ORIGINAL INSTRUCTIONS

CX26C
Mini Excavator

OPERATOR'S MANUAL

Part number 48057990
1st edition English
November 2016

CASE CONSTRUCTION

Contents

Every 250 hours

Every 400 hours

Every 500 hours

Every 1000 hours

Every 2000 hours

Every 5000 hours

When necessary

Fuse and relay locations

Storage

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Fault code resolution

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1 - GENERAL INFORMATION

Note to the Owner

Improper operation of this machine can cause injury or death. Before using this machine, make certain that every operator:

- Is instructed in safe and proper use of the machine.
- Reads and understands the Manual(s) pertaining to the machine.
- Reads and understands ALL Safety Decals on the machine.
- Clears the area of other persons.
- Learns and practices safe use of machine controls in a safe, clear area before operating this machine on a job site.

It is your responsibility to observe pertinent laws and regulations and follow CASE CONSTRUCTION instructions on machine operation and maintenance.

Your machine has been designed and built to the highest standards of quality. It conforms to all current safety regulations. However, the risk of accidents can never be completely excluded. That is why it is essential to observe elementary safety rules and precautions.

Read this manual carefully, paying particular attention to the instructions concerning safety, operation and maintenance so as to avoid the risk of injury while operating or servicing the machine.

The standard attachments and tools of this machine are designed to carry out earthmoving and rehandling operations. If you want to use this machine to handle a load (pipes, culverts, formwork, etc.), make sure that it is designed to carry out this kind of work. For this type of application, the machine must be equipped with safety valves, an overload indicator, a load handling chart corresponding to the type of machine and its attachment, and a load fixing point. All legal requirements must also be strictly observed.

Do not use this machine for any application or purpose other than those described in this manual. If the machine is to be used for work involving the use of special attachments, accessories, or equipment, consult your CASE CONSTRUCTION Dealer in order to make sure that any adaptations or modifications made are in keeping with the machine's technical specifications and with prevailing safety requirements.

Any modification or adaptation which is not approved by CASE CONSTRUCTION may invalidate the machine's initial conformity with safety requirements.

The machine must undergo regular inspections, the frequency of which varies according to the type of use. Consult your CASE CONSTRUCTION Dealer.

NOTICE: *The engine and fuel system on your machine is designed and built to government emissions standards. Tampering by dealers, customers, operators and users is STRICTLY PROHIBITED BY LAW. Failure to comply could result in government fines, rework charges, invalid warranty, legal action and possible confiscation of the machine until rework to original condition is completed. Engine service and/or repairs must be done by a certified technician only.*

Your CASE CONSTRUCTION Dealer is at your disposal for any further information. They will also provide any after-sales service you may require, and genuine CASE CONSTRUCTION spare parts, your guarantee of quality and match.

CASE CONSTRUCTION customer assistance is also available. Go to www.casece.com

You can obtain manuals on the operation, maintenance and repair of your machine from your CASE CONSTRUCTION Dealer. To ensure quick and efficient service, consult your CASE CONSTRUCTION Dealer for assistance in ordering the correct manuals for your machine.

Always give the type and the Product Identification Number (PIN) of your machine so that your CASE CONSTRUCTION Dealer can supply you with the right manuals for your machine.

CASE CONSTRUCTION reserves the right to make changes in the specification and design of the machine without prior notice and without incurring any obligation to modify units previously sold.

The description of the models shown in this manual has been made in accordance with the technical specifications known as of the date of design of this document.

All data given in this manual is subject to production variations. Dimensions and weights are provided with approximate values and the machine fitting shown in the illustrations may not correspond with standard models. For precise information on specific machine models and versions, please consult your CASE CONSTRUCTION Dealer.

Intended use

⚠ WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.
MAKE SURE THAT EVERY OPERATOR:
-learns and practices the safe use of machine controls in a safe, clear area before operating the machine on a job site.
-clears the work area of all bystanders.
-observes pertinent laws and regulations.
-follows the instructions in this operator's manual.
Failure to comply could result in death or serious injury.

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NOTICE: *do not use the excavator for operations which are foreign to its specifications and not included in this operator's manual. CASE CONSTRUCTION and CASE CONSTRUCTION dealer are not responsible for damage caused by improper use.*

The excavator has been designed to carry out digging and earth-moving operations through the use of a bucket. Operations that involve the use of hydraulic hammers are also possible. Other operations, such as moving suspended loads, are only possible if the specific variant approved by the CASE CONSTRUCTION is present.

Using the excavator and its equipment for different operations, such as towing, transporting and lifting people, is considered inappropriate and is prohibited.

Electro-Magnetic Compatibility (EMC)

Interference may arise as a result of add-on equipment that may not necessarily meet the required standards. As such interference can result in serious malfunction of the unit and/or create unsafe situations, you must observe the following:

- The maximum power of emission equipment (radio, telephones, etc.) must not exceed the limits imposed by the national authorities of the country where you use the machine
- The electro-magnetic field generated by the add-on system should not exceed **24 V/m** at any time and at any location in the proximity of electronic components
- The add-on equipment must not interfere with the functioning of the on board electronics

Failure to comply with these rules will render the CASE CONSTRUCTION warranty null and void.

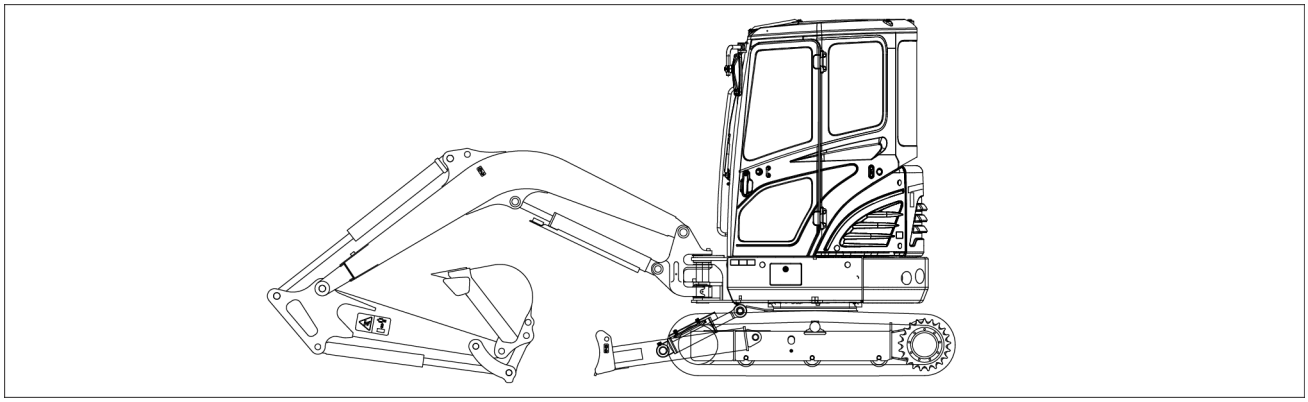
Telematics (optional)

NOTE: *the CASE CONSTRUCTION* ***SiteWatch™*** *website (www.casesitewatch.com) will not be accessible until the CASE CONSTRUCTION* ***SiteWatch™*** *subscription for this machine is registred by an authorized CASE CONSTRUCTION dealer. Contact an authorized CASE CONSTRUCTION for details.*

This machine can be equipped with a telematics system. This is an asset-monitoring system that combines Internet, cellular, and GPS technologies. A transponder unit is mounted on the equipment that wirelessly communicates with the user interface CASE CONSTRUCTION **SiteWatch™** at www.casesitewatch.com. Using cellular technology, the transponder can send equipment data, including location, on/off status, usage and production metrics, diagnostic data, movement alarms, and unauthorized usage to the interface. The system will help cut costs and keep accurate records. See the furnished guide for operating your telematics system.

Product identification

Your machine is a hydraulic excavator. It consists of an undercarriage fitted with tracks and a swing bearing which supports the upper-structure frame. The upper-structure frame supports the attachment at the front end of the machine, plus the engine, hydraulics and the cab/canopy. When the operator works the controls, the engine-driven pump delivers hydraulic fluid to the control valves. The control valves distribute the hydraulic fluid to the various cylinders and hydraulic motors employed. A cooling system maintains the hydraulic fluid at normal operating temperature.



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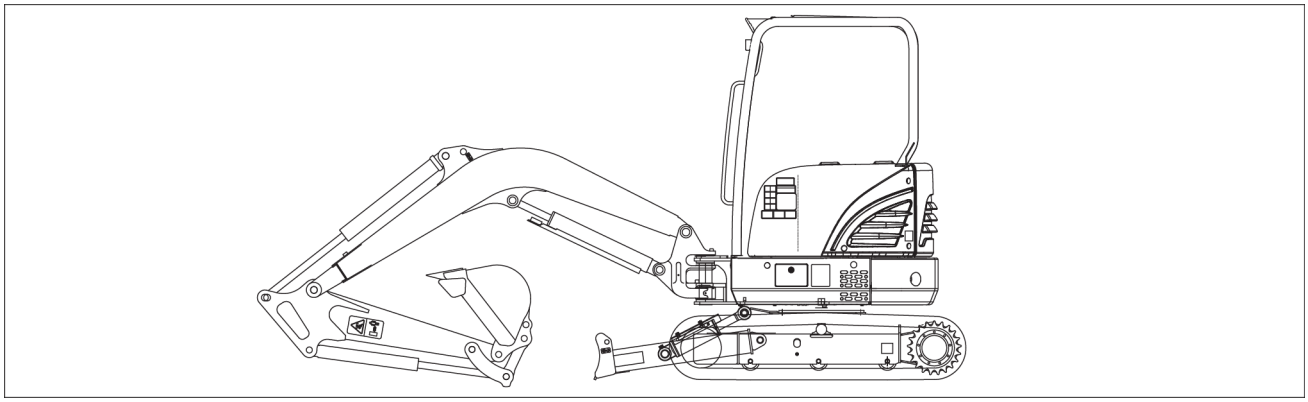
Cab version



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Canopy version

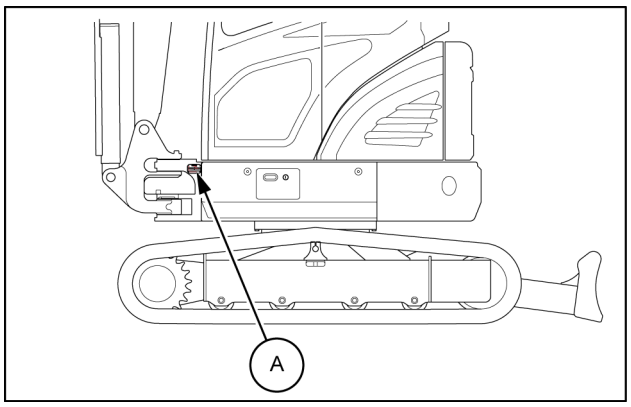
When ordering parts, obtaining information, or seeking assistance, always supply your CASE CONSTRUCTION Dealer with the type and Product Identification Number (PIN) of your machine or accessories.

Write the following in the spaces below:

- Machine Type
- Machine PIN
- Machine year of manufacture
- Serial numbers of hydraulic and mechanical components

Machine

The machine Product Identification Number (PIN) plate **(A)** is located below the front window of the operator's cab.



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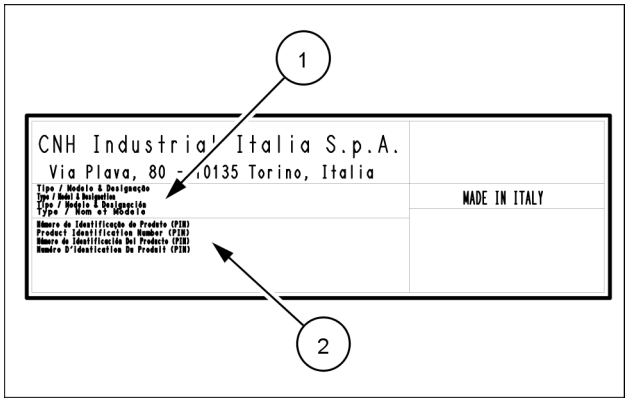
(1) Designation, Type/Model
Hydraulic Excavator_____

(2) Product Identification Number (PIN)_____



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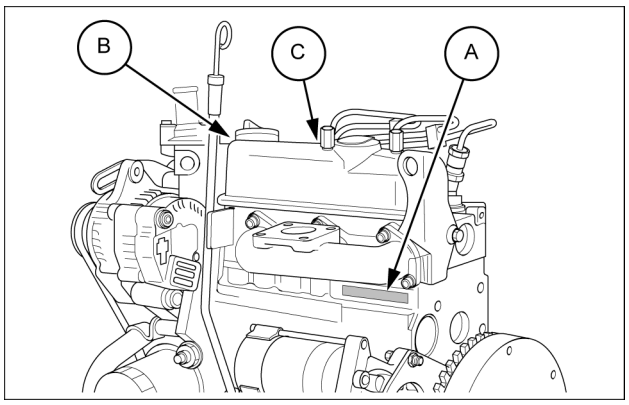
Engine

The engine serial number **(A)** is located on the engine name plate.



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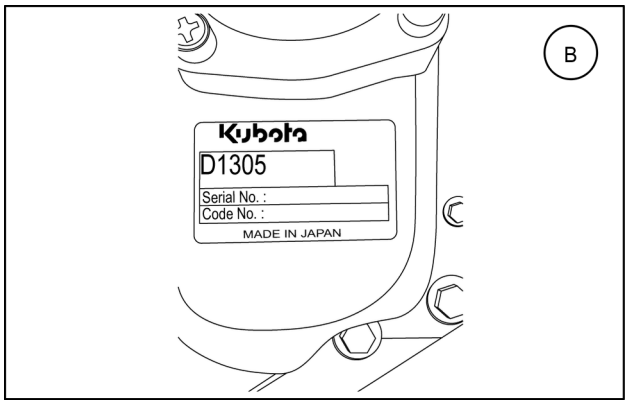
ID label (B)

This is attached on the cylinder head cover.



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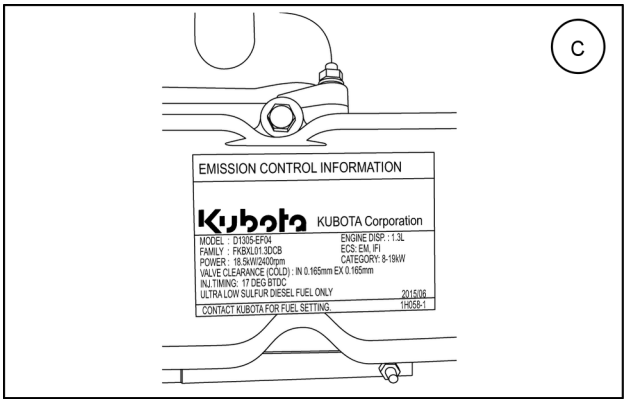
Emission decal (C)

The emission decal is affixed on the cylinder head cover. It describes important details for using the engine. Make sure to read before using the engine. Also, the emission decal describes details regarding the engine only.



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Structure protection Roll Over Protective Structure (ROPS)

Complies with ISO 12117-2 / ISO 10262 LEVEL 1

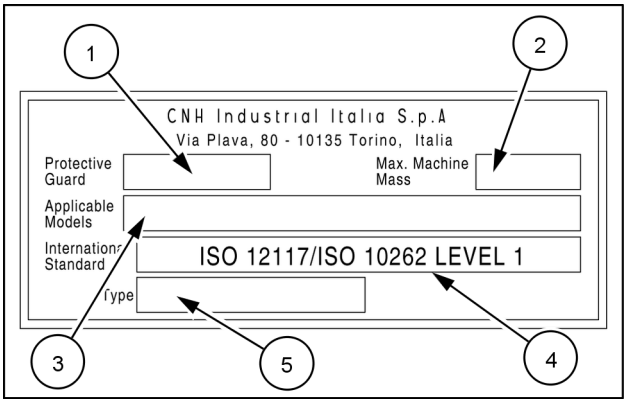
(1) Type of protective guard

(2) Maximum machine mass

(3) Applicable model

(4) International standard

(5) Type



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Component serial numbers

Hydraulic pump:

Swing reduction gear:

Travel reduction gears:

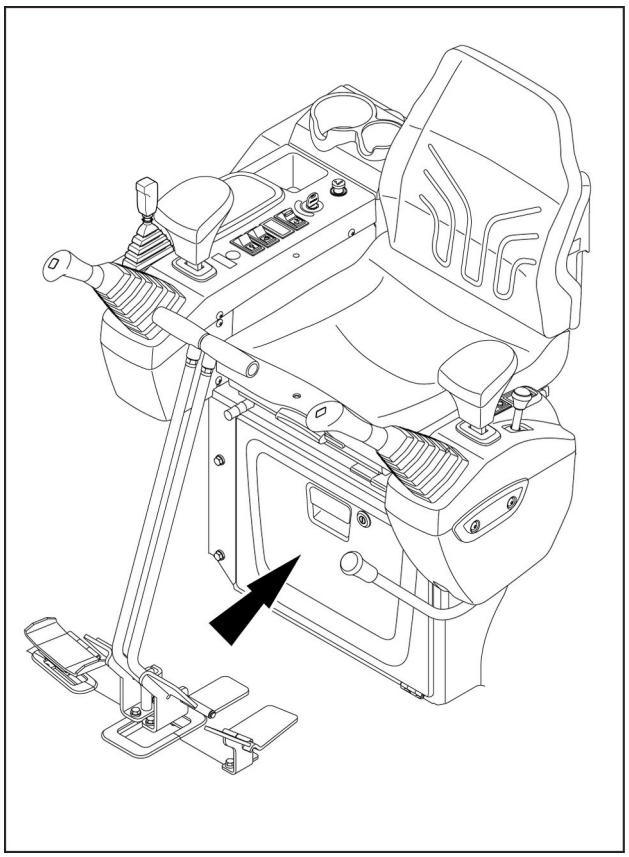
Travel control valve:

Attachment control valve:

Swing control valve:

Operator's manual storage on the machine

Always keep the manual in the location provided for that purpose (below the operator’s seat, in the storage compartment).
Make sure it is always complete and in good condition. If you wish to obtain extra copies, or copies in languages other than that of the country of use, consult your CASE CONSTRUCTION Dealer.



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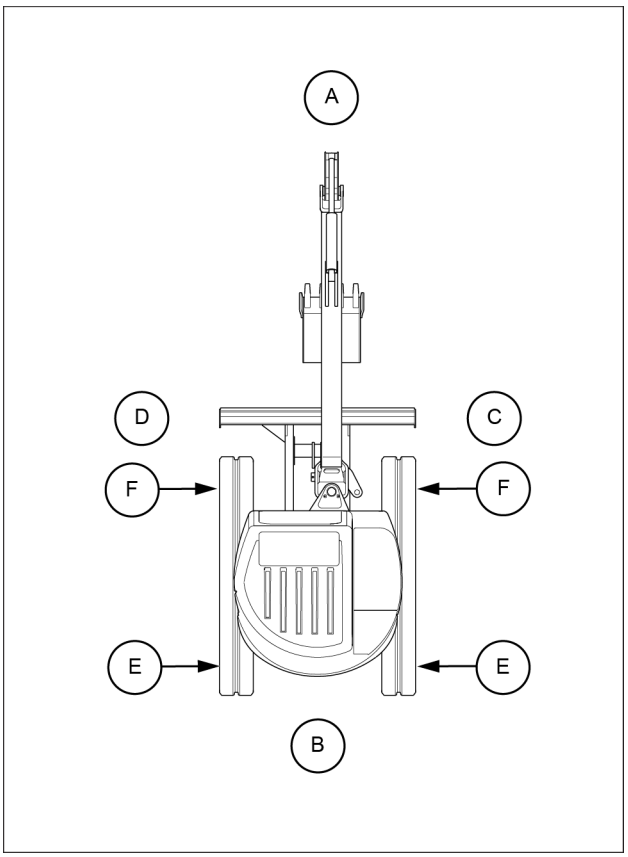
Machine orientation

The terms "Right-hand", "Left-hand", "Front" and "Rear" are used in this manual to indicate the sides as they are seen from the operator's seat when the travel motors are positioned at the rear and the operator is facing the direction in which the machine advances (forward).

A. Front
B. Rear
C. Right-hand side
D. Left-hand side
E. Travel motor
F. Idler wheel



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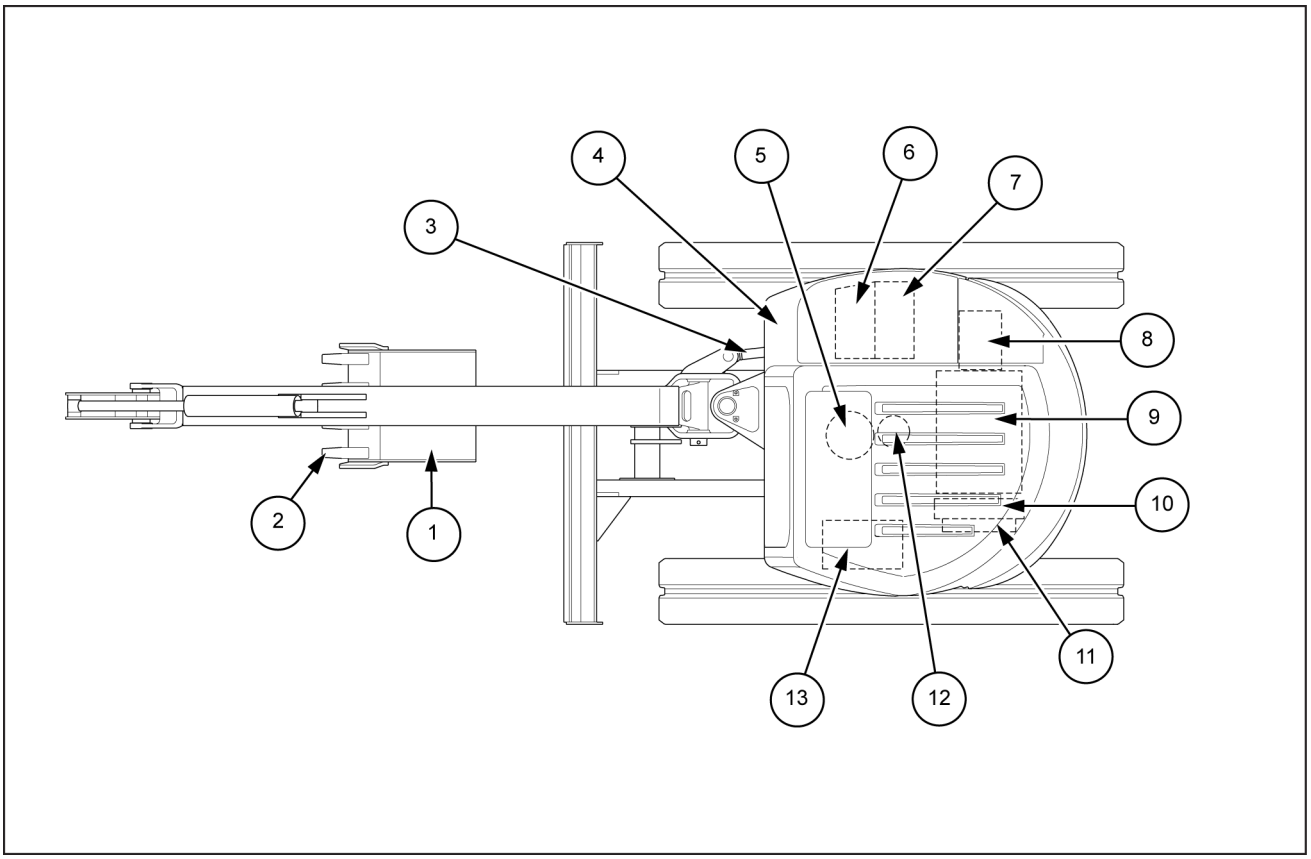
Machine components



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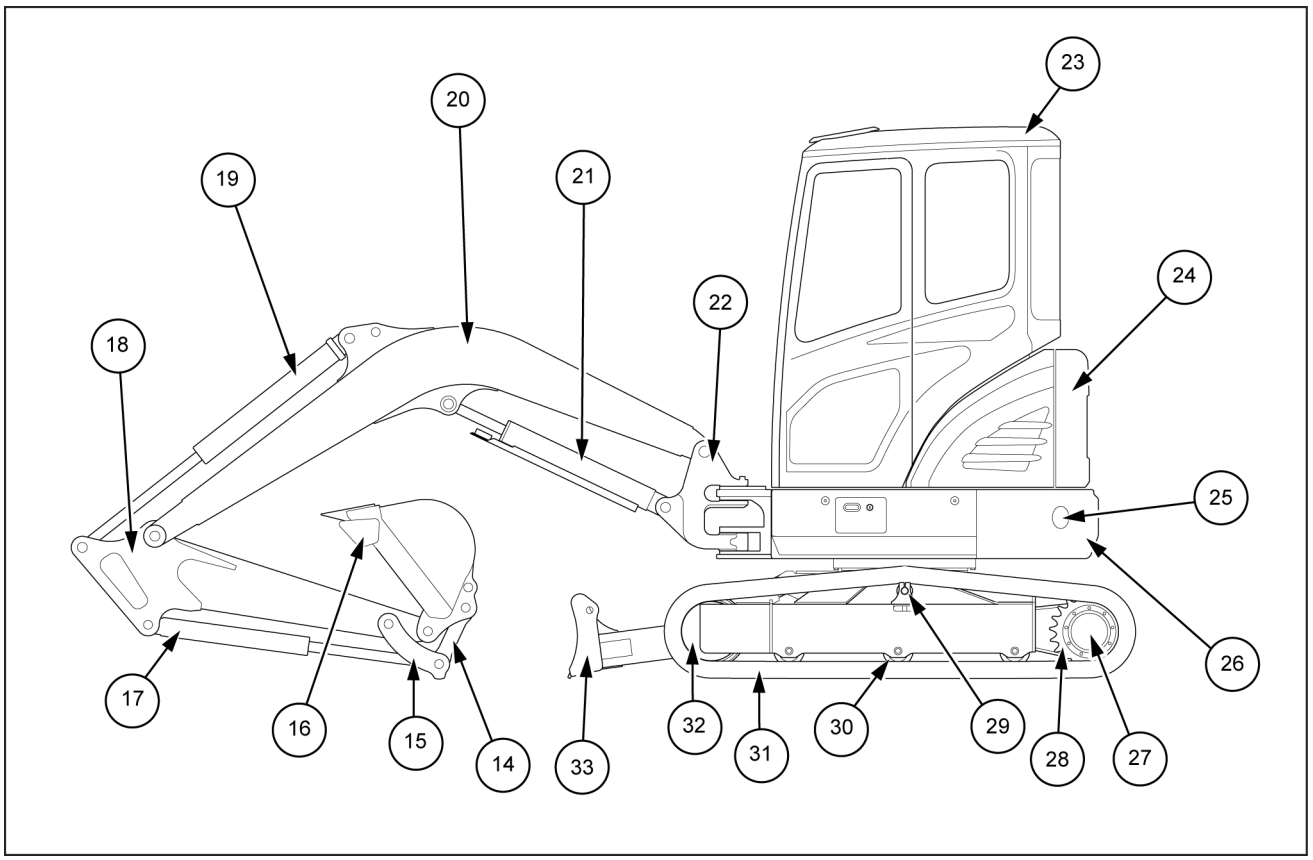
1. Bucket
2. Bucket tooth
3. Boom swing cylinder
4. Tool box
5. Swing motor
6. Fuel tank
7. Hydraulic oil tank
8. Main pump
9. Engine
10. Radiator
11. Oil cooler
12. Hydraulic central joint
13. Main control valve



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14. Bucket control rod
15. Bucket control link
16. Side cutter
17. Bucket cylinder
18. Dipper
19. Dipper cylinder
20. Boom
21. Boom cylinder
22. Swing post
23. Cab/Canopy
24. Muffler
25. Muffler pipe
26. Counterweight
27. Travel motor
28. Sprocket
29. Upper roller
30. Lower roller
31. Track
32. Idler wheel
33. Dozer blade

2 - SAFETY INFORMATION

Signal word definitions

Personal safety

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

⚠ DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

⚠ WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

⚠ CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: *Notice indicates a situation that, if not avoided, could result in machine or property damage.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: *Note indicates additional information that clarifies steps, procedures, or other information in this manual.*

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

Safety rules - Utility precautions

YOU MUST FOLLOW safety precautions when you work near buried utility lines.

During operation, it is likely that you will be working around or near buried utility lines that may include, but are not limited to:

- Electrical power line
- Gas line
- Water line
- Communication line - telephone or cable television
- Sewer line

NOTE: *Before construction work begins it is your responsibility to be aware of all utility lines in the area of your project and to avoid them.*

ALWAYS have all local utility companies mark the location of their lines.

In U.S.A. and Canada call one of many One Call System Director services. If you do not know the local number, call the national number (U.S.A. and Canada only): 1-888-258-0808. This number will direct you to the state or regional utility that assists with excavation activity.

NOTE: *Check with local authorities for laws, regulations, and/or strict penalties requiring you to locate and avoid existing utilities.*

Call all utility companies before you perform any machine operation

After you locate any buried utility lines, carefully dig a hole to the utility line by hand and/or with automatic vacuum equipment. Verify the location and depth of the line.

Where applicable, know the utility color code.

Electric	Red
Gas, Oil, or Petroleum	Yellow
Communication, Telephone, Television	Orange
Water	Blue
Sewer	Green or Brown
Proposed Excavation	White
Surveying	Pink
Reclaimed Water and Slurry	Purple

Coordinate all excavation activity with the proper authorities and professionals before beginning.

Safety rules

⚠ General safety rules ⚠

Use caution when you operate the machine on slopes. Raised equipment, full tanks and other loads will change the center of gravity of the machine. The machine can tip or roll over when near ditches and embankments or uneven surfaces.

