITTINGS

Three hydraulic fitting designs are used this machine.

Flange Type
Hose connector (3) with O-ring (2) installed on the end face is secured with split flange (4) (two pieces).

Precautions for Application
- When reinstalling, be sure to replace O-ring (2) with new one.
- Check that O-ring (2) is correctly installed in O-ring groove (6) first. Then, connect the hose to mating part (1) using split flanges (4) (2 pieces used) and socket bolts (5) (4 pieces used). If socket bolts (5) are tightened with O-ring (2) dislocated, damage to O-ring may result, causing oil to leak.
- When installing the hose, take care not to damage O-ring groove (6) and sealing face (7) of mating part (1). If damaged, damage to O-ring (2) may result, causing oil to leak.
- If oil leaks due to looseness of socket bolt (5), do not re-tighten as it is. Replace O-ring (2) with new one, check that O-ring (2) is correctly installed in O-ring groove (6). Then re-tighten.



M142-07-100

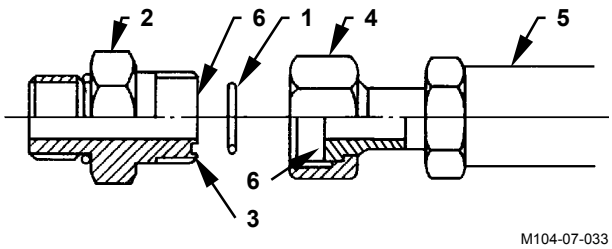
Tightening Torque:
Tighten the socket bolt according to the torque specifications shown in the table below:

±10%

Width across flats (mm)		8	10	12	14
Tightening torque	N·m	49	88	137	205
	(kgf·m)	(5)	(9)	(14)	(21)
	(lbf·ft)	(36)	(65)	(101)	(152)

Flat Face O-ring Seal Fitting (ORS Fitting)

An O-ring is used on the sealing surfaces to prevent oil leakage.



M104-07-033

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.

Torque specifications ±10%

Width across flats (mm)		27	32	36	41, 46	50
Tightening torque	N·m	93	137	175	205	340
	(kgf·m)	(9.5)	(14)	(18)	(21)	(35)
	(lbf·ft)	(69)	(101)	(130)	(152)	(251)

Metal Face Seal Fittings

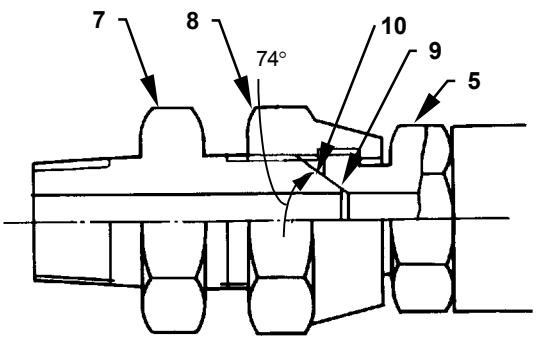
Fittings are used on smaller hoses and consist of a metal flare and a metal flare seat.

1. Inspect flare (10) and flare seat (9). They must be free of dirt or obvious defects.

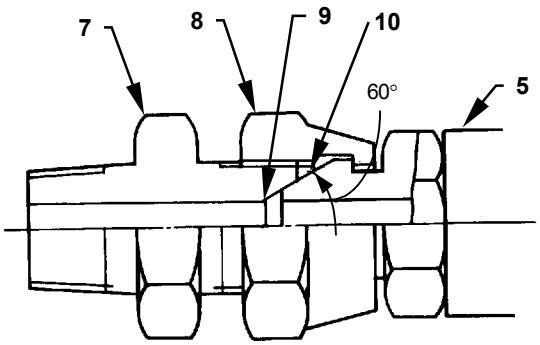
IMPORTANT: Defects in the tube flare cannot be repaired. Overtightening a defective flare fitting will not stop a leak.

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	Type A	N·m	29.5	39	93
		(kgf·m)	(3)	(4)	(9.5)
		(lbf·ft)	(21.5)	(29)	(69)
	Type B	N·m	34	49	93
		(kgf·m)	(3.5)	(5)	(9.5)
		(lbf·ft)	(25)	(36)	(69)



Type A



Type B

M113-07-055

E. FUEL SYSTEM

Tank capacity 1400 L (370 US gal)

Parts		Quantity	Interval (hours)						
			10	50	250	500	1000	1500	2000
1. Drain Fuel Tank Sump		1	■						
2. Drain Water Separator Filter Sediment		1	■						
3. Replace Water Separator Filter		1					■		
4. Replace Fuel Filter		2					■		
5.	Check Fuel Hoses (for leak, loose)	–	■						
	Check Fuel Hoses (for crack, 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.

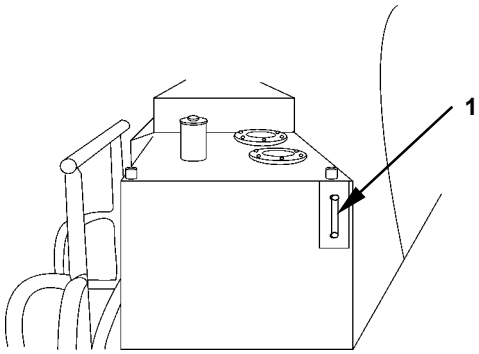
IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

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.

CAUTION: Handle fuel carefully. Shut the engine off before fueling. Do not smoke while you fill the fuel tank or work on fuel system.

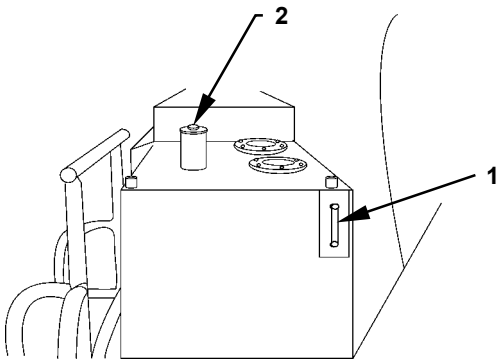
7. Check fuel gauge (1). Add fuel if necessary.

IMPORTANT: Keep all dirt, dust, water and other foreign materials out of the fuel system.



M183-07-010

8. 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 1400 liters (370 US gal).
9. Remove filler cap (2). Add fuel via the filler tube. Select a charging pump of appropriate capacity when fueling to avoid overflowing.
   Refill fuel while checking the fuel level with level gauge (1) so that fuel does not overflow.
10. 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.



M183-07-010

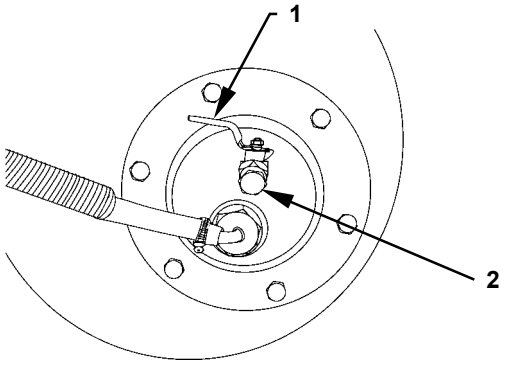
1 **Drain Fuel Tank Sump --- daily**

1. Park the machine on a level surface with the upper-structure rotated 90° for easier access.
2. Lower the bucket to the ground.
3. Turn the auto-idle 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 plug (2) and open drain cock (1) for several seconds to drain water and sediment. Close the drain cock.
8. Install and tighten plug (2).

NOTE: The plug (2) is installed on the drain cock (1) to prevent vandalism.



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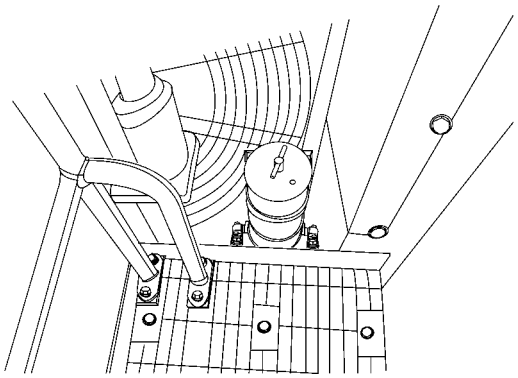
2

Drain Water Separator Filter Sediment --- daily



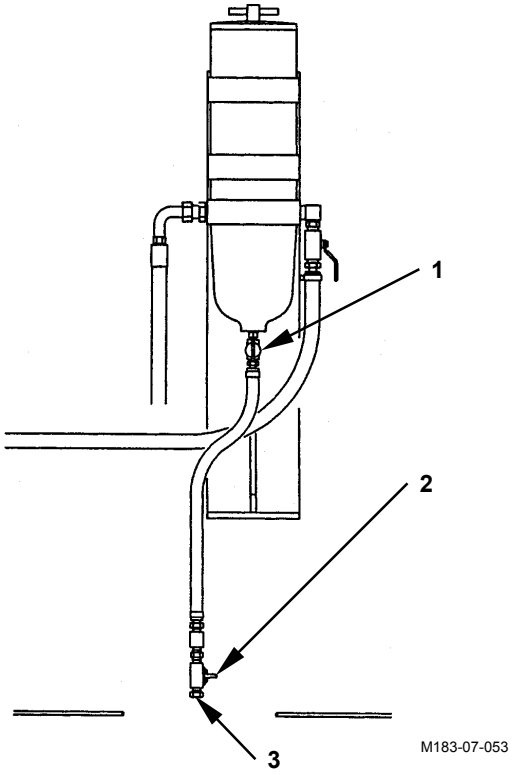
M183-07-012

1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle 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. Loosen drain cocks (1) and (2) to drain water and sediment.
8. After draining, tighten drain cocks (1) and (2).

NOTE: The plug (3) is installed on the drain cock (2) to prevent vandalism.



M183-07-053

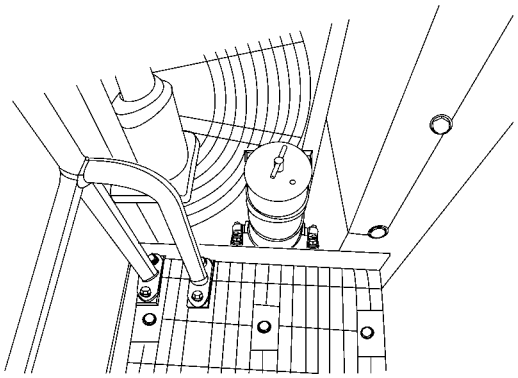
3

Replace Water Separator Filter
--- every 1000 hours

1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle 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. Close cock (5).
8. Loosen handle (3) to remove cover (4).
9. Remove cover (4).
10. Remove the filter.
11. Install the new filter and fill the filter with fuel.
12. Install cover (4) and tighten handle (3).
13. Open cock (5).



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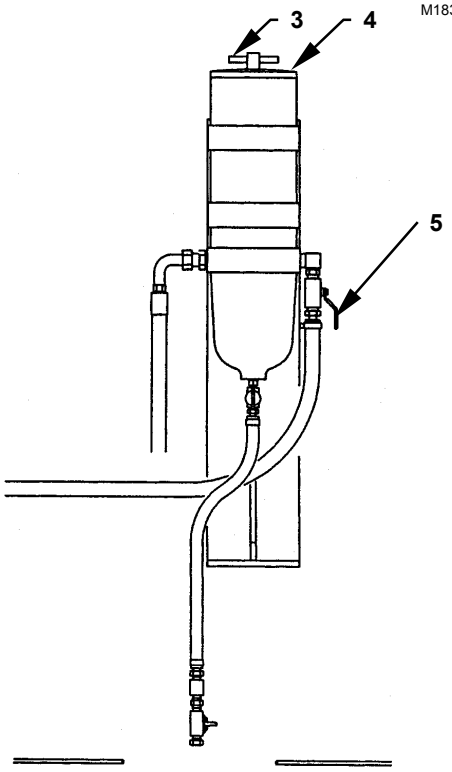
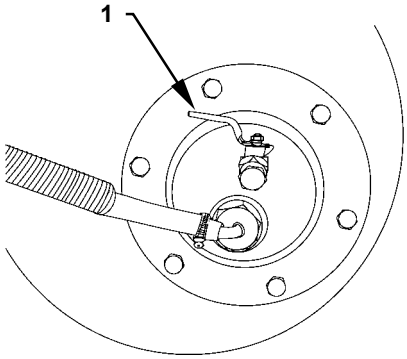


M183-07-053

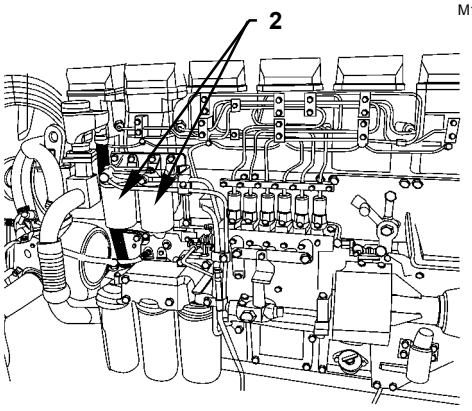
4 **Replace Fuel Filter**
--- every 1000 hours



M183-07-011

IMPORTANT: Be sure to prepare a container large enough to collect fuel when replacing fuel filter to avoid ground contamination and for safety.

1. Stop the engine.
2. Close cock (1) on the inlet line.
3. Unscrew spin-on filters (2) from the filter head, discard filters.
4. Fill the filter with clean fuel. Apply a light even coat of lubricating oil to the gasket sealing surface prior to installing the filter.
5. Position filter (2) to the filter head. Tighten by hand until the seal touches the filter head, tighten an additional 1/2 to 3/4 turn.



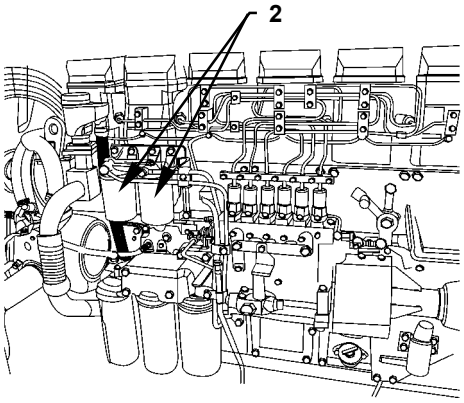
M183-07-004

NOTE: Be sure to tighten the filter by hand. If any tools are used for tightening, breakage or deformation of the filter head may arise.

6. Two fuel filters are located on either side of the engine. Four fuel filters in total are used. Replace each filter following the same procedure.
7. Open stop valve (1) at the bottom of the fuel tank.

Bleed Air From Fuel System

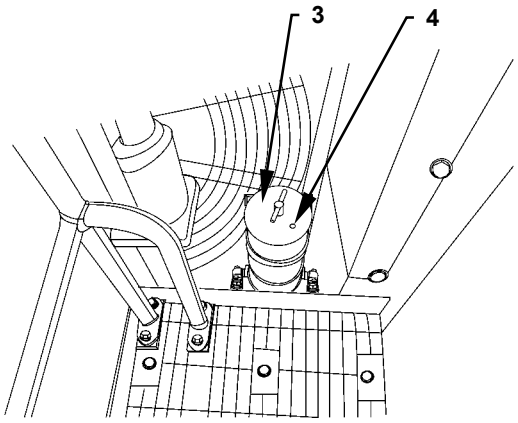
After refilling fuel to the FULL level, bleed air from the fuel system following the order of the water separator filter, fuel filter, and fuel injection pump. If air is mixed in the fuel system, the engine won't start easily and may have any other operational trouble.
Be sure to bleed air after the fuel tank was run dry, after draining water from water separator filter (3) and/or fuel filter (2), or after replacing water separator filter (3) and/or fuel filter (2) and after working on any part of the fuel system.



M183-07-004

Water Separator Filter

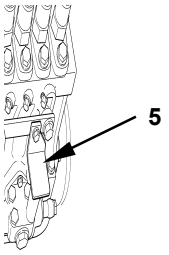
1) Loosen plug (4) on water separator filter (3).
2) Bleed air until fuel seeps out through the clearance around plug (4).
3) Tighten plug (4).



M183-07-012

Fuel Feed Pump

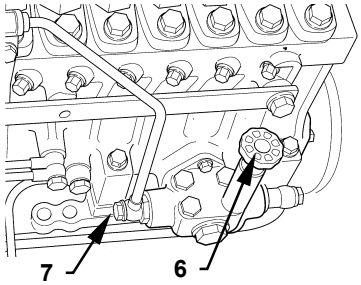
4) Remove fuel pump cover (5).
5) Loosen air bleed plug (7) 1.5 turns approximately.
6) After rotating fuel pump (6) counterclockwise, move up and down.
7) After only fuel without air flows out of air bleed plug (7), tighten air bleed plug (7). At this time, while pressing fuel feed pump (6), rotate clockwise to lock in the original position. Tighten air bleed plug (7).



M146-07-090

IMPORTANT: Tighten plug (7) only after locking fuel pump (6). Otherwise, fuel pump (6) will not be locked in the original position as pressure in the fuel injection pump increases.

8) Install fuel pump cover (5).
9) Start the engine. Check the fuel system for any fuel leaks.



M146-07-091

5

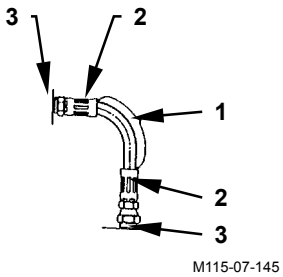
Check Fuel Hoses
--- daily
--- every 250 hours

CAUTION: Fuel leaks can lead to fires that may result in serious injury.
To avoid this hazard :

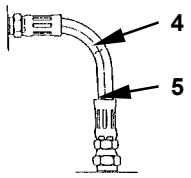
1. Park the machine on a firm, level surface. Lower the bucket to the ground. Stop the engine. Remove key from the key switch. Pull the pilot control shut-off lever to the LOCK position.
2. Check for kinked hoses, and hoses that rub against each other parts for leaks.
   Check hoses at the check points indicated below for leaks and other damage that may result in future leaks. If any abnormalities are found, replace or re-tighten them, as shown in Table 4.
3. Repair or replace any loose or damaged hoses. Never install bent or damaged hoses.

Table 4. Hoses

Interval (hours)	Check Points	Abnormalities	Remedies
Daily	Hose covers	Leak (1)	Replace
	Hose ends	Leak (2)	Replace
	Fittings	Leak (3)	Retighten or replace
Every 250 hours	Hose covers	Crack (4)	Replace
	Hose ends	Crack (5)	Replace
	Hose covers	Exposed reinforcement (6)	Replace
	Hose covers	Blister (7)	Replace
	Hose	Bend (8)	Replace
	Hose	Collapse (9)	Replace (Use proper bend radius)
	Hose ends and fittings	Deformation or corrosion (10)	Replace



M115-07-145



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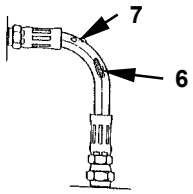

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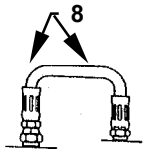

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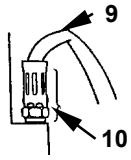


M115-07-149

Fig. 4

NOTE: Refer to the illustrations in Fig. 4 for each check point location or for a description of the abnormality. Use genuine Hitachi parts.

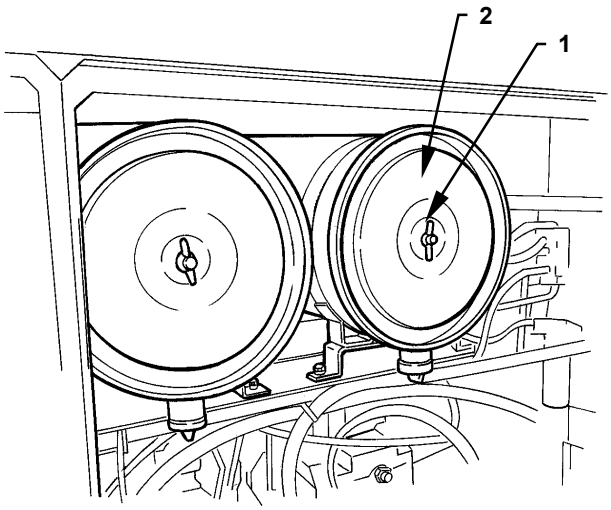
F. AIR CLEANER

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

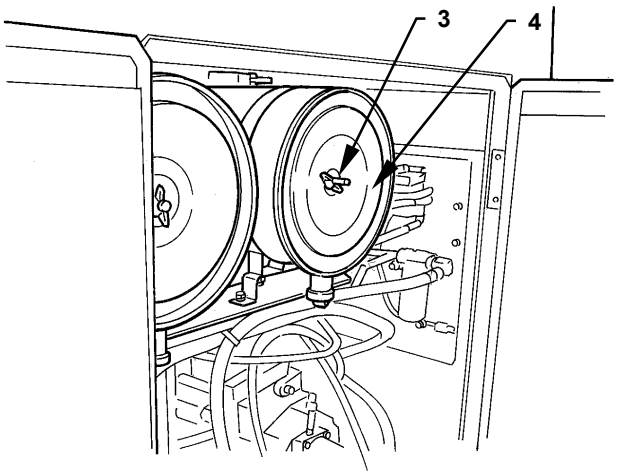
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.



M183-01-095

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

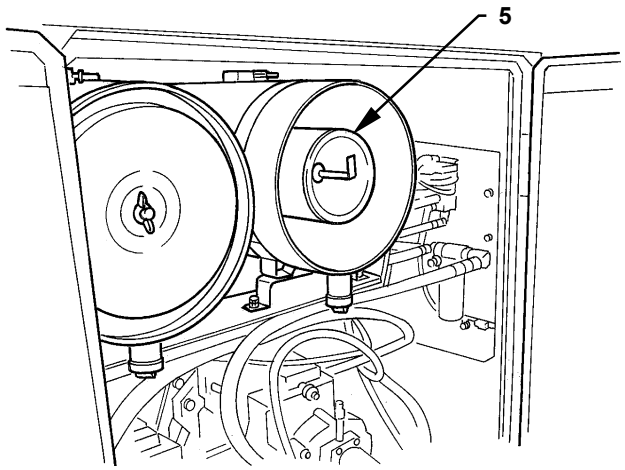
4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Pull the pilot control shut-off lever to the LOCK position.
7. Loosen wing nut (1) to remove cover (2).
8. Loosen wing nut (3) to remove outer element (4).
9. Tap outer element (4) with the palm of your hand, NOT ON A HARD SURFACE.