Never permit anyone other than the operator to ride on the machine.

Never operate the machine under the influence of alcohol or drugs, or while you are otherwise impaired.

When digging or using ground-engaging attachments, be aware of buried cables. Contact local utilities to determine the locations of services.

Pay attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety.

Hydraulic oil or diesel fuel leaking under pressure can penetrate the skin, causing serious injury or infection.

- DO NOT use your hand to check for leaks. Use a piece of cardboard or paper.
- Stop the engine, remove the key, and relieve the pressure before you connect or disconnect fluid lines.
- Make sure that all components are in good condition. Tighten all connections before you start the engine or pressurize the system.
- If hydraulic fluid or diesel fuel penetrates the skin, seek medical attention immediately.
- Continuous long term contact with hydraulic fluid may cause skin cancer. Avoid long term contact and wash the skin promptly with soap and water.

Keep clear of moving parts. Loose clothing, jewelry, watches, long hair, and other loose or hanging items can become entangled in moving parts.

Wear protective equipment when appropriate.

DO NOT attempt to remove material from any part of the machine while it is being operated or while components are in motion.

Make sure that all guards and shields are in good condition and properly installed before you operate the machine. Never operate the machine with shields removed. Always close access doors or panels before you operate the machine.

Dirty or slippery steps, ladders, walkways, and platforms can cause falls. Make sure these surfaces remain clean and clear of debris.

A person or pet within the operating area of a machine can be struck or crushed by the machine or its equipment. DO NOT allow anyone to enter the work area.

Raised equipment and/or loads can fall unexpectedly and crush persons underneath. Never allow anyone to enter the area underneath raised equipment during operation.

Never operate the engine in enclosed spaces as harmful exhaust gases may build up.

Before you start the machine, be sure that all controls are in neutral or park lock position.

Start the engine only from the operator's seat. If you bypass the safety start switch, the engine can start with the transmission in gear. Do not connect or short across terminals on the starter solenoid. Attach jumper cables as described in the manual. Starting in gear may cause death or serious injury.

Always keep windows, mirrors, all lighting clean to provide the best possible visibility while you operate the machine.

Operate controls only when seated in the operator's seat, except for those controls expressly intended for use from other locations.

Before you leave the machine:

1. Park the machine on a firm, level surface.
2. Lower the attachment to the ground.
3. Put all controls in neutral position.
4. Place the gate lock lever in central position.
5. Turn off the engine and remove the key.

⚠ General maintenance safety ⚠

Keep the area used for servicing the machine clean and dry. Clean up spilled fluids.

Service the machine on a firm, level surface.

Install guards and shields after you service the machine.

Close all access doors and install all panels after servicing the machine.

Do not attempt to clean, lubricate, clear obstructions, or make adjustments to the machine while it is in motion or while the engine is running.

Always make sure that working area is clear of tools, parts, other persons and pets before you start operating the machine.

Unsupported hydraulic cylinders can lose pressure and drop the equipment, causing a crushing hazard. Do not leave equipment in a raised position while parked or during service, unless the equipment is securely supported.

Jack or lift the machine only at jack or lift points indicated in this manual.

Incorrect towing procedures can cause accidents. When you tow a disabled machine follow the procedure in this manual. Use only rigid tow bars.

Stop the engine, remove the key, and relieve pressure before you connect or disconnect fluid lines.

Stop the engine and remove the key before you connect or disconnect electrical connections.

Scalding can result from incorrect removal of coolant caps. Cooling systems operate under pressure. Hot coolant can spray out if you remove a cap while the system is hot. Allow the system to cool before you remove the cap. When you remove the cap, turn it slowly to allow pressure to escape before you completely remove the cap.

Replace damaged or worn tubes, hoses, electrical wiring, etc.

The engine, transmission, exhaust components, and hydraulic lines may become hot during operation. Take care when you service such components. Allow surfaces to cool before you handle or disconnect hot components. Wear protective equipment when appropriate.

When welding, follow the instructions in the manual. Always disconnect the battery before you weld on the machine. Always wash your hands after you handle battery components.

⚠ Fire and explosion prevention ⚠

Fuel or oil that is leaked or spilled on hot surfaces or electrical components can cause a fire.

Crop materials, trash, debris, bird nests, or flammable material can ignite on hot surfaces.

Always have a fire extinguisher on or near the machine.

Make sure that the fire extinguisher(s) is maintained and serviced according to the manufacturer's instructions.

At least once each day and at the end of the day, remove all trash and debris from the machine especially around hot components such as the engine, transmission, exhaust, battery, etc. More frequent cleaning of your machine may be necessary depending on the operating environment and conditions.

At least once each day, remove debris accumulation around moving components such as bearings, pulleys, belts, gears, cleaning fans, etc. More frequent cleaning of your machine may be necessary depending on the operating environment and conditions.

Inspect the electrical system for loose connections and frayed insulation. Repair or replace loose or damaged parts.

Do not store oily rags or other flammable material on the machine.

Do not weld or flame cut any items that contain flammable material. Clean items thoroughly with non-flammable solvents before welding or flame-cutting.

Do not expose the machine to flames, burning brush, or explosives.

Promptly investigate any unusual smells or odors that may occur during operation of the machine.

Before performing maintenance for electrical systems or electric welding, always place the key of the battery master switch in "O" (Off) position or disconnect the negative — terminal of the batteries, in order to cut off the electric circuit.

⚠ General battery safety ⚠

Always wear eye protection when you work with batteries.

Do not create sparks or have open flame near a battery.

Ventilate the area when you charge a battery or use a battery in an enclosed area.

Disconnect the negative — terminal first and reconnect the negative — terminal last.

When you weld on the machine, disconnect both terminals of the battery.

Do not weld, grind, or smoke near a battery.

When you use auxiliary batteries or connect jumper cables to start the engine, use the procedure shown in the operator's manual. Do not short across terminals.

Follow the manufacturer's instructions when you store and handle batteries.

Battery post, terminals, and related accessories contain lead and lead compounds. Wash hands after handling.

Battery acid causes burns. Batteries contain sulfuric acid. Avoid contact with skin, eyes, or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately.

Antidote (internal) : Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.

Keep out of reach of children and other unauthorized persons.

⚠ Seat belts ⚠

Seat belts must be worn at all times.

Seat belt inspection and maintenance:

- Keep seat belts in good condition.
- Keep sharp edges and items than can cause damage away from the belts.
- Periodically check belts, buckles, retractors, tethers, slack take-up system, and mounting bolts for damage and wear.
- Replace all parts that have damage or wear.
- Replace belts that have cuts that can make the belt weak.
- Check that bolts are tight on the seat bracket or mounting.
- If the belt is attached to the seat, make sure that the seat or seat brackets are mounted securely.
- Keep seat belts clean and dry.
- Clean belts only with soap solution and warm water.
- Do not use bleach or dye on the belts because this can make the belts weak.

⚠ Operator protective structure ⚠

Your machine is equipped with an operator protective structure, such as: a Roll Over Protective Structure (ROPS), Falling Objects Protective Structure (FOPS), or a cab with a ROPS. A ROPS may be a can frame or a two-posted or four-posted structure used for the protection of the operator to minimize the possibility of serious injury. The mounting structure and fasteners forming the mounting connection with the machine are part of the ROPS.

The protective structure is a special safety component of your machine.

DO NOT attach any device to the protective structure for pulling purposes. DO NOT drill holes to the protective structure.

The protective structure and interconnecting components are a certified system. Any damage, fire, corrosion, or modification will weaken the structure and reduce your protection. If this occurs, THE PROTECTIVE STRUCTURE MUST BE REPLACED so that it will provide the same protection as a new protective structure. Contact your dealer for protective structure inspection and replacement.

After an accident, fire, tip over, or roll over, the following MUST be performed by a qualified technician before returning the machine to field or job-site operations:

- The protective structure MUST BE REPLACED.
- The mounting or suspension for the protective structure, operator's seat and suspension, seat belts and mounting components, and wiring within the operator's protective system MUST be carefully inspected for damage.
- All damaged parts MUST BE REPLACED.

DO NOT WELD, DRILL HOLES, ATTEMPT TO STRAIGHTEN, OR REPAIR THE PROTECTIVE STRUCTURE. MODIFICATION IN ANY WAY CAN REDUCE THE STRUCTURAL INTEGRITY OF THE STRUCTURE, WHICH COULD CAUSE DEATH OR SERIOUS INJURY IN THE EVENT OF FIRE, TIP OVER, ROLL OVER, COLLISION, OR ACCIDENT.

Seat belts are part of your protective system and must be worn at all times. The operator must be held to the seat inside the frame in order for the protective system to work.

⚠ Air-conditioning system ⚠

The air-conditioning system is under high pressure. Do not disconnect any lines. The release of high pressure can cause serious injury.

The air-conditioning system contains gases that are harmful to the environment when released into the atmosphere. Do not attempt to service or repair the system.

Only trained service technicians can service, repair, or recharge the air-conditioning system.

⚠ Personal Protective Equipment (PPE) ⚠

Wear Personal Protective Equipment (PPE) such as hard hat, eye protection, heavy gloves, hearing protection, protective clothing, etc.

⚠ Do Not Operate tag ⚠

Before you start servicing the machine, attach a 'Do Not Operate' warning tag to the machine in an area that will be visible.

⚠ Hazardous chemicals ⚠

If you are exposed to or come in contact with hazardous chemicals you can be seriously injured. The fluids, lubricants, paints, adhesives, coolant, etc. required for the function of your machine can be hazardous. They may be attractive and harmful to domestic animals as well as humans.

Material Safety Data Sheets (MSDS) provide information about the chemical substances within a product, safe handling and storage procedures, first aid measures, and procedures to take in the event of a spill or accidental release. MSDS are available from your dealer.

Before you service your machine check the MSDS for each lubricant, fluid, etc. used in this machine. This information indicates the associated risks and will help you service the machine safely. Follow the information in the MSDS, and on manufacturer containers, as well as the information in this manual, when you service the machine.

Dispose of all fluids, filters, and containers in an environmentally safe manner according to local laws and regulations. Check with local environmental and recycling centers or your dealer for correct disposal information.

Store fluids and filters in accordance with local laws and regulations. Use only appropriate containers for the storage of chemicals or petrochemical substances.

Keep out of reach or children or other unauthorized persons.

Applied chemicals require additional precautions. Obtain complete information from the manufacturer or distributor of the chemicals before you use them.

⚠ Utility safety ⚠

When digging or using ground-engaging equipment, be aware of buried cables and other services. Contact your local utilities or authorities, as appropriate, to determine the locations of services.

Make sure that the machine has sufficient clearance to pass in all directions. Pay special attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety. Contact local authorities or utilities to obtain safe clearance distances from high voltage power lines.

Retract raised or extended components, if necessary. Remove or lower radio antennas or other accessories. Should a contact between the machine and an electric power source occur, the following precautions must be taken:

- Stop the machine movement immediately.
- Apply the parking brake, stop the engine, and remove the key.
- Check if you can safely leave the cab or your actual position without contact with electrical wires. If not, stay in your position and call for help. If you can leave your position without touching lines, jump clear of the machine to make sure that you do not make contact with the ground and the machine at the same time.
- Do not permit anyone to touch the machine until power has been shut off to the power lines.

⚠ Electrical storm safety ⚠

Do not operate machine during an electrical storm.

If you are on the ground during an electrical storm, stay away from machinery and equipment. Seek shelter in a permanent, protected structure.

If an electrical storm should strike during operation, remain in the cab. Do not leave the cab or operator's platform. Do not make contact with the ground or objects outside the machine.

⚠ Mounting and dismounting ⚠

Mount and dismount the machine only at designated locations that have hand-holds, steps, and/or or ladders.

Do not jump off of the machine.

Make sure that steps, ladders, and platforms remain clean and clear of debris and foreign substances. Injury may result from slippery surfaces.

Face the machine when you mount and dismount the machine.

Maintain a three-point contact with steps, ladders, and handholds.

Never mount or dismount from a moving machine.

Do not use the controls or accessories as hand-holds when you enter or exit the cab.

⚠ Working at heights ⚠

When the normal use and maintenance of the machine requires you to work at heights:

- Correctly use installed steps, ladders, and railings.
- Never use ladders, steps, or railings while the machine is moving.
- Do not stand on surfaces that are not designated as steps or platforms.

Do not use the machine as a lift, ladder, or platform for working at heights.

⚠ Lifting and overhead loads ⚠

Never use loader buckets, forks, etc. or other lifting, handling, or digging equipment to lift persons.

Do not use raised equipment as a work platform.

Know the full area of movement of the machine and equipment and do not enter or permit anyone to enter the area of movement while the machine is in operation.

Never enter or permit anyone to enter the area underneath raised equipment. Equipment and/or loads can fall unexpectedly and crush persons underneath it.

Do not leave equipment in raised position while parked or during service, unless securely supported. Hydraulic cylinders must be mechanically locked or supported if they are left in a raised position for service or access.

Loader buckets, forks, etc. or other lifting, handling, or digging equipment and its load will change the center of gravity of the machine. This can cause the machine to tip on slopes or uneven ground.

Load items can fall off the loader bucket or lifting equipment and crush the operator. Care must be taken when lifting a load. Use proper lifting equipment.

Do not lift load higher than necessary. Lower loads to transport. Remember to leave appropriate clearance to the ground and other obstacles.

Equipment and associated loads can block visibility and cause an accident. Do not operate with insufficient visibility.

⚠ Before using the machine⚠

- Avoid loose fitting clothing, loose or uncovered long hair, jewelry or any other items which could get caught up in machinery.
- Different types of job will require different types of protective equipment. Items such as hard hats, safety shoes, heavy gloves, reflector type jackets, respirators, ear protection and eye protection may be required. Before starting a job, determine what protective equipment will be necessary. Use this equipment at all times.
- Do not attempt to operate this machine unless you have first read and perfectly understood the safety messages and instructions appearing in this manual.
- Operating the machine requires full attention and care on the part of the operator. Get to know the machine's possibilities and limitations and the working space required. There are areas of poor visibility in the working range of the machine. Have someone guide you for all areas where visibility is not adequate.
- Grease, oil, mud or (in winter) ice on the steps and access handles can cause accidents. Make sure they are kept clean at all times.
- Every day, inspect the machine to detect any signs of hydraulic fluid leakage. Tighten the connections or replace any defective components as necessary.
- Remove any obstructions which hinder visibility. Keep the windshield, rear view mirror and windows clean at all times.
- Make sure the windshield wiper works correctly.
- Make sure you are familiar with hand signals in daily use on the work-site so as to be able to obtain help with tight maneuvers or when carrying out operations where visibility is poor.
- Before undertaking any travel or working operations during hours of darkness, make sure the lighting and signaling equipment is fully operative.
- Before any travel operation, make sure that the doors and hoods are properly latched.
- Check that no tools or other items have been left on the machine (be it on the undercarriage or the upperstructure) or in the operator's compartment.
- The operator must be alone on the machine at all times. Do not allow anyone to stand on or around the machine.
- To get in or out of the cab, it is imperative that the upperstructure frame is in line with the undercarriage.
- When exiting or getting into the operator's compartment, always face the machine and use the steps and access handles.

- Be sure you know the position and function of each control. Incorrect operation of the controls can cause serious injuries.
- Check all controls and safety devices in a safe, open area before starting work.
- Keep away from dangerous areas such as ditches, overhangs, rocky areas, etc. Make a survey of the work-site and determine the possible dangers before using the machine.
- Before parking the machine, make sure that the ground is stable. Plan the work-site so that the ground is flat, hard and level.
- Before moving the machine to work in a new area, walk around to determine all possible causes of accidents there. Holes, obstacles, debris, and other danger risks in the working area can cause serious injury.
- Be ready to meet emergencies. Always carry a first aid kit and if possible, fire extinguisher (not supplied) within easy reach on board. Make sure the fire extinguisher is regularly serviced in conformance with the manufacturer's instructions.
- Check the fastening of the main components: counterweight, swing bearing, and operator's compartment. In the event of problems, consult your CASE CONSTRUCTION Dealer.
- Make sure you understand the symbols used on the machine safety signs. Keep the signs clean so that they are completely legible at all times.

⚠ Operating the machine⚠

- When working on a public highway, use standard traffic signs and take into consideration the working range of the upperstructure and its attachments. Local or national regulations stipulate the number, type, and location of reflector strips.
- Avoid running the engine in a confined space. If there is no alternative, proper ventilation must be provided at all times.
- Do not allow anyone else on the machine. The passenger could fall or cause an accident.
- Never operate the working or travel controls unless you are properly seated in the operator’s seat with the seat belt correctly fastened.
- Before starting the engine, check the direction of travel (in forward drive, the reduction gears should be to the rear of the machine).
- Do not work near overhead high-voltage electric lines without checking beforehand that all necessary measures have been taken to respect the minimum distances:
  Less than 57000 volts: **3 m** (**9.8 ft**).
  More than 57000 volts: **5 m** (**16.4 ft**).
- Study the position of any existing pipelines or conduits before starting work. Electrical cables, gas and water pipes, and other underground installations can cause serious injury.
- Always make allowance for working conditions (sloping or rough ground), the site, and weather conditions when driving the machine.
- Do not allow anyone to stand in the machine working area. Accidental operation of the upperstructure swing control or of an attachment control could cause an accident. Stop all operations until everyone has moved away.
- Before operating the dozer blade (if equipped) make sure that there is no one in the working area of the dozer blade.
- Operate all controls gradually to ensure smooth machine operation.
- Whenever load handling operations are to be carried out, it is imperative to adhere strictly to the instructions given in this manual and local legislation.
- It is forbidden to use the machine to carry out tasks other than those for which it is intended. Never use the equipment for sweeping the ground to level out rubble or push objects (these actions cause transversal stress on the attachment).
- Stop the engine and remove the ignition key when the machine is not in use, even for short periods of time.
- Work out a means of convenient escape from the machine (emergency exit via the windshield or the rear window glass) in the event of the machine turning over or tipping over or the cab door being jammed.
- Make sure you are familiar with traffic regulations and special safety equipment requirements before transporting this machine on a public highway.
- When loading trucks, never swing the load over the truck cab.
- Before undertaking any travel on the job site, make sure the itinerary to be followed is safe. If bridges are to be crossed, make sure they are capable of supporting the weight of the machine.
- Always steer round large obstacles such as boulders, big trees, etc.

Quick coupler (optional)

- Every day, check that the locking bar functions correctly and that it is not fouled by foreign matter. Clean the locking system if necessary.
- If you must use the quick coupler with buckets not manufactured by CASE CONSTRUCTION, make sure the diameter of the pins and the width between the bucket lugs meet the dimensions needed to fit the quick coupler (pins, washers, bushings, etc.). Consult your CASE CONSTRUCTION Dealer.

- The working area of the end attachment that is mounted may interfere with the machine. Interference may be caused due to the type of end attachment or installation of parts such as a cab guard. Always maintain a safe margin of distance. (Be careful of tool swing or accidental operations.)
- To access or exit the operator's compartment, the left-hand control arm must be in the raised position. Never forget this basic requirement.
- Never leave the operator's compartment while the engine is running.
- To get in or out of the cab, it is imperative that the upperstructure frame is in line with the undercarriage.
- Dust, smoke, or mist can reduce visibility and cause an accident. Reduce speed or come to a complete halt until visibility has improved.
- Never jump down from the machine. When you exit the machine or the upperstructure, always face the machine and use the steps and access handles.
- In the event of an operating problem or failure, move the machine to a safe place, lower the attachment to the ground, shut down the engine, and remove the ignition key. Locate the problem, report it if necessary, and take the necessary steps to warn others not to attempt to operate the machine.
- Before tilting the seat back forward, it is mandatory to raise the armrests to avoid any accidental operation of the control levers.
- Never turn the key of the battery master switch to "O" (Off) position when engine is running. The electrical systems can be damaged.
- When the engine is stopped, always wait three minutes minimum before you place the key of the battery master switch in "O" (Off) position, otherwise the program of the machine controllers will not exit successfully.

⚠ Preventing risks caused by vibrations⚠

The machine's vibration affects the comfort and in some cases the health and safety of the operator. To reduce vibration risks to a minimum:

1. Make sure that the machine, the equipment, and the tool are suitable for the work to be carried out.
2. Make sure that the machine is in good condition and that servicing intervals are complied with.
3. Check the track tension adjustment and the play in equipment linkages.
4. Make sure that the operator's seat and adjustment controls are in good condition and then adjust the seat to suit the operator's size and weight.

During work:

1. Operate all controls gradually to ensure smooth machine operation.
2. Modify the machine's operation to suit the working conditions.
3. During travel, adjust the machine's speed, reducing it if necessary.
4. Make sure that the machine's operating radius is in good condition, and free of obstacles and holes.

⚠ Quick coupler (optional)⚠

- Never place the control switch in the unlocked position when the machine is working.
- Each time a bucket is installed on the quick coupler, close the bucket and raise the attachment so as to be able to make a visual check that the bucket pin is correctly engaged in the latching hook.
- The quick coupler modifies the working range of the machine. In certain attachment positions the tool may damage the machine. Always leave a safe distance between the quick coupler and the machine..
- Never carry out load handling using the front or rear anchoring points used to install the tool on the quick coupler.
- Never put your hands inside the quick coupler. Never attempt to adjust or repair the quick coupler if the engine is running.

⚠ Parking the machine⚠

When parking the machine, proceed as follows:

1. Position the machine on flat, level ground, away from soft ground, excavations, or poorly shored cavities.
2. Place the upper-structure and the attachment in line with the undercarriage, retract the attachment, and dig the bucket into the ground.
3. Lower the dozer blade (if equipped) until it rests on the ground.
4. Place the gate lock lever in central position before leaving the operator's compartment.
5. Stop the engine and remove the ignition key.
6. Lock the cab door.
7. Make sure that the hoods and doors are properly latched.

8. Check that no part of the machine is encroaching on the highway. If this cannot be avoided, install the necessary regulation signaling equipment.

⚠ Maintenance and adjustments⚠

- Do not try to service this machine unless you have first read and understood the safety messages and instructions featuring in this manual.
- When carrying out service work always wear suitable attire. Avoid loose-fitting clothing.
- Release pressure completely in the hydraulic system before disconnecting the hydraulic lines. Hydraulic oil escaping under pressure can cause serious injury.
- Before doing maintenance work on the machine, shut down the engine and allow it to cool down. Otherwise, you could be burned.
- Before commencing any work on the machine, place a "Do not operate" tag on the right-hand control arm.
- Always wear eye protection when using a tool that might project metal particles. Use a hammer with a soft face, such as copper, for installing pins.
- Poorly carried out maintenance or adjustments can cause serious injuries. If you do not understand a servicing or adjustment procedure, consult your CASE CONSTRUCTION Dealer.
- If the attachment is raised or if the machine moves without an operator, serious injury can result. Before carrying out maintenance on this machine, proceed as follows:
  Park the machine on flat, level ground.
  Lower the attachment until it is resting on the ground.
  Lower the dozer blade (if equipped) until it rests on the ground.
  Stop the engine and remove the ignition key.
  Lock the tracks to prevent any machine movement.
- Any unauthorized modifications made to this machine can cause serious injury. Do not undertake any modifications without first consulting your CASE CONSTRUCTION Dealer. Any modifications made must be in conformity with the technical specifications of the machine and any current safety legislation requirements.
- Certain components of the machine are subject to type approval. When replacing such components, it is mandatory to make sure that they conform to regulations. Use only genuine CASE CONSTRUCTION parts.
- Pressurized hydraulic fluid or grease that penetrates the skin can cause serious injury. Take the necessary safety precautions (safety clothing and protection for face and hands) to avoid such risks. Also, before using these products, read the manufacturer's instructions concerning their use. If hydraulic fluid penetrates the skin, call a doctor immediately.
- Coolant solution is toxic.
  Avoid contact with skin, eyes, and clothing.
  Antidote:
  External: rinse thoroughly with water and remove soiled clothes.
  Internal: do not induce vomiting. Rinse the mouth out with water. Seek medical advice.
  Eyes: rinse thoroughly with water and seek medical advice.
- The pressure in the track tension cylinders is high. Follow the procedure described in this manual carefully for increasing or reducing track tension.
- When carrying out a welding operation on the undercarriage or upper-structure carriage as authorized by CASE CONSTRUCTION and in accordance with the instructions, disconnect the batteries, disconnect the alternator B+ and D+ terminal wires, and connect the welding apparatus ground cable to the component on which the welding operation is to be performed. Never connect the welding apparatus to the undercarriage when welding on the upper-structure (or vice-versa). Never connect the welding apparatus ground to a component of the hydraulic system.
- When using compressed air, take the necessary precautions to protect your face.
- Clean the machine regularly. Accumulations of grease, dirt, and debris can cause injuries or damage the machine.
- Periodically inspect the fastening of the main components, as part of the machine maintenance program: counterweight, swing bearing, and operator's compartment. In the event of problems, consult your CASE CONSTRUCTION Dealer.
- If the accumulator is not functioning correctly, consult your CASE CONSTRUCTION Dealer. Never try to carry out any servicing operation on the accumulator. If this instruction is not followed serious injury can result.
- The accumulator is charged with nitrogen under high pressure. Do not weld or allow flames to come near to the accumulator.
- There is high pressure fuel in the feed line when the engine is running and immediately after it has been shut down. Wait for two minutes after engine shut down before you do any maintenance or inspections to allow the pressure to drop in the line.
- High-voltage is charged to the controller and/or to the injector while the engine is running and immediately after it has been shut down.
  Do not touch the controller or the injector.
  If it is necessary to touch them for maintenance purposes, consult your CASE CONSTRUCTION Dealer.

⚠ Using an Implement other than a bucket⚠

- When using a special implement (hydraulic breaker, cutter crusher etc.), refer to the operator's manual provided with the implement.

⚠ Implement operation and maintenance ⚠

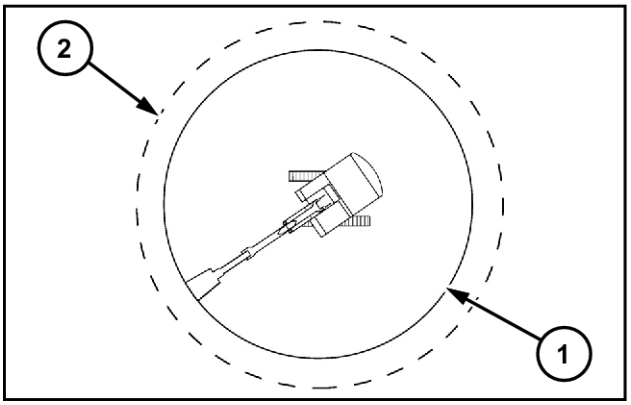
- For the implement operation and maintenance, refer to the operator's manual provided with the implement.

⚠ Safety area ⚠

The safety area is the space necessary for the machine to operate at the maximum range of the tool and at full swing **360 °** plus **2 m** (**6.56 ft**).

(1) Working area.

(2) Safety area.



SMIL13CEX2517AB 1

Ecology and environment

Soil, air, and water quality is important for all industries and life in general. When legislation does not yet rule the treatment of some of the substances that advanced technology requires, sound judgment should govern the use and disposal of products of a chemical and petrochemical nature.

Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation. Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these substances on man and nature and how to safely store, use, and dispose of these substances. Your CASE CONSTRUCTION dealer can also provide assistance.

Helpful hints

- Avoid the use of cans or other inappropriate pressurized fuel delivery systems to fill tanks. Such delivery systems may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of these products contain substances that may be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
- Avoid spillage when you drain fluids such as used engine coolant mixtures, engine oil, hydraulic fluid, brake fluid, etc. Do not mix drained brake fluids or fuels with lubricants. Store all drained fluids safely until you can dispose of the fluids in a proper way that complies with all local legislation and available resources.
- Do not allow coolant mixtures to get into the soil. Collect and dispose of coolant mixtures properly.
- Do not open the air-conditioning system yourself. It contains gases that should not be released into the atmosphere. Your CASE CONSTRUCTION dealer or air-conditioning specialist has a special extractor for this purpose and can recharge the system properly.
- Repair any leaks or defects in the engine cooling system or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.

Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways. CASE CONSTRUCTION strongly recommends that you return all used batteries to a CASE CONSTRUCTION dealer, who will dispose of the used batteries or recycle the used batteries properly. In some countries, this is a legal requirement.

NHIL14GEN0038AA 1

Mandatory battery recycling

NOTE: *The following requirements are mandatory in Brazil.*

Batteries are made of lead plates and a sulfuric acid solution. Because batteries contain heavy metals such as lead, CONAMA Resolution 401/2008 requires you to return all used batteries to the battery dealer when you replace any batteries. Do not dispose of batteries in your household garbage.

Points of sale are obliged to:

- Accept the return of your used batteries
- Store the returned batteries in a suitable location
- Send the returned batteries to the battery manufacturer for recycling

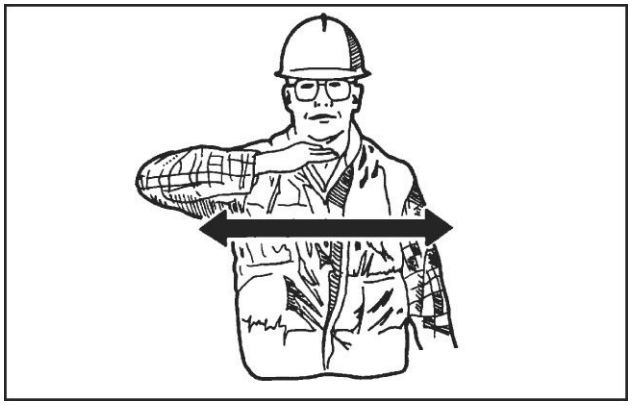
Hand signals

When operating the machine, always work with a signalman when you carry out tasks that require fine control and/or require you to work in areas with poor or impaired visibility. Make sure that you and the signalman understand the signals to be used.