M183-01-096

CAUTION: Use reduced compressed air pressure. (Less than 0.2 MPa, 2 kgf/cm^2, 28 psi). Clear area of bystanders, guard against flying chips, and wear personal protection equipment including goggles or safety glasses.

10. Clean outer element (4) using compressed air. Direct the air to the inside of the filter element, blowing out.
11. Clean the filter interior before installing outer element (4).
12. Install outer element (4) into the body to hold it in place, tighten wing nut (3) by hand. After wing nut (3) makes contact with the end face of outer element (4), tighten it 5 to 6 turns by hand.
13. Install cover (2) and tighten wing nut (1).
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 (4).
16. When replacing the air cleaner filter element, replace both outer (4) and inner (5) elements together. Remove outer element (4). Clean the filter interior before removing inner element (5). Remove inner element (5). First install inner element (5) and then install outer element (4).
17. Clean the body interior, every 250 hours or when air filter restriction indicator comes on.



M183-01-097

G. COOLING SYSTEM

Parts	Quantity	Interval (hours)						
		10	50	250	500	1000	1500	2000
1. Check Coolant Level	1							
2. Check Fan Belt for Wear	–							
3. Change Coolant	113 L (30 US gal)	Twice a year, in spring and autumn ✳						
4. Clean Radiator Core and Oil Cooler core	1							
5. Clean Inter Cooler Front Screen	1				★			

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.

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

Coolant

Fill the radiator with soft, pure tap or bottled water.

Anti-rust agent

Add approximately 2.3 L (2.4 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.

Antifreeze Mixing Table

Air temperature		Mixing Ratio	Refill Capacities			
			Antifreeze		Soft Water	
°C	°F	%	L	(US gal)	L	(US gal)
−1	30	30	33.9	(9.0)	79.1	(20.9)
−4	25	30	33.9	(9.0)	79.1	(20.9)
−7	19	30	33.9	(9.0)	79.1	(20.9)
−11	12	30	33.9	(9.0)	79.1	(20.9)
−15	5	35	39.6	(10.5)	73.4	(19.4)
−20	−4	40	45.2	(11.9)	67.8	(17.9)
−25	−13	45	50.9	(13.4)	62.1	(16.4)
−30	−22	50	56.5	(14.9)	56.5	(14.9)
−50	−58	60	67.8	(17.9)	45.2	(11.9)

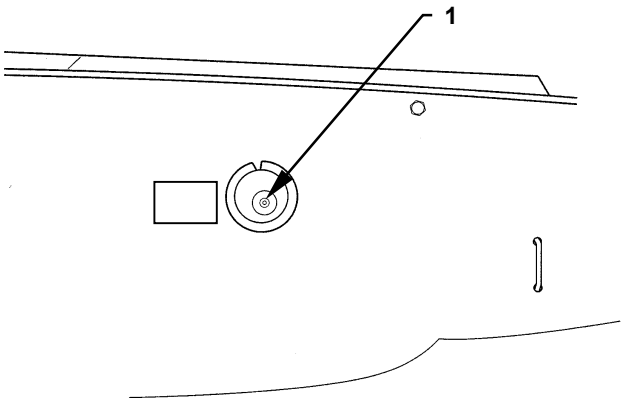
CAUTION:

- **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.**

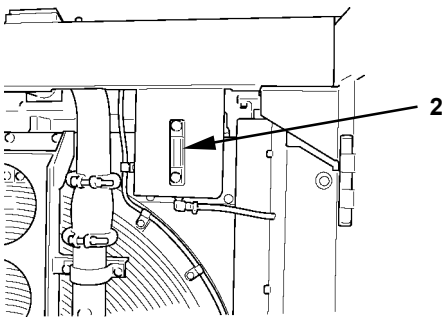
1 **Check Coolant Level --- daily**

CAUTION: 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 MAX and MIN marks. If the coolant level is below the MIN mark, add coolant to coolant reservoir (2).
If coolant reservoir (2) is empty, add coolant to the radiator filler cap (1) and then to coolant reservoir (2).



SS-2221



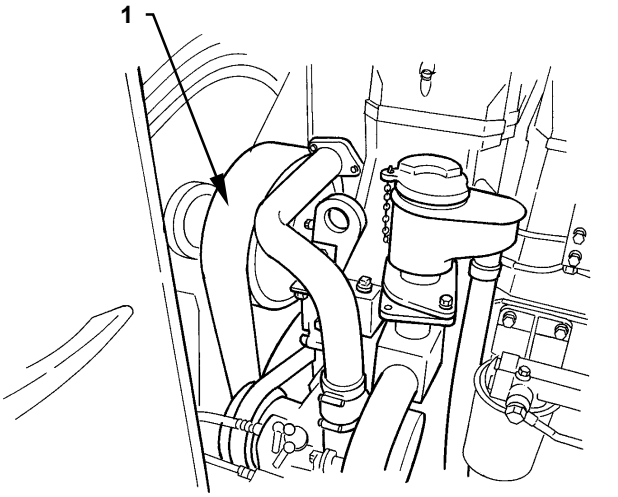
M17F-07-003

2 **Check Fan Belt for Wear --- daily**

IMPORTANT: Loose fan belt (1) tension may result in insufficient battery charging, engine overheating as well as a rapid, abnormal belt wear. Belts that are too tight, however, can damage both bearings and belts.

1. Park the machine on as flat a surface as possible. Lower the bucket to the ground, pull the pilot control shut-off lever to the LOCK position, and stop the engine.

2. Visually check fan belt (1) for wear. Ask your authorized dealer for belt replacement if necessary.



M183-01-089

3 **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.

CAUTION: Do not loosen the radiator cap until the system is cool. Otherwise, hot water and stream may spout, possibly causing severe burns. After coolant is cool, loosen the cap slowly to release all pressure before removing the cap.

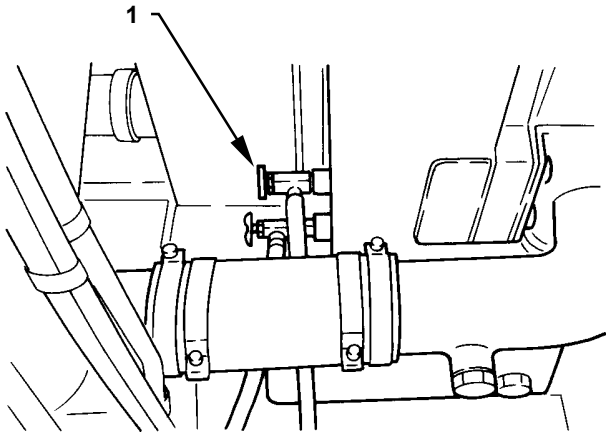
1. Park the machine on a solid and level surface. Lower the bucket to the ground. Stop the engine.

2. Remove the radiator cap. Open drain cocks (1), (2) and (3) on the radiator and engine block to allow the coolant to drain completely. Remove impurity such as water scale at the same time.

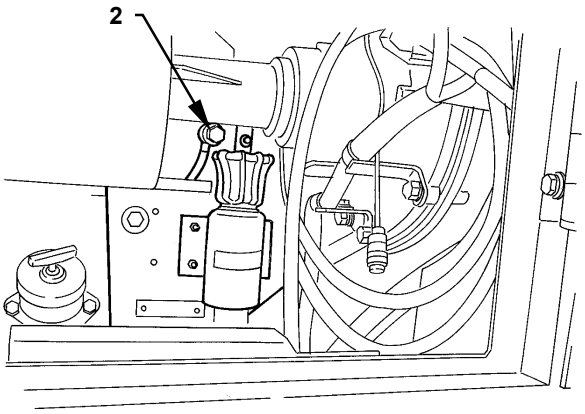
3. Close drain cocks (1), (2) and (3). Fill the radiator with tap water and a radiator cleaner agent. Start the engine and run it at a speed slightly higher than slow idle; when the needle of the temperature gauge reaches the green zone, run the engine for about ten more minutes.

4. Stop the engine and open radiator drain cock (1). Flush out the cooling system with soft water or tap water, until draining water is clear. This helps remove rust and sediment.

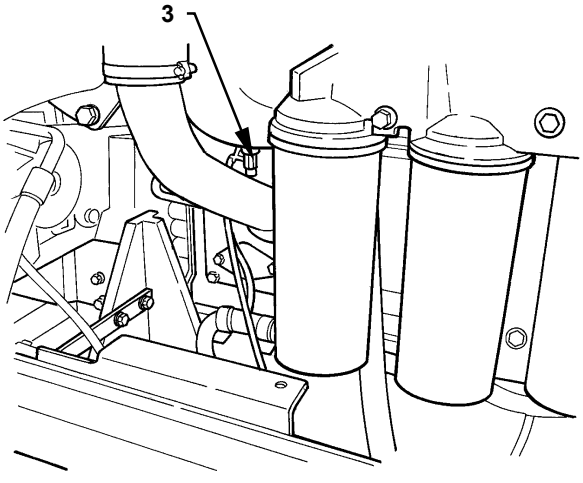
5. Close radiator drain cock (1). Fill the radiator with soft water or tap water. At that time, mix the antifreeze (or LLC) or anti-rust agent. Slowly add coolant to avoid mixing air bubbles in the system.



M142-07-055



M183-01-085



M183-01-086

6. Start the engine. Sufficiently bleed air from the cooling system.

7. After adding coolant, operate the engine for several minutes. Check the coolant level again.
   Add coolant if necessary.

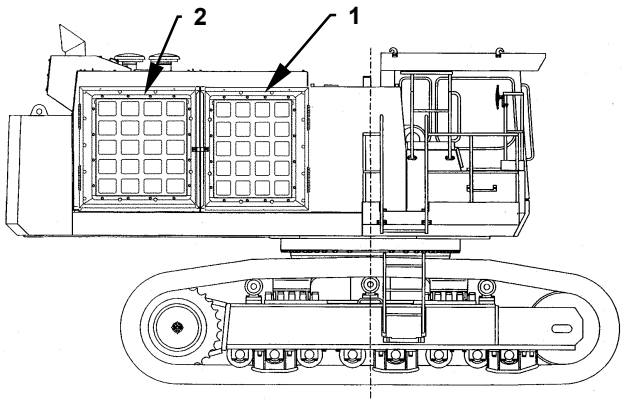
4 **Clean Radiator Core and Oil Cooler Core**

Radiator Outside --- every 500 hours

CAUTION: Always wear safety glasses or goggles when using compressed air (Less than 0.2 MPa, 2 kgf/cm^2, 28 psi) to clean radiator core.

IMPORTANT: High-pressure air or water can damage fins. When cleaning the radiator core with high-pressure air or water, keep the nozzle 200 mm or more away from the core face in order not to cause any damage.

Clean both radiator (2) and oil cooler (1) with compressed air (Less than 0.2 MPa, 2 kgf/cm^2, 28 psi) or water.



M17F-07-002

5 **Clean Inter Cooler Front Screen**
--- every 500 hours

IMPORTANT: When operating the machine in dusty environment, check the screen every day for dirt and clogging. If clogged, remove the screen and clean it.

H. AIR CONDITIONER

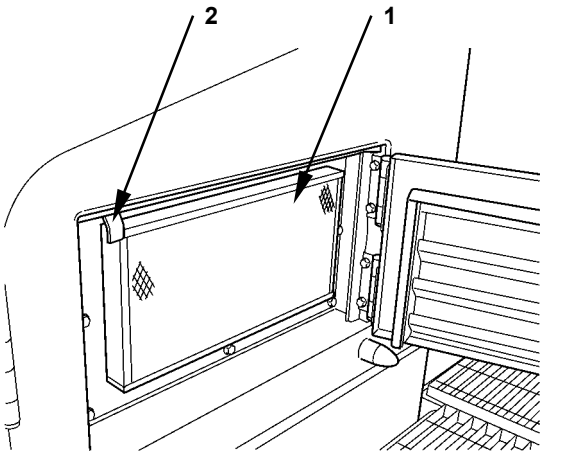
Parts		Quantity	Interval (hours)						
			10	50	250	500	1000	1500	2000
1. Recirculation Air Filter	Cleaning	1	As required						
	Replacement	1	Replace per 4 cleaning						
2. Ventilation Air Filter	Cleaning	1	As required						
	Replacement	1	Replace per 4 cleaning						
3. Check Refrigerant Quantity		1							
4. Check Compressor Belt Tension		1							
5. Clean Condenser Core		1				★			
6. Check Tightening Torque		–		✳					
7. Seasonal Maintenance		–	Twice a year						

NOTE: ✳ *First time only.*
★ *Shorten maintenance interval when the machine is operated in dusty areas.*

1 **Ventilation Air Filter**

CAUTION:
- **Always wear safety glasses or goggles when using compressed air (Less than 0.2 MPa, 2 kgf/cm^2, 28 psi) to clean filters.**
- **After installing the filter, check that locks (2) have been engaged.**

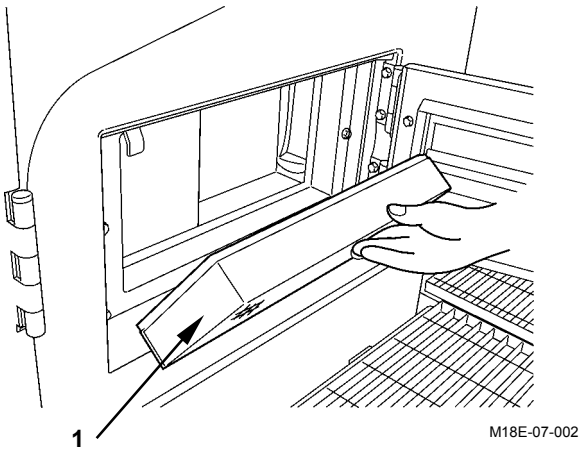
IMPORTANT: Plugged recirculation or ventilation air filter will reduce cooling capacity of the air conditioner. Be sure to clean them periodically.



M18E-07-001

Cleaning --- as required

1. Remove recirculation air filters (1).
2. Clean recirculation air filters (1) with compressed air (Less than 0.2 MPa, 2 kgf/cm^2, 28 psi) or a soft brush.



M18E-07-002

Replacing --- after cleaning 4 time

If the cooling capacity decreases even after cleaning recirculation air filter (1) due to filter clogging, replace them.

2 **Recirculation Air Filter**

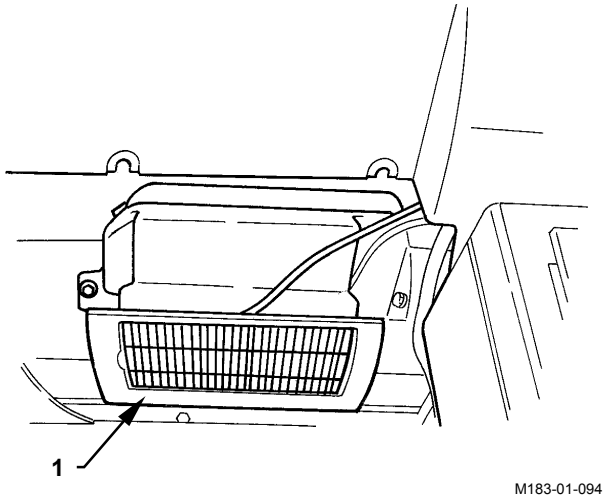
Clean Air Filter --- as required

CAUTION: Always wear safety glasses or goggles when using compressed air (Less than 0.2 MPa, 2 kgf/cm^2, 28 psi) to clean filters.

IMPORTANT: Plugged recirculation or ventilation air filter will reduce cooling capacity of the air conditioner. Be sure to clean them periodically.

1. Remove ventilation air filters (1).

2. Clean ventilation air filters (1) with compressed air (Less than 0.2 MPa, 2 kgf/cm^2, 28 psi) or a soft brush.



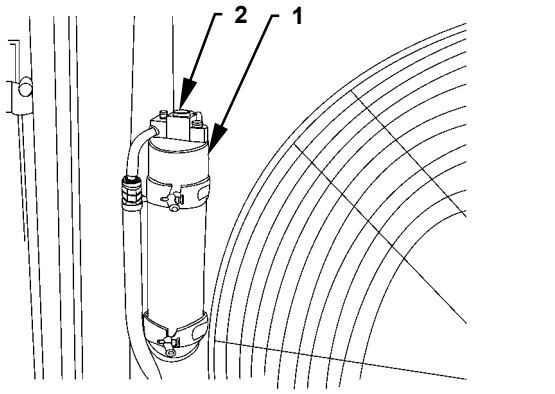
M183-01-094

Replace Air Filter --- after cleaning 4 time

Changing interval of ventilation air filter (1) differs depending on environmental conditions.

If the cooling capacity decreases after cleaning ventilation air filter (1), caused by filter plugging, replace it earlier than the standard interval.

3 **Check Refrigerant Quantity**
--- every 250 hours



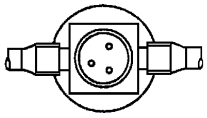
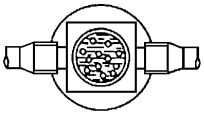
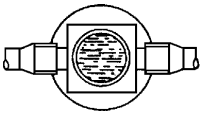
M183-07-020

CAUTION: 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 conditioner circuit.

IMPORTANT: (1) Do not operate the compressor without refrigerant in the air conditioning circuit, as doing so may damage them.
(2) Do not overcharge the system with refrigerant to avoid dangerous high pressure and low cooling effect.

Insufficient refrigerant quantity lowers cooling effect of the air conditioner. Check the refrigerant quantity through sight glass (2) on liquid tank (1) (three pieces).

1. Start the engine and run at fast idle speed.
2. Turn the air conditioner switch ON and blower fan speed to the high speed.
3. Press temperature control switch repeatedly until the air temperature is maximum cool.
4. Check the refrigerant quantity through sight glass.

Refrigerant Quantity	Sight Glass	
Appropriate	 M114-07-090	Almost clear. Gas bubbles may be seen but will dis-appear by changing engine speed.
Insufficient	 M114-07-091	A steady stream of gas bubbles is seen in the liquid flowing from the receiver-dryer.
Scarce	 M114-07-092	No bubbles but misty.

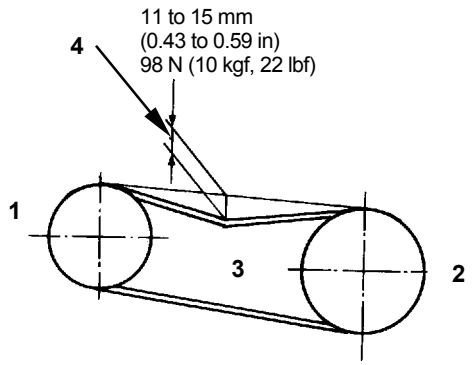
5. If the refrigerant level is low, consult your authorized dealer.

✱ Refrigerant --- R134a (HFC 134a)

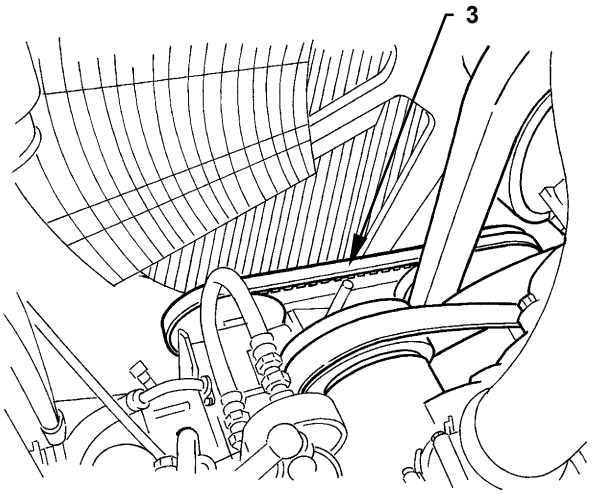
4 **Check Compressor Belt Tension**
--- every 250 hours

Visually check belt for wear. Replace if necessary. Check belt tension by depressing (3) the midpoint between accessory drive (2) and compressor pulleys (1) with the thumb. Deflection (4) must be 11 to 15 mm (0.43 to 0.59 in) at a depressing force of approximately 98 N (10 kgf, 22 lbf).

If tension is not within specifications, loosen the bolts for the compressor mounting bracket to adjust belt tension.



M113-07-071



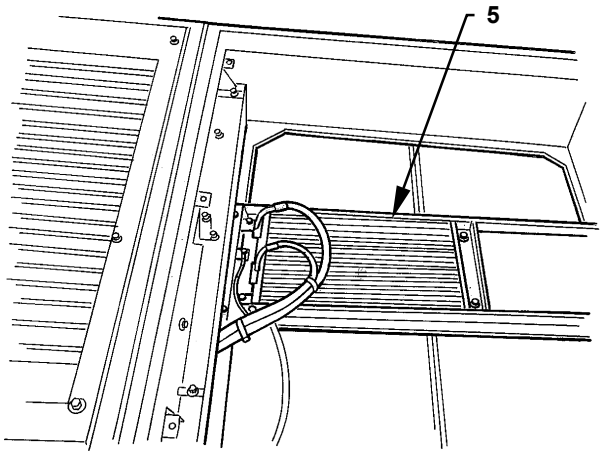
M183-01-087

5 **Clean Condenser Core**
--- every 500 hours

CAUTION: Always wear safety glasses or goggles when using compressed air to clean condenser core.

IMPORTANT: High-pressure air or water can damage condenser fins.

Open the cover. Condenser (5) is located in series with the oil cooler. Clean the condenser core with water or steam.



M183-01-092

6 **Check Tightening Torque**
--- every 250 hours
--- (first time after 50 hours)

Check the 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:

Connecting Parts	Tube Size or Bolt Size	Tightening Torque		
		N·m	(kgf·m)	(lbf·ft)
Nut Type	8 mm Dia Tube	11.5 to 14.5	(1.2 to 1.5)	(8.7 to 10.5)
	1/2 in. Dia Tube	19.5 to 24.5	(2 to 2.5)	(14.5 to 18)
	5/8 in. Dia Tube	29.5 to 34	(3 to 3.5)	(21.5 to 25.5)
Block Joint	Receiver M6 Bolt (4T)	3.9 to 6.9	(0.4 to 0.7)	(14.5 to 21.5)
	Others M6 Bolt (6T)	7.8 to 11.5	(0.8 to 1.2)	(5.8 to 8.7)

7

Seasonal Maintenance
--- preseason
--- off-season

CAUTION: Do not attempt to loosen con-nections 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.