Start the engine

PDE0002ATBP1 1

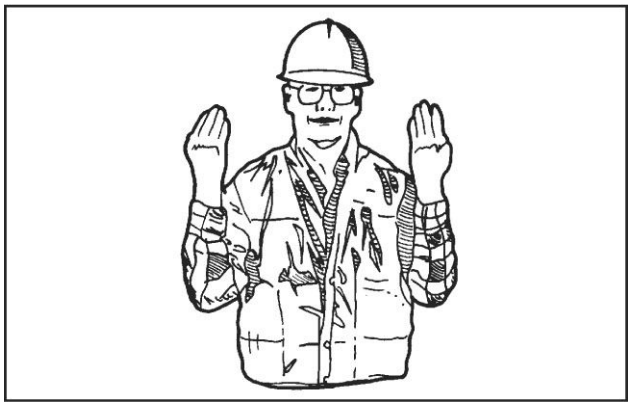
Shut down the engine



PDE0002TBP1 2

Come to me

Wave hands back and forth (palms inwards).



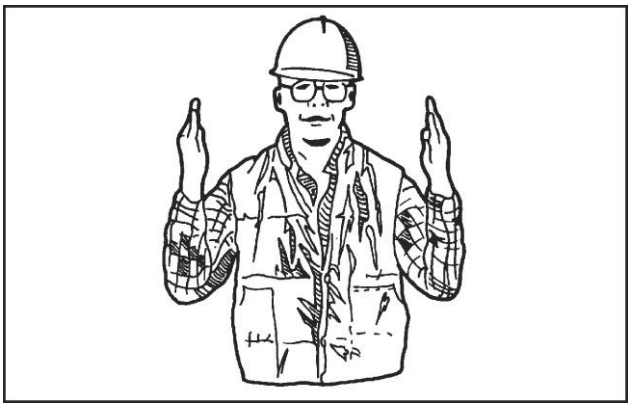
PDE0003ATBP1 3

Move away from me

Wave hands back and forth (palms outwards).

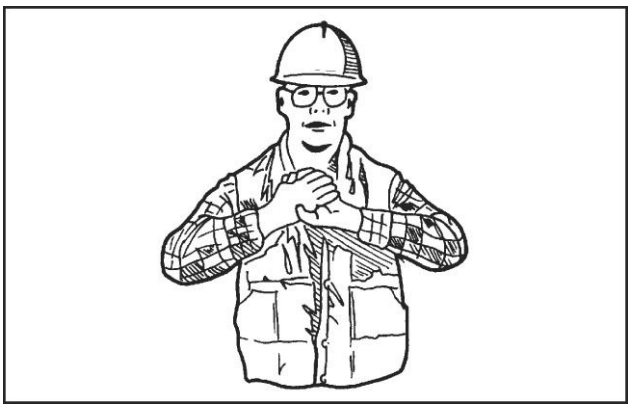
PDE0003TBP1 4

Go this far



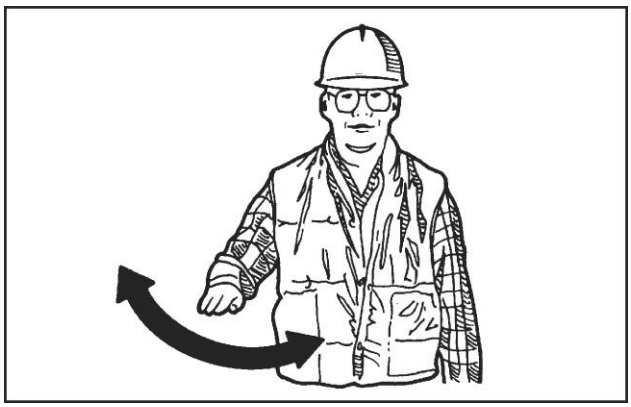
PDE0004ATBP1 5

All stop and hold



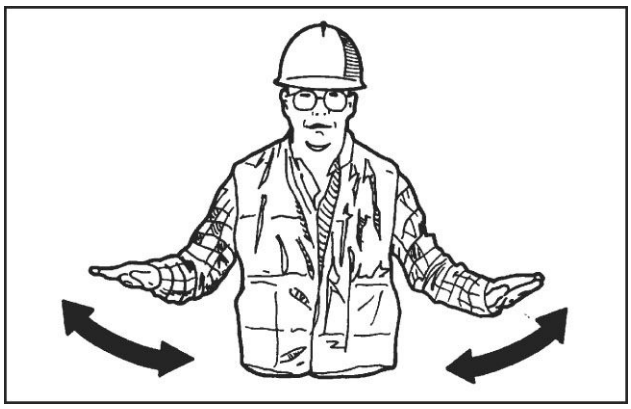
PDE0004TBP1 6

Stop
Wave one hand back and forth.



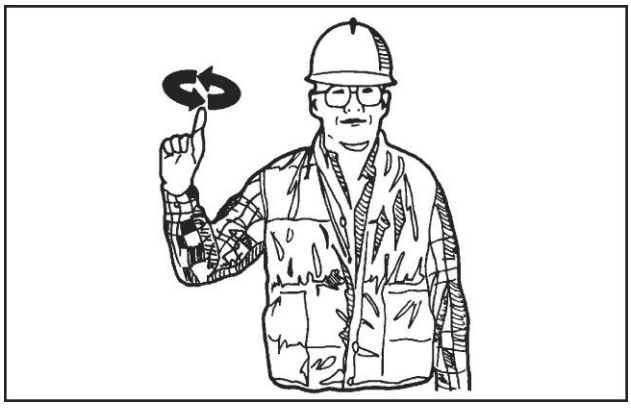
PDE0005ATBP1 7

Emergency stop
Wave hands back and forth.



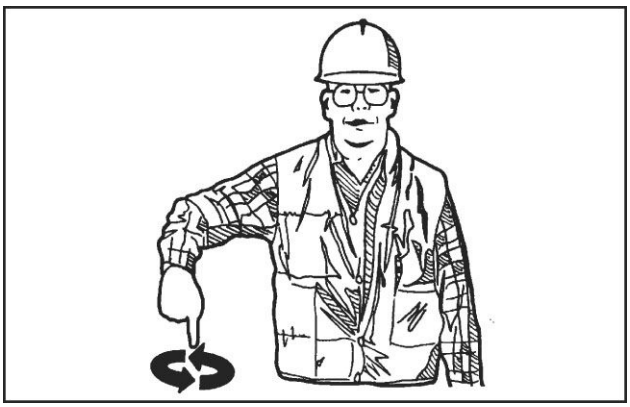
PDE0005TBP1 8

Raise load or tool



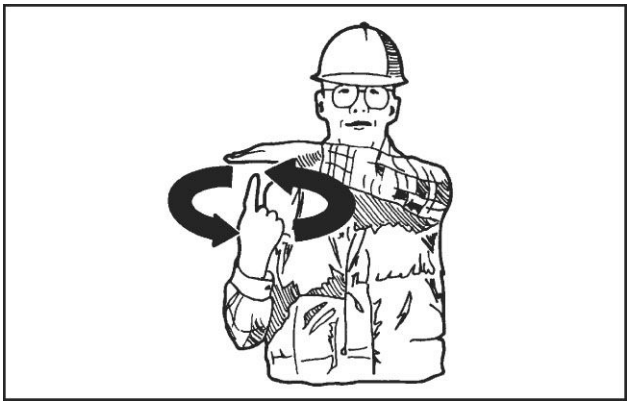
PDE0006ATBP1 9

Lower load or tool



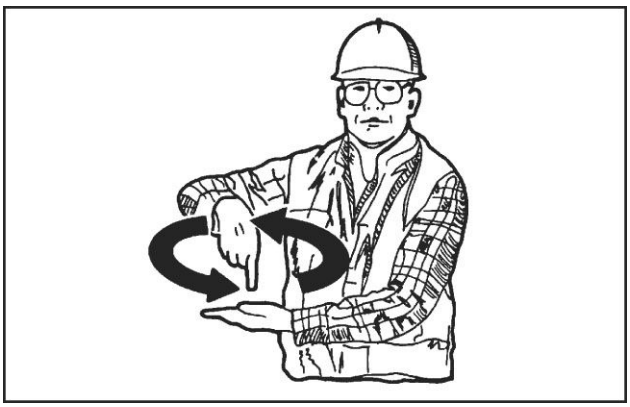
PDE0006TBP1 10

Slowly raise the load or tool



PDE0007ATBP1 11

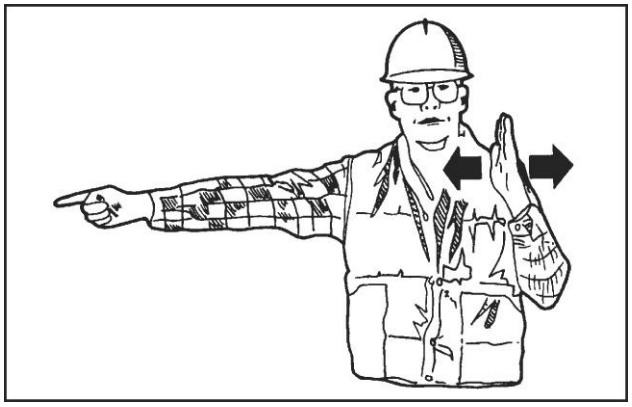
Slowly lower the load or tool



PDE0007TBP1 12

Turn machine left (swing load left)

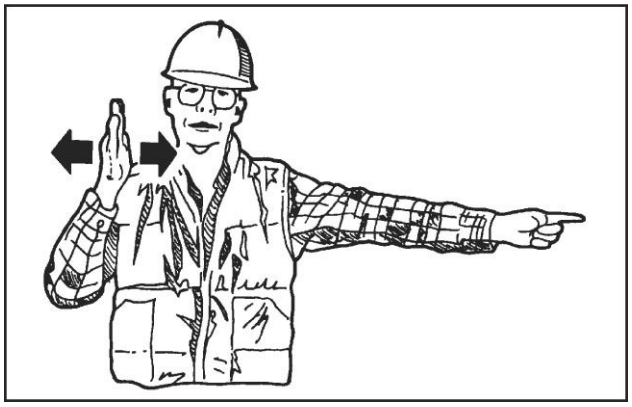
To stop movement, stop moving hand and clench fist.



PDE0008ATBP1 13

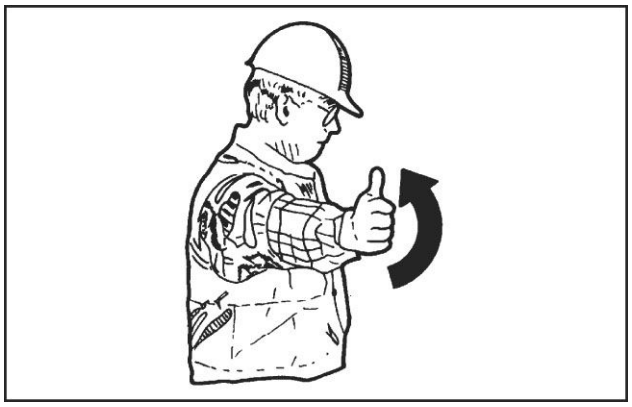
Turn machine right (swing load right)

To stop movement, stop moving hand and clench fist.



PDE0008TBP1 14

Raise tool

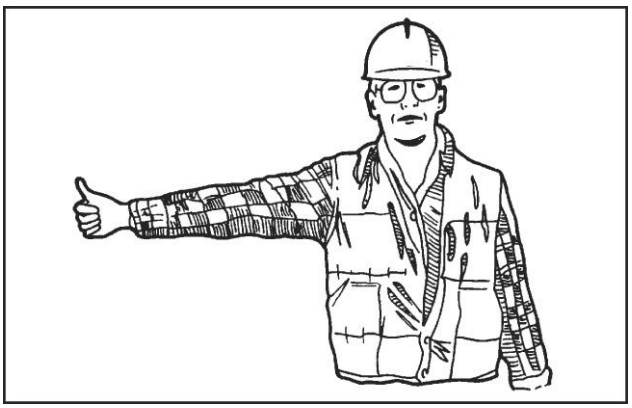


PDE0009ATBP1 15

Lower tool

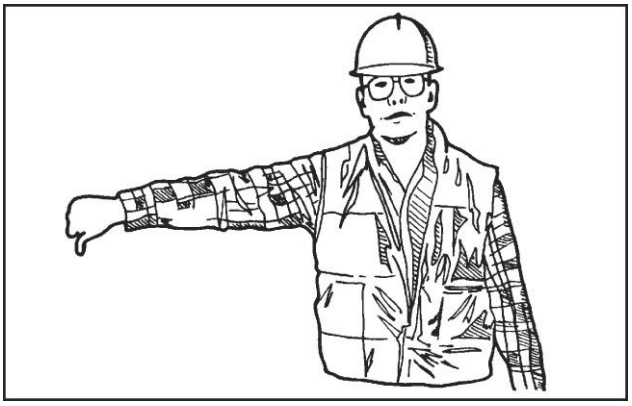
PDE0009TBP1 16

Lift boom



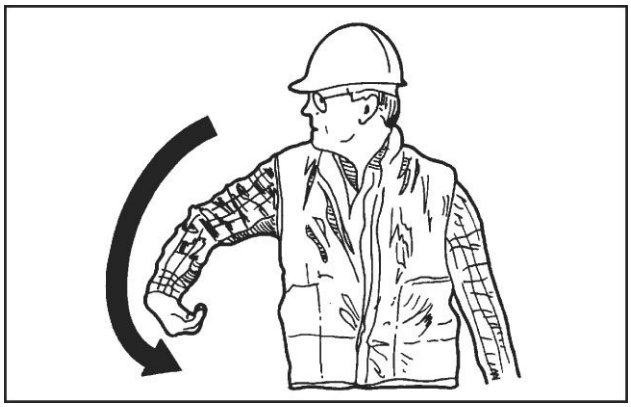
PDE0010ATBP1 17

Lower boom



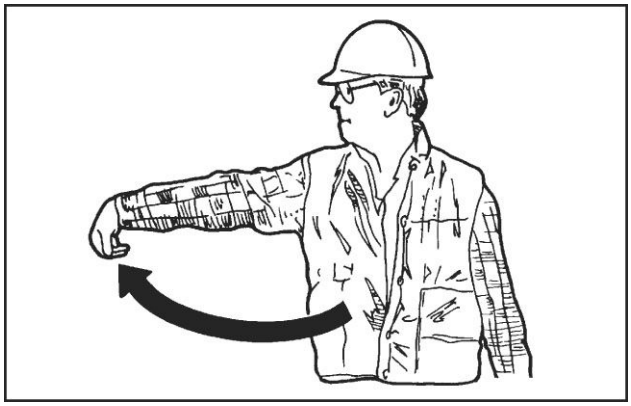
PDE0010TBP1 18

Retract dipper



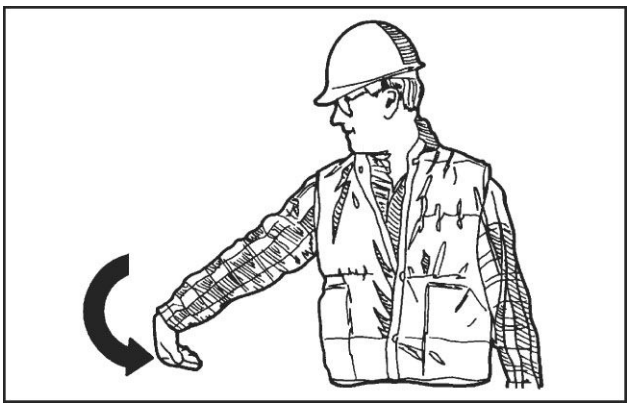
PDE0011ATBP1 19

Extend dipper



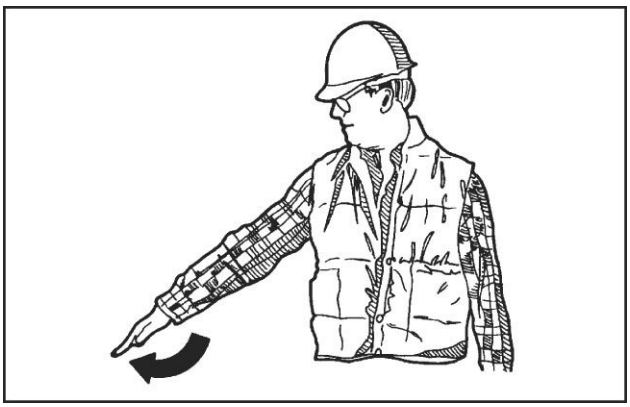
PDE0011TBP1 20

Fill tool



PDE0012ATBP1 21

Empty tool



PDE0012TBP1 22

California proposition 65 warning

CALIFORNIA
PROPOSITION 65 WARNING
Diesel engine exhaust and some of its constituents
are known to the State of California to cause cancer,
birth defects and other reproductive harm.
Battery post, terminals and related accessories
contain lead and lead compounds.
Wash hands after handling

Safety signs

⚠ WARNING

Avoid injury!
An illegible or missing decal can have far-reaching consequences. Inspect decals daily.
Failure to comply could result in death or serious injury.

W0228A

⚠ WARNING

Avoid injury!
Make sure decals are perfectly legible. Clean decals regularly. Replace all damaged, missing, painted over, or illegible decals. See your dealer for replacement decals. When replacing parts bearing decals, be sure to put new decals on each new part.
Failure to comply could result in death or serious injury.

W0229A

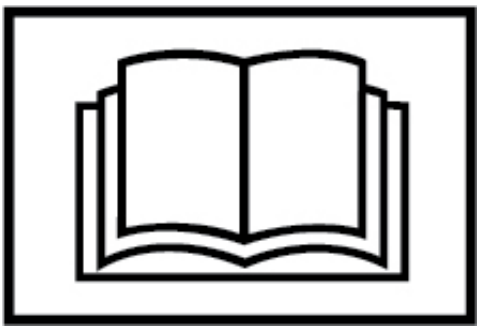
The following safety signs are on your machine as a guide for your safety and for the safety of those working with you. Walk around the machine and note the content and the location of all safety signs before you operate your machine.

Keep all safety signs clean and legible. Clean safety signs with a soft cloth, water, and gentle detergent.

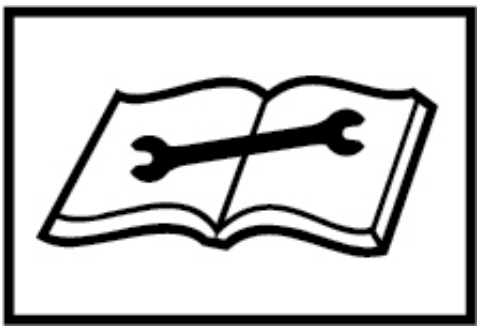
NOTICE: *do not use solvent, gasoline, or other harsh chemicals. Solvents, gasoline, and other harsh chemicals may damage or remove safety signs.*

Replace all safety signs that are damaged, missing, painted over, or illegible. If a safety sign is on a part you or your CASE CONSTRUCTION dealer replaces, make sure that you or your CASE CONSTRUCTION dealer install the safety sign on the new part. See your CASE CONSTRUCTION dealer for replacement safety signs.

Safety signs that display the "Read operator's manual" symbol direct you to the operator's manual for further information regarding maintenance, adjustments, or procedures for particular areas of the machine. When a safety sign displays this symbol, consult the appropriate page of the operator's manual.

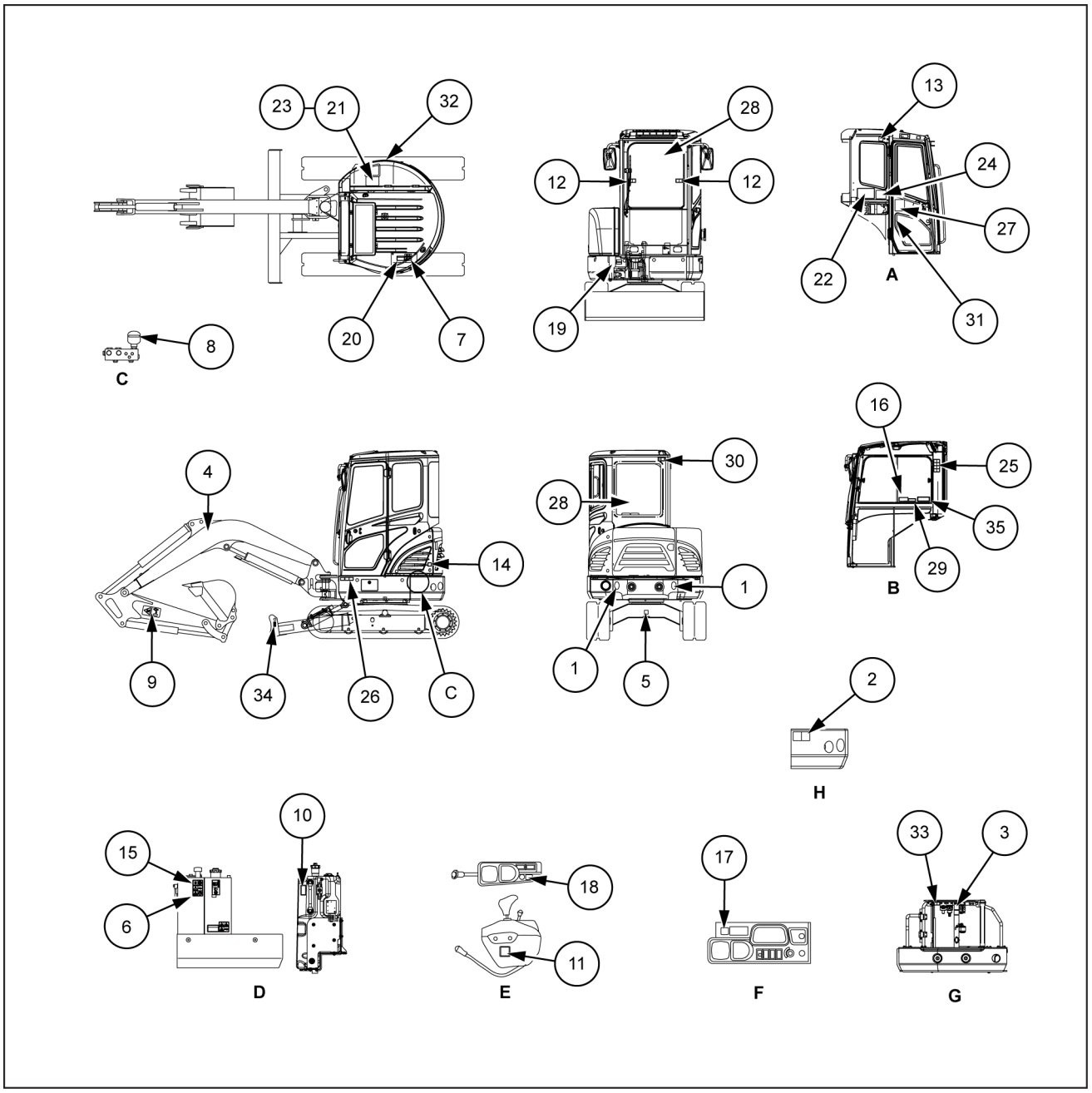


Safety signs that display the "Read service manual" symbol direct you to the service manual. If you doubt your ability to perform service operations, contact your CASE CONSTRUCTION dealer.



Signs positions

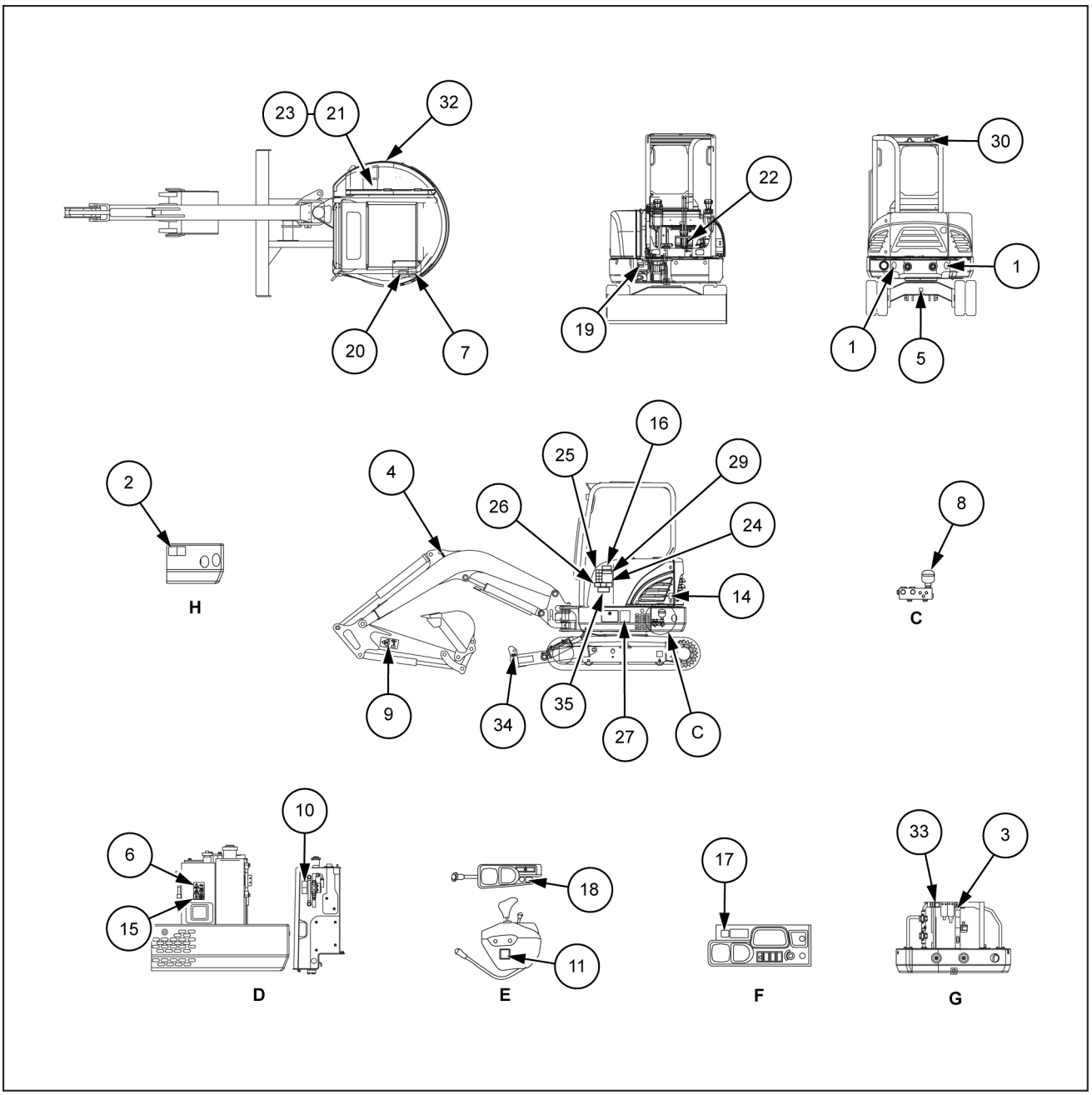
When you replace a safety sign or other machine sign, make sure you position it as shown below.



SMIL16MEX1242GB 1

Cab version

A. Cab inside - Left-hand
B. Cab inside - Right-hand
C. Accumulator of the solenoid valve
D. Hydraulic tank and fuel tank
E. Console box - Left-hand
F. Console box - Right-hand
G. Engine access door support
H. Counterweight



SMIL16MEX1243GB 2

Canopy version

A. Canopy inside - Left-hand
B. Canopy inside - Right-hand
C. Accumulator of the solenoid valve
D. Hydraulic tank and fuel tank
E. Console box - Left-hand
F. Console box - Right-hand
G. Engine access door support
H. Counterweight

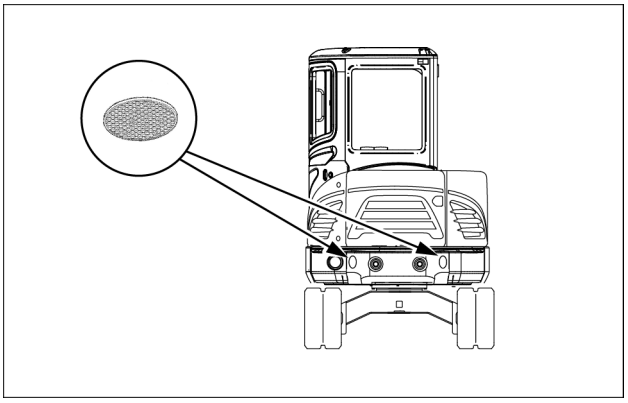
(1) Reflecting sign

Location: the two reflecting signs are located in the rear side of the machine, on the counterweight.

Quantity: 2

Part number: 48019078

The reflecting sign increases the night-time visibility.



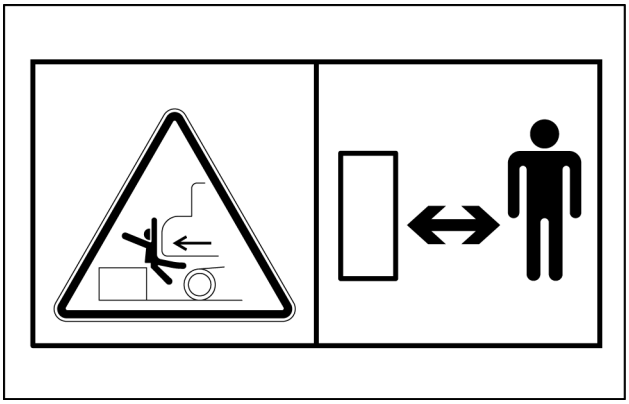
SMIL16MEX0359AA 3

(2) Keep out of work range of upper structure

⚠ DANGER

Avoid injury!
Keep clear of the swing area. Ensure that any person near the working site is outside the swing area before you start or operate the machine. Sound the horn before you start or operate the machine.
Failure to comply will result in death or serious injury.

D0123A



SMIL16MEX0004AA 4

Location: this signs is located on the counterweight.

Quantity: 2

Part number: 48018117

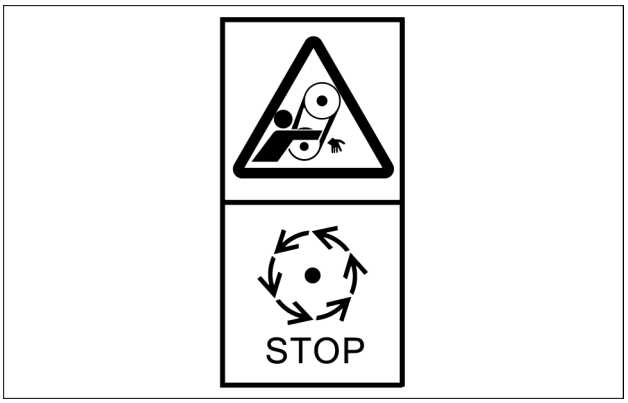
This sign cautions the operator that entry into the work range of the upper structure is forbidden while the engine is running.

(3A) Engine access door support caution - Stop the engine

⚠ WARNING

Entanglement hazard!
Always stop the engine and engage the parking brake, unless otherwise instructed in this manual, before checking and/or adjusting any drive belt or chain.
Failure to comply could result in death or serious injury.

W0097A



SMIL16MEX0013AA 5

Location: this sign is located on the engine access door support.

Quantity: 1

Part number: 48018179

This sign indicates that you should stop the engine before opening the access door.

(3B) Engine access door support caution - High pressure hoses and radiator

⚠ WARNING

Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

⚠ WARNING

Pressurized system!
Never attempt to drain fluids or remove filters when the engine is running. Turn off the engine and relieve all pressure from pressurized systems before servicing the machine.
Failure to comply could result in death or serious injury.

W0905A

⚠ CAUTION

Escaping fluid!
Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: Relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately.
Failure to comply could result in minor or moderate injury.

C0104A

SMIL16MEX1544BA 6

Location: this signs is located on the engine access door support.

Quantity: 1

Part number: 48018179

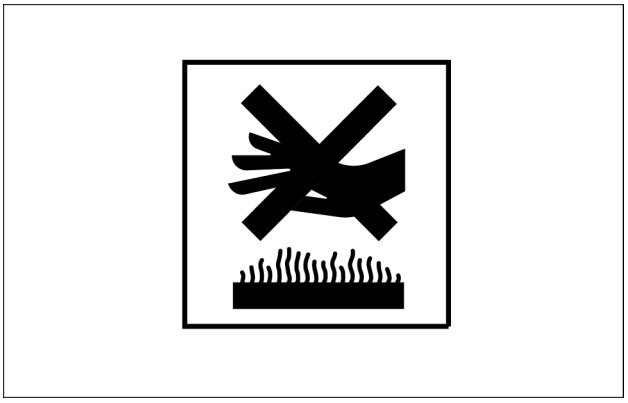
This sign warns you not to loosen the high pressure hoses, not to touch the radiator, and not to remove the radiator cap before the temperature of the cooling system drops.
Start working after the cooling system is sufficiently cooled down.

(3C) Engine access door support caution - Hot surfaces

⚠ WARNING

Burn hazard!
Exhaust surfaces are hot! Always wear protective gloves when cleaning or working on the muffler, catalytic converter, or exhaust stack.
Failure to comply could result in death or serious injury.

W0329A



SMIL16MEX0361AA 7

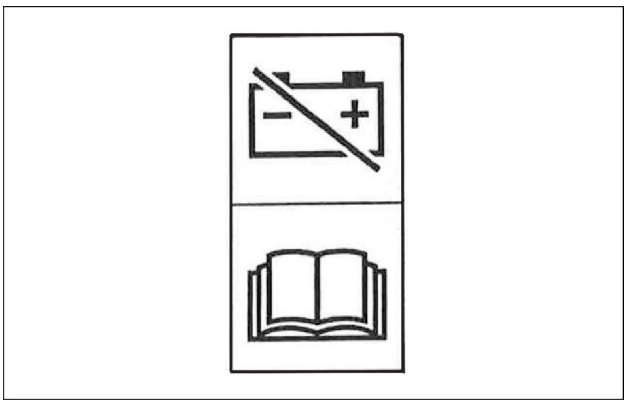
Location: this sign is located on the engine access door support.

Quantity: 1

Part number: 48018179

This sign warns to never touch the engine or the muffler when they are still hot.

(3D) Engine compartment - battery disconnect switch



SMIL16MEX0942AA 8

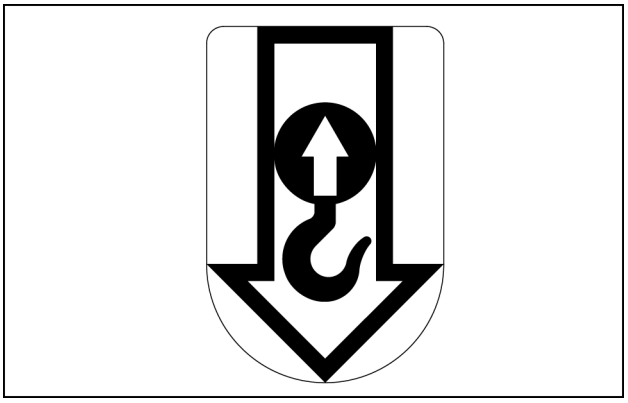
Location: this sign is located on the engine access door support.

Quantity: 1

Part number: 47617316

This sign warns to read the operator's manual before disconnect the battery.

(4) Lifting location



SMIL15CEX0450AA 9

Location: these signs are located on the boom.

Quantity: 2

Part number: 48019079

This sign shows the location where a sling is attached to handle the excavator.

Never use any location other than the lifting location that this sign shows.

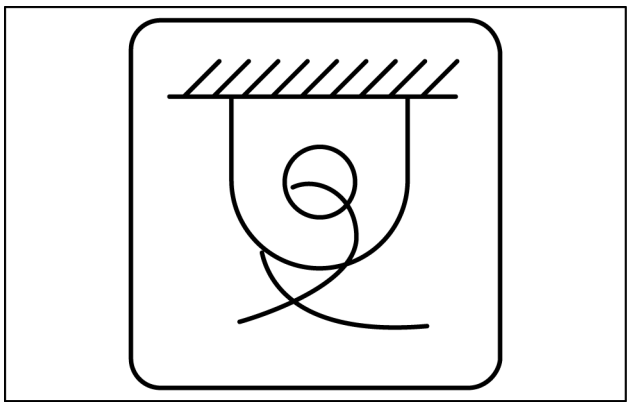
(5) Lashing point sign

Location: these signs are located on the under-carriage.

Quantity: 3

Part number: 48019081

This sign shows the coupling location when the machine has to be transported on a trailer.



SMIL16MEX0007AA 10

(6) Hydraulic oil

⚠ WARNING

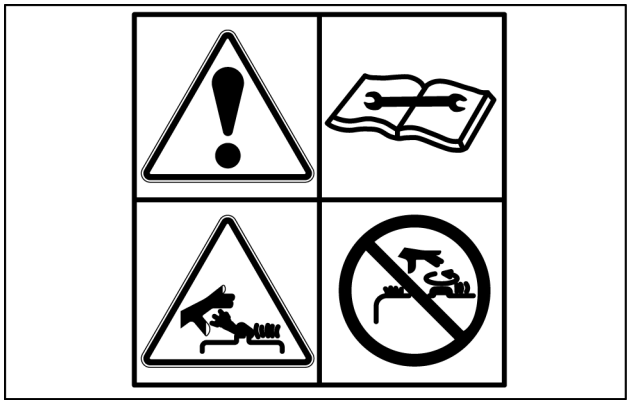
Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

⚠ WARNING

Pressurized system!
Never attempt to drain fluids or remove filters when the engine is running. Turn off the engine and relieve all pressure from pressurized systems before servicing the machine.
Failure to comply could result in death or serious injury.

W0905A



SMIL16MEX0008AA 11

Location: this sign is located on the right-hand side of the air breather.

Quantity: 1

Part number: 48018186

This sign warns you not to open the filler cap while engine running or at high hydraulic oil temperature.
This sign warns you to loosen the cap slowly and release the internal pressure completely.
This sign warns you not to mix with different brand oils.

(7) Batteries

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.
Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0111A

⚠ WARNING

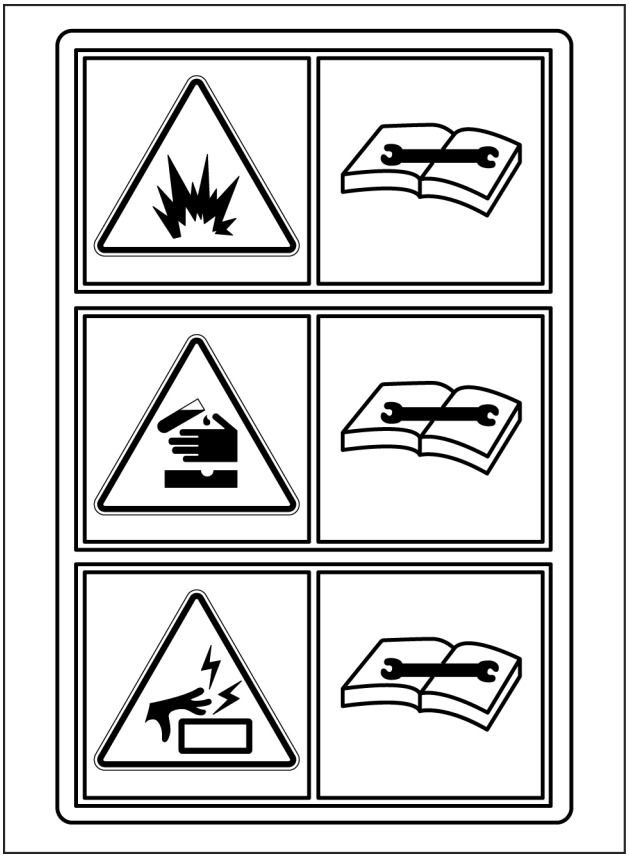
Explosive gas!
Batteries emit explosive hydrogen gas and other fumes while charging. Ventilate the charging area. Keep the battery away from sparks, open flames, and other ignition sources. Never charge a frozen battery.
Failure to comply could result in death or serious injury.

W0005A

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Before working on any component(s) of the electrical circuit, put the ignition key in the off (shut down) position. When disconnecting batteries, always disconnect the negative (-) cable first. When reconnecting batteries, always connect the negative (-) cable last.
Failure to comply could result in death or serious injury.

W0943A



48018188 12

Location: this sign is located on the battery cover.

Quantity: 1

Part number: 48018188

This sign shows that it is necessary to consult this manual before handling the batteries.

(8) Accumulator

⚠ WARNING

Pressurized system!
Do not drop the accumulator. A charged accumulator contains nitrogen compressed to 31 bar (450 psi). If the charging valve breaks away from the accumulator, the escaping nitrogen will propel the accumulator at a dangerous rate of speed.
Failure to comply could result in death or serious injury.

W0957A

⚠ WARNING

Pressurized system!
Do not expose the accumulator to temperatures above 49 °C (120 °F). A charged accumulator contains nitrogen compressed to 31 bar (450 psi). High heat will cause the safety plug to blow out of the accumulator, and the escaping nitrogen will propel the accumulator at a dangerous rate of speed.
Failure to comply could result in death or serious injury.

W0958A

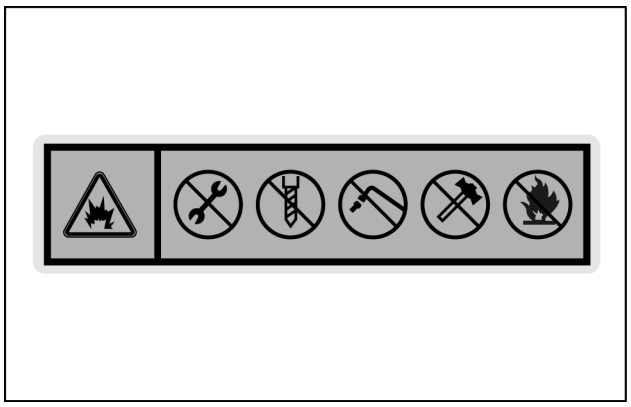
Location: this sign is located on the accumulator of the solenoid valve.

Quantity: 1

Part number: 48019423

This sign warns that accumulator is filled with high pressure gas so that near-by fire activity or welding is prohibited.

Consult the CASE CONSTRUCTION Dealer for the service.



SMIL16MEX0018AA 13

(9) Keep out of work range of attachment

⚠ WARNING

Falling object hazard!
Loss of hydraulic pressure or movement of a control can cause raised equipment to fall. Never work under an implement or attachment supported only by the hydraulic system. Always use suitable equipment to support an implement or attachment that must be serviced in a raised position.
Failure to comply could result in death or serious injury.

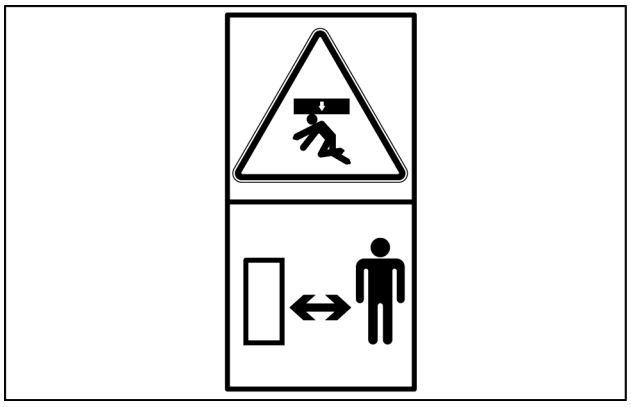
W0325A

Location: these signs are located on both sides of the boom.

Quantity: 2

Part number: 48018196

This sign warns the operator that entry into the work range of the attachment is forbidden while the engine is running.



SMIL16MEX0003AA 14

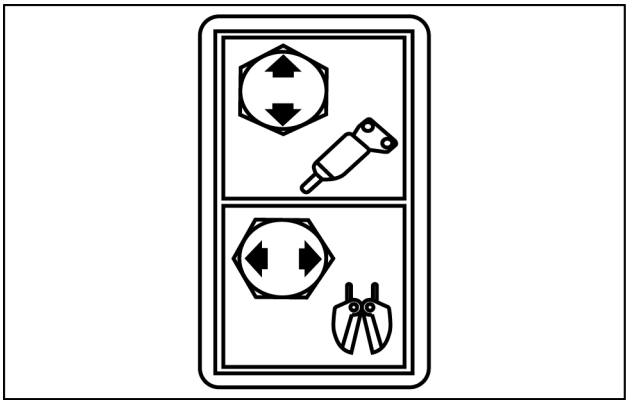
(10) Combined hydraulic attachment sign

Location: this sign is located on the hydraulic oil tank.

Quantity: 1

Part number: 48018208

This sign indicates how position the three-way valve to select the single action hydraulic attachment circuit or the double action hydraulic attachment circuit.



48018208 15

(11) Parking the machine

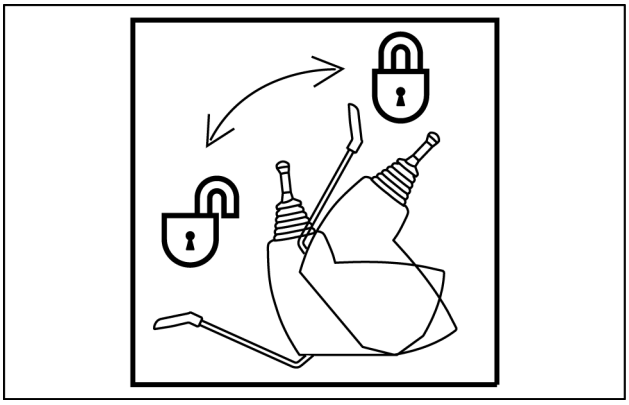
Location: this sign is located on the left-hand console box.

Quantity: 1

Part number: 48019083

To prevent unauthorized and unintended movement of the machine, always do the following before you leave the operator's compartment:

1. Lower the bucket to the ground completely.
2. Place the safety lock lever in the raised position.
3. Stop the engine.
4. Remove the key.



SMIL16MEX0015AA 16

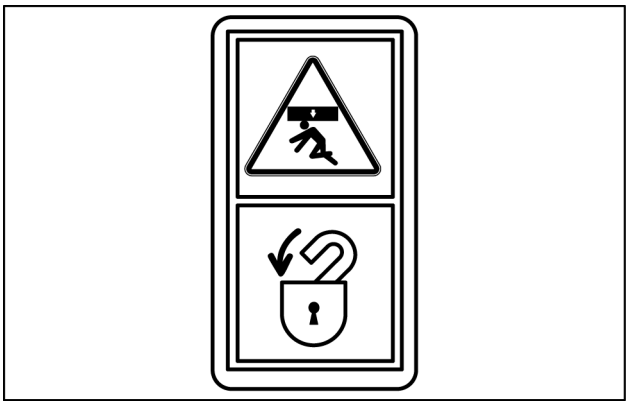
(12) Safety front window

Location: these signs are located on the both side window of the cab.

Quantity: 2

Part number: 48018201

Be careful that the front window may be promptly closed. During the machine movements the window could fall injuring the operator.



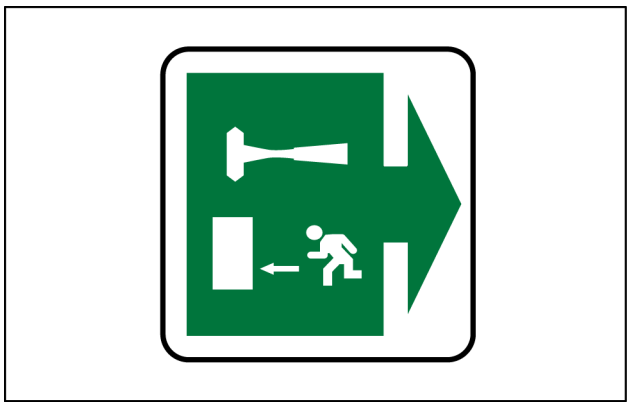
48018201 17

(13) Emergency exit

⚠ WARNING

Avoid injury!
A safety sign indicates which window to use as an emergency exit. Remove this window only in an emergency. Do not place any object that could be an obstacle in case of evacuation in front of this window.
Failure to comply could result in death or serious injury.

W1435A



SMIL16MEX0012AA 18

Location: this sign s located on the cab door.

Quantity: 1

Part number: 48019425

This sign shows the position of and how to use the emergency exit (right-hand side window).
In case of emergency, use the hammer to break the right-hand side window of the cab.

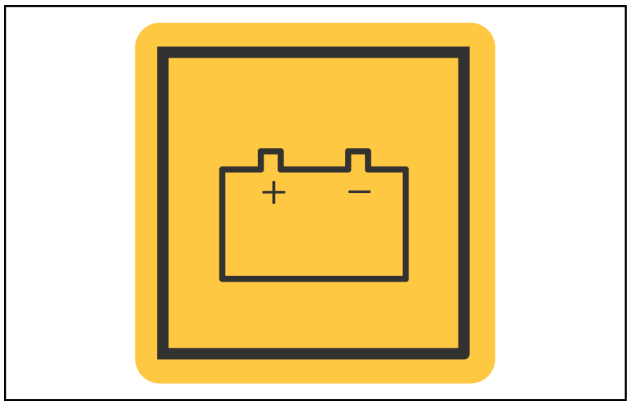
(14) Battery position

Location: this sign is located on the battery cover.

Quantity: 1

Part number: 48019084

This sign indicates the position of the battery.



SMIL16MEX0016AA 19

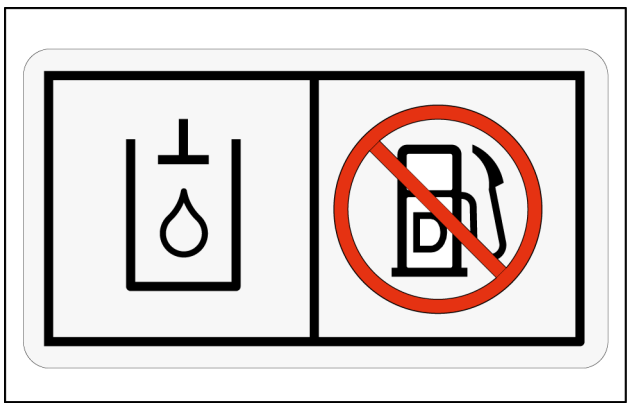
(15) Hydraulic tank

Location: this sign is located on the hydraulic tank.

Quantity: 1

Part number: 48019086

This sign warns you to fill only hydraulic oil and not to not fill the diesel fuel.



SMIL16MEX0014AA 20

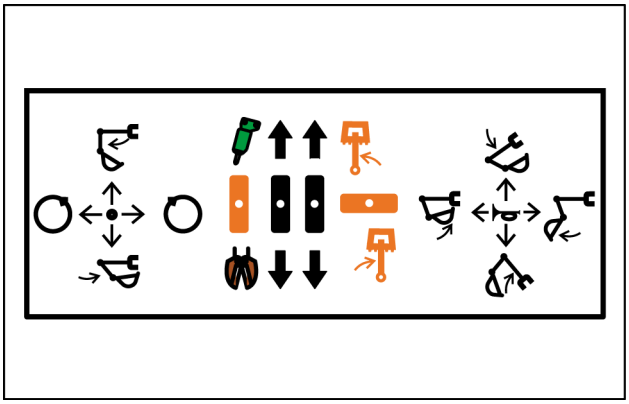
(16) Functions of operation levers

Cab location: this sign is located in right-hand window of the cab.

Canopy location: this sign is located on the right-hand side of operator's compartment.

Quantity: 1

This sign describes the functions of operation levers.



SMIL16MEX0022AA 21

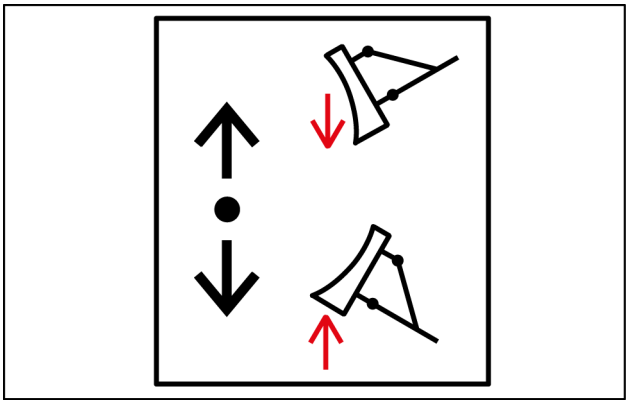
(17) Dozer blade operation

Location: this sign is located on the right-hand console box.

Quantity: 1

Part number: 48018266

This sign describes the blade operations.



SMIL16MEX0010AA 22

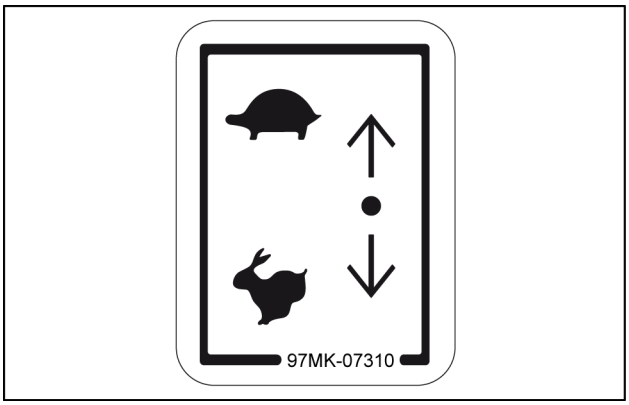
(18) Engine control ideogram

Location: this sign is located on the left-hand console box.

Quantity: 1

Part number: 48019102

This signs describes the engine operation.



SMIL16MEX0913AA 23

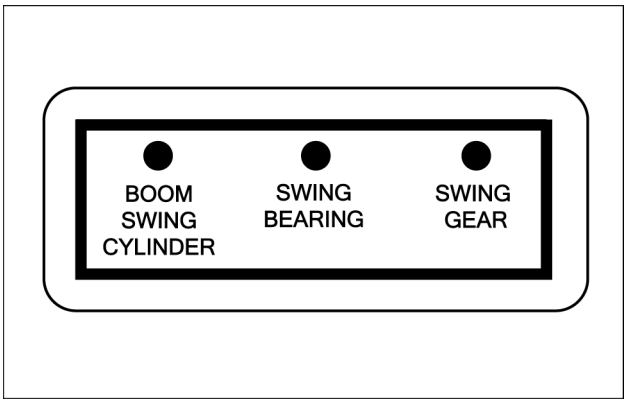
(19) Greasing point

Location: this sign is located in front of the cab/canopy, close to the greasing points.

Quantity: 1

Part number: 48019412

This sign identifies the greasing points.



SMIL16MEX1424AA 24

(20) Electric welding

Location: this sign is located on the battery cover.

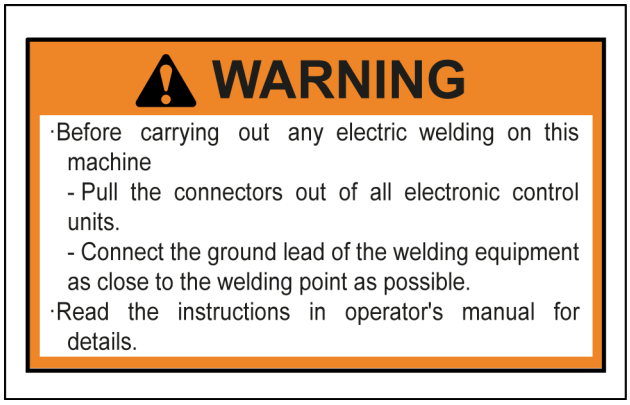
Quantity: 1

Part number: 48019415

This sign warns you before carrying out any electric welding on the machine, to follow the below procedure:

- Pull the connectors out of all electric control units.
- Connect the ground lead of the welding equipment as close to the welding point as possible.

Read the safety instruction in this Operator's Manual.



SMIL16MEX0017AA 25

(21) Fuel tank

⚠ CAUTION

Fuel vapors are explosive and flammable. Do not smoke while handling fuel. Keep fuel away from flames or sparks. Shut off engine and remove key before servicing. Always work in a well-ventilated area. Clean up spilled fuel immediately.
Failure to comply could result in minor or moderate injury.

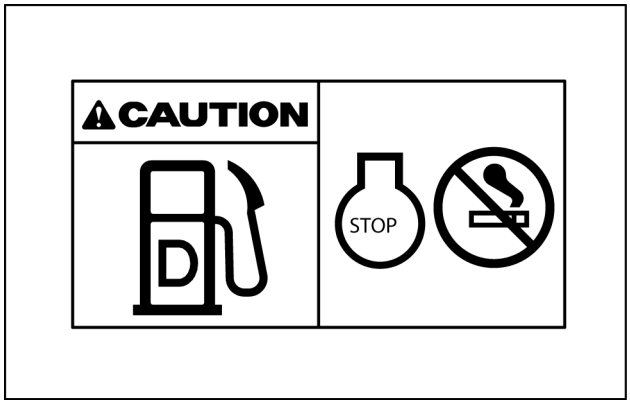
C0195A

Location: this sign is located on the right-hand side of the fuel filler neck.

Quantity: 1

Part number: 48019273

This sign shows the position of the fuel tank and the fuel to use.
This sign warns you to stop the engine when refueling and to keep all lights or flames at a safe distance while refueling.



SMIL16MEX0006AA 26

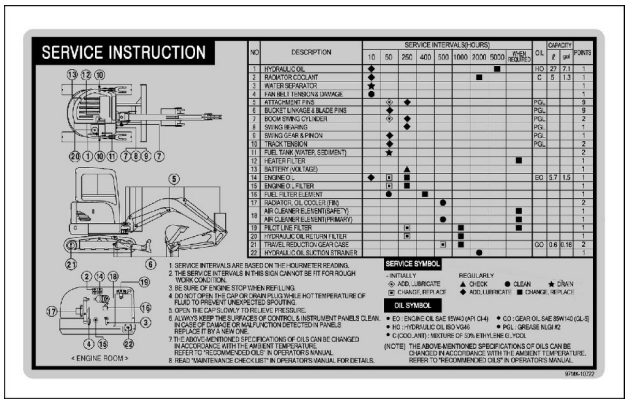
(22) Service instructions

Location: this sign is located on the left-hand side in the cab.

Quantity: 1

Part number: 48019417

This sign describes the service locations and the service intervals.



SMIL16MEX0952A 27

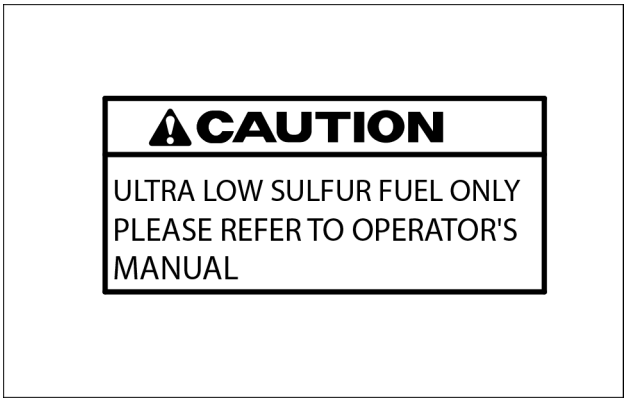
(23) Ultra low sulfur fuel

Location: this sign is located on the right-hand side of the fuel filler neck.