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.

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 air temperature to MEDIUM COOL. This operation also prevents refrigerant leakage caused by a dried up shaft seal.
2. Check for refrigerant leakage. If the refrigerant level is low during off-season, rust will form inside the circuit.

NOTE: Do not remove compressor belt from the compressor during off-season.

I. ELECTRICAL SYSTEM

IMPORTANT: Improper radio communication equipment and associated parts, and/or improper installation of radio communication equipment effects the machine's electronic parts, causing involuntary movement of the machine.
Also, improper installation of electrical equipment's may cause machine failure and/or a fire on the machine.
Be sure to consult your authorized dealer when installing 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.

Batteries

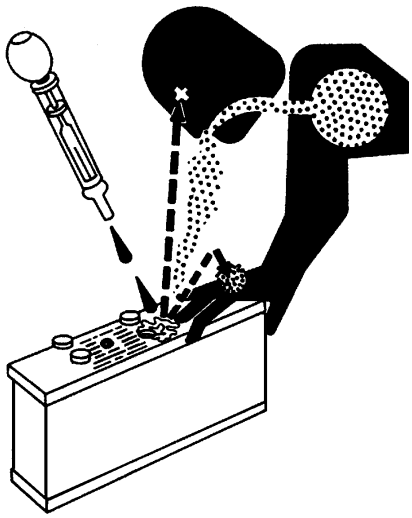
CAUTION: Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check the battery electrolyte level.

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

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into the eyes.

Avoid hazard by:
- **Filling batteries in a well-ventilated area.**
- **Wearing eye protection and rubber gloves.**
- **Avoiding breathing fumes when electrolyte is added.**
- **Avoiding spilling or dripping electrolyte.**
- **Using proper booster battery starting procedures.**

If you spill acid on yourself:
- **Flush your skin with water.**
- **Apply baking soda or lime to help neutralize the acid.**
- **If splashed in eyes, flush with water for 10 to 15 minutes. Get medical attention immediately.**



SA-036

If acid is swallowed:

- **Drink large amounts of water or milk.**
- **Then drink milk of magnesia, beaten eggs, or vegetable oil.**
- **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.

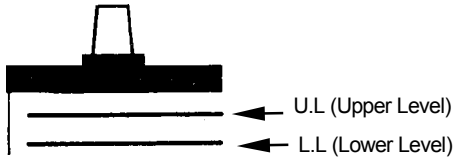
IMPORTANT: Don’t refill electrolyte more than the specified upper level. Electrolyte may spill, damaging the painted surfaces and/or corroding other machine parts.

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.

Electrolyte Level Check

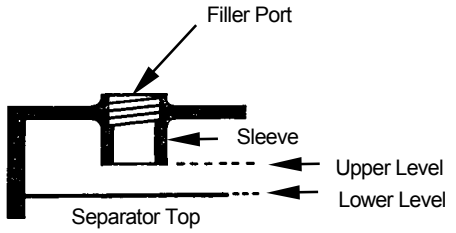
1. Check the electrolyte level at least once a month.
2. Park the machine on level ground and stop the engine.
3. Check the electrolyte level.

3.1 When checking the level from the battery side: Clean around the level check lines with a wet towel. Don't 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.



M146-07-109

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.



M146-07-110

Proper

Since the electrolyte surface touches the bottom end of the sleeve, the electrolyte surface is raised due to surface tension so that the electrode ends are seen curved.

M146-07-111

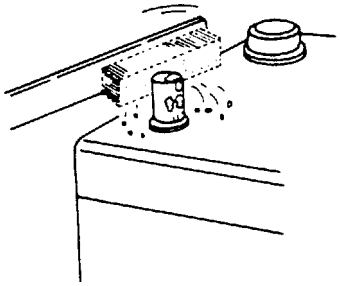
Lower

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

M146-07-112

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

4. Always keep 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.



M409-07-072

Check electrolyte specific gravity

CAUTION: 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.

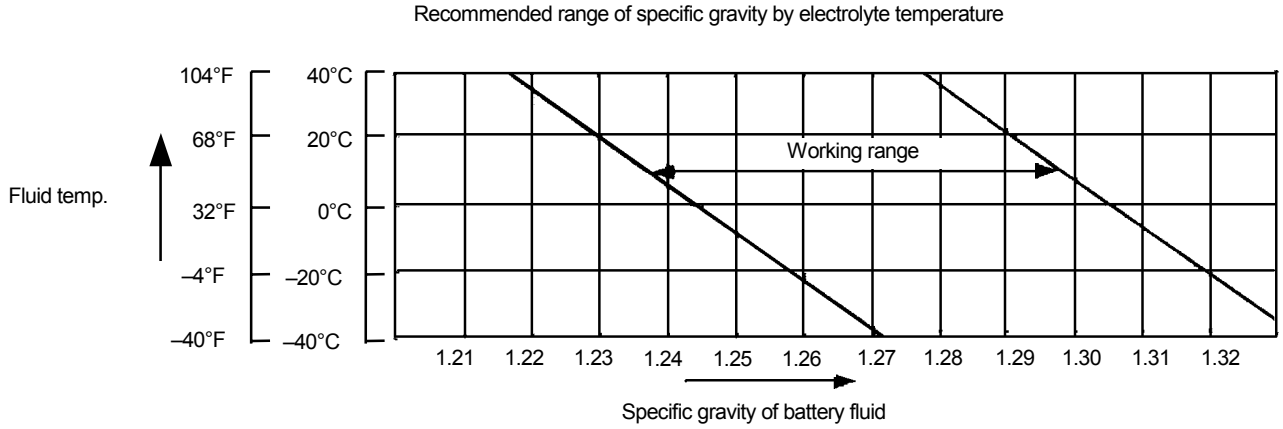
Avoid hazard by:
- **Filling batteries in a well-ventilated area.**
- **Wearing eye protection and rubber gloves.**
- **Avoiding breathing fumes when electrolyte is added.**
- **Avoiding spilling or dripping electrolyte.**
- **Using proper booster battery starting procedures.**

If you spill acid on yourself:
- **Flush your skin with water.**
- **Apply baking soda or lime to help neutralize the acid.**
- **If splashed in eyes, flush with water for 10 to 15 minutes. Get medical attention immediately.**

If acid is swallowed:
- **Drink large amounts of water or milk.**
- **Then drink milk of magnesia, beaten eggs, or vegetable oil.**
- **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.

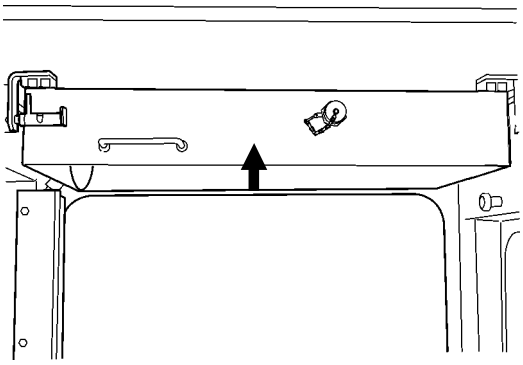


REPLACE BATTERIES

Your machine has four 12-volt batteries with negative (–) ground.
If one of four batteries in a 24-volt system has failed but the other are still good, replace all the batteries together with new ones 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.

REPLACING FUSES

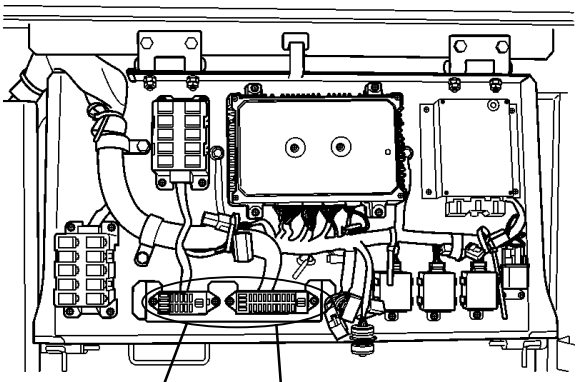
If any electrical equipment fails to operate, first check the fuses. The fuse box is located in the electrical equipment box installed on the rear-upper corner in the cab. A fuse location/specification decal is attached to the fuse box cover.



M18E-01-003

CAUTION: Before opening fuse box (A), remove four bolts (B). While holding handle (C), remove lock (D) to open the fuse box. If lock (D) is removed without holding handle (C), the fuse box may be opened by its own weight. Possibly, it may create a hazardous situation. Be sure to hold handle (C) before removing lock (D).

Remove the fuse box cover by lifting it upward. Spare fuses are located on the underside of the cover.



M18E-01-004

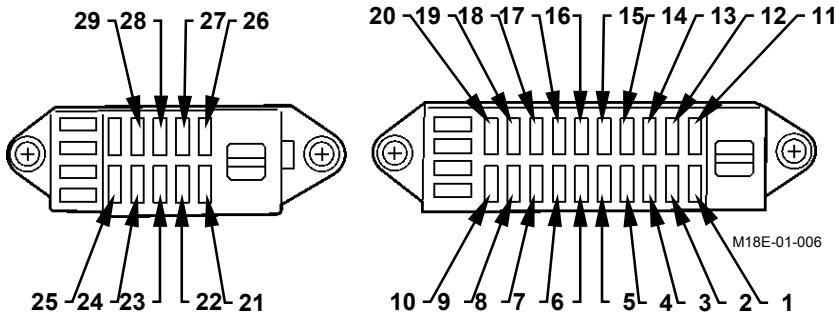
IMPORTANT: Be sure to install fuses with correct amperage ratings to prevent electrical system damage due to overload.

Fuse Box (Left)

1-	BACK UP	5A	11-	LAMP	20A
2-	CONTROLER	5A	12-	WIPER	20A
3-	POWER ON	5A	13-	HEATER	20A
4-	CONVERTOR	20A	14-	SOLENOID	15A
5-	MCX SOLENOID	10A	15-	RADIO	5A
6-	TRAVEL ALARM	5A	16-	LIGHTER	10A
7-	SW BOX	5A	17-	ROOM LAMP	5A
8-	ENTRANCE LIGHT	5A	18-	HORN	10A
9-	AIRCON	5A	19-	START REPEATING RELAY	5A
10-	BATTERY RELAY	5A	20-	ECM ENG. START SIGNAL	5A

Fuse Box (Right)

21-	E.C.M MAIN	20A
22-	PREHEAT SW	5A
23-	STOP SOL. RELAY	5A
24-	E.C.M RELAY	5A
25-	DLU MAIN	5A
26-	DLU DOWN LOAD	50A
27-	OPTION	20A
28-	OPTION	20A
29-	COOLANT LEVEL SW	5A



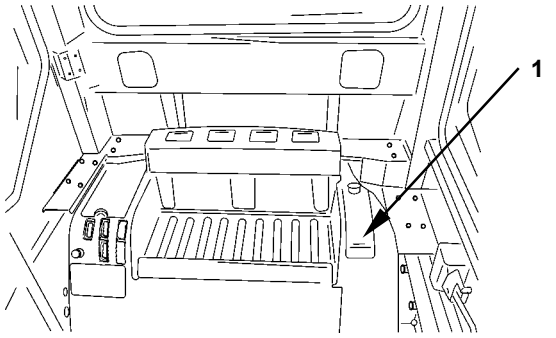
M18E-01-006

Power Source Terminal

- 12 Volts Terminal

1. Remove cover (1) located behind the operator's seat.

2. Power (12 volts) is available by connecting to the terminal. The allowable current is 5 amperes.



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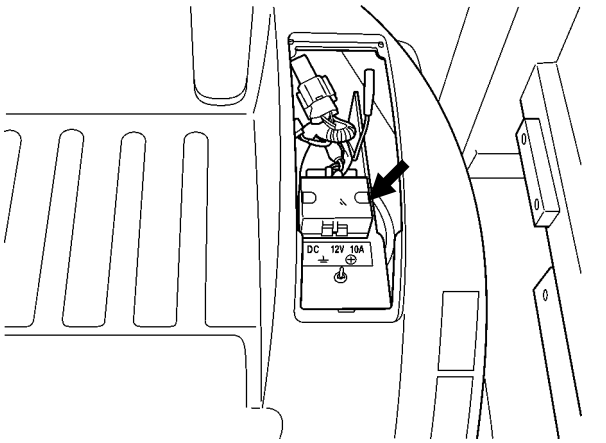

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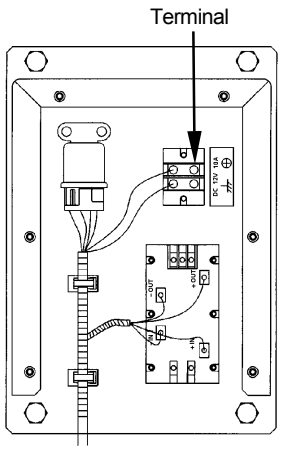
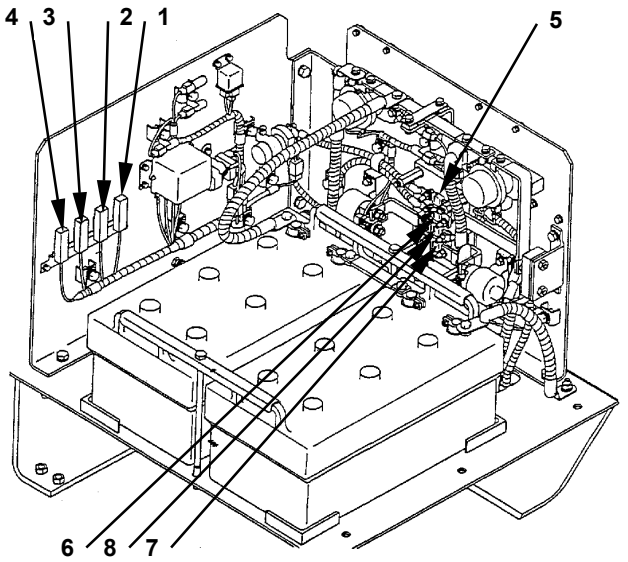


M142-07-115

Slow Blow Fuse

Slow blow fuses are located inside battery room between the batteries and key switch, and the battery relay and fuse box.
Slow blow fuse protects electric main circuit against excessive current.
If slow blow fuse is melted and disconnected by short circuit, see your authorized dealer.



T183-01-02-015

Slow Blow Fuse Connection Table

Fuse No.		
1	45A	Key Switch
		Fuse box ; Fuse No. 1, 2 to 21
2	75A	Fuse box ; Fuse No. 11 to 14, 24
3	75A	Fuse box ; Fuse No. 4 to 9, 25, 26
4	45A	Stop Solenoid Relay
5	250A	Starter Relay
6	100A	Alternator
7	250A	Air Heater Relay 2
8	300A	Air Heater Relay 1

Check Electrical Cables and Wire Harnesses for Short Circuits

CAUTION: Short circuits can cause fires that may result in serious injury.
To avoid this hazard:

1. Park the machine on a solid, level surface. Lower the bucket to the ground. Stop the engines. Remove key from the key switches. Pull the pilot control shut-off lever to the LOCK position.

2. Clean and tighten all electrical connections.

3. Check before each shift or after ten (10) hours of operation for loose, kinked, hardened or frayed electrical cables and wires.
   Check before each shift or after ten (10) hours of missing or damaged terminal caps.
   DO NOT OPERATE MACHINE if cable or wire are loose, kinked, etc..

   Check cables and harnesses at the check points indicated below for damage that may result in future short circuits. If any abnormalities are found, replace, retighten or reconnect them, as shown in Table 1.

4. Tighten, repair or replace any loose or damaged electrical cables, wires, and terminal caps before operating the machine.

Table 1. Electrical Cables and Wire Harnesses

Interval (hours)	Check Points	Abnormalities	Remedies
Daily	Wire harnesses and cables (1)	Degree of hardening	Replace
		Cracks	Replace
		Worn tape	Replace
		Contact with part edge	Replace
		Missing cap (harness terminal)	Replace
		Loose screw terminal	Retighten
		Damaged at the contacting part with clamps	Replace
	Lead wires of sensor and solenoid valve (2)	Degree of hardening	Replace
		Cracks	Replace
		Worn tape	Replace
		Contact with part edge	Replace
	Connector (3)	Degree of Hardening	Replace
		Loose locking	Lock
		Contact with part edge	Replace
		Damaged and crushed parts	Replace
		Loose or worn part	Replace
	Terminal and terminal cover (4)	Degree of hardening of cover	Replace
		Cracks	Replace
		Worn cover	Replace
		Missing cover	Replace
		Loose locking	Reconnect
	Clamps of the harnesses or connectors (5)	Missing	Replace
		Clamping positions	Correcting
		Damage	Replace

NOTE: Refer to the illustrations in Fig. 1 for each check point location. Replace the damaged parts with genuine Hitachi parts.

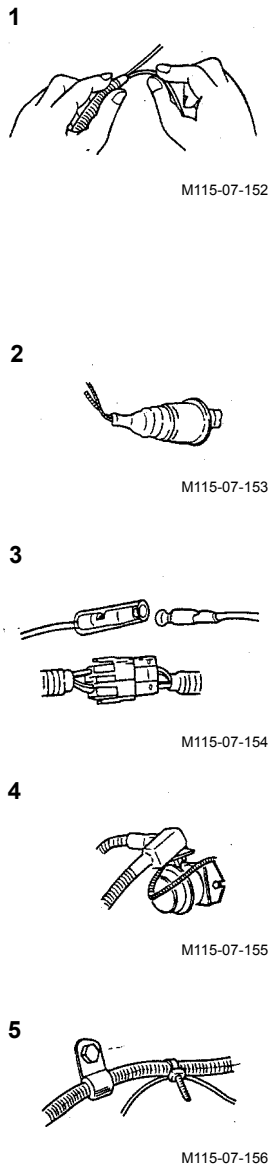
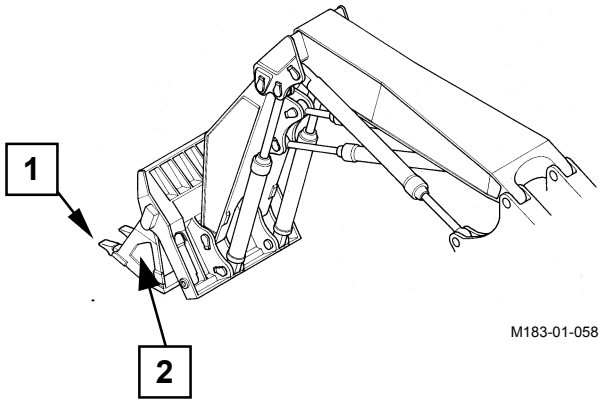


Fig. 1

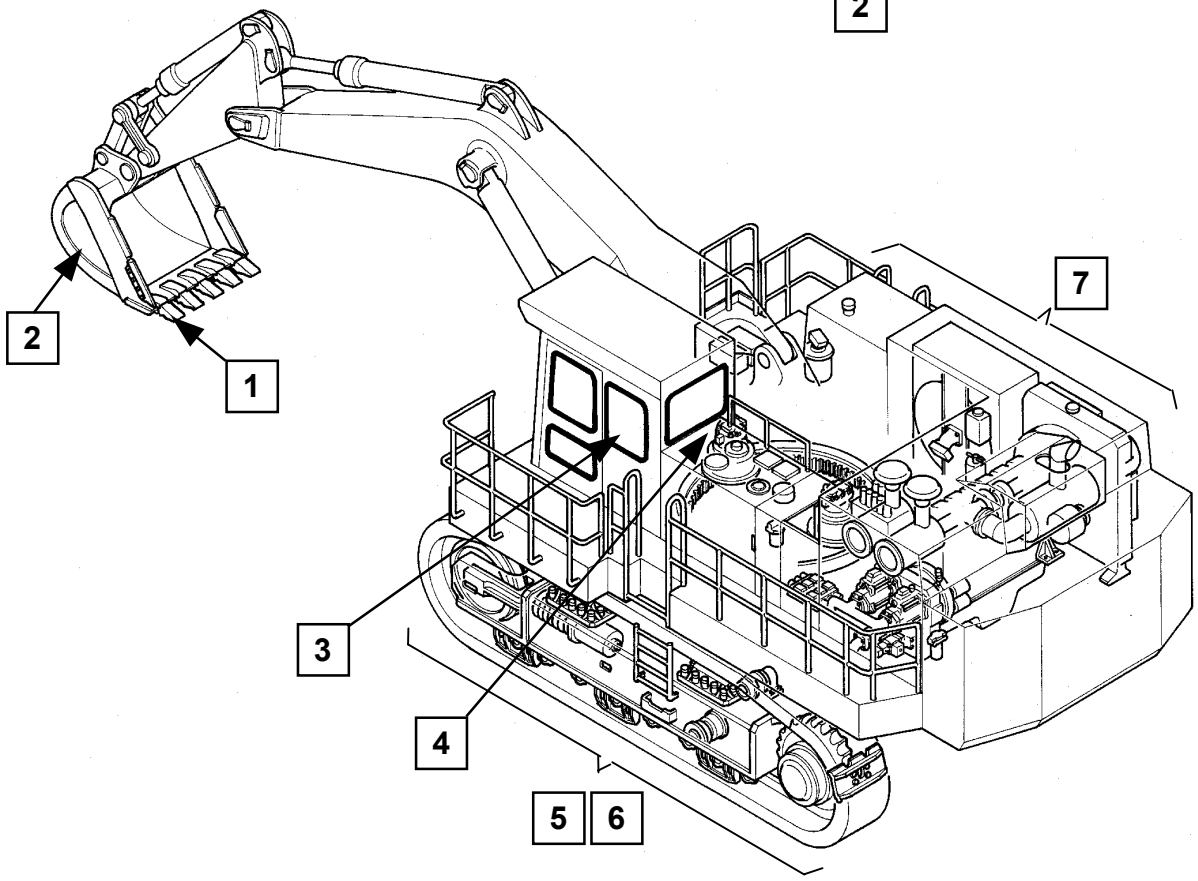
J. MISCELLANEOUS

Parts		Quantity	Interval (hours)						
			10	50	100	250	500	1000	2000
1. Check Bucket Teeth									
2. Change Bucket		–	As required						
3. Seat Belt	Check	1							
	Replacement	1	At least once every 3 years						
4. Check Windshield Fluid Level		1	As required						
5. Check and Adjust Track Sag		2							
6. Auto-Lubrication System									
7. Check Tightening Torque				✱					

NOTE: ✱ First time only.