Quantity: 1

Part number: 48019426

This sign indicates to use low sulfur fuel only (sulfur content < **15 ppm**).



SMIL16MEX0486AA 28

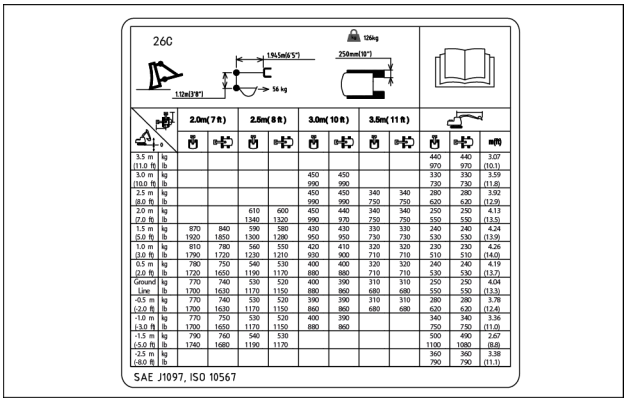
(24) Load handling (optional)

Cab location: this sign is located on the left-hand side of the cab.

Canopy location: this sign is located on the right-hand side of operator's compartment.

Quantity: 1

The load handling indicates the rated lift capacities that shall be considered at different distances from the swing axis.



SMIL16MEX0642AA 29

(25) Danger electric line - Interference with attachments

⚠ WARNING

Fold zone!
The booms may hit the cab when folding. Use extra care during manual boom folding and unfolding.
Failure to comply could result in death or serious injury.

W0032A

⚠ CAUTION

Electrocution hazard!
Contact with overhead power lines can cause severe electrical burns or death from electrocution. Make sure there is enough clearance between equipment and overhead power lines.
Failure to comply could result in minor or moderate injury.

C0103A

Cab location: this sign is located on the right-hand side window of the cab.

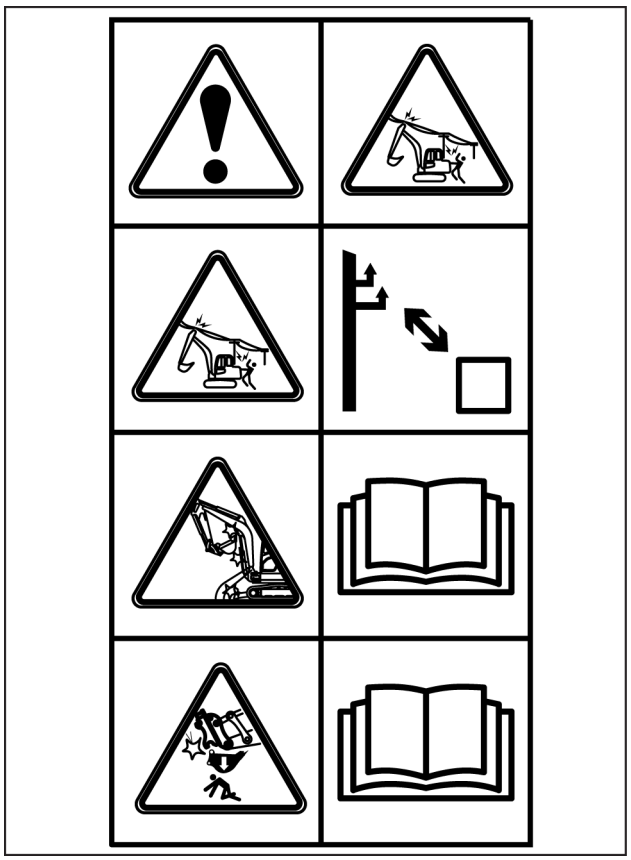
Canopy location: this sign is located on the right-hand side of operator's compartment.

Quantity: 1

Part number: 48018423

This sign shows that work near overhead high-voltage electric lines must not be done without checking beforehand that all necessary measures have been taken to respect the minimum distances.

The cab and/or the boom may collide with the arm or the bucket (at the end of the attachment) depending upon the length of the arm, the size of the bucket, the angle of boom swing, or the installation of a quick coupler or other attachment. Be sure to avoid abrupt operation and secure proper clearance in order to prevent collision with the cab and the boom.



SMIL16MEX0002BA 30

(26) Frame general warning

Cab location: this sign is located on the right-hand side of the engine hood.

Canopy location: this sign is located on the right-hand side of operator’s compartment.

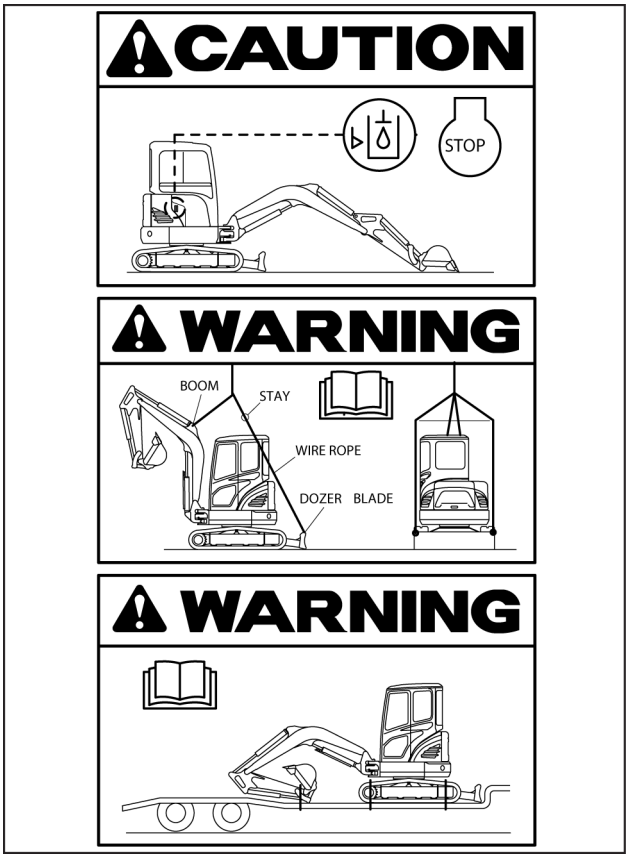
Quantity: 1

Part number: 48019279

This sign warns you to refill the recommended hydraulic oil up to the specified level.

When lift the excavator, ensure that the wire rope is proper size. Follow the instructions in this manual.

This sign indicates that you always need to read the operator's manual before you transport the machine.



SMIL16MEX0011BA 31

(27) Machine control pattern

⚠ WARNING

Unexpected machine movement!
Pilot controls have two different backhoe controls patterns; before operating the machine, check which control function is active.
Failure to comply could result in death or serious injury.

W0185A

The machine control pattern can easily be changed to the "ISO type" or to the "A type" by changing the position of the lever-pattern.

How to use:

1. Loosen the bolt **(1)** or **(2)**.
2. Move the lever to the “ISO” or “A” position.
3. After setting the pattern, tighten the bolt to secure the lever.

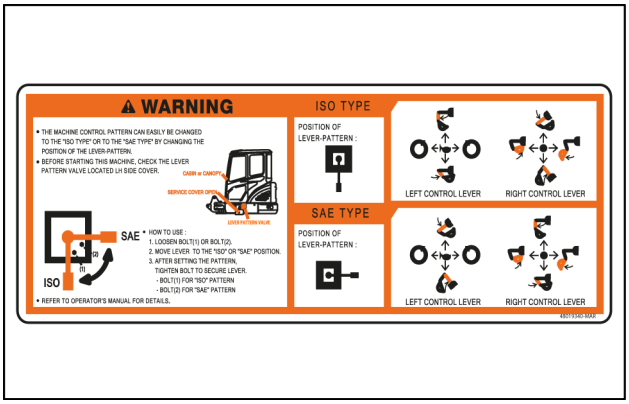
NOTE: *tighten the bolt* ***(1)*** *for the “ISO” pattern. Tighten the bolt* ***(2)*** *for the “A” pattern.*

Location: this sign is located on the left-hand side door of the cab/canopy.

Quantity: 1

Part number: 48019340

This sign shows the location where a sling is attached to handle the excavator and the coupling location when the machine has to be transported on a trailer.



SMIL16MEX3175AA 32

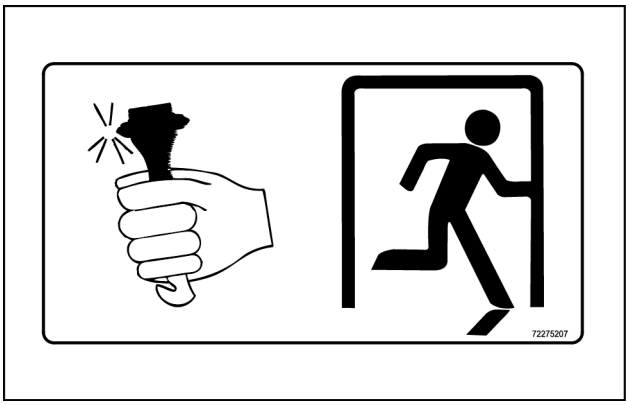
(28) Break the glass to exit

Location: these signs are located on the front window and on the rear window.

Quantity: 2

Part number: 72275207

This sign warns you that in case of emergency with the cab door locked, break the glass to exit.



72275207 33

(29) Water separator

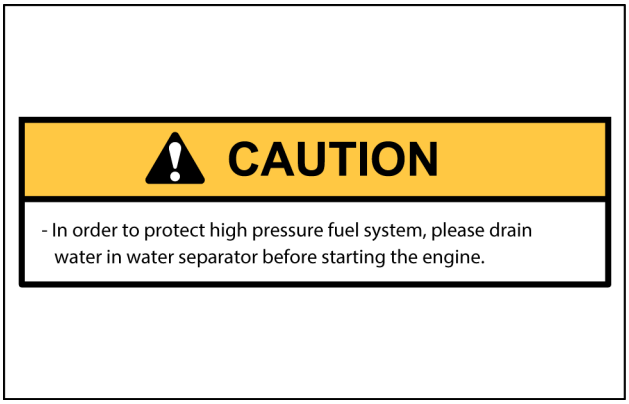
Cab location: this sign is located on the right-hand side window.

Canopy location: this sign is located on the right-hand side of operator's compartment.

Quantity: 1

Part number: 48019373

This sign warns you that in order to protect the high pressure fuel system, please drain the water in the water separator before starting the engine



SMIL16MEX0020AA 34

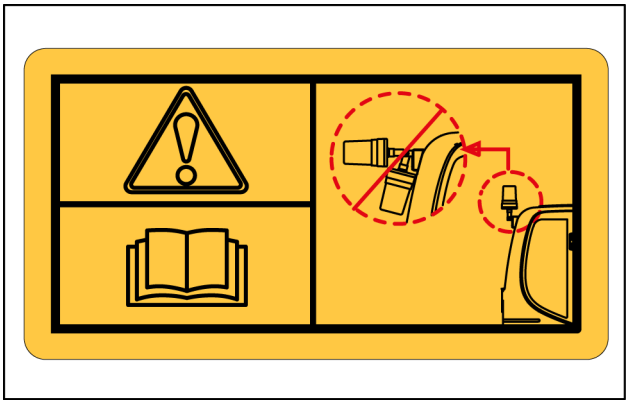
(30) Beacon light

Location: this sign is located on the rear outside of the cab/canopy.

Quantity: 1

Part number: 48018867

This sign indicates to make sure that the beacon light maintains a vertical position.
A horizontal position can result in a decrease in life time of the lamp due to the infiltration of foreign substances such as dust or water.
During the machine transfer, change the position of the lamp to the horizontal position.



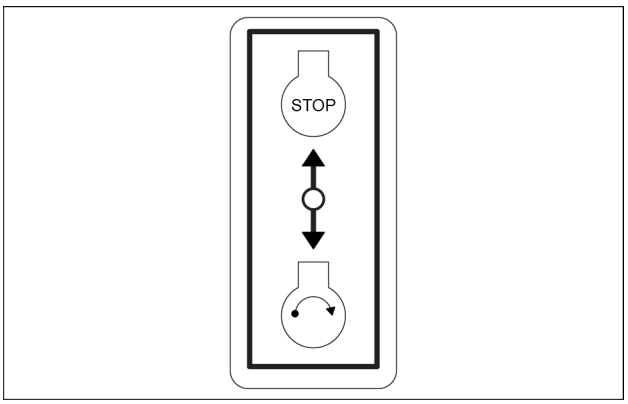
SMIL16MEX0021AA 35

(31) Emergency stop of the engine

Location: this sign is located on the left-hand side of the cab, next to the windshield washer reservoir.

Quantity: 1

This sign indicates that, only in case of emergency, the operator can stop the engine by operating the switch upwards.



SMIL16MEX0644AA 36

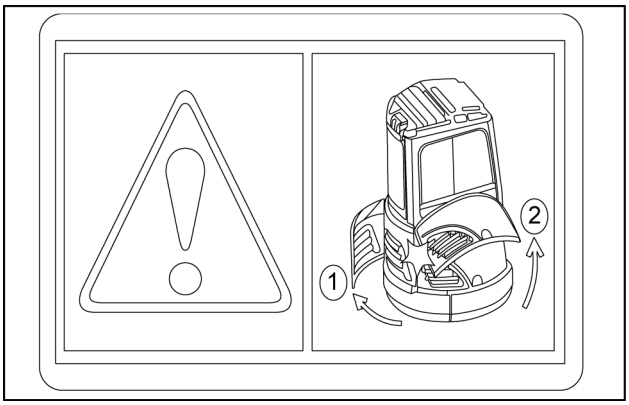
(32) Side hoods opening

Location: this sign is located on the side hood.

Quantity: 1

Part number: 48018871

This safety sign indicates to open the door **(1)** and then the door **(2)** to avoid damage to the seal between the two doors.



SMIL16MEX0932AA 37

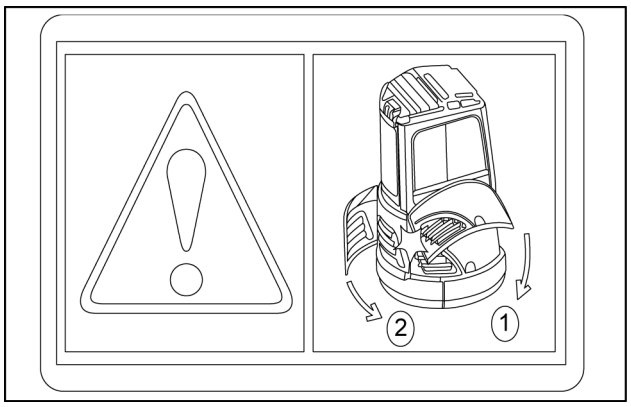
(33) Side hoods closing

Location: this sign is located on the engine access door support.

Quantity: 1

Part number: 48018872

This safety sign indicates to close the door **(1)** then the door **(2)** to avoid damage to the seal between the two doors.



SMIL16MEX0931AA 38

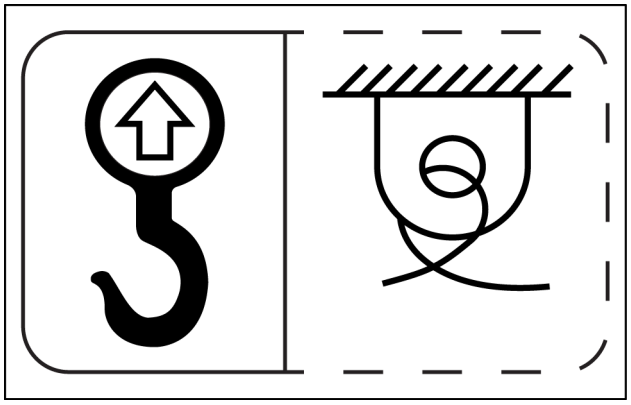
(34) Lifting point

Location: these signs are located on the dozer blade.

Quantity: 2

Part number: 48019104

This sign shows the location where a sling is attached to handle the excavator and the coupling location when the machine has to be transported on a trailer.



48019104 39

(35) Compliant to Canadian Regulation ICES-002

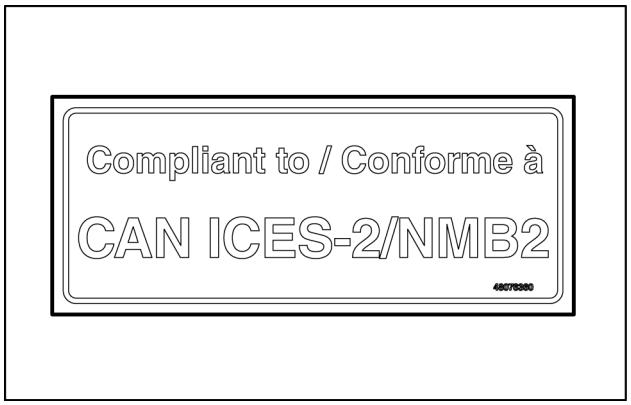
Cab location: this sign is located on the right-hand window.

Canopy location: this sign is located on the right-hand side of operator's compartment.

Quantity: 1

Part number: 48076360

This sign shows compliance to Canadian Regulation ICES-002 (vehicles, boats and other devices propelled by an internal combustion engine, electrical means or both).



SMIL16MEX3227AA 40

3 - CONTROLS AND INSTRUMENTS

Access to operator's platform

Door and steps

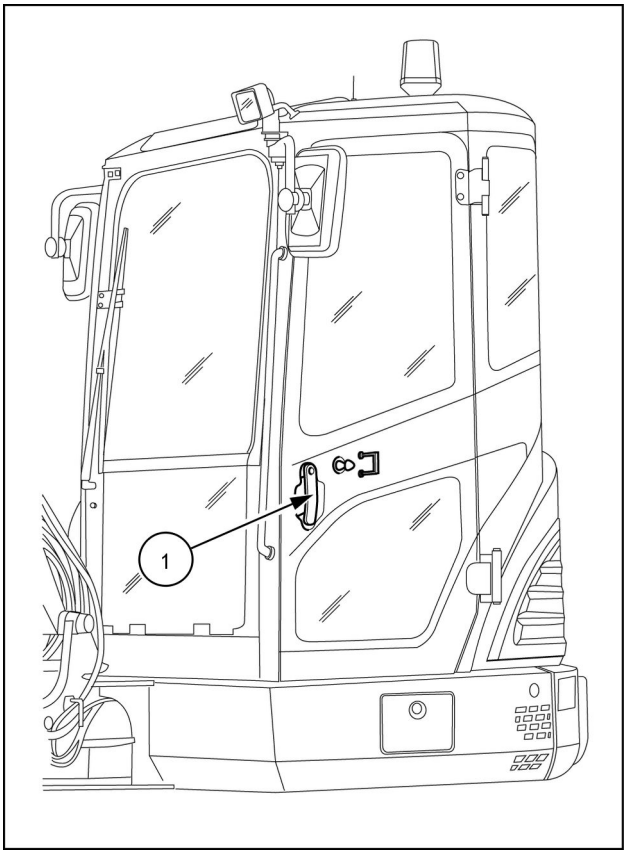
Cab door

⚠ CAUTION

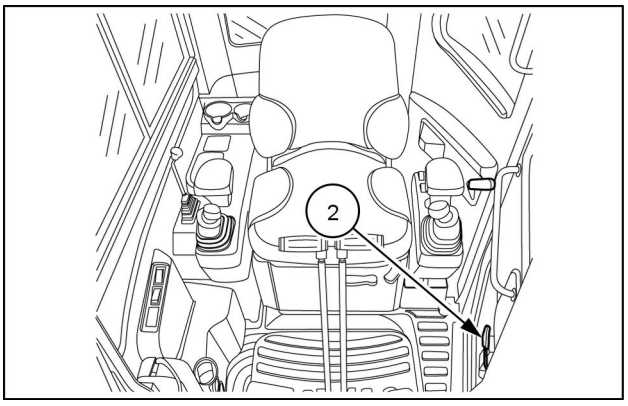
Pinch hazard!
Be careful not to get your hand, clothes, etc. caught in the door when closing it.
Failure to comply could result in minor or moderate injury.

C0046A

To open the door, use the handle **(1)** from the outside and use the handle **(2)** from the inside.



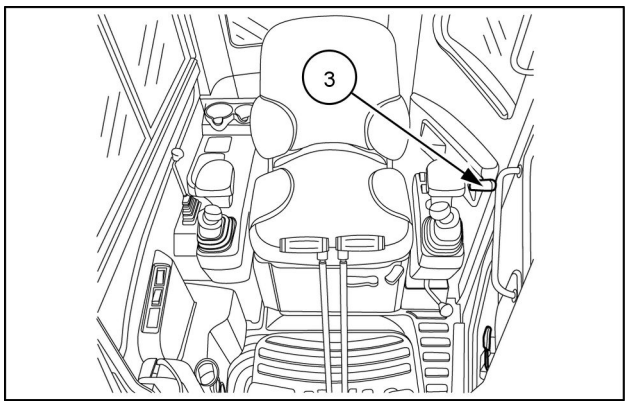
SMIL16MEX0364BA 1



SMIL16MEX0365AA 2

The door can be latched in completely open position. To latch or unlatch the door, operate the lever **(3)**.

NOTICE: *do not leave the door ajar. Fix it in a latched position. Before performing work with the door open, lock it securely.*



SMIL16MEX0365AA 3

Steps and access handles

⚠ WARNING

Fall hazard!
Clean the steps and access handles to remove all traces of grease, oil, mud, and ice (in winter).
Failure to comply could result in death or serious injury.

W0139A

⚠ WARNING

Fall hazard!
Jumping on or off the machine could cause an injury. Always face the machine, use the handrails and steps, and get on or off slowly. Maintain a three-point contact to avoid falling: both hands on the handrails and one foot on the step, or one hand on the handrail and both feet on the steps.
Failure to comply could result in death or serious injury.

W0141A

⚠ WARNING

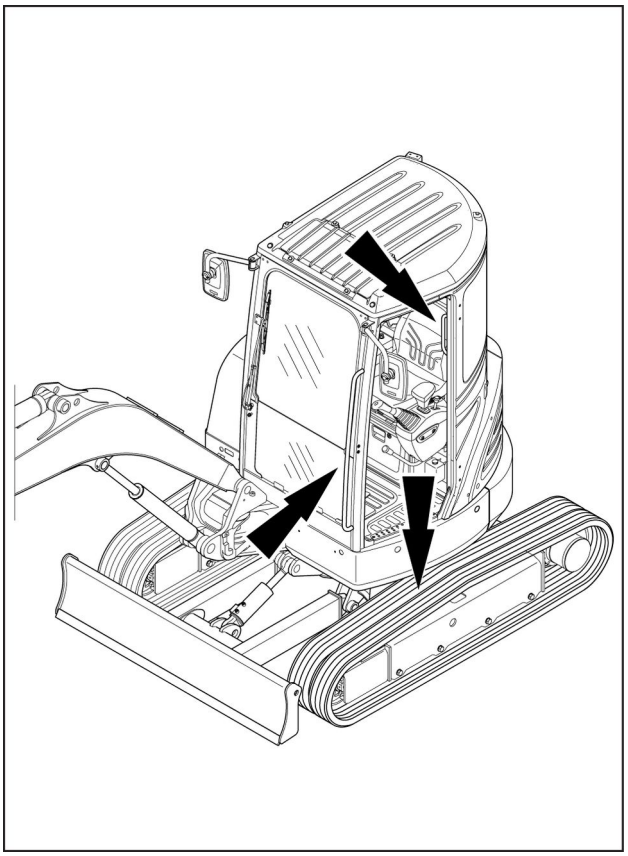
Fall hazard!
When entering or exiting the cab, never use the control levers as handholds. Always mount and dismount the machine in a safe way. Maintain a three-point contact with steps, ladders, and/or handholds.
Failure to comply could result in death or serious injury.

W1340B

To get in or out of the machine always face the machine and use the handrails and track shoes .

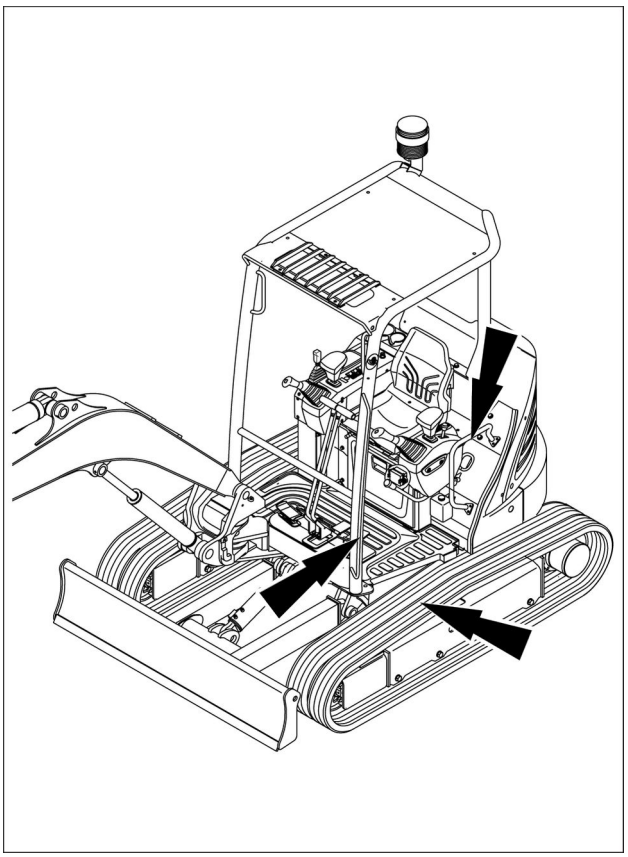
Ensure safety by always maintaining at least three-point contact of hands and feet with the handrails, and track shoes.
If grasping the door handrail when mounting or dismounting or moving on the track, open and lock the door securely in the open position. Otherwise, the door may move suddenly, causing you to loose balance and fall.

Cab version



SMIL16MEX0027BB 4

Canopy version



SMIL16MEX1496BA 5

Operator's seat

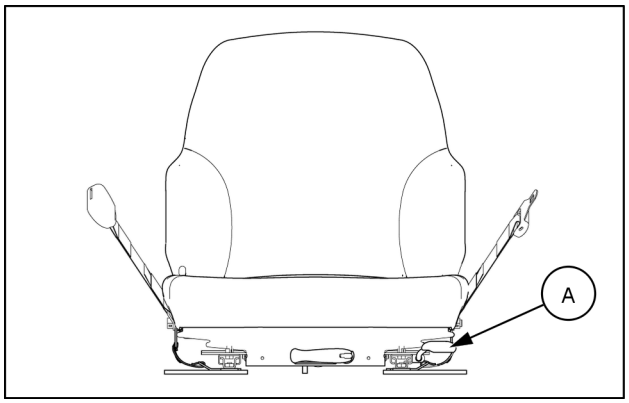
Operator's seat

In order to operate the machine correctly and with maximum efficiency and comfort, adjust the seat to suit the weight and size of the operator.

Fore and aft adjustment

- Hold the lever **(A)** in the raised position.
- Slide the seat to the required position.
- Release the lever **(A)**.

NOTE: *the seat can be positioned over a range of* ***52 mm*** *(****2 in****).*

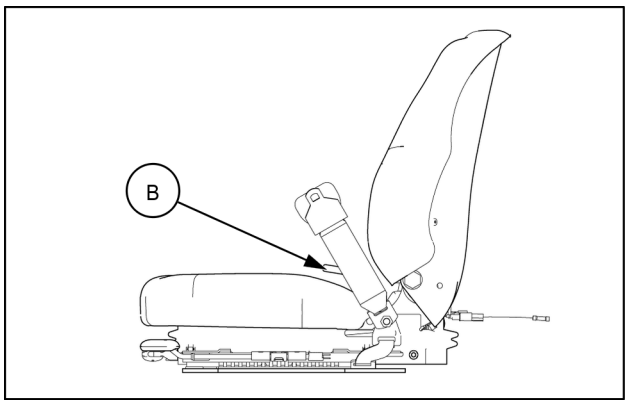


SMIL16MEX0033AA 1

Seat back angle adjustment

- Hold the lever **(B)** in the raised position.
- Move with the seat-back to the desired position.
- Release the lever **(B)**.

NOTE: *the seat back can be adjusted over a range of* ***-5 – 25 °****, with 18 locking positions.*

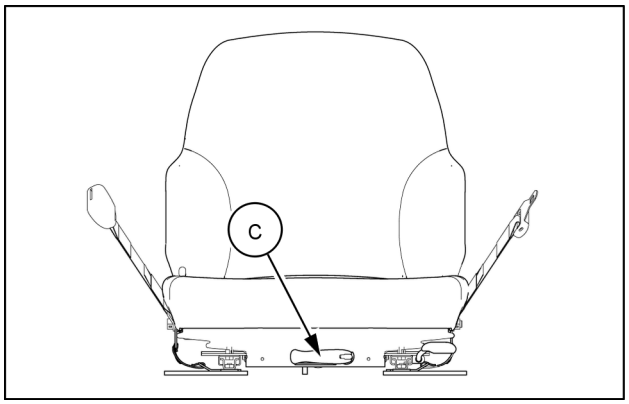


SMIL16MEX0034AA 2

Weight adjustment

- Lower the lever **(C)** to decrease the rigidity of the suspension.
- Raise the lever **(C)** to obtain harder suspension.