M183-01-058



M183-01-059

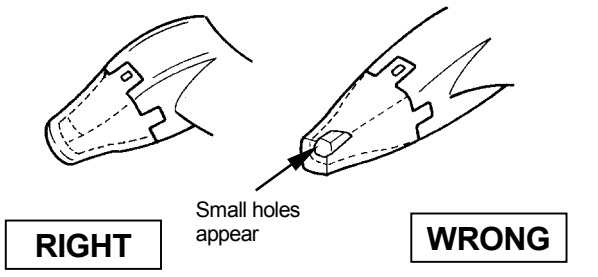
1 **Check Bucket Teeth --- daily**

1. Check bucket teeth for wear and looseness

Replace teeth if tooth wear exceeds the designated service limit shown below.

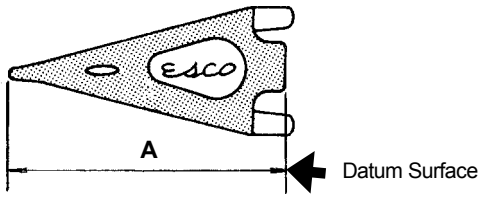
Dimension A in mm (ft·in)

Part No.	Dimension A mm (ft·in)	
	New	Limit of use
4484175	440	236



M112-07-089

NOTE: Be sure to replace a tooth point before its wear exceeds the limit as the exposed adapter nose caused by the worn point is worn out quickly, resulting in tooth point breakage or slipping off.



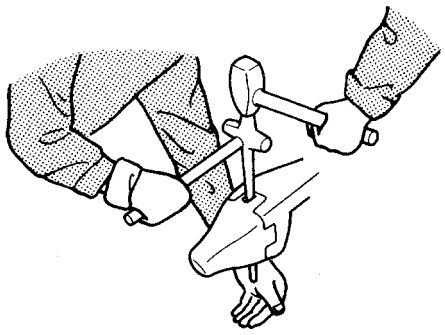
M112-07-090

2. Replacing procedure

(1) Use a hammer and pin removing tool to drive out locking pin.

(2) Remove the tooth point.

NOTE: Use thick gloves.

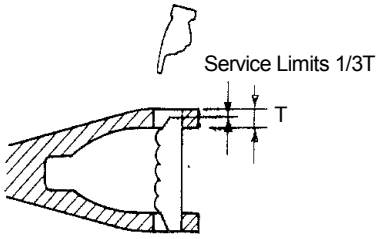


M112-07-091

(3) Check the pin lock and rubber lock for wear or cracks and replace with a new one if necessary.

(a) Pin lock
The wear limit of the pin lock is 1/3 the tooth point thickness, as illustrated in the right figure. Earlier replacement of the pin lock is recommended.

(b) Rubber lock
When a tooth point is removed, and if steel balls in the rubber lock come off or seem ready to come off, this indicates that the rubber lock has reached its service limit. Replace it with a new one.



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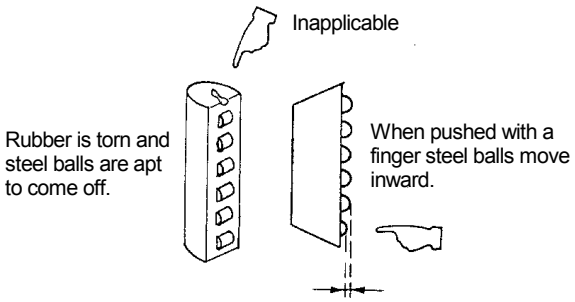
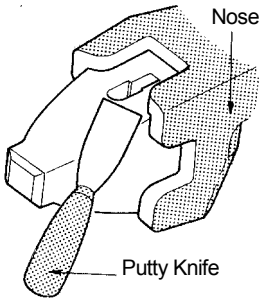


M112-07-093

(4) Check that the nose and tooth point joint surfaces are free from extrusions like scale, flush and so on. If found, remove extrusions from them with a putty knife, wire brush or chisel.

(5) Insert the rubber lock into the nose hole.

NOTE: Do not apply grease onto the rubber lock. If grease is applied, the pin lock will slip out.



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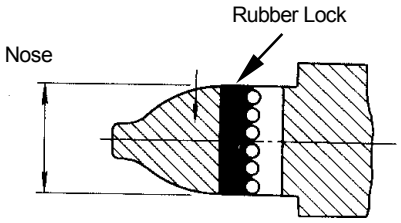
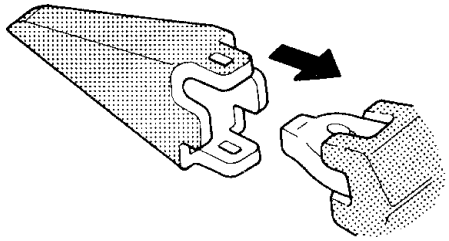


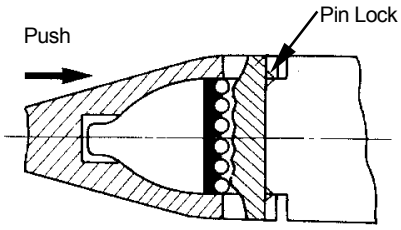
M112-07-095

(6) Install the tooth point onto the nose.



M112-07-096

(7) Drive in pin locks
Push the tooth point onto the nose as illustrated.
Drive in the pin lock with a sledge hammer.

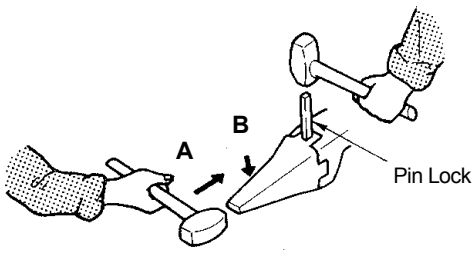


M112-07-097

NOTE: Drive in the pin lock from the top until it is 4 to 5 mm below the tooth point surface. Then, hit it up from the reverse side to flatten both ends. If this process is not followed correctly, the rubber lock and pin lock may easily be knocked off pitch.

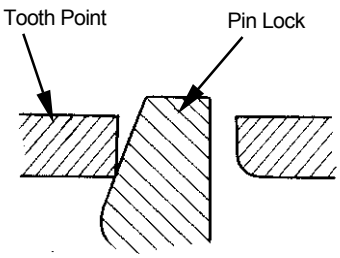
Tooth Point

When the pin lock is hard to drive in, tap the tip end of the tooth point from A direction a few times. Then try to drive in the pin lock again. After the pin lock is seated, tap the tip end of the tooth point from direction B to check if the pin lock is securely seated.



M112-07-098

NOTE: When the tooth point comes in contact with the pin lock, as shown in the right figure, the service life of the nose has finished. Consult your authorized Hitachi dealer.



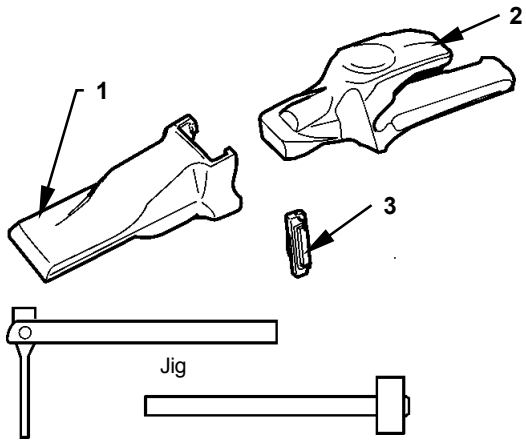
M112-07-099

3. Replacing Procedure (Backhoe)

3.1 Removal

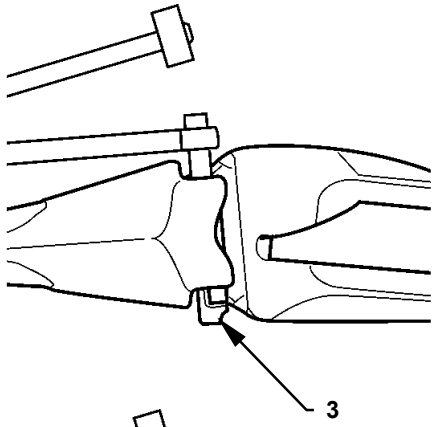
CAUTION: Guard against injury from flying pieces of metal. Wear goggles or safety glasses.

(1) 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).



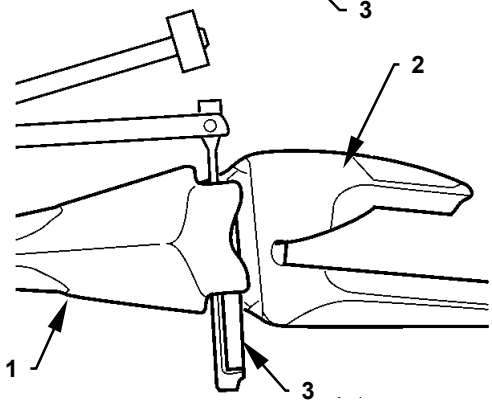
M113-07-102

(2) Removing the lock pin.
Remove pebbles, dirt, etc., completely from the gap between lock pin (3) and adapter (2).
Place pin-removing special tool 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 shorter jig.



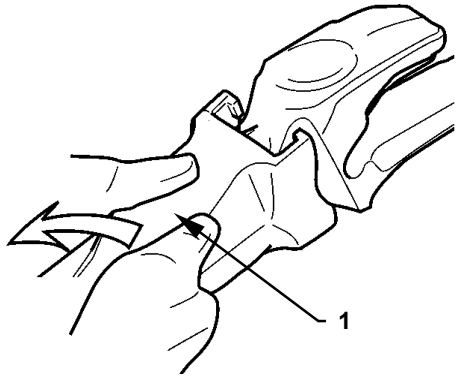
M113-07-103

(3) When top end of lock pin (3) comes to the upper end position of the lug of tooth point (1), use the longer special tool to remove lock pin (3).



M113-07-104

(4) Removing the tooth point
Turn tooth point (1) to the left and pull it toward you to remove it.

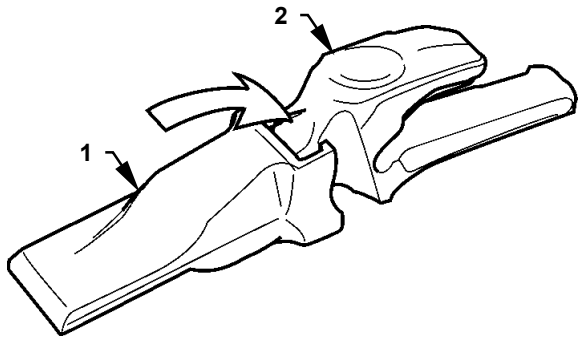


M113-07-105

3.2 Installation

(1) Mounting tooth point (1)
Clean the top end of adapter (2) nose. If pebbles, dirt, etc., are stuck to the adapter nose, tooth point (1) will not insert properly and the lock pin cannot be driven in.

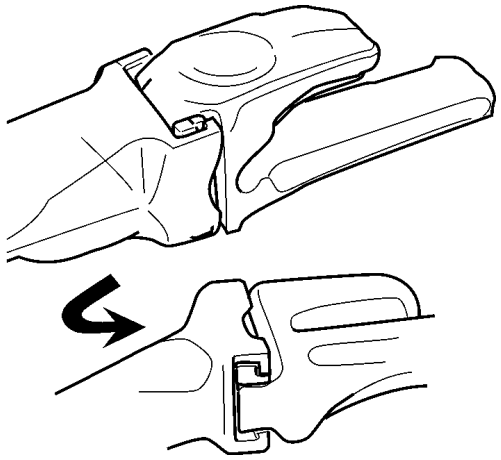
Also check that lock pin has no cracks.



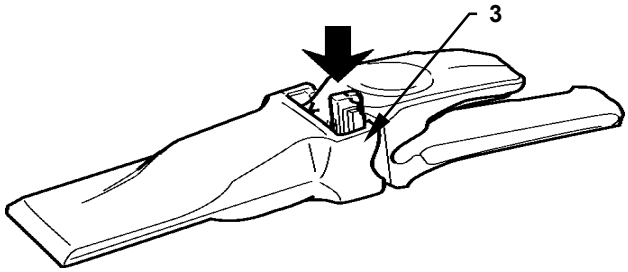
M113-07-106

Insert tooth point (1) slowly while turning it to the right.

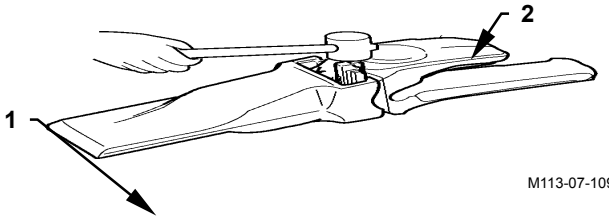
(2) Insert lock pin (3).
Be sure to check the direction of lock pin (3).


M113-07-107

(3) With tooth point (1) fully inserted onto adaptor (2), tap lock pin (3) into tooth point (1) with a hammer until the top of lock pin (3) comes flat with the tooth point.



M113-07-108

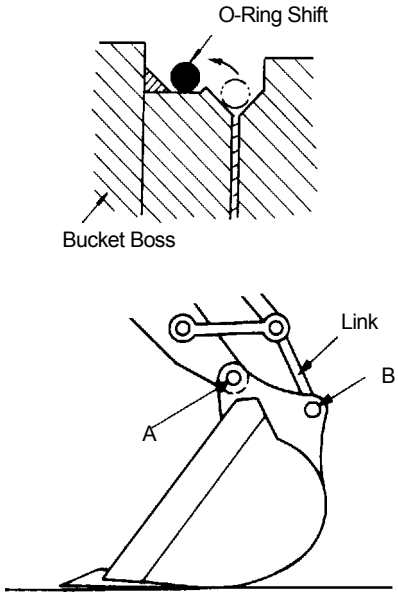


M113-07-109

2 **Change Bucket (Backhoe)**

CAUTION: 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.
2. Slide the O-rings 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 adjusting bucket linkage clearance procedure.
8. Apply grease to pin joints A and B.
9. 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.



M104-07-063

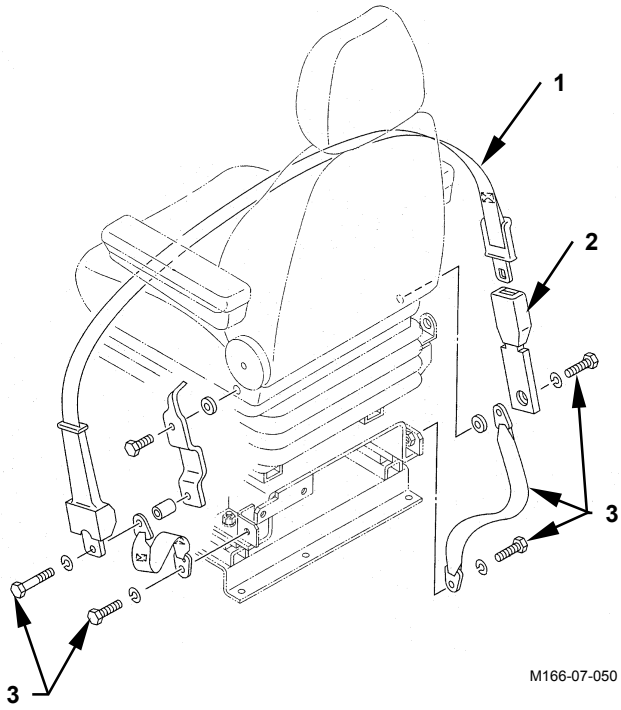
3

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 (1), buckle (2) and attaching hardware (3). If any item is damaged or materially worn, replace the seat belt or component before operating the machine.

We recommend that the seat belt be replaced every three years regardless of its apparent condition.

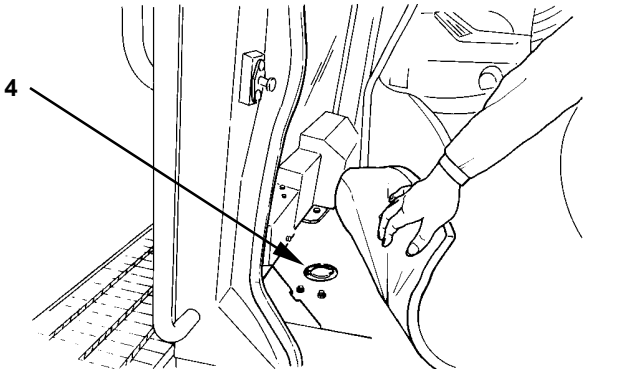


M166-07-050

4

Check Windshield Washer Fluid Level
--- as required.

Remove cap (4) and check fluid in windshield washer tank under the floor plate.
If the fluid level is low, remove cap and add fluid via the opening.
During winter season, use all season windshield washer which will not freeze.



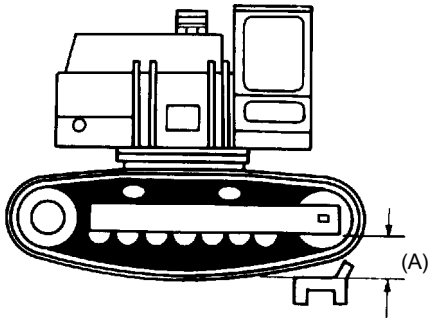
M142-07-031

5 **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.



M113-07-083

Track sag specification ····· 490 to 550 mm (1′ 7″ to 1′ 10″)

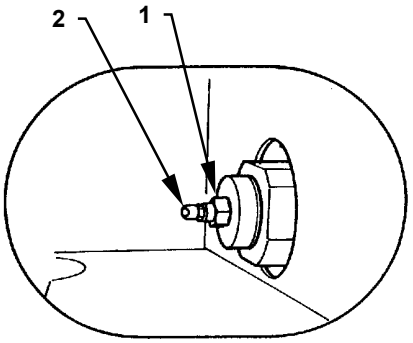
NOTE: Check track sag after thoroughly removing soil stuck on the track area by washing.

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.

Loosen the Track

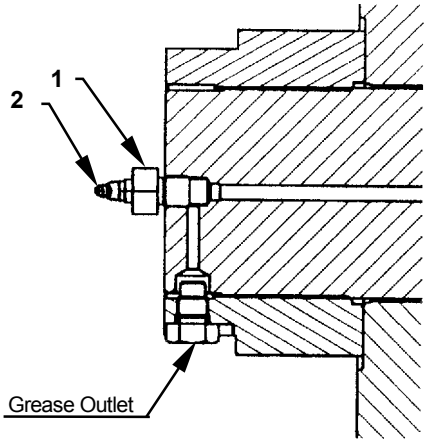


M116-07-093

CAUTION: 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 mm; 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 to147 N·m (15 kgf·m, 108 lbf·ft).



M17F-07-002

Tighten the Track

CAUTION: 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.

6 Auto-Lubrication System

The machine is equipped with an optional lubrication system which automatically greases the front joint pins.

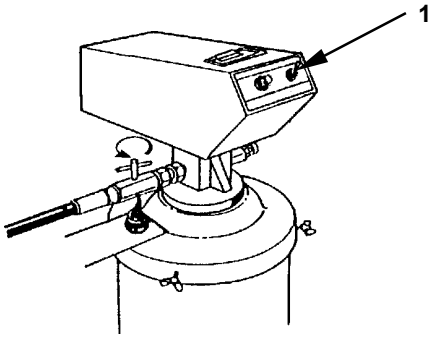
NOTE: Automatic greasing is not applied to the back-hoe bucket pins and swing bearing. Manually grease these fittings. (See "A. GREASING" in the MAINTENANCE section.)

1. Automatic Greasing

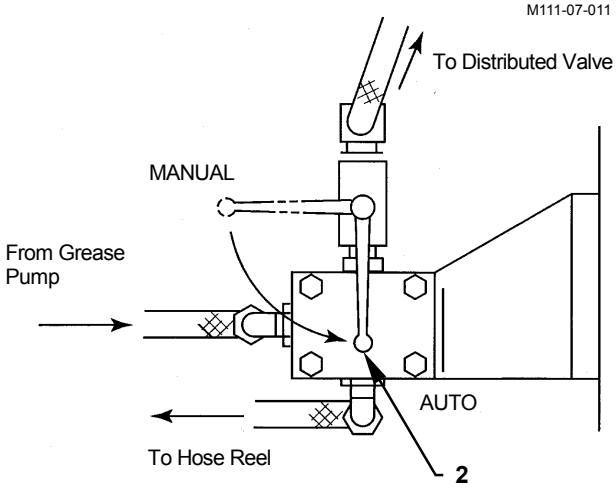
IMPORTANT:
- **The auto lubrication system does not operate unless switch (1) located on the grease pump is turned ON. If the system fails to operate, be sure to check if switch (1) is turned ON.**
- **Confirm that lubrication mode indicator (4) shows AUTO position before turning auto/manual selector valve lever (2) to the AUTO position. If lubrication mode indicator (4) shows MANUAL position, auto lubrication indicator (5), located on the monitor panel, will come on and the lubricator will continuously send grease (for a certain length of time), resulting in overcharging.**

(1) Pull auto/manual selector valve lever (2), located inside the battery compartment, to the AUTO position.

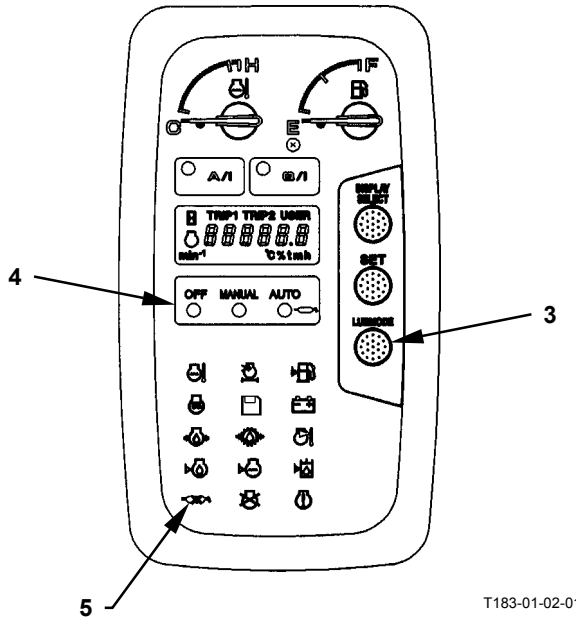
(2) Push lubrication mode switch (3), located on the right console, to the AUTO position.



M111-07-011

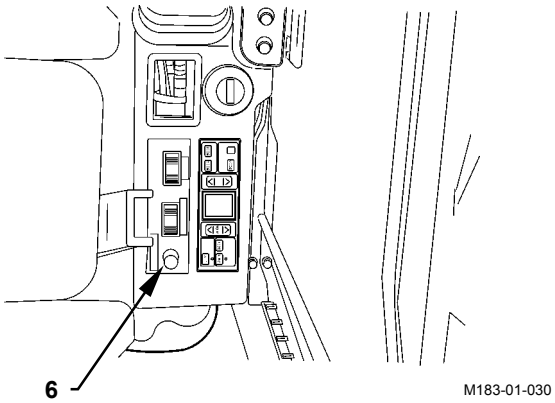


M162-07-061



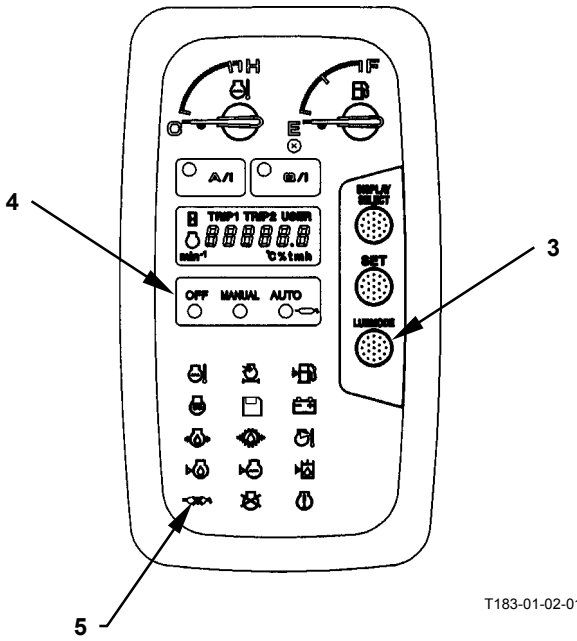
T183-01-02-013

(3) Turn automatic greasing interval switch (6), located on the right console, to the desired position. Three positions: 15, 20, and 25 minutes, are available. Auto lubrication indicator (5), located on the monitor panel, will come on if any of the following trouble occurs in the auto-lubrication line. Troubleshoot the auto-lubrication line in the order stated below.



M183-01-030

- Grease can is empty.
  If indicator (5) comes on, first check if the grease can is empty. Replace the grease can as necessary.
- Lubrication mode switch (3) is in the MANUAL position.
  Check if lubrication mode indicator shows AUTO position. If not, change AUTO position using lubrication mode switch (3).
- Distribution valves and/or greasing lines are restricted.
  If indicator (5) still does not go off, the probable cause is a restriction in the distribution valves and/or in the greasing lines. Stop auto lubrication and manually grease the fittings. Contact your authorized dealer for further inspection and repair.

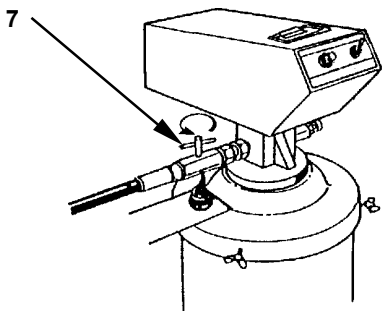


T183-01-02-013

NOTE: Auto lubrication indicator (5) comes on for approximately 2 seconds when the key switch is turned to the ON position. If not, replace the bulb.

IMPORTANT: After the day's operation, release the remaining pressure from the grease pump to protect it from being damaged, as follows;

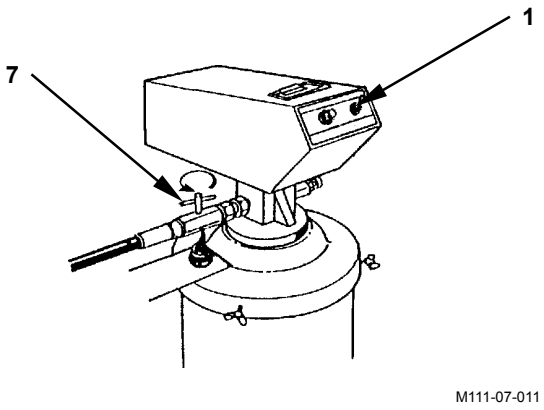
(4) Loosen check valve (7) or pull the grease gun to release the remaining pressure from the grease pump and hose on the hose reel. Some pressurized grease will come out from the check valve or from the grease gun.



M111-07-011

2. Manual Greasing

The lubricator is used in manual greasing. Manual greasing is used to grease the bucket pins, swing bearing, and to adjust track sag. It is also used to grease front joint pins in case the auto lubrication system fails. See “A. GREASING” in the MAINTENANCE section for greasing the bucket pins and swing bearing. See “J. MISCELLANEOUS” in the MAINTENANCE section.



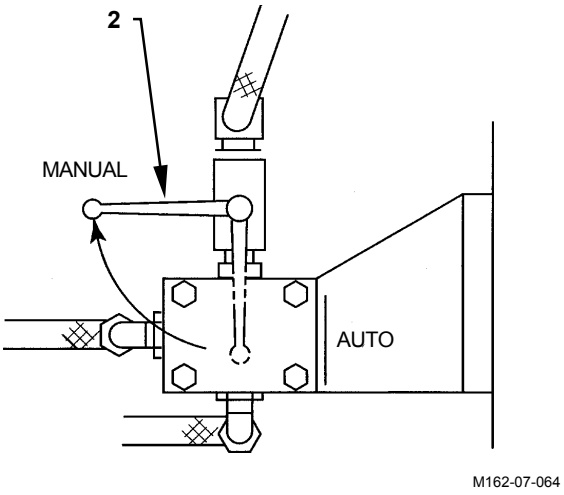
M111-07-011

IMPORTANT: Manual greasing cannot be performed unless switch (1) located on the grease pump is turned ON. If manual greasing cannot be performed, be sure to check if switch (1) is turned ON.

(1) Turn on switch (1) located on the grease pump.

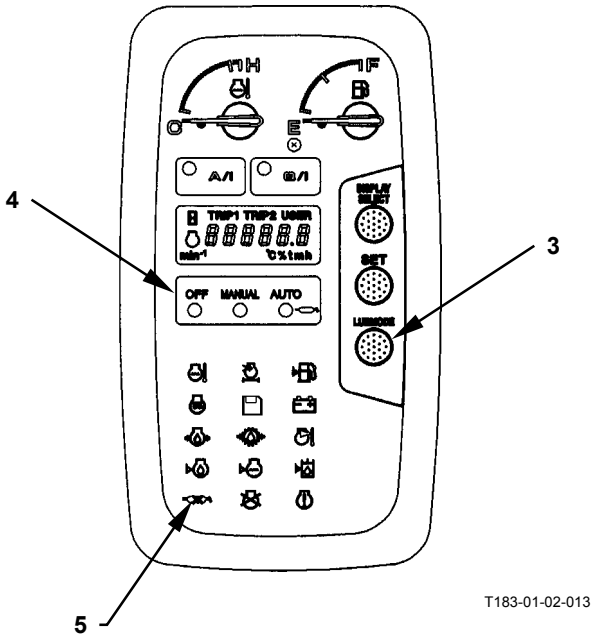
(2) Push down auto/manual selector valve lever (2), located inside the battery compartment, to the MANUAL position.

(3) Push lubrication mode switch (3), located on the right console, until lubrication mode indicator shows the MANUAL position. Auto lubrication indicator (5), located on the monitor panel, will come on. This is normal.



M162-07-064

NOTE: Lighting of auto lubrication indicator means that the auto lubrication system is deactivated because lubrication mode switch (3) is turned to the MANUAL position.



T183-01-02-013

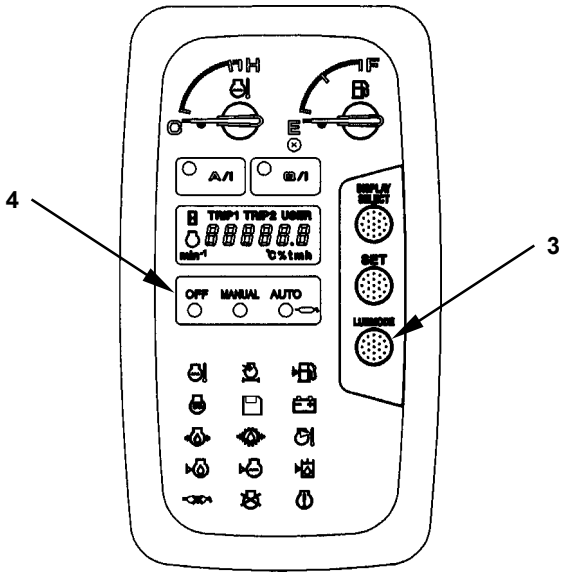
(4) Use the lubricator and grease gun to add grease to each greasing point.

NOTE: 1. See "A. GREASING" in the MAINTENANCE section for how to use the lubricator.
2. Greasing points, other than bucket pins, swing bearing, and track adjusters, can be lubricated via the fittings provided on the greasing blocks located between the distribution valves and each greasing point.

IMPORTANT: After the day's operation, release the remaining pressure from the grease pump to protect it from being damaged, as follows:

(5) Push lubrication mode switch (3) until lubrication mode indicator (4) shows OFF position.

(6) Loosen check valve (7) or pull the grease gun to release the remaining pressure from the grease pump and hose on the hose reel. Some pressurized grease will come out from the check valve or from the grease gun.



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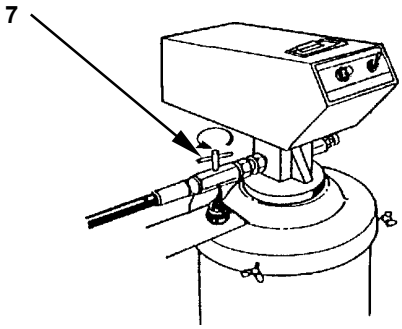


M111-07-011

7 Check Tightening Torque of Bolts and Nuts --- every 2000 hours (first time after 50 hours)

Check tightness after first 50 hours then every 2000 hours. Tighten to torque shown if any are loose. Bolts and nuts should be replaced with the same or higher grade.

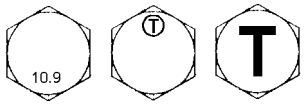
IMPORTANT: Check and tighten bolts and nuts using a torque wrench.

Torque Specifications

No.	Descriptions	Bolt Dia mm	Q'ty	Wrench Size (mm)	Torque N·m	Torque (kgf·m)	Torque (lbf·ft)
1	Engine cushion rubber mounting bolt (F) Engine cushion rubber mounting bolt (R)	22 33	2 2	32 50	740 2550	(75) (260)	(540) (1880)
2	Engine bracket mounting bolt (R)	27	12	41	1030	(105)	(760)
3	Radiator mounting bolt	27	4	41	1030	(105)	(760)
4	Hydraulic oil tank mounting bolt	20	8	30	540	(55)	(400)
5	Fuel tank mounting bolt	20	8	30	540	(55)	(400)
6	ORS fittings for hydraulic hoses and piping	$1-\frac{7}{16}$ – 12UNF $1-\frac{11}{16}$ – 12UNF		41 50	205 340	(21) (35)	(152) (255)
7	Pump transmission mounting bolt	$\frac{1}{2}$ – 13 UNC		19	118	(12)	(87)
8	Pump mounting bolt (Main) Pump mounting bolt (Fan)	20 16	12 4	Hexagonbar wrench 17 Hexagonbar wrench 14	540 265	(55) (27)	(400) (195)
9	Gear pump mounting bolt	14	2	22	137	(14)	(101)
10	Control valve mounting bolt (Main) Control valve mounting bolt (Swing)	20 16	4×2 3	30 17	390 49	(40) (5)	(290) (36)
11	Swing device mounting bolt	27	16×2	41	1370	(140)	(1010)
12	Swing motor mounting bolt	12	12×2	19	88	(9)	(65)
13	Battery mounting bolt	12	2	19	34	(3.5)	(25.5)
14	Cab mounting bolt	16	8	24	265	(27)	(195)
15	Cab-bed mounting bolt	16	34(B/H) 58(L/D)	24	205	(21)	(152)
16	Swing bearing mounting bolt to upperstructure Swing bearing mounting bolt to undercarriage	36 36	52 50	55 55	2750 2750	(280) (280)	(2030) (2030)
17	Travel device mounting bolt	27	52	41	1370	(140)	(1010)
18	Travel motor mounting bolt	18	8	27	295	(30)	(215)
19	Sprocket mounting bolt	27	60	41	1370	(140)	(1010)
20	Upper roller mounting bolt	20	24	30	540	(55)	(400)
21	Lower roller mounting bolt	27	64	41	1370	(140)	(1010)
22	Track shoe mounting bolt	30	416	46	2840	(290)	(2090)
23	Track guard mounting bolt	27	28	41	1370	(140)	(1010)
24	Side frame mounting bolt	42	52	65	3920	(400)	(2890)
25	Counterweight mounting bolt	45	8	65	3920	(400)	(2890)
26	Front pin lock bolt (Loading shovel) A Front pin lock bolt B Bucket pin lock bolt C Bucket pin lock bolt D Bucket pin lock bolt	 20 20 16 12	 14 4 18 6	 30 *17 24 19	 390 540 265 88	 (40) (55) (27) (9)	 (290) (400) (195) (65)
27	Front pin lock bolt (Backhoe) A Front pin lock bolt B Stopper bolt	 20 20	 12 12	 30 30	 390 390	 (40) (40)	 (290) (290)
28	Side cutter mounting bolt	33	12	50	2550	(260)	(1880)
29	T-bolt clamp of low pressure piping			8	2.9 to 4.4	(0.3 to 0.45)	(2.2 to 3.3)

*NOTE: * Hexagonal socket wrench*

Tightening Torque Chart

Bolt Dia.	Wrench Size	Hexagon Wrench Size	 M552-07-091 Socket Bolt			 M552-07-090			 M157-07-225		
			N·m	(kgf·m)	(lbf·ft)	N·m	(kgf·m)	(lbf·ft)	N·m	(kgf·m)	(lbf·ft)
M8	13	6	30	(3.1)	(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)

IMPORTANT: (1) Make sure bolt and nut threads are clean before installing.
(2) Apply lubricant (e. g. white zinc B solved into spindle oil) to bolts and nuts to stabilize friction coefficient of them.

NOTE: Tightening torque required is shown in N·m (kgf·m).
For example, when tightening bolt or nut with a wrench of 1 m length, turning the end of it with a force of 118 N·m (12 kgf·m), the torque produced will be:

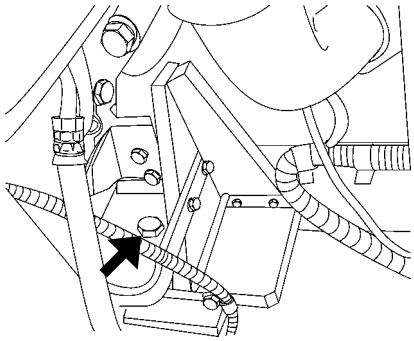
1 m × 118 N = 118 N·m
(12 kgf) (12 kgf·m)

To produce the same torque with a wrench of 250 mm):
0.25 m × ☐ N = 118 N·m
(kgf) (12 kgf·m)

Necessary force will be:
118 N·m ÷ 0.25 m = 472 N
(12 kgf·m) (48 kgf)

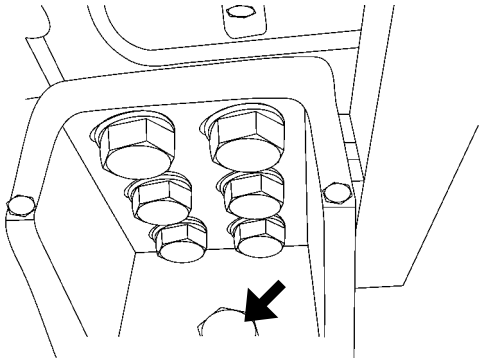
1. Engine cushion rubber mounting bolts.

(Front)
Tool: 32 mm
Torque: 740 N·m (75 kgf·m, 540 lbf·ft)



M183-07-026

(Rear)
Tool: 50 mm
Torque: 2550 N·m (260 kgf·m, 1880 lbf·ft)

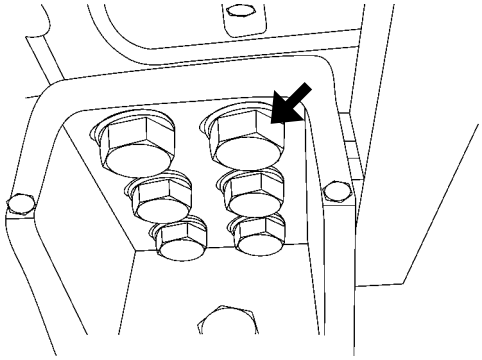


M183-07-027

2. Engine bracket mounting bolts.

(Rear)

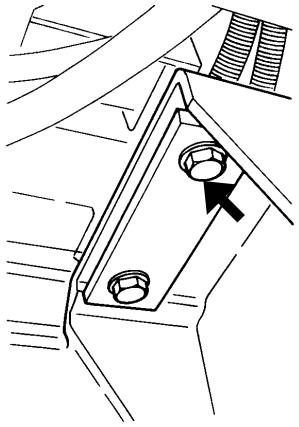
Tool: 41 mm
Torque: 1030 N·m (105 kgf·m, 760 lbf·ft)



M183-07-027

3. Radiator mounting bolts

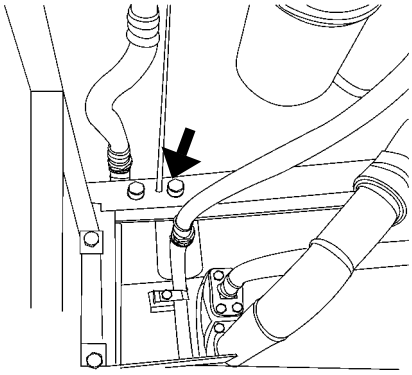
Tool: 41 mm
Torque: 1030 N·m (105 kgf·m, 760 lbf·ft)



M142-07-059

4. Hydraulic oil tank mounting bolts.

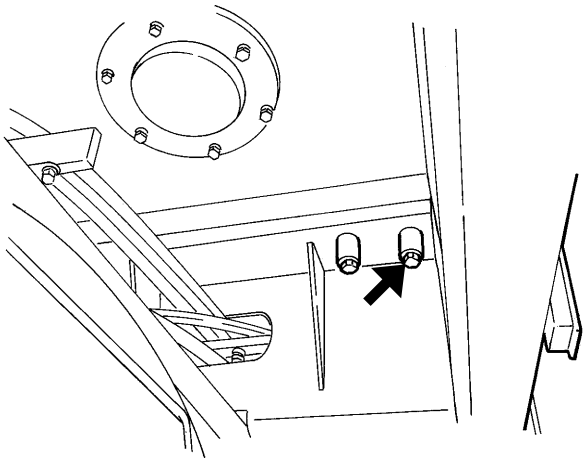
Tool: 30 mm
Torque: 540 N·m (55 kgf·m, 400 lbf·ft)



M183-07-028

5. Fuel tank mounting bolts.

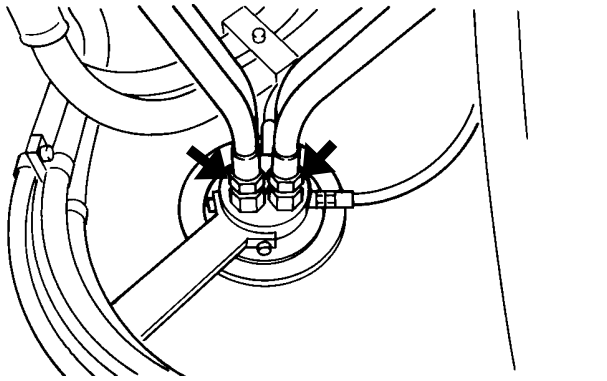
Tool: 30 mm
Torque: 540 N·m (55 kgf·m, 400 lbf·ft)



M183-01-091

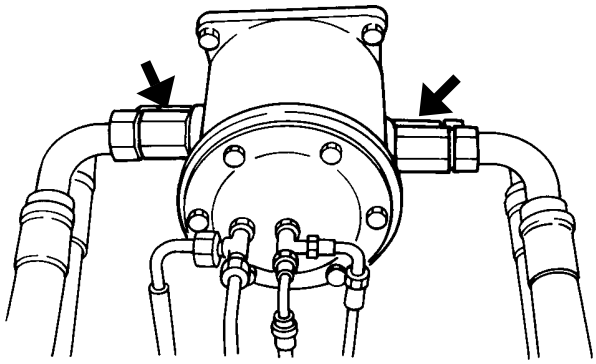
6. ORS fittings for hydraulic hoses and piping.

Tool: 41 mm
Torque: 205 N·m (21 kgf·m, 152 lbf·ft)



M142-07-060

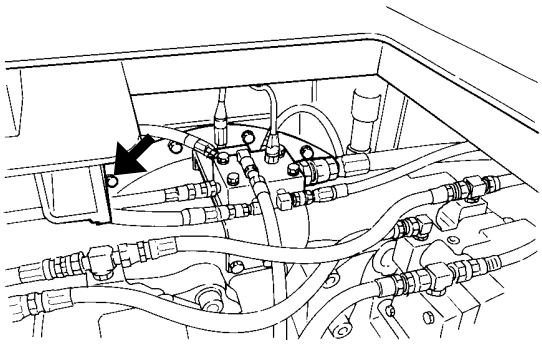
Tool: 50 mm
Torque: 340 N·m (35 kgf·m, 255 lbf·ft)



M142-07-061

7. Pump transmission mounting bolts

Tool: 19 mm
Torque: 118 N·m (12 kgf·m, 87 lbf·ft)



M183-07-030

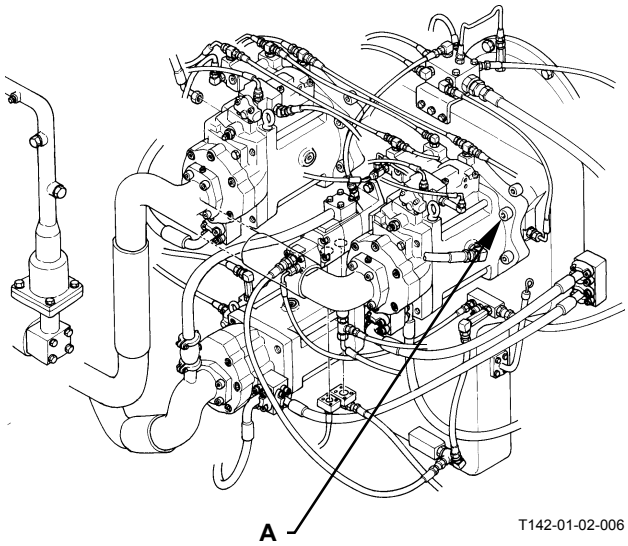
8. Pump mounting bolts (A).