NOTE: *the weight adjustment is for all operator weights between* ***45 – 136 kg*** *(****99 – 300 lb****).*



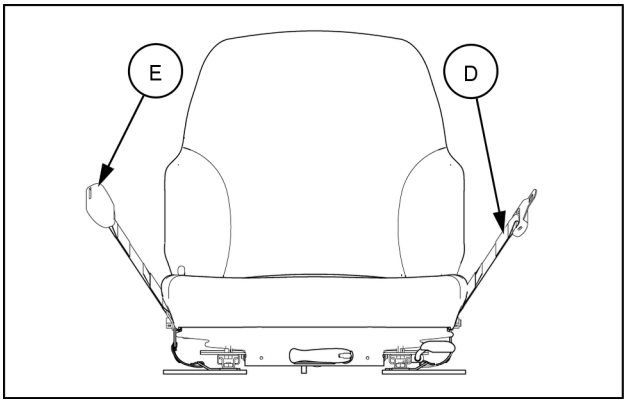
SMIL16MEX0033AA 3

Seat belt

⚠ WARNING

Equipment failure could cause accident or injury!
Always fasten the seat belt securely before you operate the machine. Inspect seat belt parts for wear and damage. Replace any and all worn or damaged parts of the seat belt prior to operation.
Failure to comply could result in death or serious injury.

W0046C



SMIL16MEX0033AA 4

- Sit comfortably on the operator's seat.
- Pull out a long section of belt **(D)**.
- Engage the belt in the fastening system **(E)**.

NOTE: *if the section of belt pulled out is not long enough, release it, so it rolls up and then pull it out again.*

To release the seat belt press down the releasing lever of the fastening system **(E)**.

NOTICE: *the seat belt must be kept clean. Use only soap and water to clean the belt, do not use bleach or dyes.*

Forward controls

Forward controls

⚠ WARNING

Unexpected machine movement!
Pilot controls have two different backhoe controls patterns; before operating the machine, check which control function is active.
Failure to comply could result in death or serious injury.

W0185A

This machine is equipped with a lever pattern valve that allows the operator to select between the “ISO type” controls pattern or the “SAE Type” controls pattern by changing the position of the valve.
Before starting machine operation, select the desired controls pattern, and change the position of the valve accordingly. Refer to page **4-13**.

Control levers

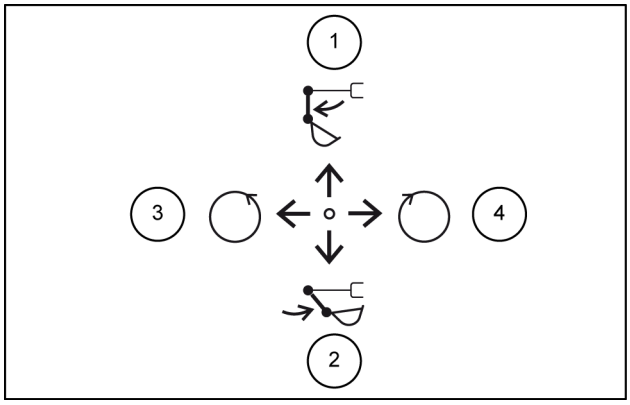
Pattern: ISO type

Left-hand control lever:

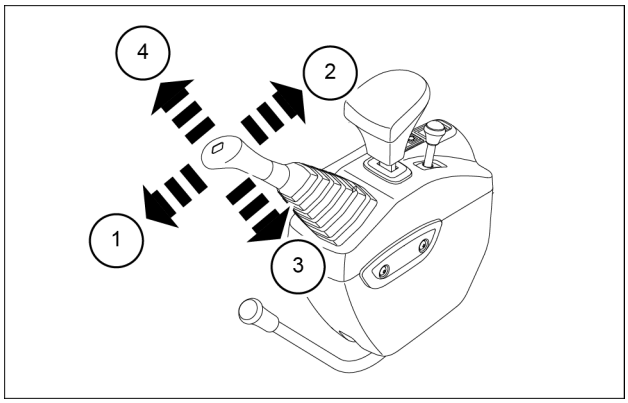
1. The dipper arm extends.
2. The dipper arm retracts.
3. The upper structure swings to the left–hand side.
4. The upper structure swings to the right–hand side.

NOTE: *the movement speed of the arm or of the swing depends on the control lever tilt angle. In the intermediate position two movements can be obtained simultaneously.*

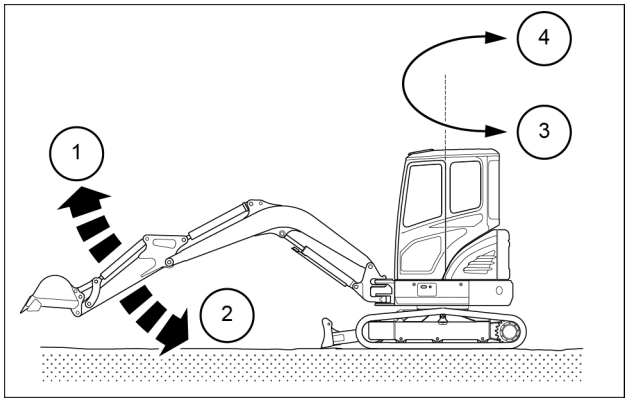
NOTE: *when the upper structure swing control is released, the upper structure may continue to rotate due to the force of inertia. In this event, make allowance for the extra movement by releasing the control slightly earlier.*



SMIL16MEX3075AB 1



SMIL16MEX0366AB 2

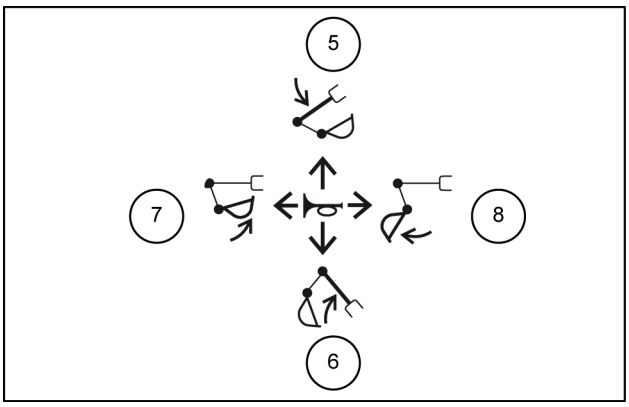


SMIL16MEX0367AB 3

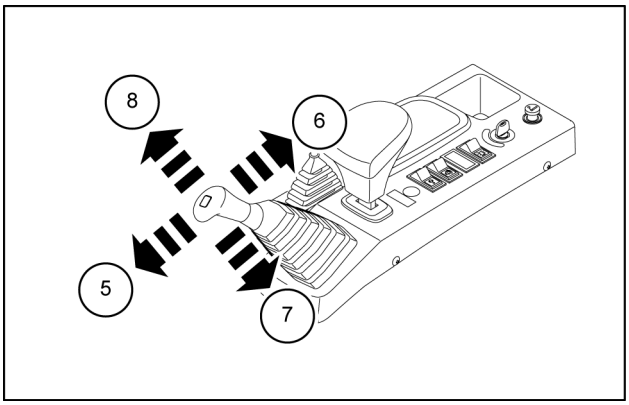
Right-hand control lever:

5. The boom lowers.
6. The boom raises.
7. The bucket retracts (filling).
8. The bucket extends (dumping).

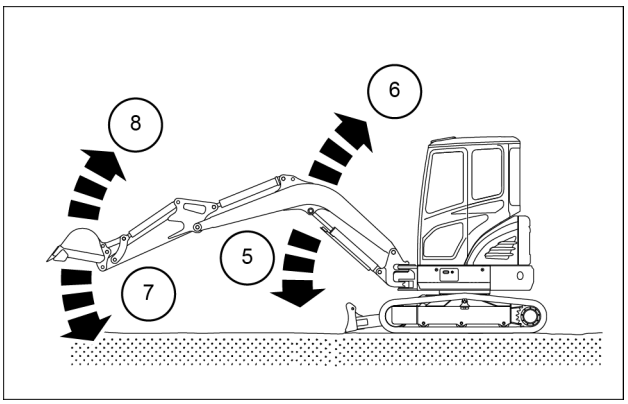
NOTE: *the movement speed of the boom or of the bucket depends on the control lever tilt angle. In the intermediate position two movements can be obtained simultaneously.*



SMIL16MEX3076AB 4



SMIL16MEX0368AB 5



SMIL16MEX0369AB 6

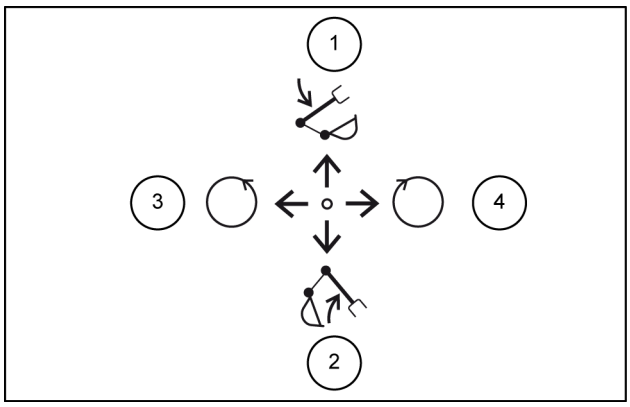
Pattern: SAE type

Left-hand control lever:

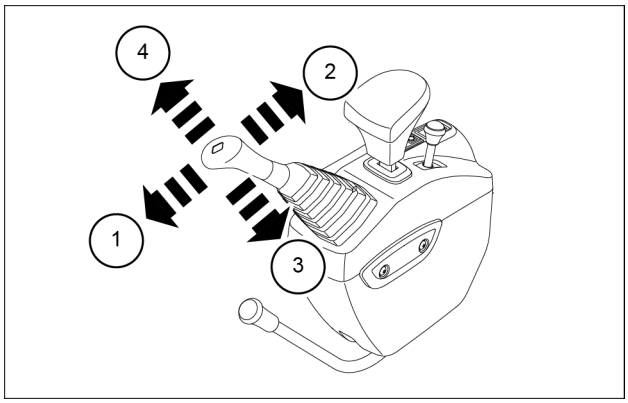
1. The boom lowers.
2. The boom raises.
3. The upper structure swings to the left–hand side.
4. The upper structure swings to the right–hand side.

NOTE: *the movement speed of the arm or of the swing depends on the control lever tilt angle. In the intermediate position two movements can be obtained simultaneously.*

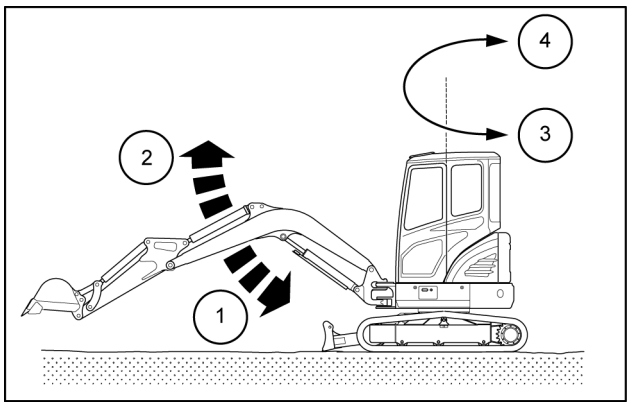
NOTE: *when the upper structure swing control is released, the upper structure may continue to rotate due to the force of inertia. In this event, make allowance for the extra movement by releasing the control slightly earlier.*



SMIL16MEX3077AB 7



SMIL16MEX0366AB 8

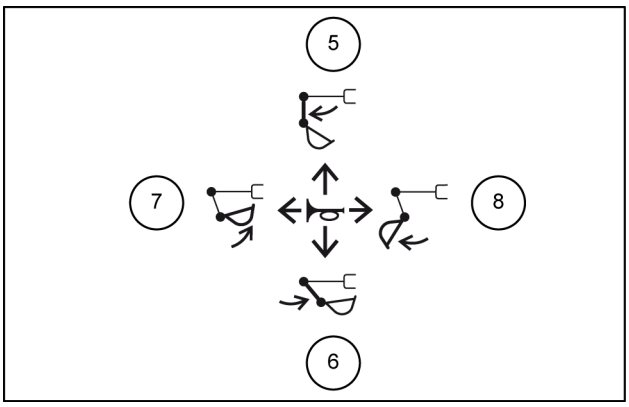


SMIL16MEX3078AB 9

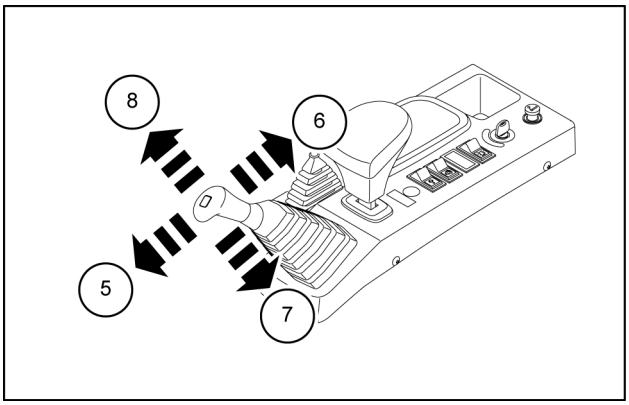
Right-hand control lever:

5. The dipper arm extends.
6. The dipper arm retracts.
7. The bucket retracts (filling).
8. The bucket extends (dumping).

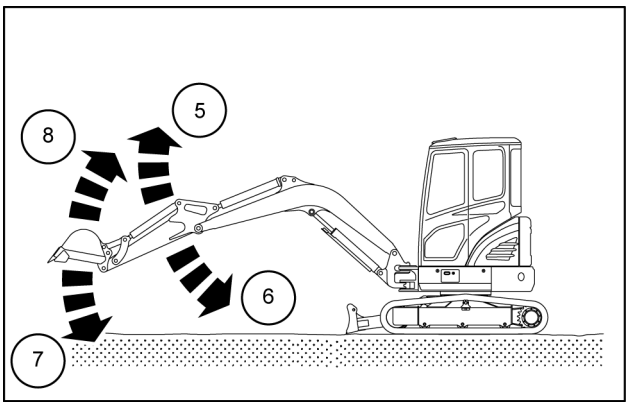
NOTE: *the movement speed of the boom or of the bucket depends on the control lever tilt angle. In the intermediate position two movements can be obtained simultaneously.*



SMIL16MEX3079AB 10



SMIL16MEX0368AB 11



SMIL16MEX3080AB 12

Travel control levers and pedals

The travel control levers and pedals are used to move the machine.

(N): neutral

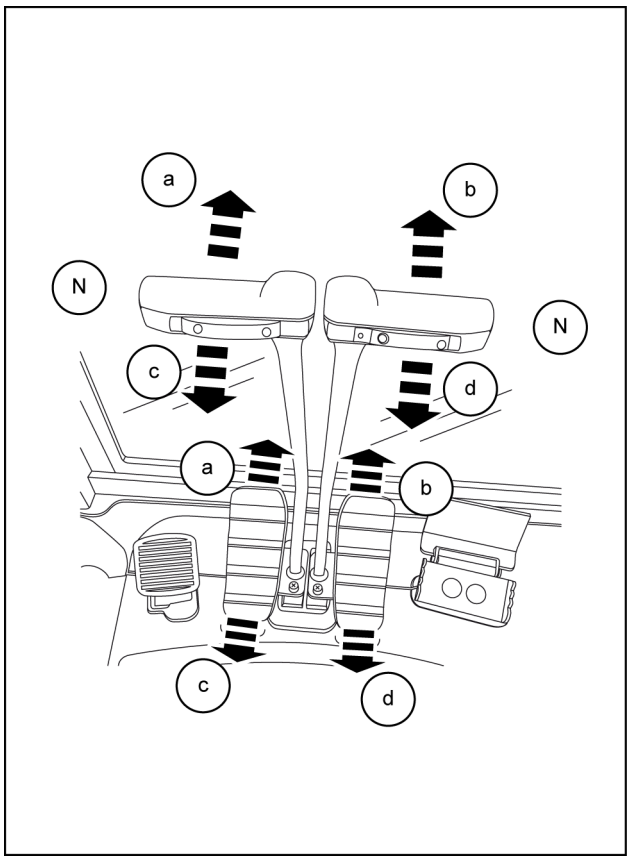
(a) + **(b)**: machine moves forward.

(c) + **(d)**: machine moves backward.

(b) + **(c)**: opposite simultaneous rotation of the tracks with consequent counterclockwise rotation of the machine around its center axis.

(a) + **(d)**: opposite simultaneous rotation of the tracks with consequent clockwise rotation of the machine around its center axis.

(a), **(b)**, **(c)**, **(d)**: positions to move one track only. Consequently the machine steers pivoting on the stationary track.

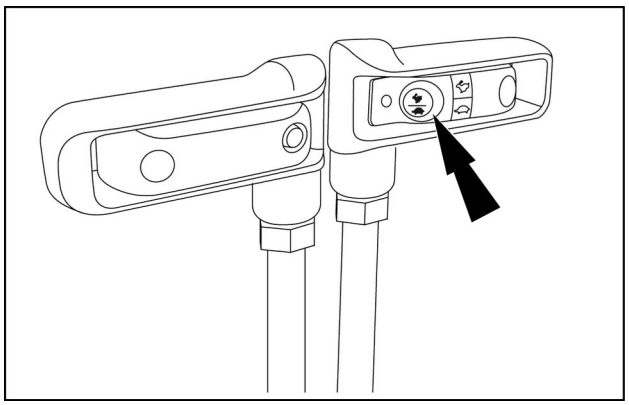


SMIL16MEX0915BA 13

Travel mode selector switch

The travel mode selector switch allows to set two different travel speed ranges:

- Low speed range: **0 – 2.4 km/h** (**0.0 – 1.5 mph**)
- High speed range: **0 – 4.3 km/h** (**0.0 – 2.7 mph**)

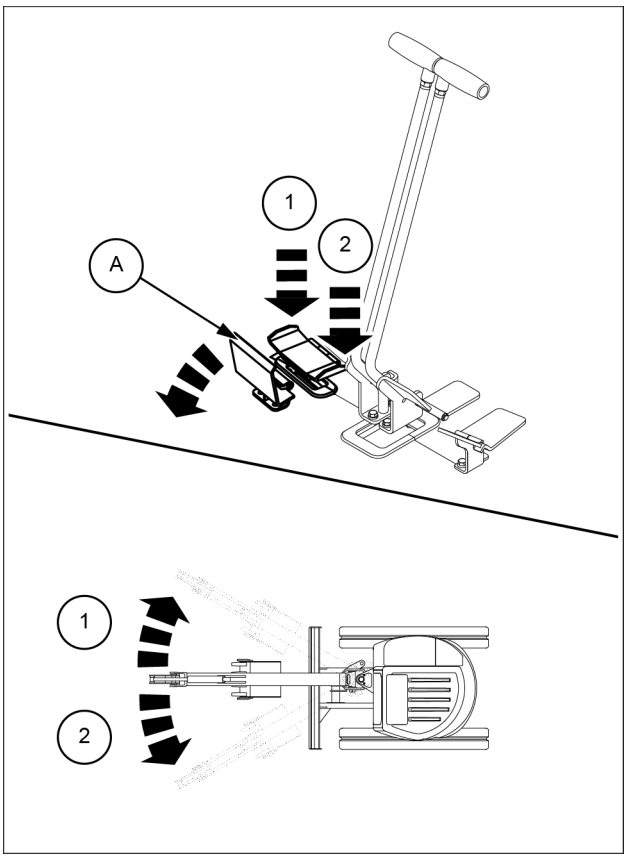


SMIL16MEX1499AA 14

Boom swing pedal

This pedal is used to swing the boom to the right-hand and left-hand direction.
Move the lock cover **(A)** to unlock position by foot.
Press the pedal to right-hand side **(1)** to swing the boom to the right-hand direction.
Press the pedal to left-hand side **(2)** to swing the boom to the left-hand direction.

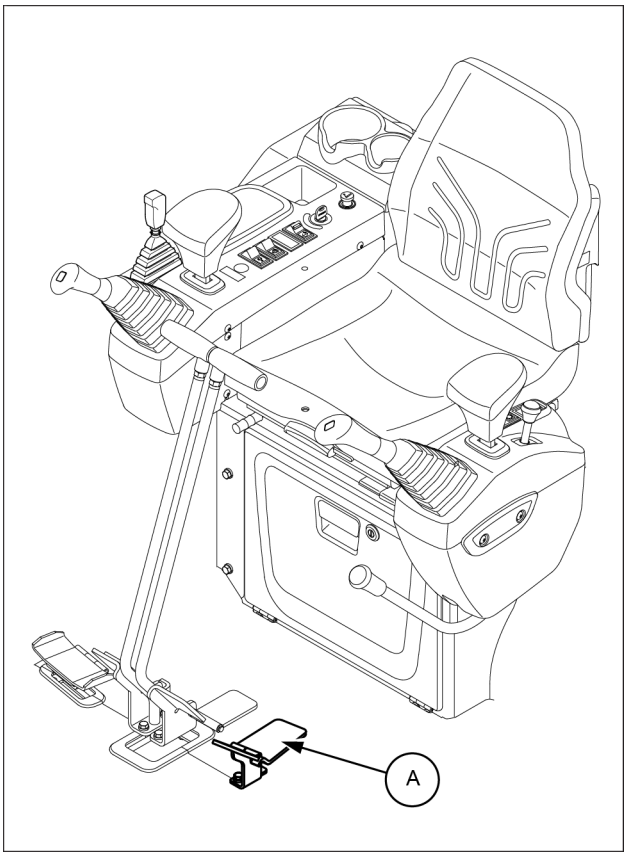
NOTICE: *make particular attention when swing the boom to the left-hand side: the attachment may collide with the cab/canopy.*



SMIL16MEX0371BB 15

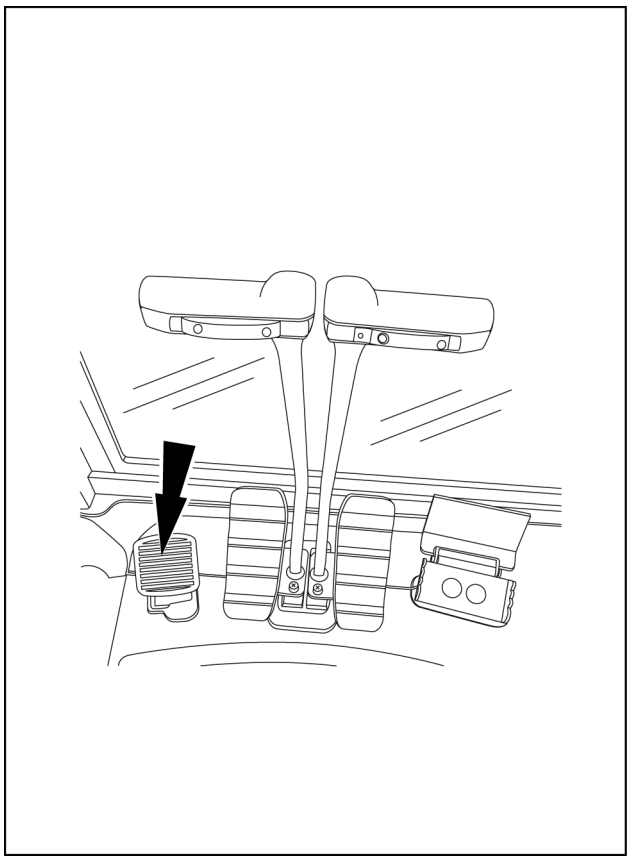
Auxiliary pedal (if equipped)

The auxiliary pedal **(A)** allows to control the main auxiliary hydraulic circuit. This circuit is intended to operate attachments like hydraulic breakers or hydraulic clamshells.



SMIL16MEX0370BB 16

Footrest



SMIL16MEX1264BA 17

Windshield

⚠ CAUTION

Pinch hazard!
Make sure you correctly follow the instructions in this manual when handling the windshield. If you do not handle the windshield correctly, it could slip and injure your fingers or hands.
Failure to comply could result in minor or moderate injury.

C0045A

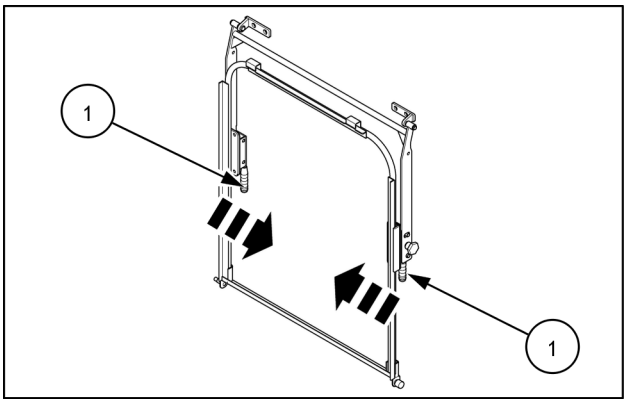
Opening

Hold the grips **(1)** located on both sides of the windshield frame.

Move the grips **(1)** to the inside to release the lock latches.

Hold both grips **(1)** and push the windshield upward.

Hold both grips **(1)** and back into the storage position. Release both grips carefully until the lock latches are in the locked position.



SMIL16MEX0035AB 1

Closing

Hold the grips **(1)** located on both sides of the windshield frame.

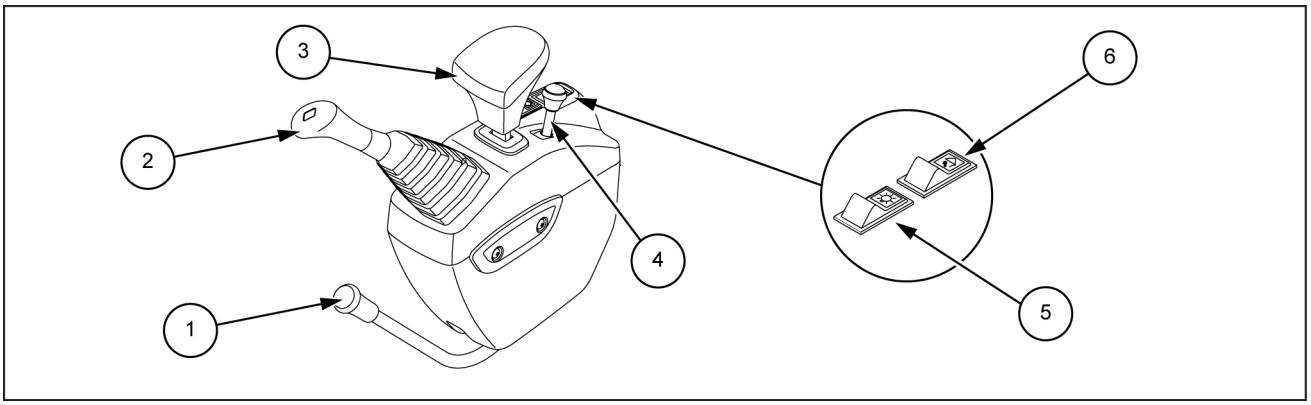
Move the grips **(1)** to the inside to release the lock latches.

Hold both grips **(1)** and push the windshield downward.

Hold both grips **(1)** and back into the storage position. Release both grips carefully until the lock latches are in the locked position.

Left-hand side controls

Left-hand side controls



SMIL16MEX0383EB 1

(1) Safety lock lever (refer to page **3-15**)

(2) Left-hand control lever (refer to page **3-6**)

(3) Armrest

(4) Engine speed control lever (refer to page **3-15**)

(5) Main light switch. This switch activates the head light and the work light in two steps.

The first step activates the head light and the cluster illumination lamp.
The second step activates the work light and the indicator lamp on the switch.

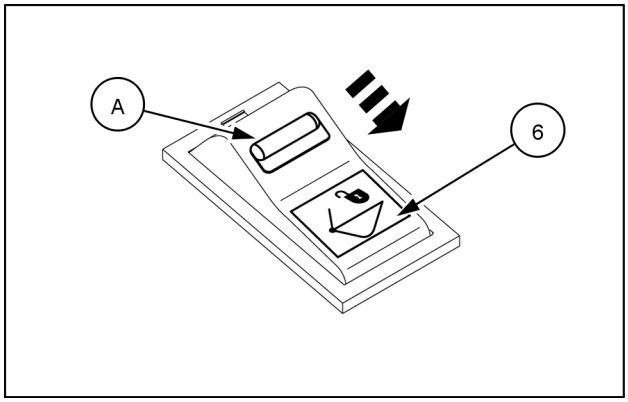
(6) Hydraulic quick coupling system activation switch (optional)

Hydraulic quick coupling system activation switch (optional)

The hydraulic quick coupling system activation switch **(6)** is used to engage or disengage the hydraulic quick coupling system.

This activation switch has a sliding mechanism **(A)** for preventing erroneous switch operation. Slide sliding mechanism **(A)** in the direction of the arrow to lock or unlock the device.

The buzzer sounds when the hydraulic quick coupling system activation switch is pressed to disengage the moving hook. The buzzer stops when the switch is released to engage the moving hook.



SMIL16MEX3181AA 2

To connect or disconnect an attachment, proceed as follows:

1. Place the attachment in full curled position for disconnecting.
2. Slide the switch mechanism, then press and hold the hydraulic quick coupling activation switch **(6)** in release position.

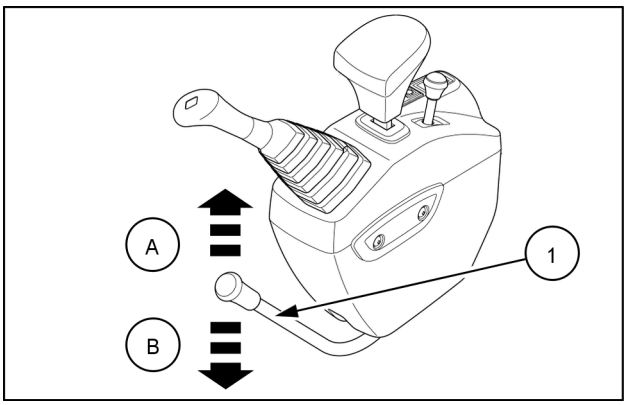
   NOTE: *the right-hand control lever tilted to left-hand direction (bucket-in) activates the pins of the quick coupler.*
3. Tilt the right-hand control lever to the left-hand direction for disconnecting the attachment.
4. Release the switch.