Main

Tool: Hexagonbar wrench 17 mm
Torque: 390 N·m (40 kgf·m, 290 lbf·ft)

Fan

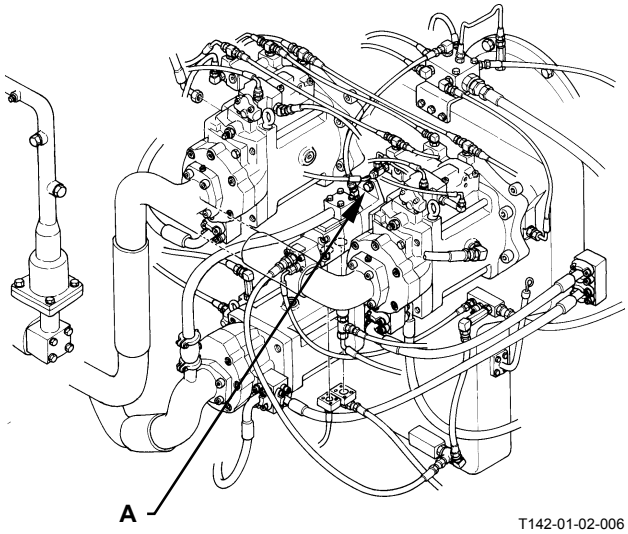
Tool: Hexagonbar wrench 14 mm
Torque: 205 N·m (21 kgf·m, 152 lbf·ft)



T142-01-02-006

9. Gear pump mounting bolts (A).

Tool: 22 mm
Torque: 137 N·m (14 kgf·m, 101 lbf·ft)



T142-01-02-006

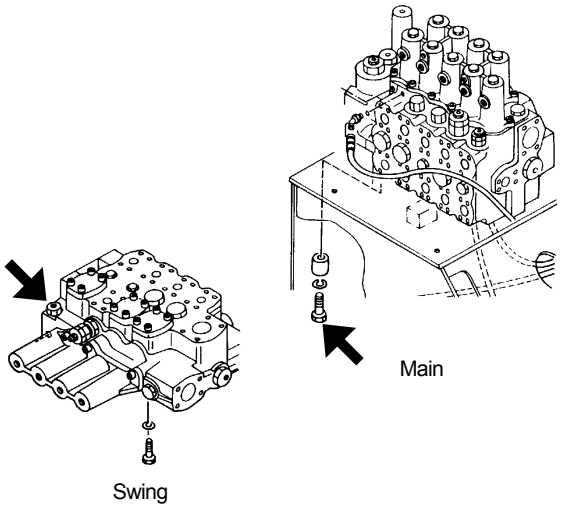
10. Control valve mounting bolts.

Main

Tool: 30 mm
Torque: 390 N·m (40 kgf·m, 290 lbf·ft)

Swing

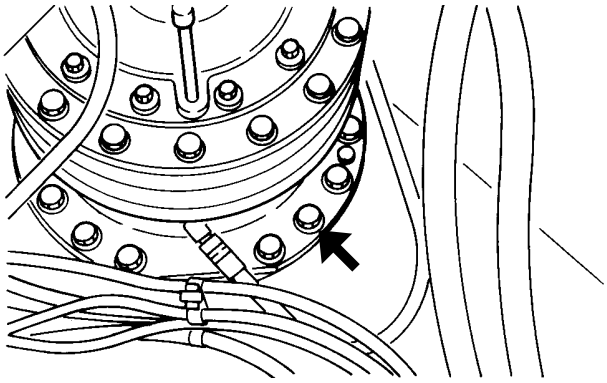
Tool: 17 mm
Torque: 49 N·m (5 kgf·m, 36 lbf·ft)



M183-07-031

11. Swing device mounting bolts.

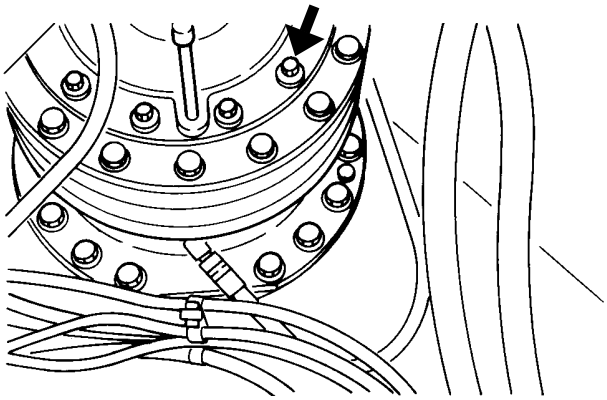
Tool: 41 mm
Torque: 1370 N·m (140 kgf·m, 1010 lbf·ft)



M142-07-062

12. Swing motor mounting bolts.

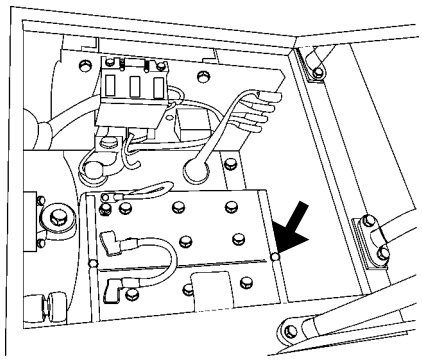
Tool: 19 mm
Torque: 88 N·m (9 kgf·m, 65 lbf·ft)



M142-07-062

13. Battery mounting bolts.

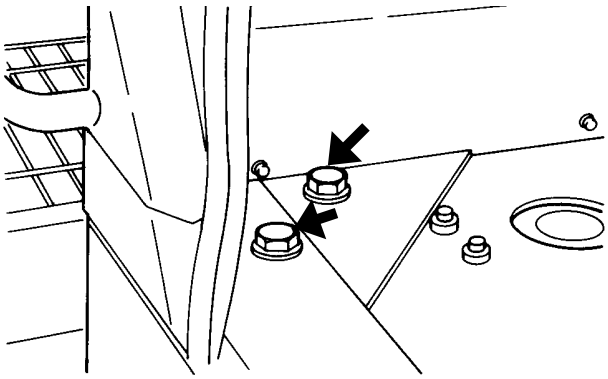
Tool: 19 mm
Torque: 34 N·m (3.5 kgf·m, 25.5 lbf·ft)



M183-07-024

14. Cab mounting bolts

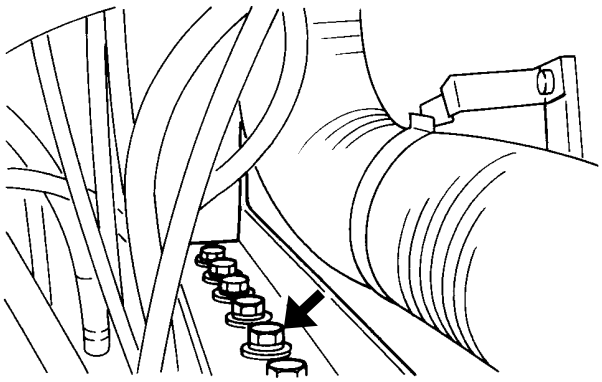
Tool: 24 mm
Torque: 265 N·m (27 kgf·m, 195 lbf·ft)



M142-07-064

15. Cab-bed mounting bolts

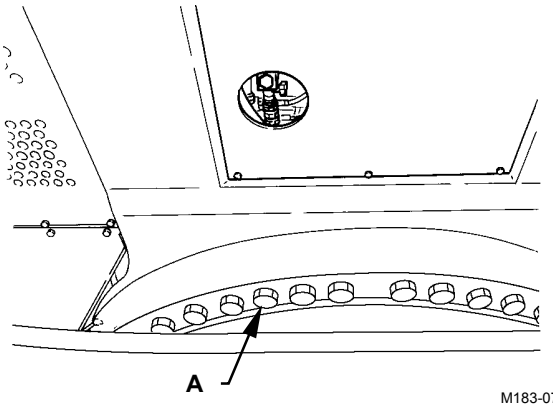
Tool: 24 mm
Torque: 205 N·m (21 kgf·m, 152 lbf·ft)



M142-07-065

16. Retighten swing bearing mounting bolts (A) to upperstructure.

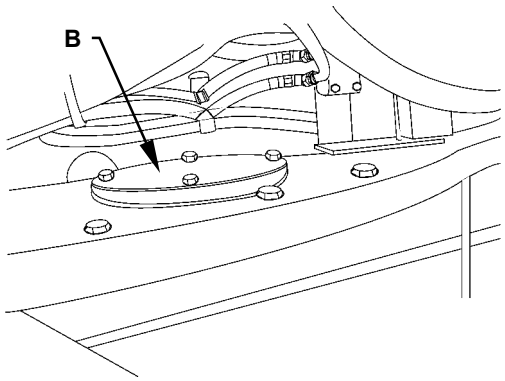
Tool: 55 mm
Torque: 2750 N·m (280 kgf·m, 2030 lbf·ft)



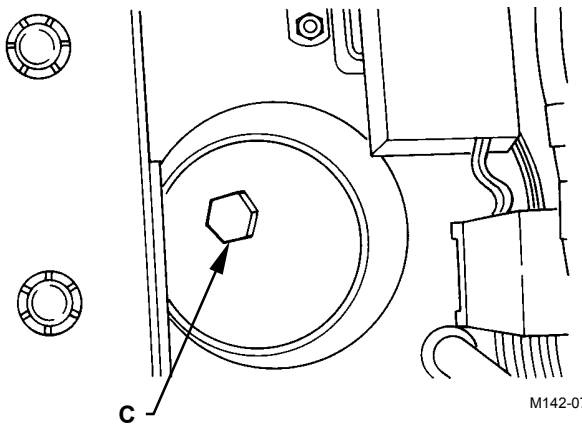
M183-07-032

Retighten swing bearing mounting bolts (C) to undercarriage.
Remove cover (B) and retighten bolts (C).

Tool: 55 mm
Torque: 2750 N·m (280 kgf·m, 2030 lbf·ft)



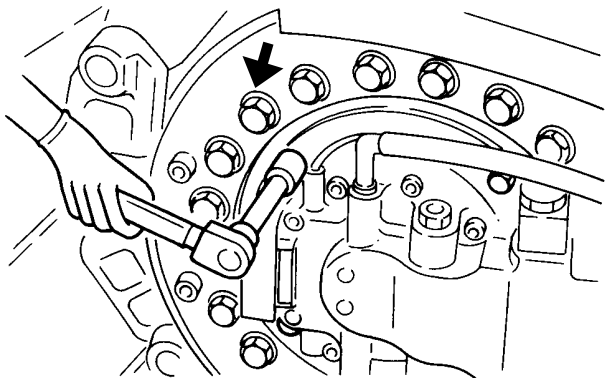
M183-07-003



M142-07-067

17. Travel device mounting bolt.

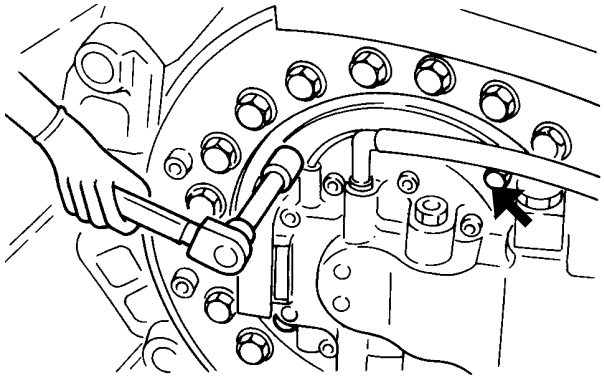
Tool: 41 mm
Torque: 1370 N·m (140 kgf·m, 1010 lbf·ft)



M142-07-069

18. Travel motor mounting bolts.

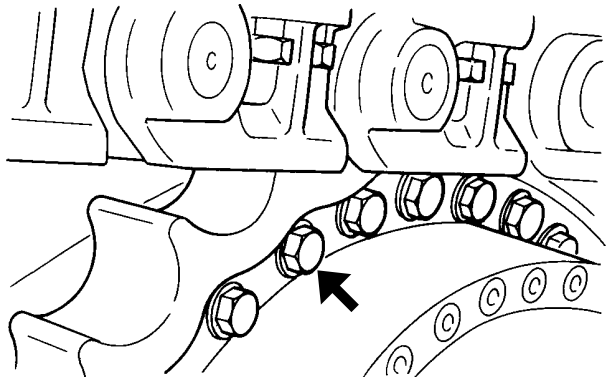
Tool: 27 mm
Torque: 295 N·m (30 kgf·m, 215 lbf·ft)



M142-07-068

19. Sprocket mounting bolts.

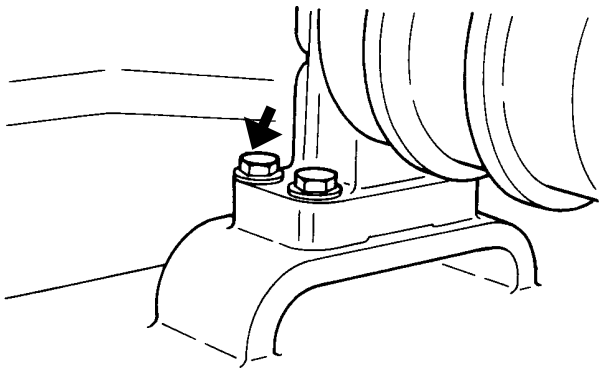
Tool: 41 mm
Torque: 1370 N·m (140 kgf·m, 1010 lbf·ft)



M142-07-070

20. Upper roller mounting bolts.

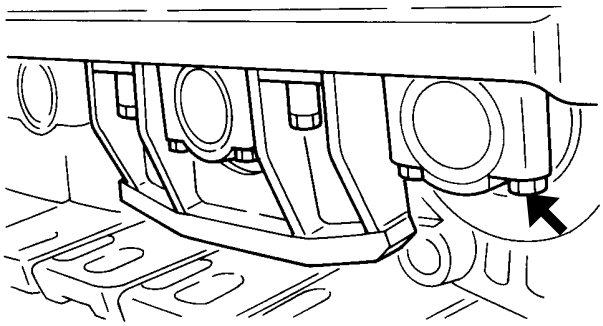
Tool: 30 mm
Torque: 540 N·m (55 kgf·m, 400 lbf·ft)



M142-07-071

21. Lower roller mounting bolts.

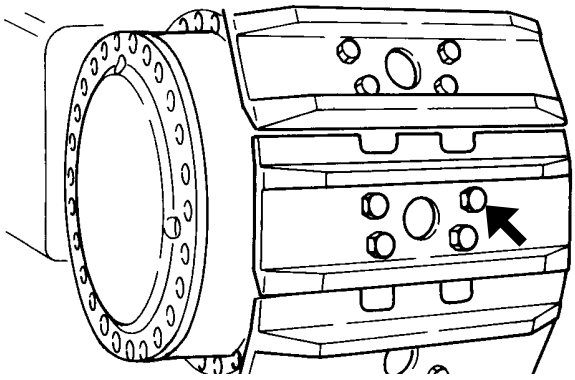
Tool: 41 mm
Torque: 1370 N·m (140 kgf·m, 1010 lbf·ft)



M142-07-072

22. Track shoe mounting bolts.

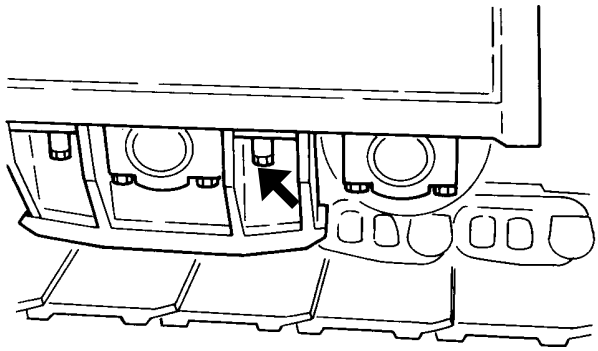
Tool: 46 mm
Torque: 2840 N·m (290 kgf·m, 2090 lbf·ft)



M142-07-073

23. Track guard mounting bolts.

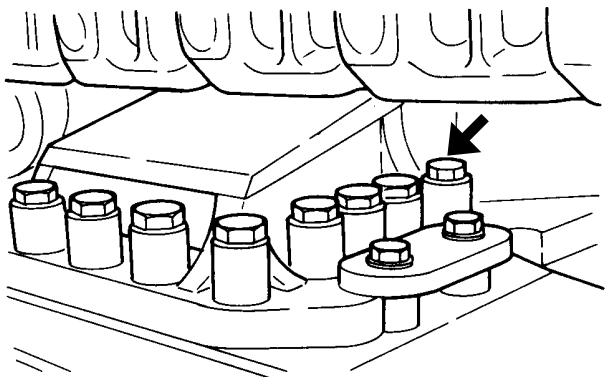
Tool: 41 mm
Torque: 1370 N·m (140 kgf·m, 1010 lbf·ft)



M142-07-074

24. Side frame mounting bolts.

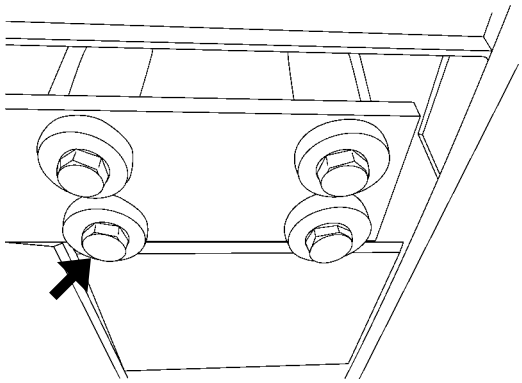
Tool: 65 mm
Torque: 3920 N·m (400 kgf·m, 2890 lbf·ft)



M142-07-075

25. Counterweight mounting bolts.

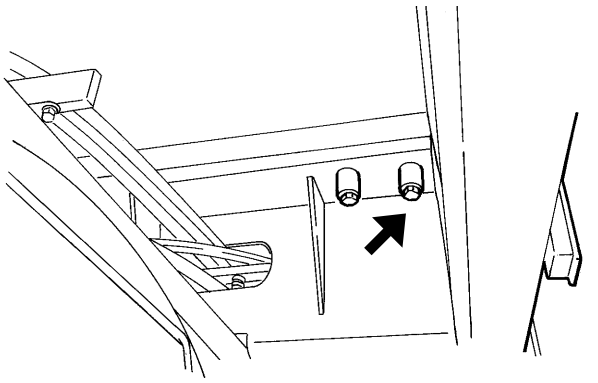
Tool: 65 mm
Torque: 3920 N·m (400 kgf·m, 2890 lbf·ft)



M183-07-033

26. Oil cooler mounting bolts

Tool: 36 mm
Torque: 930N·m (95 kgf·m, 690 lbf·ft)

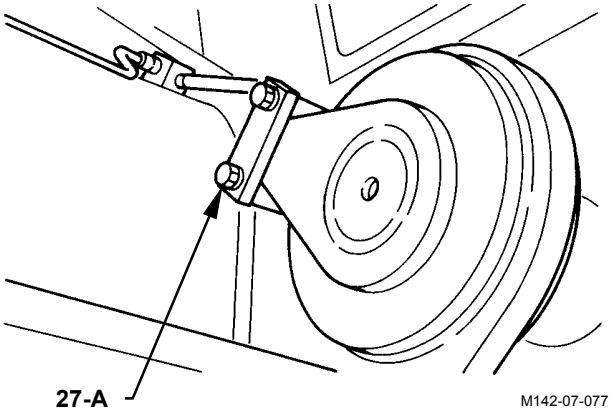


M183-07-060

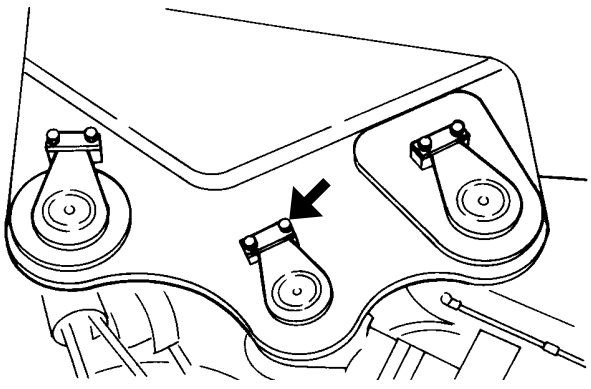
27. Front pin lock bolts (Loading shovel).

27-A.Retighten front pin lock bolts.

Tool: 30 mm
Torque: 390 N·m (40 kgf·m, 290 lbf·ft)



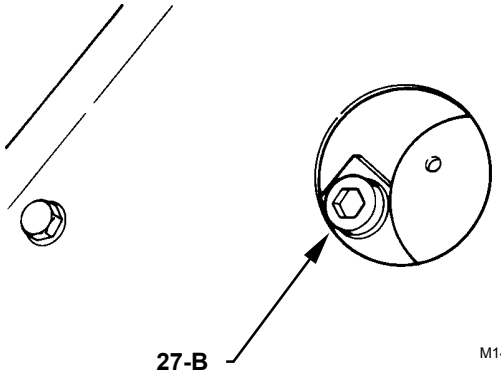
M142-07-077



M142-07-078

27-B.Bucket pin lock bolts.

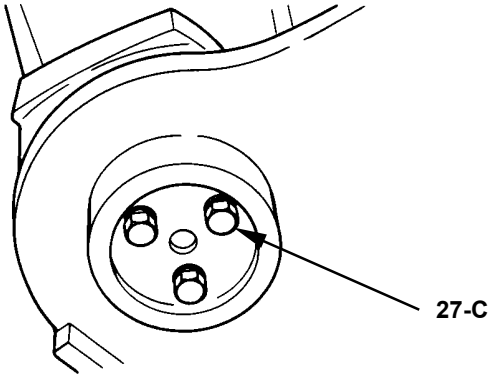
Tool: 17 mm
Torque: 540 N·m (55 kgf·m, 400 lbf·ft)



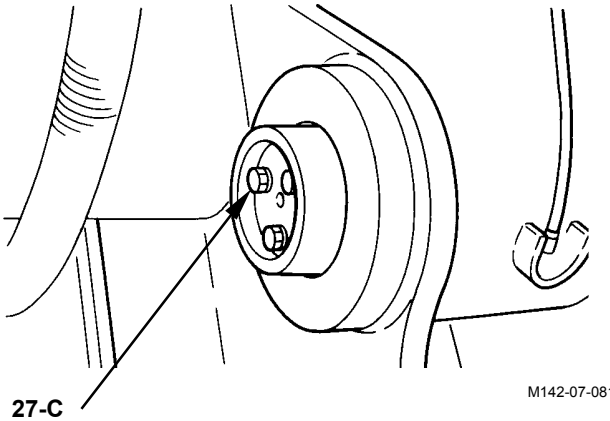
M142-07-079

27-C.Bucket pin lock bolts.

Tool: 24 mm
Torque: 265 N·m (27 kgf·m, 195 lbf·ft)



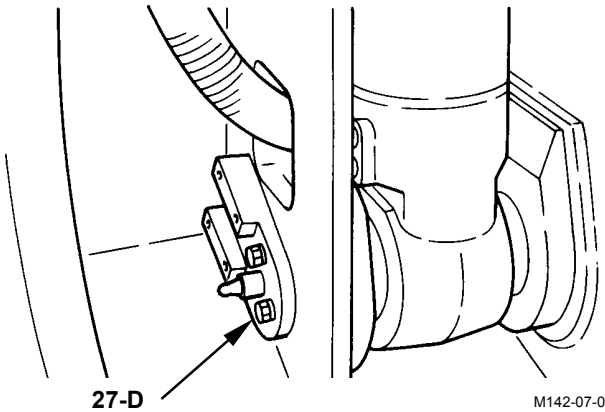
M142-07-080



M142-07-081

27-D.Bucket pin lock bolts.

Tool: 19 mm
Torque: 88 N·m (9 kgf·m, 65 lbf·ft)

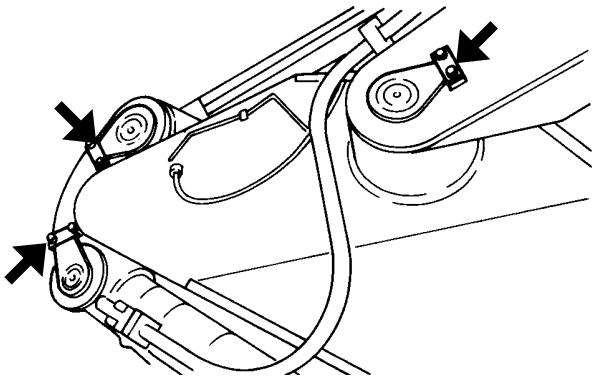


M142-07-042

28. Retighten front pin lock bolts (Backhoe).

28-A.Retighten front pin lock bolts.

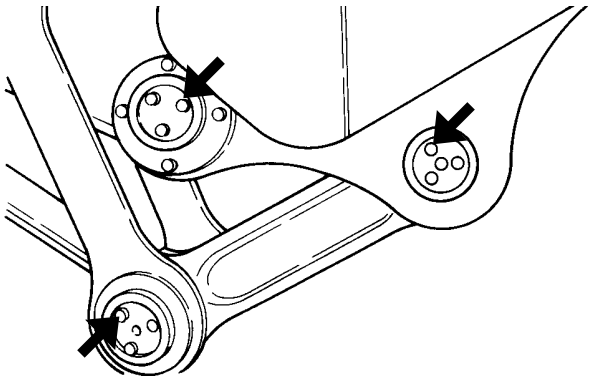
Tool: 30 mm
Torque: 390 N·m (40 kgf·m, 290 lbf·ft)



M142-07-082

28-B.Retighten stopper bolts.

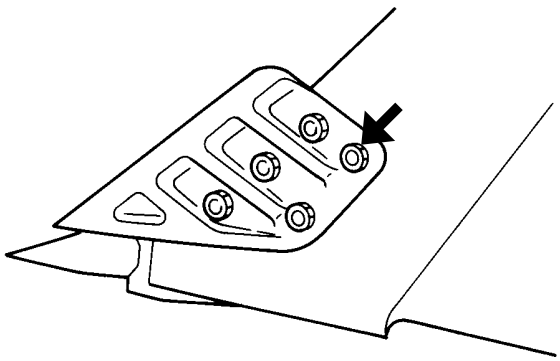
Tool: 30 mm
Torque: 390 N·m (40 kgf·m, 290 lbf·ft)



M142-07-044

29. Retighten side cutter mounting bolts.

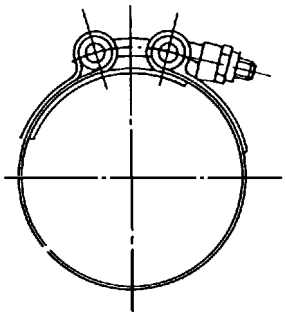
Tool: 50 mm
Torque: 2550 N·m (260 kgf·m, 1880 lbf·ft)



M142-07-084

30. Retighten T-bolt clamp

Tool: 8 mm
Torque: 2.9 to 4.4 N·m (0.3 to 0.45 kgf·m, (2.2 to 3.3 lbf·ft)



T Bolt Clamp

M114-07-042

MEMO

MAINTENANCE UNDER SPECIAL ENVIRONMENTAL CONDITIONS

Operating Conditions	Precautions for Maintenance	
Muddy Soil, Rainy or Snowy Weather	Before Operation: After Operation:	Check the tightness of plugs and all drain cocks. Clean the machine and check for cracks, damaged, loose or missing bolts and nuts. Lubricate all necessary parts without delay.
Near the Ocean	Before Operation: After Operation:	Check tightness of plugs and all drain cocks. Thoroughly clean the machine with fresh water to wash off salt. Service electrical equipment often to prevent corrosion.
Dusty Atmosphere	Air Cleaner: Radiator: Fuel System: Electrical Equipment: Air Conditioner:	Clean the element regularly at shorter service intervals. Clean the oil cooler screen to prevent clogging of the radiator core. Clean the filter element and strainer regularly at shorter service intervals. Clean them regularly, in particular, the commutator surface of the alternator and starter. Clean filter regularly with shorter service interval.
Rocky Ground	Tracks: than Front Attachment: use	Carefully operate while checking for cracks, damage and loose bolts and nuts. Loosen the tracks a little more usual. Standard attachment may be damaged when digging rocky ground. Reinforce the bucket before using it, or a heavy duty bucket.
Freezing Weather	Fuel: Lubricant: Engine Coolant: Battery: Tracks:	Use high quality fuel suitable for low temperature. Use high quality low viscosity hydraulic oil and engine oil. Be sure to use antifreeze. Fully charge the batteries regularly at shorter service intervals. If not fully charged, electrolyte may freeze. Keep the tracks clean. Park the machine on a hard surface to prevent the tracks from freezing to the ground.
Falling Stones	Cab:	Provide a cab guard to protect the machine from falling stones when necessary.

MEMO

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.

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.

ENGINE

Problem	Cause	Solution
Engine Cranks But Will Not Start or Hard to Start	No fuel	Add fuel. Bleed air.
	Wrong fuel	Drain tank. Use correct fuel.
	Contaminated fuel	Drain tank and add clean fuel.
	Low battery power	Charge or install new battery.
	Injection Pump	See your authorized dealer.
	Poor electrical connection	Clean and tighten battery and starter motor connections.
	Starter motor failure	Replace starter.
	Wrong engine oil	Drain oil. Use correct oil.
	Air filter plugged	Replace elements.
	Fuel filter plugged	Remove air from fuel system. Clean fuel tank strainer.
	Engine compression low	See your authorized dealer.
	Injection nozzles dirty or not working correctly	See your authorized dealer.
	Malfunction of fuel solenoid valve	See your authorized dealer.
	Leaks in fuel system	Check fuel system connections.
	Air in fuel system	Bleed air.
	Faulty ECM (Engine Control Module)	See your authorized dealer.
Engine Knocks, Runs Irregularly or Stops	Engine oil level low	Add oil.
	Plugged air intake system	Clean filter and system.
	Injection pump out of time	See your authorized dealer.
	Plugged fuel filters.	Install new filters.
	Low coolant temperature	Thermostat not working correctly or too “cool”.
	Water, dirt or air in fuel system	Bleed air from fuel system. Clean fuel tank outlet screen.
	Injection nozzles dirty or faulty	See your authorized dealer.

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.
	Wrong fuel	Use correct fuel.
	Wrong oil	Use correct oil.
	Turbocharger failure	See your authorized dealer.
	Injection pump out of time	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 and fan 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.

ENGINE

Problem	Cause	Solution
Coolant Temperature Too Low	Thermostat	See your authorized dealer.
	Temperature gauge or sending unit	See your authorized dealer.
Low Engine Oil Pressure	Engine oil pump or pump drive	See your authorized dealer.
	Low oil level	Add oil.
	Engine oil pressure regulation valve	See your authorized dealer.
	Plugged oil pump intake screen	See your authorized dealer.
	Plugged oil filter	Install a new oil filter.
	Oil leaks	Check for leaks.
	Oil diluted with fuel or coolant	See your authorized dealer.
	Engine temperature too high	Check cooling system.
	Wrong oil	Drain oil. Use correct oil.
Engine Uses Too Much Oil	Wrong oil	Drain oil.Use correct oil.
	Oil leaks	Check engine oil drain plug.
	Engine temperature too high	Check cooling system.
	Plugged air cleaner	Clean element or install new element.
	Internal engine component wear	See your authorized dealer.
Engine Uses Too Much Fuel	Plugged or dirty air intake system	Clean air intake system.
	Wrong fuel	Use correct fuel.
	Fuel injection nozzles	See your authorized dealer.
	Injection pump out of time.	See your authorized dealer.
Excessive Black or Gray Exhaust Smoke	Wrong fuel	Drain tank. Use correct fuel.
	Plugged or dirty air intake or exhaust system	Clean air intake and exhaust system.
	Injection pump out of timing	See your authorized dealer.
	Injection nozzles dirty or faulty	See your authorized dealer.
	Basic engine failures	See your authorized dealer.

ENGINE

Problem	Cause	Solution
Nothing Works	Battery	Recharge or replace.
Nothing Works (Except clock)	Battery relay	Replace relay.
Batteries Undercharged	Loose or corroded connections	Clean and tighten or replace batteries.
	Alternator belt loose	Tighten or install new belt.
	Alternator not charging	See your authorized dealer.
	Fuse	Replace fuse.
	Key switch failure	Replace key switch.
Starting Motor Will Not Turn	Battery undercharged or dead	Recharge or replace battery.
	Battery cables making poor connections	Clean connections.
	Slow blow fuse	Replace slow blow fuse
	Key switch	See your authorized dealer.
	Start relay	See your authorized dealer.
	Starter solenoid	See your authorized dealer.
	Starter	Repair or replace start motor.
	Starter pinion jammed in flywheel gear	Repair or replace starter.
	Major engine failure	See your authorized dealer.
Starter Solenoid Chatters	Poor connections at batteries or starter	Clean connections.
	Low battery charge	Recharge or replace batteries.
	Starter solenoid “hold-in” windings open	See your authorized dealer.
Starter Motor Turns but Will Not Crank Engine	Starter pinion gear not engaging flywheel ring gear	See your authorized dealer.
	Pinion shift mechanism jammed or malfunctioning	See your authorized dealer.
	Faulty ECM (Engine Control Module)	See your authorized dealer.
	Pinion gear teeth broken	See your authorized dealer.
	Malfunction of fuel solenoid valve	See your authorized dealer.
	Flywheel gear teeth broken	See your authorized dealer.
Engine Cranks Slowly	Battery cables damaged or broken internally	Inspect and replace cables.
	Battery or starter cable connections loose or corroded	Clean and tighten connections.

ENGINE

Problem	Cause	Solution
Exhaust Gas is White	Wrong fuel	Drain tank. Use correct fuel.
	Cold engine	Run engine until warm.
	Thermostat faulty or too “cool”	See your authorized dealer.
	Injection pump out of time	See your authorized dealer.
	Coolant leakage into engine cylinder	See your authorized dealer.
Turbocharger Excessively Noisy or Vibrates	Bearings not lubricated	Insufficient oil pressure. Check for restricted turbocharger oil line.
	Worn bearings	See your authorized dealer.
	Air leak in engine, intake or exhaust manifold	Inspect, repair.
	Improper clearance between turbine wheel and turbine housing	See your authorized dealer.
	Broken blades on turbine	Remove exhaust elbow and air inlet hose and inspect.
Oil Dripping from Turbocharger Adapter	Damaged or worn bearings and/or worn seals	See your authorized dealer. Inspect and clean air cleaner. Check for proper engine service intervals or dirt enter into engine.
	Excessive crankcase pressure	Check vent tube to ensure tube is not plugged. Clean.
	Turbocharger oil return line carbon build up where line passes exhaust manifold	Remove line. Inspect, clean.
Excessive Drag in Turbo-charger Rotating Members	Carbon build-up behind turbine wheel caused by combustion deposits	Inspect, clean.
	Dirt build-up behind compressor wheel caused by air intake leaks	Inspect, clean.
	Bearing seizure or dirty or worn bearings, caused by excessive temperature, unbalanced wheel, dirty oil, oil starvation, or insufficient lubrication	See your authorized dealer.

ELECTRICAL SYSTEM

Problem	Cause	Solution
Engine Cranks Slowly	Battery discharged or will not hold a charge	Replace battery.
	Starter “dragging”	See your authorized dealer.
	Low battery voltage	Recharge or replace battery.
Starter Motor Continues to Run After Engine Starts	Start relay stuck	See your authorized dealer.
	Starter solenoid stuck	See your authorized dealer.
	Starter not disengaging	See your authorized dealer.
	Key switch	See your authorized dealer.
Charging Indicator Light On-Engine Running	Loose or glazed alternator belt	Check belt. Replace if glazed, tighten if loose.
	Engine rpm low	Adjust rpm to specification.
	Excessive electrical load from added accessories	Remove accessories or install higher output alternator.
	Loose or corroded electrical connections on battery, ground strap, starter, or alternator	Inspect, clean, or tighten electrical connections.
	Battery voltage low	Change or replace battery.
	Alternator or regulator	See your authorized dealer.
	Indicator circuit	See your authorized dealer.
Noisy Alternator	Worn drive belt	Replace belt.
	Worn pulleys	Replace pulleys and belt.
	Pulley misaligned	Adjust alternator mount.
	Alternator bearing	Loosen alternator belts. Turn pulley by hand. If any roughness is felt, repair alternator.
No Monitor Panel Indicators Work	Fuse	Replace fuse.
	Wiring harness	See your authorized dealer.
Individual Light in Monitor Panel is Not Working	Bulb	Replace bulb.
	Fuse	Replace fuse.
	Wiring harness	See your authorized dealer.

ELECTRICAL SYSTEM

Problem	Cause	Solution
No Indicators in Gauge Panel Operate	Circuit board	See your authorized dealer.
	Wiring harness	See your authorized dealer.
	Fuse	Replace fuse.
Indicator Light in Gauge Panel is Inoperative	Bulb	Replace bulb.
	Fuse	Replace fuse.
	Sender	Do sender check.
	Wiring harness failure	See your authorized dealer.
Coolant Temperature Gauge Does Not Work	Fuse	Replace fuse.
	Gauge	See your authorized dealer.
	Gauge sender	Do coolant temperature gauge sender check.
	Wiring harness	See your authorized dealer.
Indicator Lights Do Not Operate Auto-idle	Fuse	Replace fuse.
	Bulb	Replace bulb.
	Auto-idle switch	See your authorized dealer.
Fuel Gauge Does Not Work	Fuse	Replace fuse.
	Gauge	See your authorized dealer.
	Wiring harness	See your authorized dealer.

MODE SELECTION

Problem	Cause	Solution
Fast/Slow Travel Speed Does Not Function	Travel mode switches	See your authorized dealer.
	Pilot pressure switch (Travel)	See your authorized dealer.
	Pump delivery pressure sensor wire harness	See your authorized dealer.
	Main controller	See your authorized dealer.
	Solenoid valve unit	See your authorized dealer.
	Damaged travel motor	See your authorized dealer.
Auto-Idle Does Not Work	Fuse	Replace fuse.
	Switch panel	See your authorized dealer.
	Electrical connector	See your authorized dealer.
	Wire harness	See your authorized dealer.
	Pressure switches (Travel, Front)	See your authorized dealer.
	Main controller	See your authorized dealer.

CONTROL LEVERS

Problem	Cause	Solution
Moves Hard	Corroded joint	See your authorized dealer.
	Worn out pusher	See your authorized dealer.
Does Nothing	Worn out pusher	See your authorized dealer.
	Pilot valve	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	Fill reservoir to full mark.
	Cold oil	Push hydraulic warm up switch.
	Wrong oil	Drain tank. Use correct oil.
	Engine speed too low	Increase speed or see your authorized dealer.
	Pilot circuit	See your authorized dealer.
	Worn pump	See your authorized dealer.
	Restricted pump suction line	See your authorized dealer.
Hydraulic Oil Overheats	Wrong oil	Use correct oil.
	Air leak in pump suction line	See your authorized dealer.
	Oil lines restricted	See your authorized dealer.
	Low oil level	Fill reservoir to full mark.
	Plugged filters	Install new filters.
	Worn pump	See your authorized dealer.
	Plugged radiator or oil cooler	Clean and straighten fins.
	Oil cooler bypass	See your authorized dealer.

HYDRAULIC SYSTEM

Problem	Cause	Solution
Hydraulic Oil Overheats	Relief valve	See your authorized dealer.
	Contaminated oil	Drain oil and refill.
	Travel motors	See your authorized dealer.
	Improperly adjusted hydraulic components	See your authorized dealer.
Oil Foams	Air leak in line from reservoir to pump	Repair leak or see your authorized dealer.
	Kinks or dents in oil lines	Check lines.
	Wrong oil	Use correct oil.
	Water in oil	Change oil.
	High or low oil level	Correct level.
Low or No Oil Pressure	Wrong oil	Use correct oil.
	Improperly adjusted hydraulic components	See your authorized dealer.
	No oil in system	Fill with correct oil.
	Worn cylinder packings	See your authorized dealer.
	Relief valve	See your authorized dealer.
No Hydraulic Functions (Noise from pumps)	Hydraulic pump	See your authorized dealer.
	Lack of hydraulic oil	Add oil.
	Damaged suction line or hose	See your authorized dealer.
	Clogged suction filter	Clean.
Hydraulic Cylinders Operate but Cannot Lift Load	Hydraulic pump worn	See your authorized dealer.
	Main relief valve pressure low	See your authorized dealer.
	Hydraulic oil level low	Add oil.
	Suction screen plugged	Clean strainer and system.
	Pump suction line leaking	Inspect suction line.

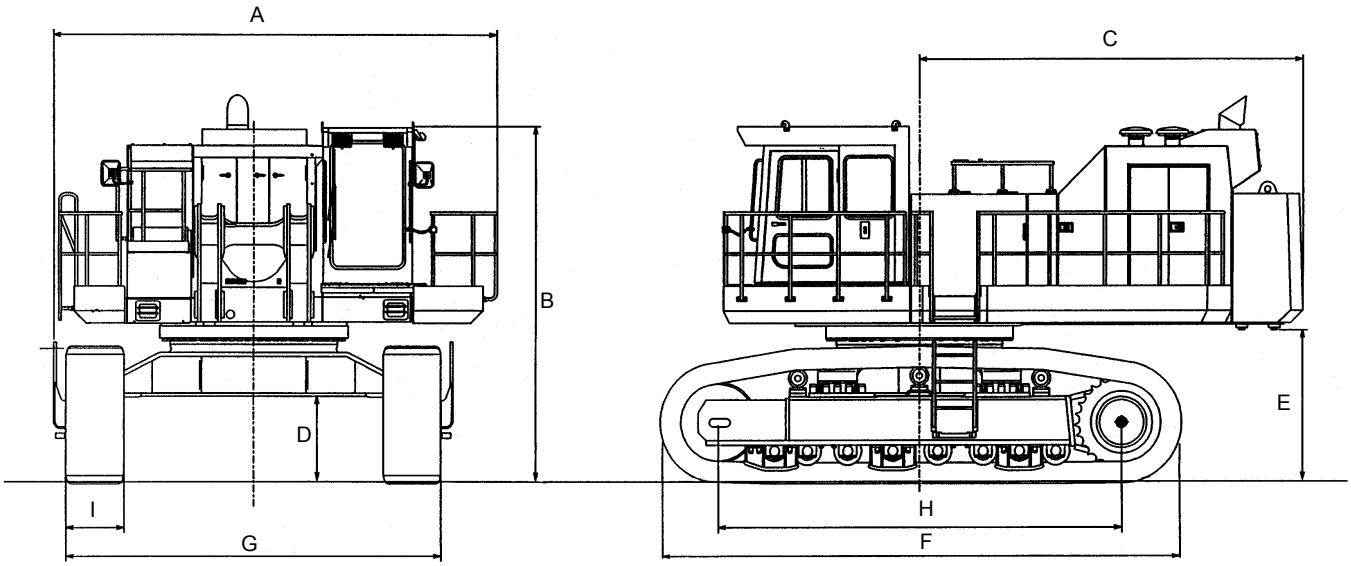
HYDRAULIC SYSTEM

Problem	Cause	Solution
One Control Lever Does Not Work	Relief valve pressure low	See your authorized dealer.
	Tube or hose damaged	Repair or replace.
	Hydraulic fittings loose	Tighten.
	Damaged O-rings in fittings	Install new O-ring.
	Hydraulic pump	See your authorized dealer.
	Pilot valve	See your authorized dealer.
	Pilot lines	Repair or replace.
One Cylinder Does Not Work	Control valve spool damaged or contaminated with dirt	See your authorized dealer.
	Hydraulic lines damaged	Repair or replace.
	Fittings loose	Tighten.
	O-ring in fitting damaged	Install new O-ring.
	Pilot valve	See your authorized dealer.
	Pilot lines	Repair or replace.
One Cylinder Does Not Work or Has Little Power	Piston seals leaking	See your authorized dealer.
	Cylinder rod damaged	See your authorized dealer.
	Pilot lines	Repair or replace.
	Pilot valve	See your authorized dealer.
	Failed wiring harness	See your authorized dealer.
Both Travel Motors Do Not Work	Center joint failure	See your authorized dealer.
One Travel Motor Does Not Work	Travel motor	See your authorized dealer.
	Parking brake not releasing	See your authorized dealer.
	Pilot valve	See your authorized dealer.
	Pilot lines	Repair or replace.
Travel is Not Smooth	Track adjustment	Adjust tension.
	Front idler or rollers damaged	See your authorized dealer.
	Track frame bent	See your authorized dealer.