Safety lock lever

⚠ WARNING

Unexpected machine movement!
When you must leave the operator's seat, always place the safety lever in the LOCKED position. If the safety lever is unlocked and the control lever is moved unexpectedly, a serious accident could result.
Failure to comply could result in death or serious injury.

W1241A



SMIL16MEX0030AB 1

The safety lever operates on two positions:

A. Locked position: when the safety lever **(1)** is in locked position **(A)**, all the functions are disabled.

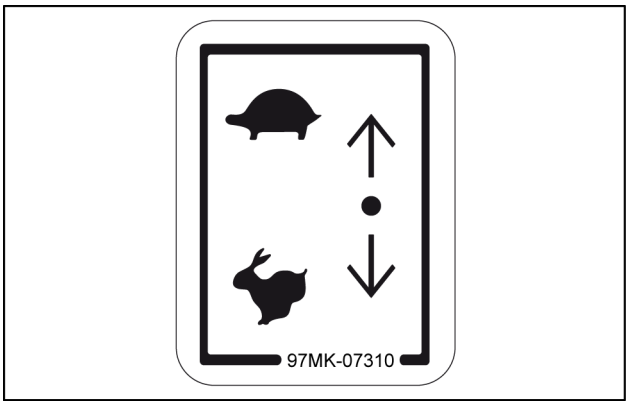
NOTICE: *never use the safety lock lever as a handhold when get in or out the machine.*

B. Unlocked position: when the safety lever **(1)** is in unlocked position **(B)**, the machine is operative.

Engine speed control lever

This lever is used to increase or decrease the rotation speed of engine (RPM).

See the relevant decal locate on the left hand console.

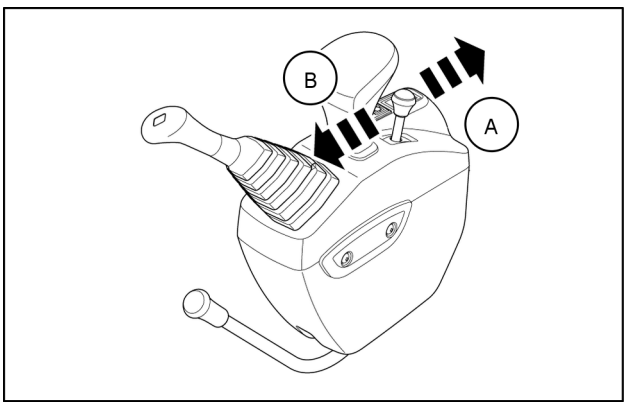


SMIL16MEX0913AA 1

Move the lever backward **(A)** to increase engine RPM.

Move the lever forward **(B)** to decrease engine RPM.

NOTE: *when stop the engine, move the engine speed control lever completely forward **(B)** and turn the starter key OFF.*



SMIL16MEX0031AB 2

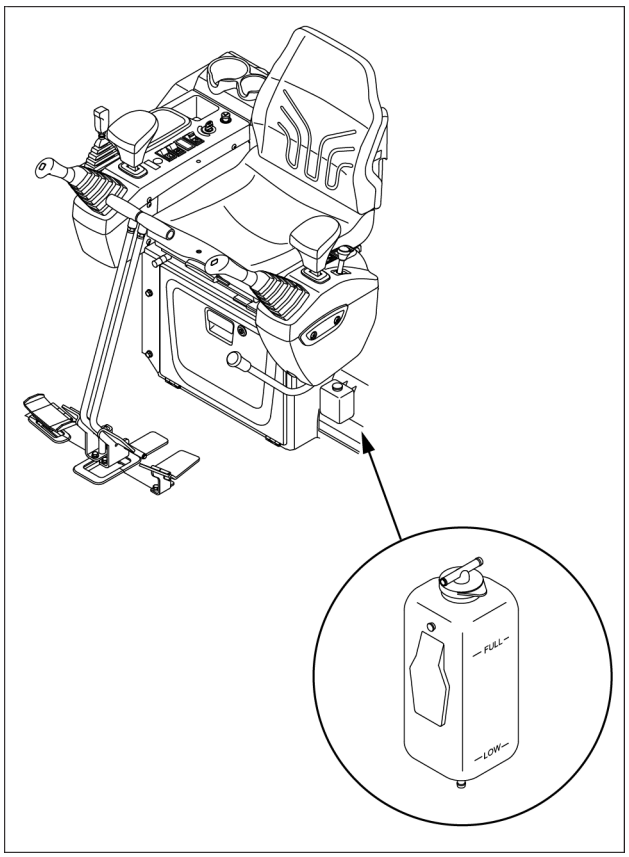
Windshield washer reservoir

This reservoir, located in the left-hand side of the cab, is equipped with an electric pump which is operated from the wiper and washer switch.

NOTICE: *never operate the windshield washer control when the reservoir is empty. This could cause damage to the electric pump.*

Remove the cap to add windshield washing fluid.

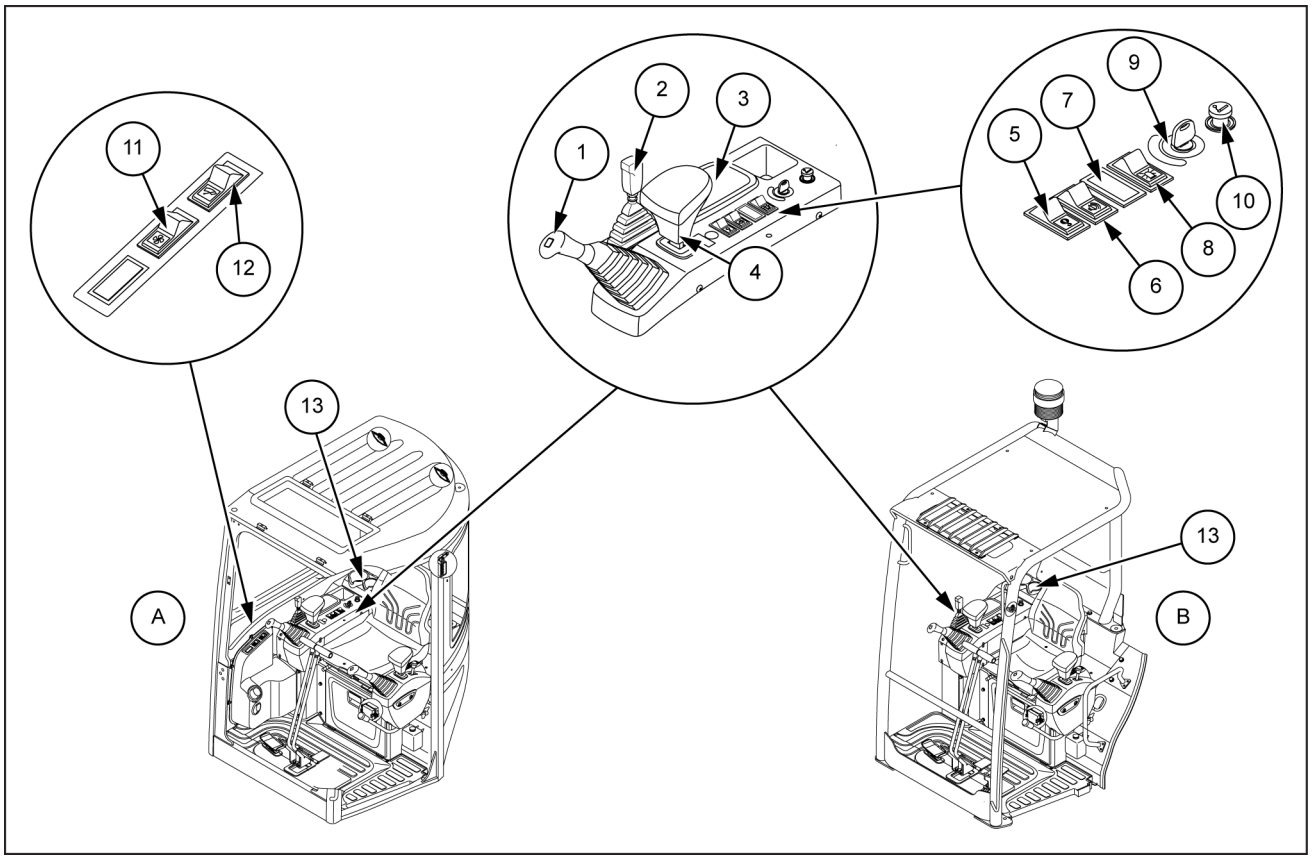
NOTICE: *in cold weather, add anti-freeze to the windshield washer water.*



SMIL16MEX1425BA 1

Right-hand side controls

Right-hand side controls



SMIL16MEX2729FB 1

(A) Cab version

(B) Canopy version

(1) Right–hand control lever (refer to page **3-6**) and horn push–button. Press and maintain pressed the push-button to activate the horn.

(2) Dozer blade control lever (refer to page **3-19**)

(3) Instrument cluster (refer to page **3-20**)

(4) Armrest

(5) Overload warning switch (optional)

(6) Travel alarm switch (optional)

(7) Spare

(8) Beacon switch (optional) (refer to page **9-13**).

(9) Starter switch

(10) Cigarette lighter and **12 V** power supply socket: the device is active with the starter key in ON position, or while the engine is running.
To operate the cigarette lighter, push it down to engage its heating position.

NOTICE: *if you continuously push in the cigarette lighter, you can cause serious damage to the device and the machine electrical system.*

NOTICE: *connect only **12 V**, **120 W** devices to the socket. Connecting devices functioning at different voltage can cause damages to the device itself and to the electrical system.*

(11) Heater switch (cab version only) (refer to page **3-25**).

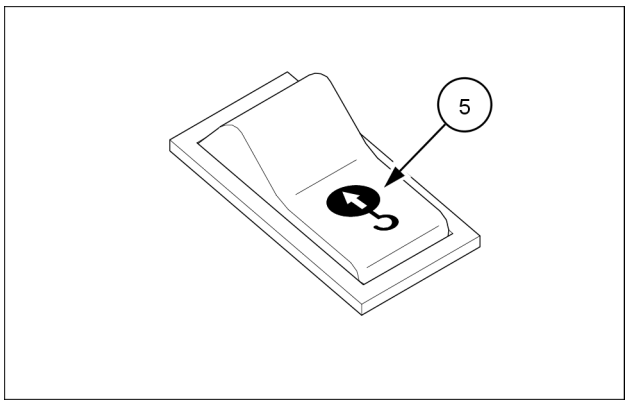
(12) Washer/wiper switch (cab version only)

(13) Beverage can holder

Overload warning switch (optional)

The overload warning switch **(5)**, when pressed, activates the overload warning function. When the machine is overloaded, a buzzer sounds and the red warning light in the instrument cluster is ON.

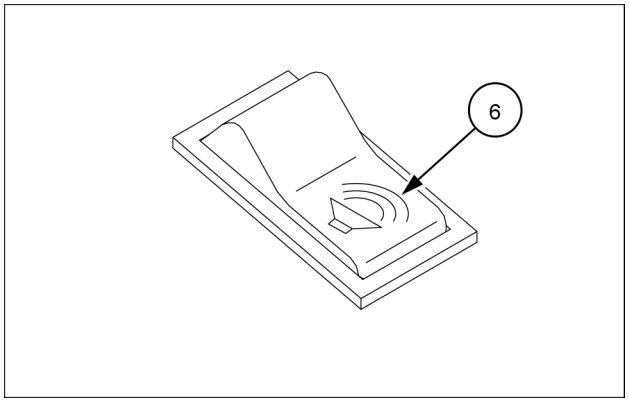
When the overload warning switch is depressed, the buzzers stops sounds and the red warning light in the instrument cluster is OFF.



SMIL16MEX0390AA 2

Travel alarm switch (optional)

The travel alarm switch **(6)**, when pressed, activates a buzzer to alarm surrounding the machine when the machine travels forward and backward.



SMIL16MEX0391AA 3

Starter switch

The starter switch has four positions:

(1) OFF: engine shut–down

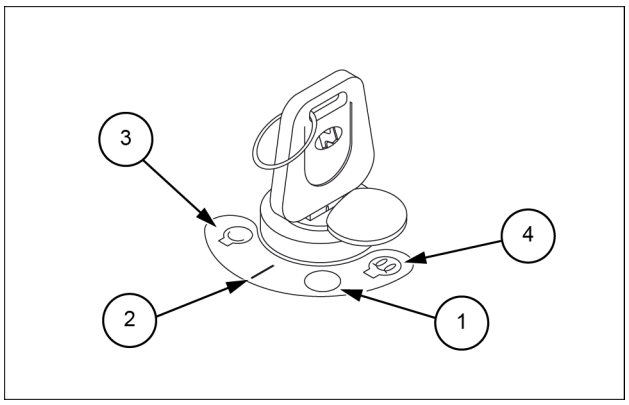
(2) ON: contact, all the systems of the machine operate. The buzzer sounds for **1 s**.

NOTICE: *if this alarm does not sound, the electric circuit is abnormal. Contact the CASE CONSTRUCTION dealer for inspection and maintenance.*

(3) START: engine ignition

(4) HEAT: to be used when the weather temperature is below **10 °C** (**50 °F**), until the pre-heat lamp on the instrument cluster turns OFF.

NOTE: *the starter key is also used to lock the cab door, the side hoods, and the storage compartment.*



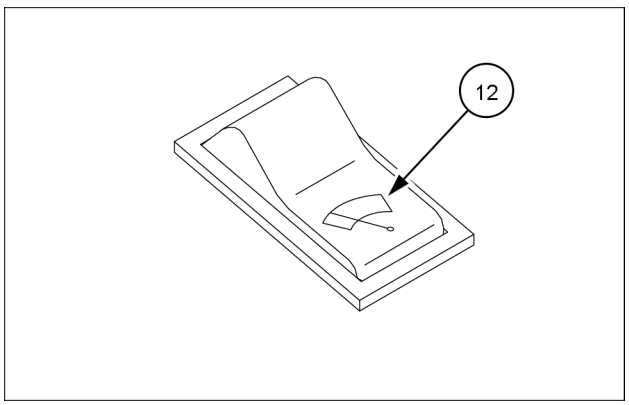
SMIL16MEX0399AB 4

Washer/wiper switch (cab version only)

The washer/wiper switch **(12)** activates the wiper and the washer in two steps.

First step: wiper activation.

Second step: washer activation. The washer liquid is sprayed and the wiper is operative only while the switch is pressed. If the washer/wiper switch is released, it returns to first step.



SMIL16MEX0392AA 5

Dozer blade control lever

⚠ WARNING

Hazard to bystanders!
ALWAYS make sure the work area is clear of bystanders and domestic animals before starting this procedure. Know the full area of movement of the machine. Do not permit anyone to enter the area of movement during this procedure.
Failure to comply could result in death or serious injury.

W0245A

The dozer blade control lever is located on the right-hand console.
The basic operation of dozer blade control lever are the following:

- push the dozer blade control lever forward **(A)** to lower the dozer blade.
- pull the dozer blade control lever rearward **(B)** to raise the dozer blade.

The operation of the dozer blade stops when the lever is released. The lever returns to the neutral position.

Use the blade only for light work such as dozing of soft soil or mud.

Do not forcibly push down or dig deeply with the blade.

When operating in an area with many rocks and stones, pay attention not to damage the blade.

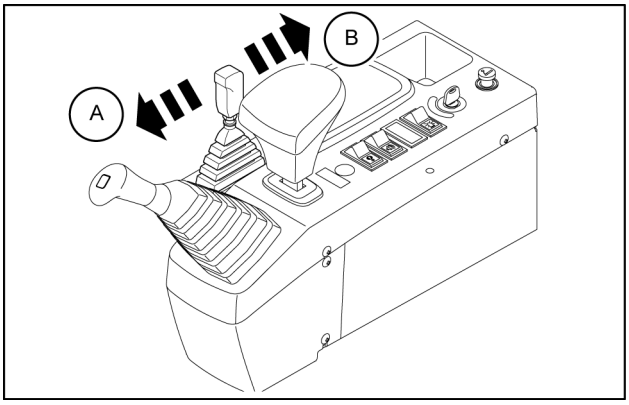
NOTICE: *during blade operations, avoid application of concentrated or lateral load to the blade. Severe damages may be caused to the blade structure.*

When the blade is used as an outrigger during the operation, check that the ground has the sufficient strength, and be sure that the edge surface of the blade is contacting the ground uniformly. Severe damages may be caused to the blade structure if the machine is supported only at one side of the blade.

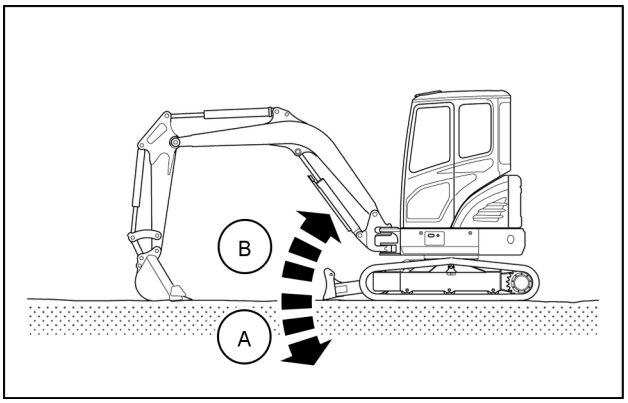
NOTICE: *make sure to lower the blade to the ground before stopping machine operation.*

If the engine is stopped with the blade in raised position, it is still possible to lower the blade proceeding as follows:

1. Turn the starter key to ON position.
2. Set the safety lock lever in forward position.
3. Push the blade control lever to lower the dozer blade.



SMIL16MEX1426AB 1



SMIL16MEX0040AA 2

Instrument cluster

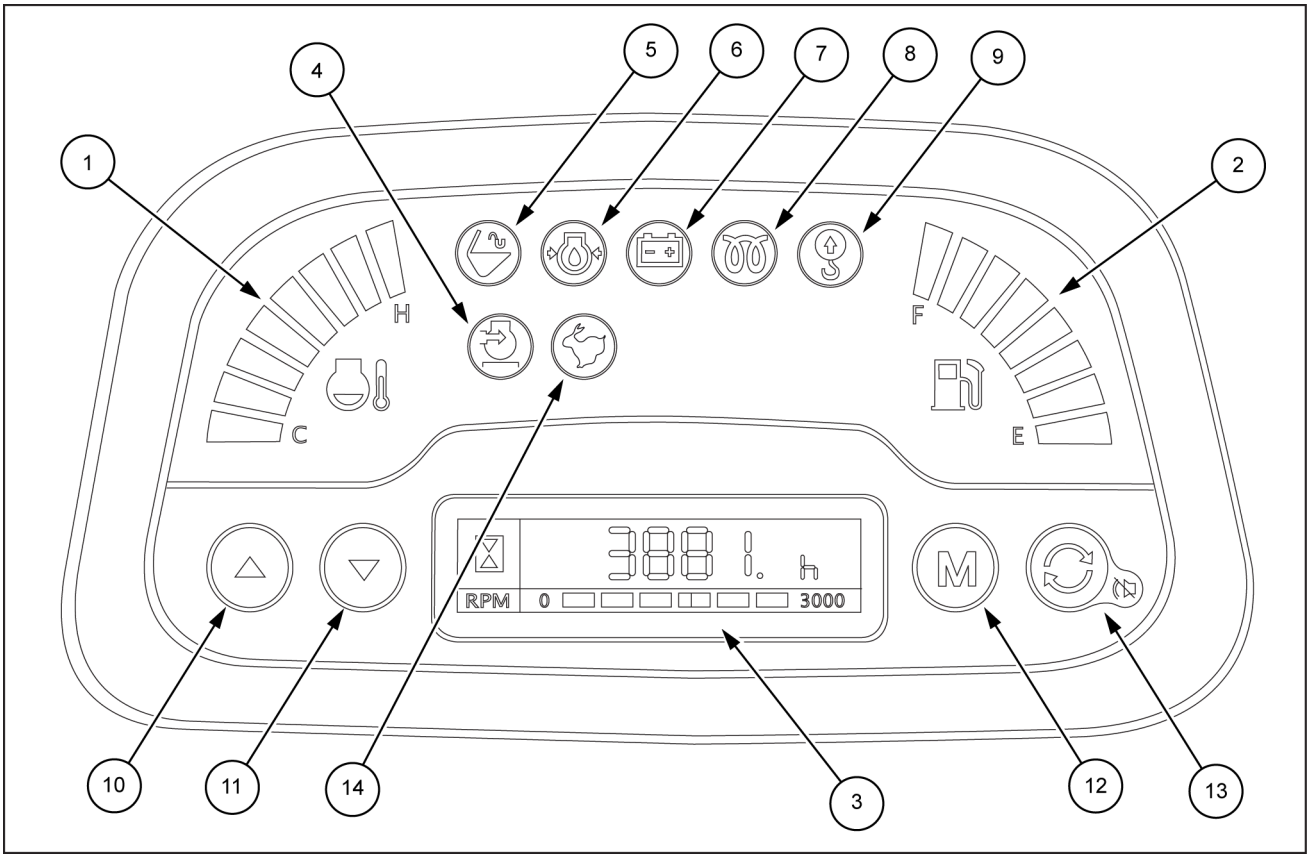
The instrument cluster consists of gauges and lights as shown below, to warn the operator in case of abnormal machine operation or conditions for the appropriate operation and inspection.

Gauges: indicate operating status of the machine.

Warning lights: indicate abnormality of the machine (red).

Pilot lights : indicate operating status of the machine.

NOTE: *the cluster installed on this machine does not entirely guarantee the condition of the machine. Daily inspection should be performed. When the cluster provides a warning, immediately check the problem and perform the required action*



SMIL16MEX1500FB 1

1. Engine coolant temperature gauge
2. Fuel gauge
3. Main display
4. Air cleaner warning light
5. Hydraulic quick coupler unlock pilot light
6. Engine oil pressure warning light
7. Battery charging warning light
8. Engine pre-heat pilot light
9. Overload warning light
10. Up/left–hand button
11. Down/right–hand button
12. Menu button
13. Enter and buzzer stop button
14. High speed travel light

1. Engine coolant temperature gauge

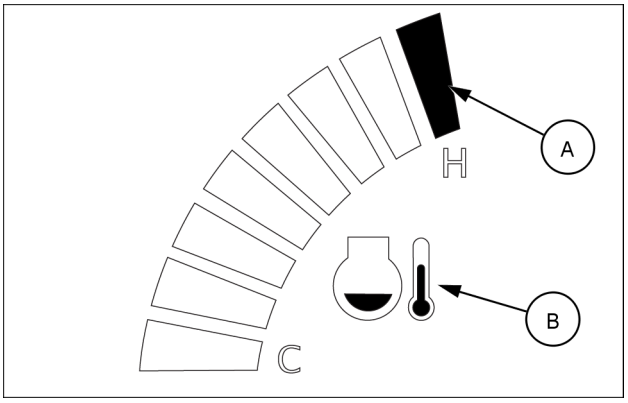
The engine coolant temperature gauge indicates the temperature of the coolant.

The red range **(A)** lights on when the temperature is above **115 °C** (**239 °F**)

The warning light **(B)** appears and a buzzer sounds when the temperature is above **115 °C** (**239 °F**).

When the red range **(A)** and the warning light **(B)** are ON, do not stop abruptly the engine, but run the engine at medium speed to allow it to cool gradually, then stop the engine.

NOTICE: *if the engine is stopped without cooled down running, the temperature of engine parts will rise suddenly, and this can cause severe engine trouble.*



SMIL16MEX0379AA 2

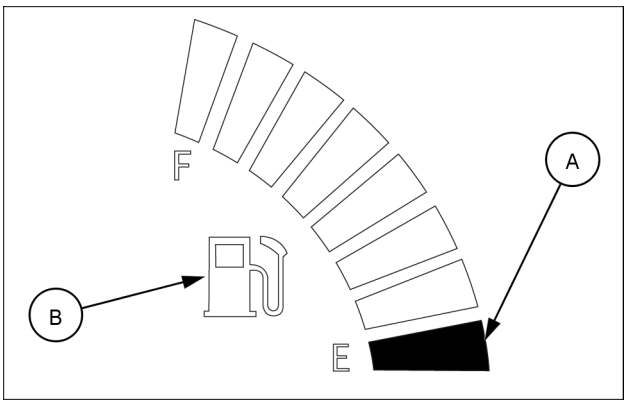
2. Fuel gauge

The fuel gauge indicates the amount of fuel in the fuel tank.

The red range **(A)** and the warning light **(B)** turn ON and a buzzer sounds when the level of fuel is below **5.5 L** (**1.5 US gal**).

Fill the fuel when the red range **(A)** shows and the warning light **(B)** is ON.

NOTICE: *if the fuel gauge illuminates the red range or the warning light is ON even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.*



SMIL16MEX0380AA 3

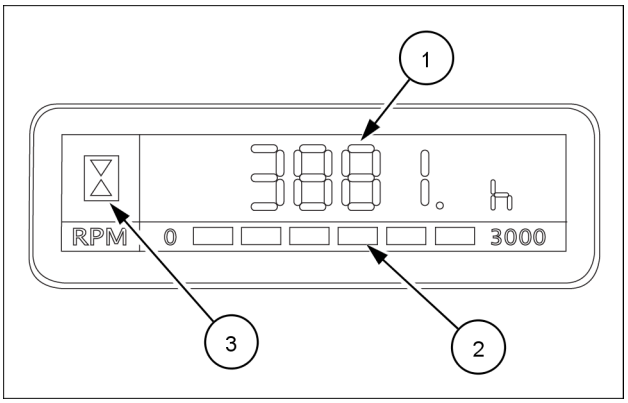
3. Main display

The service meter **(1)** shows the total operation hours of the machine.

NOTE: *always ensure the operating condition of the service meter during the machine operation.*

The engine RPM **(2)** displays the engine speed.

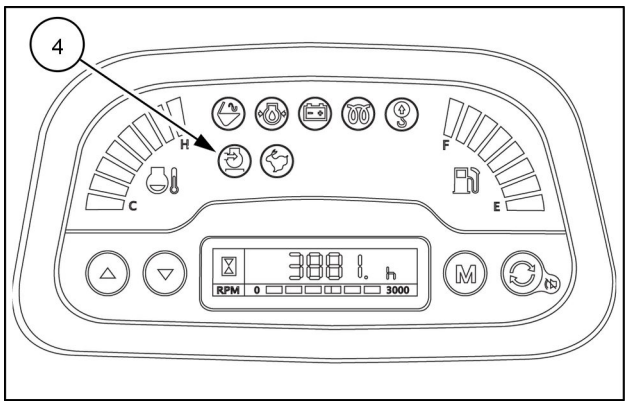
The engine run status **(3)** displays the engine run status.



SMIL16MEX0381AA 4

4. Air cleaner warning light

The air cleaner warning red light **(4)** is ON when the filter of the air cleaner is clogged.

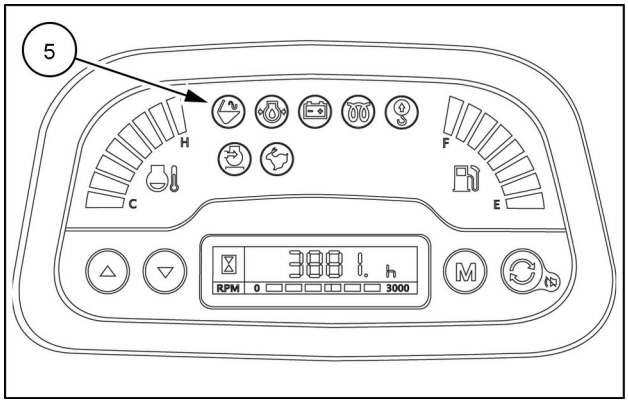


SMIL16MEX1501AA 5

5. Hydraulic quick coupler unlock pilot light

The hydraulic quick coupler unlock pilot red light **(5)** is ON and the buzzer sounds when the activation switch of the hydraulic quick coupling system is turned ON.

When the activation switch is turned OFF, the red light **(5)** turns OFF and the buzzer stops.

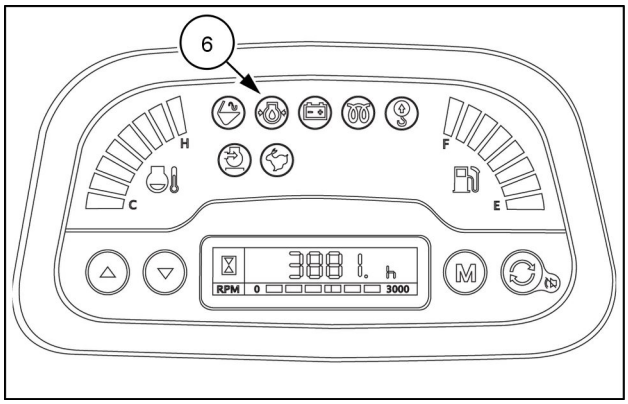


SMIL16MEX1501AA 6

6. Engine oil pressure warning light

The engine oil pressure warning red light **(6)** is ON and the buzzer sounds when the oil pressure is low.

If the red light **(6)** is ON during engine operation, stop the engine immediately.