HYDRAULIC SYSTEM

Problem	Cause	Solution
Travel is Not Smooth	Rocks or mud “jammed” in track frame	Remove and repair.
	Travel brake not releasing	See your authorized dealer.
Swing Does Not Work	Swing brake release valve	See your authorized dealer.
	Swing motor	See your authorized dealer.
	Pilot valve	See your authorized dealer.
Swing is Not Smooth	Swing gear	See your authorized dealer.
	Swing bearing	See your authorized dealer.
	Lack of grease	Apply grease.
Engine Stop When Travel or/and Control Lever Moved	Failure of connector contact	Repair or release
	Failed wiring harness	See your authorized dealer.
	Failed main controller	See your authorized dealer.

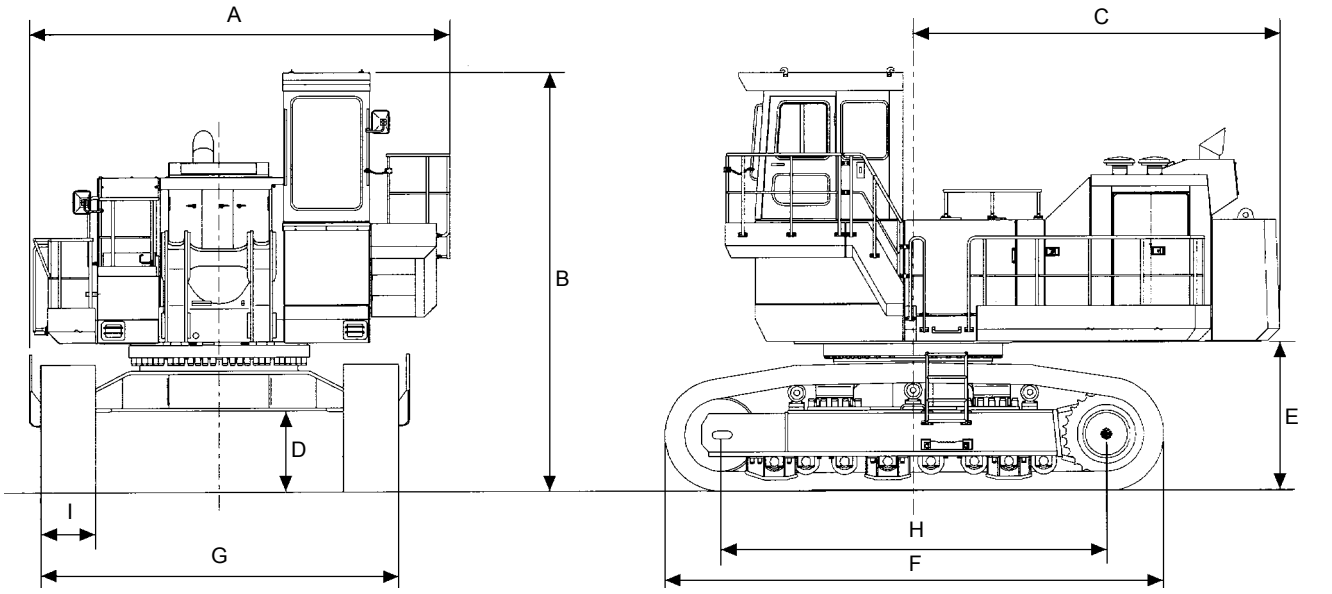
SPECIFICATIONS



M183-11-001

Model	EX1200-5C Hydraulic Excavator	
Type of Front-End Attachment	Backhoe [9.1 m (29'10") boom, 3.4 m (11'2") arm]	BE Backhoe [7.55 m (24'9") BE boom, 3.4 m BE arm]
Bucket Capacity (Heaped)	PCSA 5.0 m^3 (6.5 yd^3), CECE 4.4 m^3	PCSA 6.5 m^3 (8.5 yd^3)
Operating Weight	108000 kg, (238000 lb)	109000 kg (243000 lb)
Basic Machine Weight	80500 kg (177000 lb)	
Engine	Hitachi S6R-Y2TAA2 482 kW/1650 min^{-1} (655 PS/1650 rpm)	
A: Overall Width	5430 mm (17 ft 10 in)	
B: Cab Height	4320mm (14 ft 2 in)	
C: Rear End Swing Radius	4850 mm (15 ft 11 in)	
D: Minimum Ground Clearance	990 mm (3 ft 3 in) (Excluding shoe lug)	
E: Counterweight Clearance	1790 mm (5 ft 10 in) (Excluding shoe lug)	
F: Undercarriage Length	6410 mm (21 ft 0 in)	
G: Undercarriage Width	4610 mm (15 ft 2 in)	
H: Sprocket Center to Idler Center	5000 mm (16 ft 5 in)	
I: Track Shoe Width	710 mm (28 in) (Grouser shoe)	
Ground Pressure	136 kPa (1.39 kgf/cm^2, 19.7 psi)	137 kPa (1.40 kgf/cm^2, 19.9 psi)
Swing Speed	5.8 min^{-1} (rpm)	5.8 min^{-1} (rpm)
Travel Speed (Fast/Slow)	3.5/2.4 km/h (2.2/1.5 mph)	
Gradeability	35° ($\tan\theta$ = 0.70)	

NOTE: ✳ The standard specification loading shovel is equipped with an elevated cab.

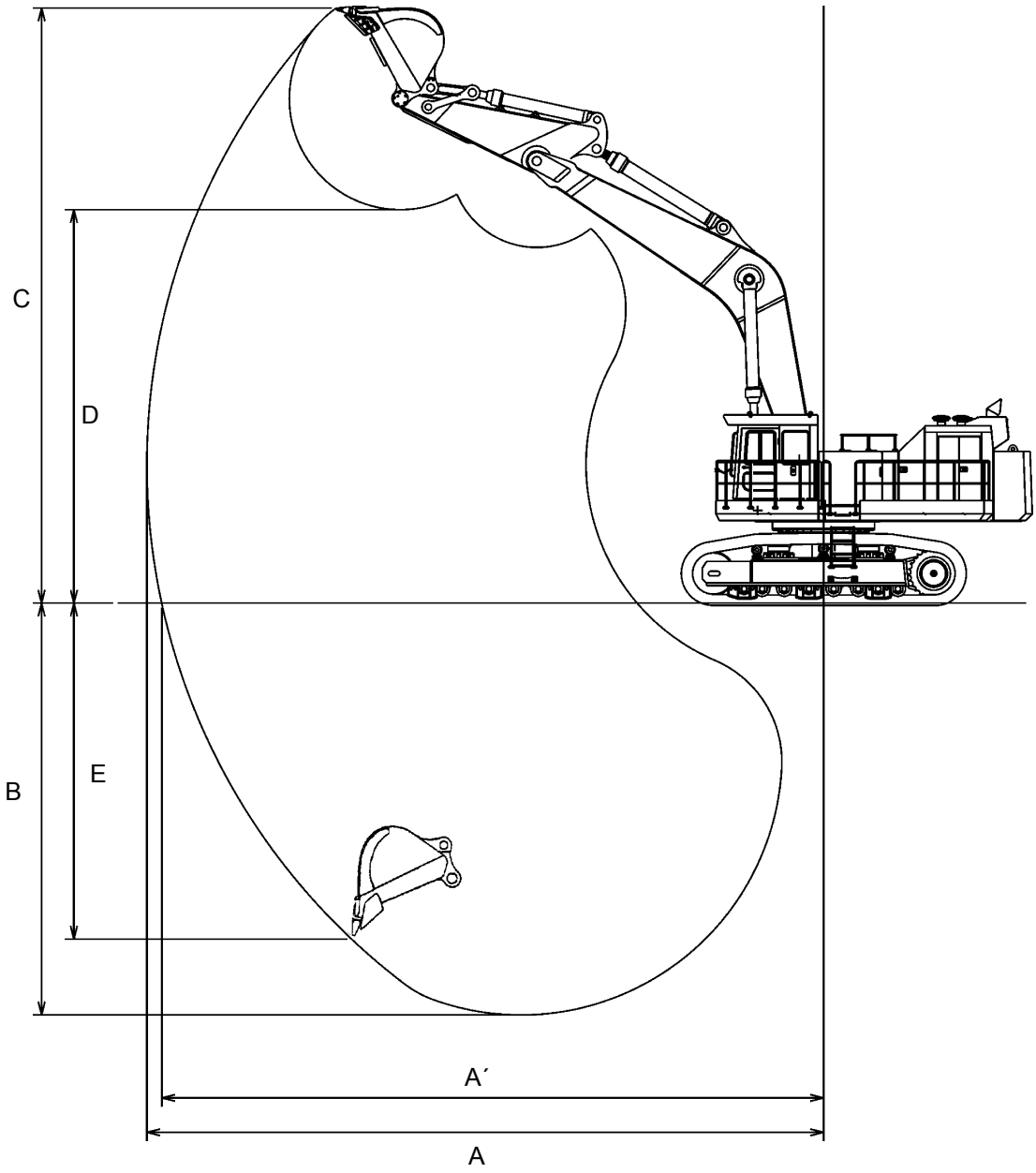


T183-01-01-002

Model	EX1200-5C Hydraulic Excavator
Type of Front-End Attachment	Loading Shovel
Bucket Capacity (Heaped)	PCSA 6.5 m^3 (8.5 yd^3)
Operating Weight	111000 kg, (245000 lb)
Basic Machine Weight	80900 kg (178400 lb)
Engine	Hitachi S6R-Y2TAA2 482 kW/1650 min^{-1} (655 PS/1650 rpm)
A: Overall Width	5430 mm (17 ft 10 in)
B: Cab Height	*5410mm (17 ft 9 in)
C: Rear End Swing Radius	4850 mm (15 ft 11 in)
D: Minimum Ground Clearance	990 mm (3 ft 3 in) (Excluding shoe lug)
E: Counterweight Clearance	1790 mm (5 ft 10 in)
F: Undercarriage Length	6410 mm (21 ft 0 in)
G: Undercarriage Width	4610 mm (15 ft 2 in)
H: Sprocket Center to Idler Center	5000 mm (16 ft 5 in)
I: Track Shoe Width	710 mm (28 in) (Grouser shoe)
Ground Pressure	139 kPa (1.42 kgf/cm^2, 20.2 psi)
Swing Speed	5.8 min^{-1} (rpm)
Travel Speed (Fast/Slow)	3.5/2.4 km/h (2.2/1.5 mph)
Gradeability	35° ($\tan\theta$ = 0.70)

*NOTE: * The standard specification loading shovel is equipped with an elevated cab.*

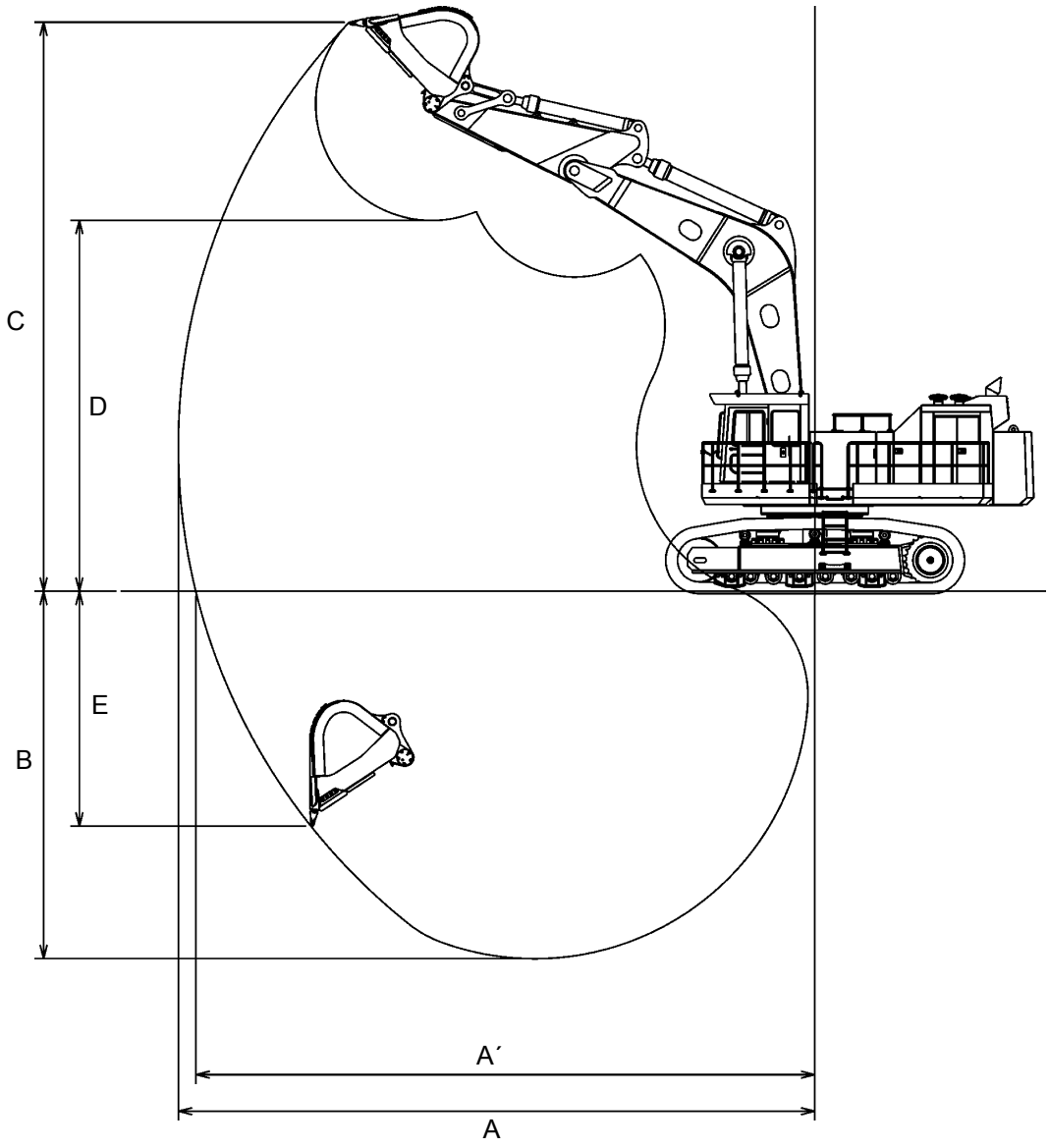
WORKING RANGE (BACKHOE)



M183-11-002

Boom Length	9.10 m (29′ 10″)
Arm Length	3.40 m (11′ 2″)
A : Maximum Digging Reach	15340 mm (50′ 4″)
A' : Maximum Digging Reach (on ground)	15000 mm (49′ 3″)
B : Maximum Digging Depth	9340 mm (30′ 8″)
C : Maximum Cutting Height	13490 mm (44′ 3″)
D : Maximum Dumping Height	8920 mm (29′ 3″)
E : Maximum Vertical Wall	7620 mm (25′ 0″)

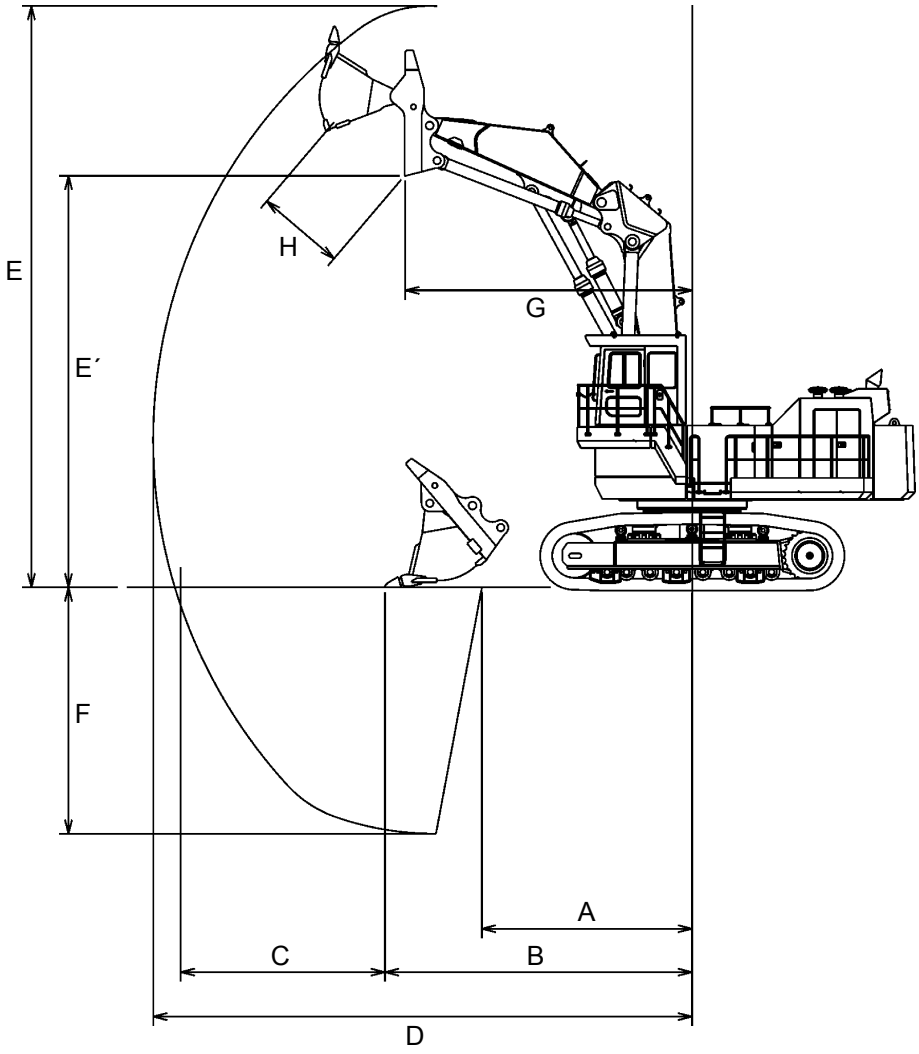
WORKING RANGE (BE BACKHOE)



M183-11-003

Boom Length	7.55 m (24′ 9″) BE-boom
Arm Length	3.40 m (11′ 2″)
A : Maximum Digging Reach	13760 mm (45′ 2″)
A' : Maximum Digging Reach (on ground)	13380 mm (43′ 11″)
B : Maximum Digging Depth	7940 mm (26′ 1″)
C : Maximum Cutting Height	12300 mm (40′ 4″)
D : Maximum Dumping Height	8020 mm (26′ 4″)
E : Maximum Vertical Wall	5080 mm (16′ 8″)

WORKING RANGE (LOADING SHOVEL)



M183-11-004

A : Minimum Digging Distance	4460 mm (14′ 8″)
B : Minimum Level Crowding Distance	6520 mm(21′ 5″)
C : Level Crowding Distance	4340 mm(13′ 10″)
D : Maximum Digging Reach	11440 mm(37′ 6″)
E : Maximum Cutting Height	12350 mm(40′ 6″)
E' : Maximum Dumping Height	8740 mm(28′ 8″)
F : Maximum Digging Depth	5240 mm(17′ 2″)
G : Working Radius at Maximum Dumping Height	6090 mm(20′ 0″)
H : Maximum Bucket Opening Width	1880 mm(6′ 2″)

BACKHOE SHOE TYPES AND APPLICATIONS

Shoe Types and Applications, and Machine Specifications When Employing Them

Shoe Width	710 mm (28 in) Grouser Shoe	900 mm (35 in) Grouser Shoe
Application	For Ordinary Ground (Standard)	For Weak Footing (Option)
Operating Weight	108000 kg (238000 lb)	110000 kg (243000 lb)
Basic Machine Weight	80500 kg (177000 lb)	82800 kg (183000 lb)
Cab Height	4270 mm (14 ft 0 in)	4270 mm (14 ft 0 in)
Minimum Ground Clearance	✳990 mm (3 ft 3 in)	✳1050 mm (3 ft 5 in)
Undercarriage Length	6410 mm (21 ft 0 in)	6460 mm (21 ft 0 in)
Undercarriage Width	4610 mm (15 ft 2 in)	4800 mm (15 ft 9 in)
Ground Pressure	136 kPa (1.39 kgf/cm^2, 19.7 psi)	109 kPa (1.11 kgf/cm^2, 15.8 psi)

NOTE: (1) The machine specifications are when equipped with the front attachment of 9.1 m (29′ 10″) boom, 3.4 m (11′ 2″) arm and PCSA 5.0 m^3 (6.5 yd^3) backhoe bucket.

(2) Optional grouser shoes [900 mm] (35″) are only for soft ground. If they are used on a rough ground with gravels and rocks, they may be bent and cause shoe bolt loosening or damaging track links and/or rollers.

(3) Use optional grouser shoes [900 mm] (35″) only for the machine with backhoe front. Do not use them for the machine with loader front.

(4) ✳ The dimensions do not include the height of the shoe lug.

Sound Level Results (2000/14/EC)

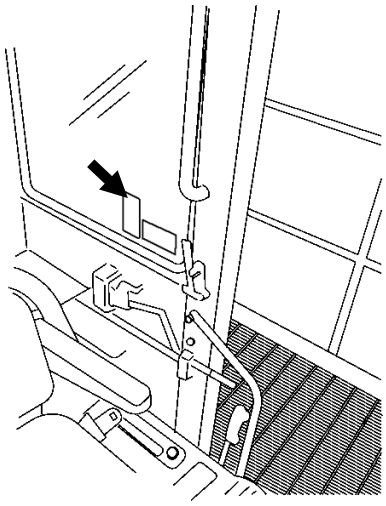
Sound level at operator's station

LpA = 77 dB (A)

Sound-power level of airborne noise

LWA = 113 dB (A)

NOTE: The sound level decal is applied to glass of cab.



M18E-12-001

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