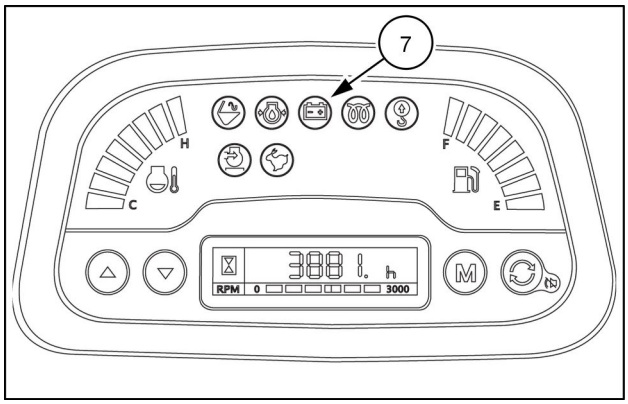


SMIL16MEX1501AA 7

7. Battery charging warning light

The battery charging warning red light **(7)** is ON and the buzzer sounds when the starter switch is ON. The red light **(7)** will turn OFF after starting the engine.

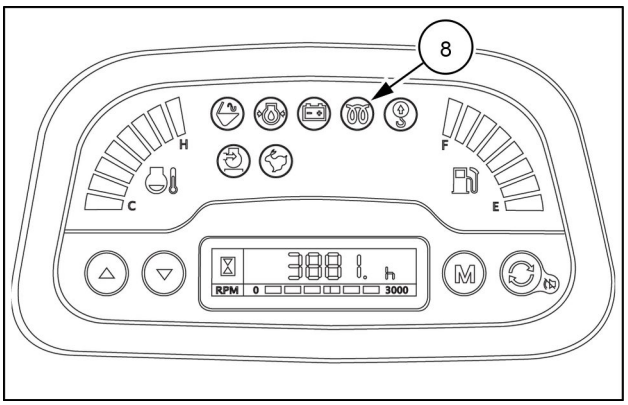
Check the battery charging circuit when this light blinks during engine operation.



SMIL16MEX1501AA 8

8. Engine pre-heat pilot light

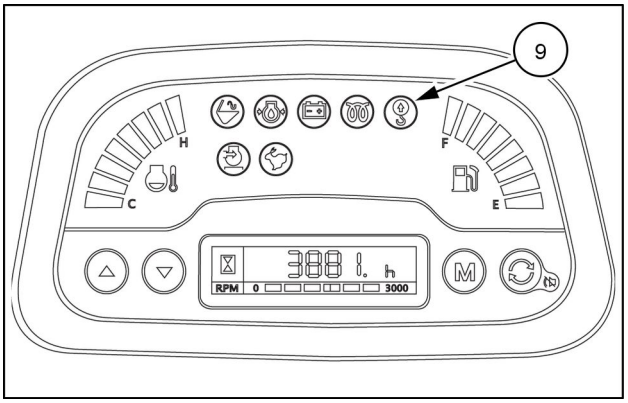
When the starter switch is in the HEAT position, the engine pre-heat orange pilot light **(8)** is ON.



SMIL16MEX1501AA 9

9. Overload warning light

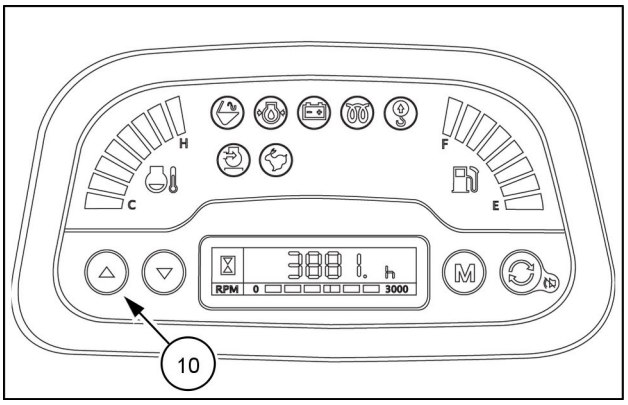
The overload warning red light **(9)** is ON when the machine is overloaded. The overload warning alarm is intended to avoid lifting of excessive loads.



SMIL16MEX1501AA 10

10. Up/left–hand button

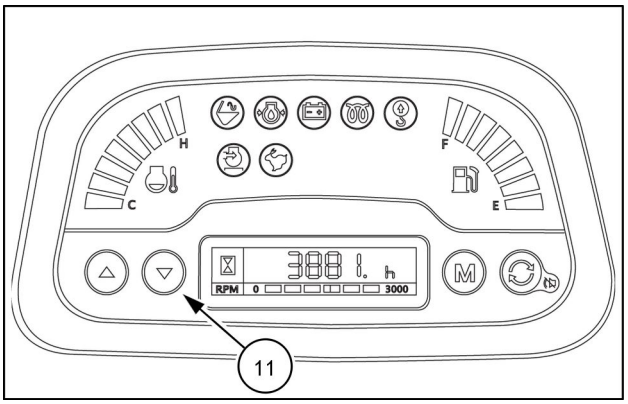
Press the button **(10)** to navigate up or left within the display, and to increase an input value.



SMIL16MEX1501AA 11

11. Down/right–hand button

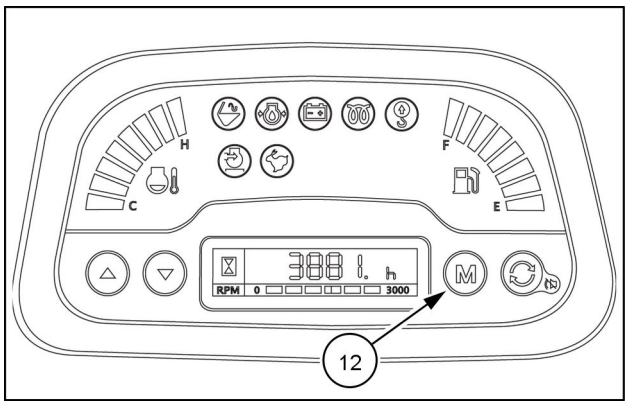
Press the button **(11)** to navigate down or right within the display, and to decrease an input value.



SMIL16MEX1501AA 12

12. Menu button

Press the button **(12)** to show the next display on the main display.

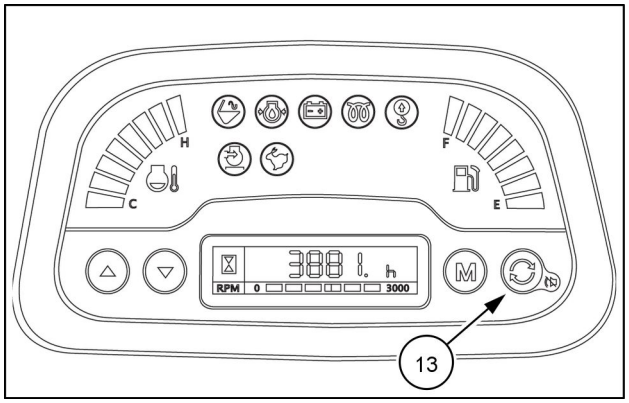


SMIL16MEX1501AA 13

13. Enter and buzzer stop button

Press the button **(13)** to select the menu.

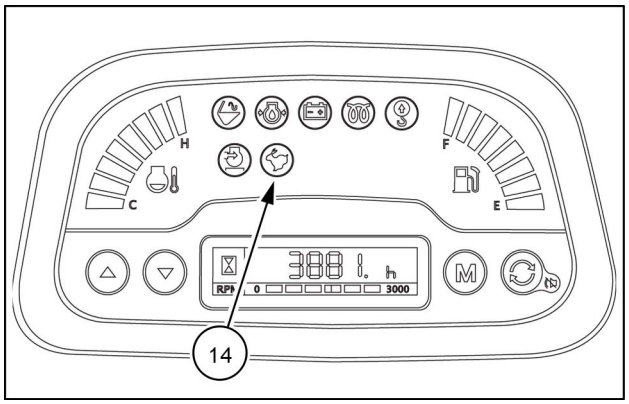
Press the button **(13)** to stop the buzzer when the buzzer sounds.



SMIL16MEX1501AA 14

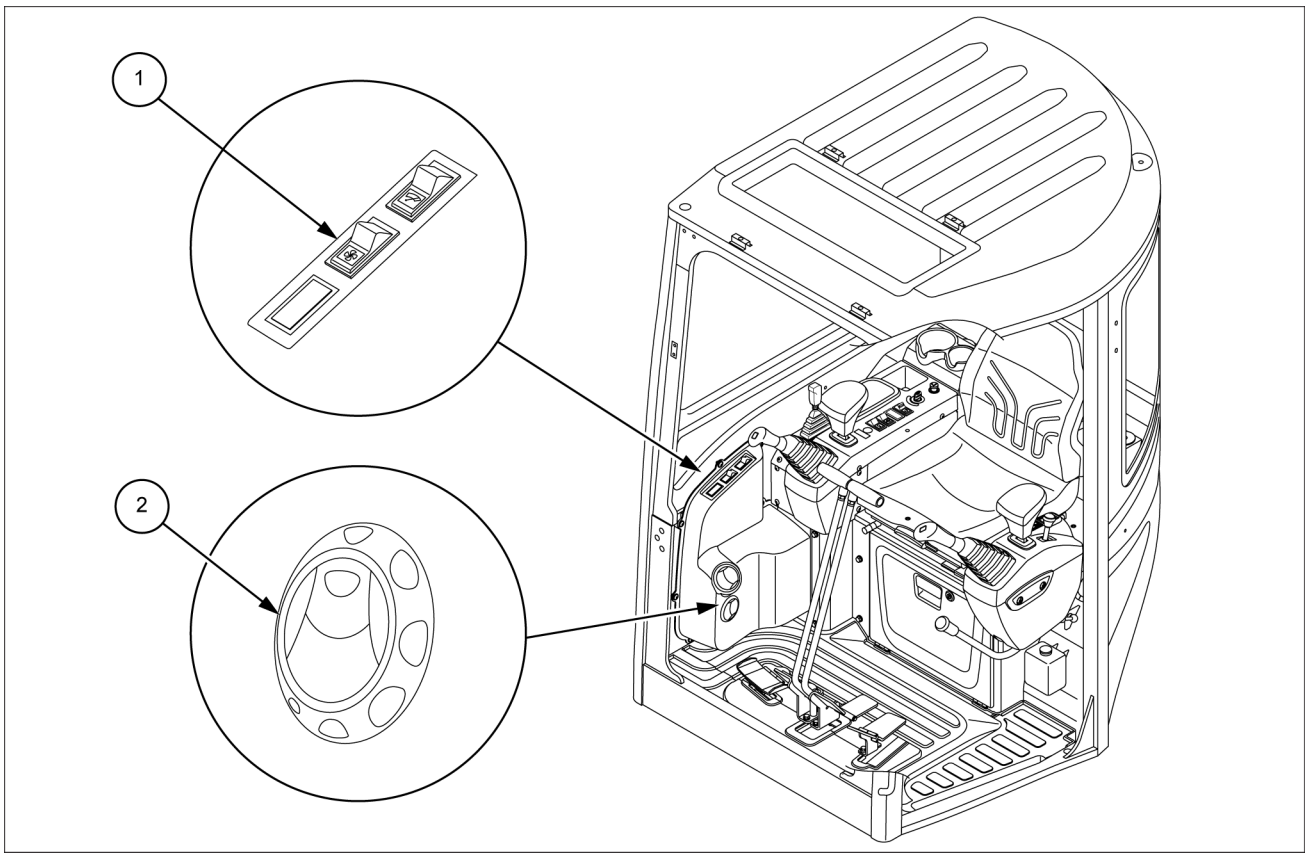
14. High speed travel light

The high speed travel light **(14)** is ON when the high speed mode is selected by means of the travel mode selector switch located on the right-hand travel lever.



SMIL16MEX1501AA 15

Ventilation and heating



SMIL16MEX0387FB 1

The heater switch **(1)** activates two different speeds of ventilation.
The first step activates the low fan speed of ventilation.
The second step activates the high fan speed of ventilation.

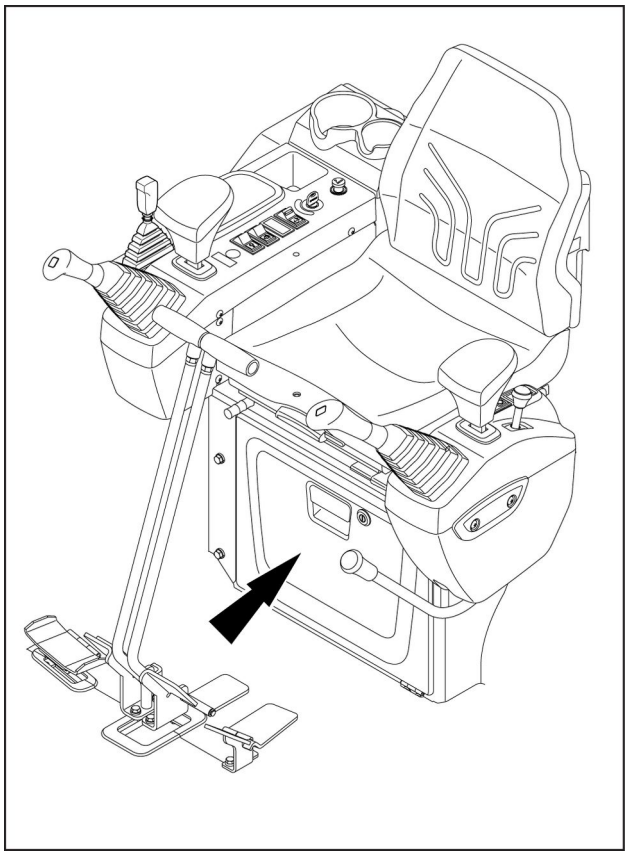
The outlet control louvers **(2)** allows the operator to control the direction of air.
The outlet control louvers can be closed or open.

Rearward controls

Storage compartment

Located below the operator's seat, this compartment is used to store various objects.

Lock and unlock the storage compartment with the starter key.



SMIL16MEX1495BA 1

Overhead controls

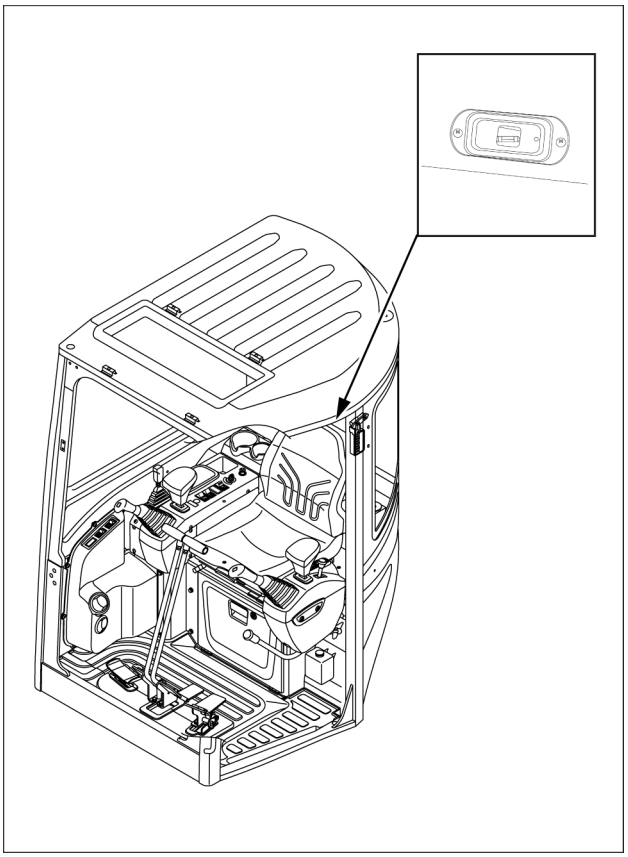
Cab internal lighting

The room light **(A)** can turn ON and OFF as you open and close the door.

The room light selection switch is equipped to select either one of the following status:

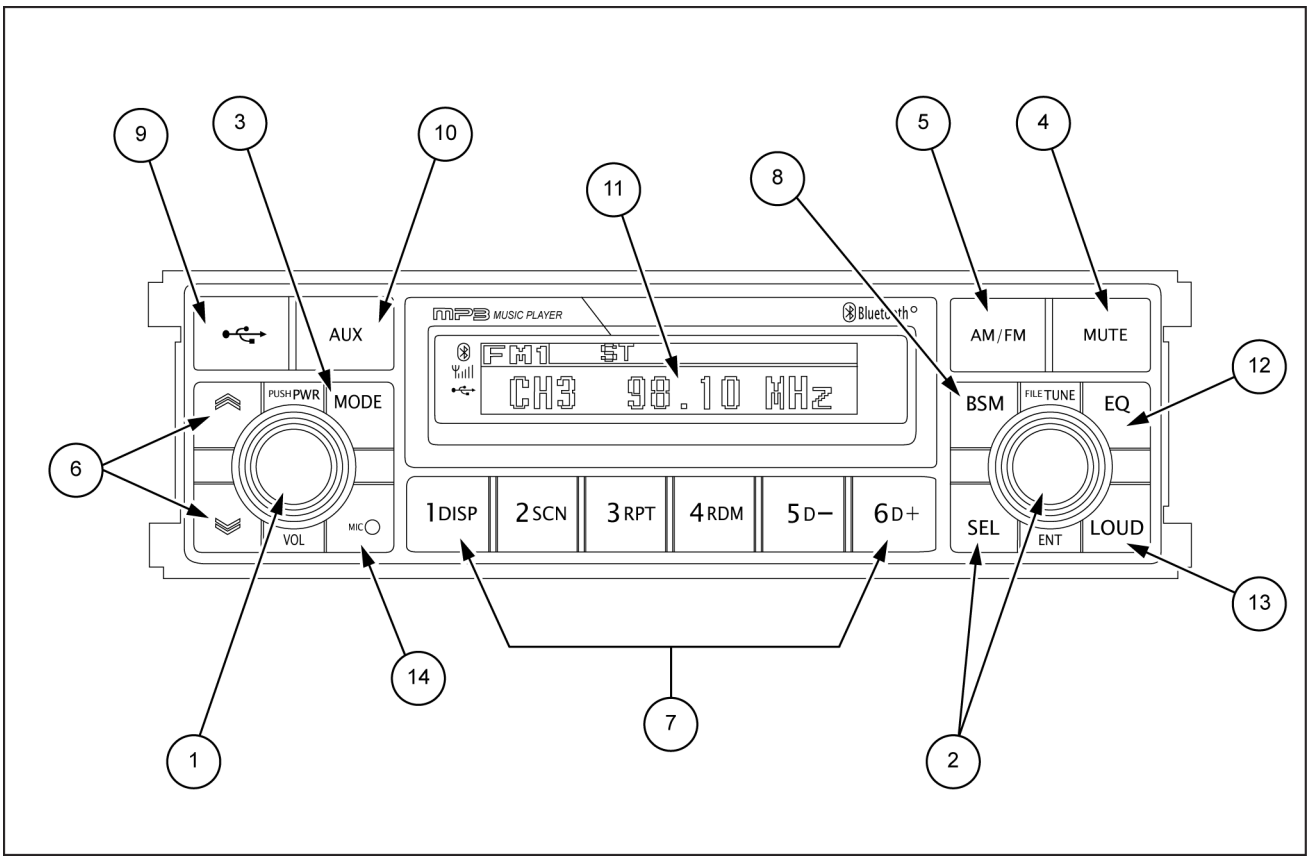
- OFF: the light is turned off always.
- ON: the light is turned on always.

NOTICE: *make sure that the cab internal lighting is turned off after using it. Leaving it turned on may drain out the battery.*



SMIL16MEX1428BA 1

Radio



SMIL16MEX0393FB 1

(1) Power and volume knob

(2) Audio selection knob and (SEL) button

(3) MODE button

(4) Audio MUTE button

(5) AM/FM selection button

(6) UP/DOWN tuning button

(7) Pre-set memory buttons

(8) Pre-set scan (PS) / Best Station Memory (BSM) button

(9) USB function

(10) Auxiliary (AUX) function

(11) Liquid Crystal Display (LCD) screen

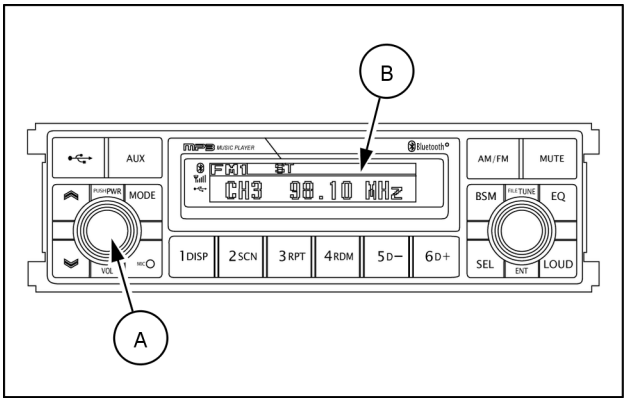
(12) Equalizer (EQ) button

(13) Loud button

(14) Microphone (MIC)

General

(1) Power and volume knob



SMIL16MEX3084AA 2

Power ON/OFF button

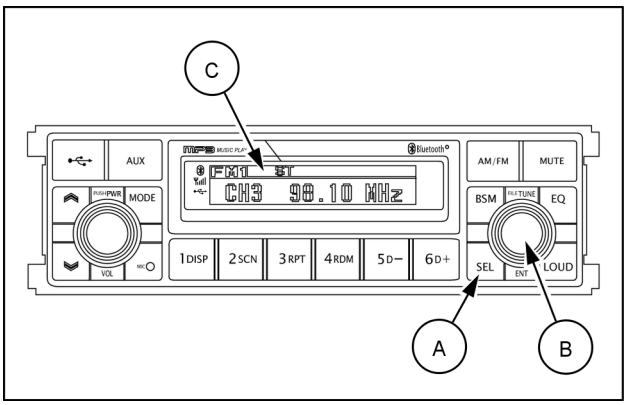
Press the power button **(A)** to turn the unit ON or OFF shortly. When the power is ON, the previous mode (last memory) will appear.

Volume up / down control

Turn the volume up/down button **(A)** right-hand to increase the volume level. The level will be shown in VOLUME xx on the LCD screen **(B)** .

Turn the volume up/down button **(A)** left-hand to decrease the volume level. After **5 s** of volume indication, the LCD screen **(B)** will return to the previous mode.

(2) Audio selection knob and (SEL) button



SMIL16MEX3084AA 3

The audio selection knob **(B)** allows you to adjust the sound. Each time you press SEL button **(A)** shortly, the LCD screen **(C)** shows each mode as follows:

- BASS
- TREBLE
- BAL (Balance)

NOTE: *when the button **(A)** is pressed, LCD screen **(C)** shows the selected function for **5 s** and then returns back to the previous mode. On selected function, level can be controlled by turning this button. The display will automatically return to normal indication in **5 s** after the last adjustment is made or when another function is activated.*

BASS control

To adjust the bass level, first select the bass mode by pressing the SEL button **(A)** until BASS indication appears on the LCD screen **(C)**.

Within **5 s** of choosing the BASS mode, turn the selection knob **(B)** right–hand/left-hand to adjust the bass level as desired. The BASS level will be shown on the LCD screen **(C)** from a minimum of BASS –10 to a maximum of BASS +10.

The LCD screen **(C)** will automatically return to the normal indication in **5 s** after the last adjustment or when another function is activated.

TREBLE control

To adjust the TREBLE level, first select the TREBLE mode by pressing the SEL button **(A)** until TREBLE indication appears on the LCD screen **(C)**.

Within **5 s** of choosing the TREBLE mode, turn the selection knob **(B)** right–hand/left-hand to adjust the TREBLE level as desired. The TREBLE level will be shown on the LCD screen **(C)** from a minimum of TREBLE -10 to a maximum of TREBLE +10.

The LCD screen **(C)** will automatically return to the normal indication in **5 s** after the last adjustment or when another function is activated.

BALANCE control

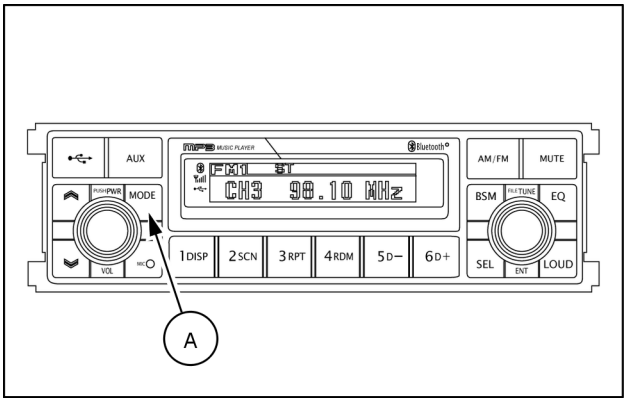
To adjust the left-hand/right-hand speaker balance, first select the BALANCE mode by pressing the SEL button **(A)** until the BAL indication appears on the LCD screen **(C)**.

Within **5 s** of choosing the BALANCE mode, turn the selection knob **(B)** right–hand/left-hand to adjust the BALANCE as desired. The balance position will be shown on the LCD screen **(C)** from BAL 10L (full left) to BAL 10R (full right). When the volume level between the left-hand and the right-hand speakers is equal, BAL L=R will be shown on the LCD screen **(C)**.

The LCD screen **(C)** will automatically return to the normal indication in **5 s** after the last adjustment or when another function is activated.

(3) Mode button

Press the mode button **(A)** to select RADIO / USB / AUX audio.

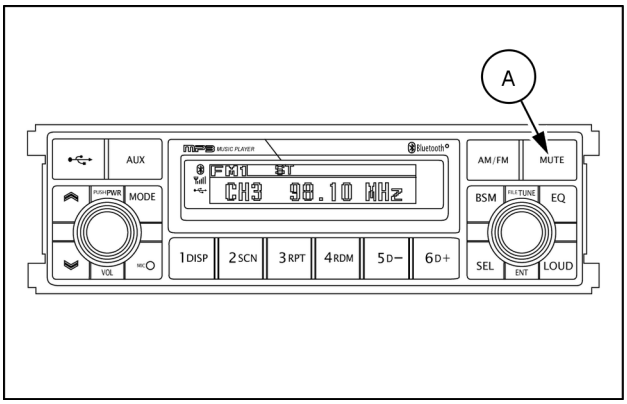


SMIL16MEX3084AA 4

(4) Audio mute button

Press the audio mute button **(A)** momentarily to mute volume and MUTE mark will blink on the LCD screen.

Press the audio mute button **(A)** again to return to the mode in use before the mute mode was activated.



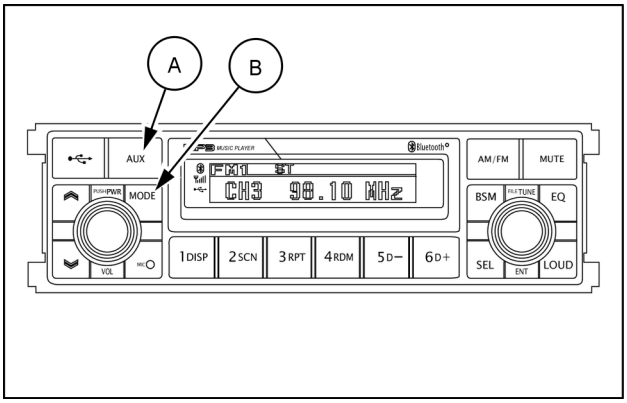
SMIL16MEX3084AA 5

(10) AUX function

If you want to listen to music from an external audio device, open the cover **(A)** of the AUX function, connect the external audio device using the AUX cable an push the MODE button **(B)** to switch the AUX mode.

If an audio file from an external Audio device is playing, the music sounds through the speakers of the cab.

Push the MODE button **(B)** to switch other radio modes and leave the AUX mode.

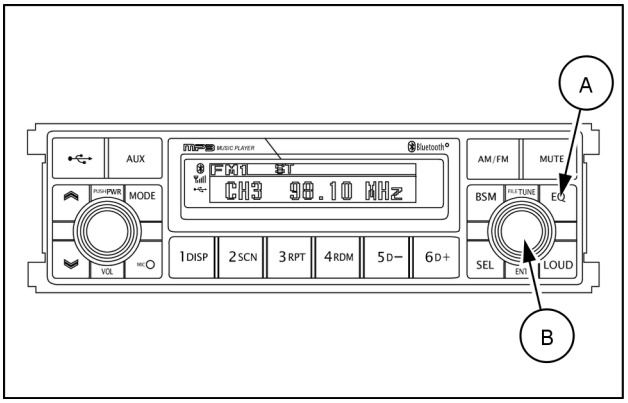


SMIL16MEX3084AA 6

(12) Equalizer (EQ) button

You can select an equalizer curve designed for four music types (POP, ROCK, CLASSIC, JAZZ) by pressing the equalizer (EQ) button **(A)**.

Within **5 s** of choosing the EQ mode, turn the selection knob **(B)** to select an equalizer curve as desired.



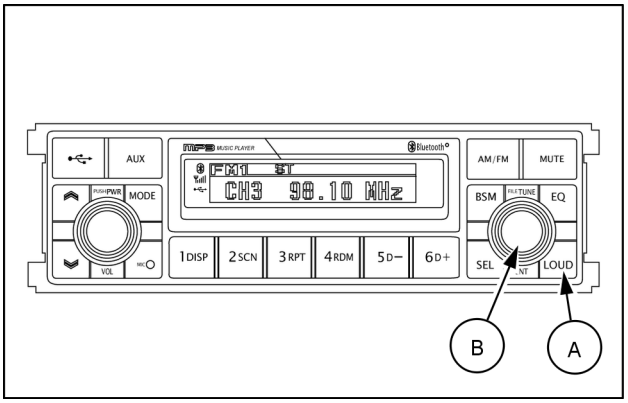
SMIL16MEX3084AA 7

(13) Loud button

When listening to music at low volume levels, this feature will boost the bass and treble response.

This action will compensate for the reduction in bass and treble performance experienced at low volume.

To select the loudness feature, press the loud button **(A)** until LOUD ON or LOUD OFF is displayed, then turn the selection knob **(B)** right–hand/left-hand to activate or deactivate loudness.



SMIL16MEX3084AA 8

Radio

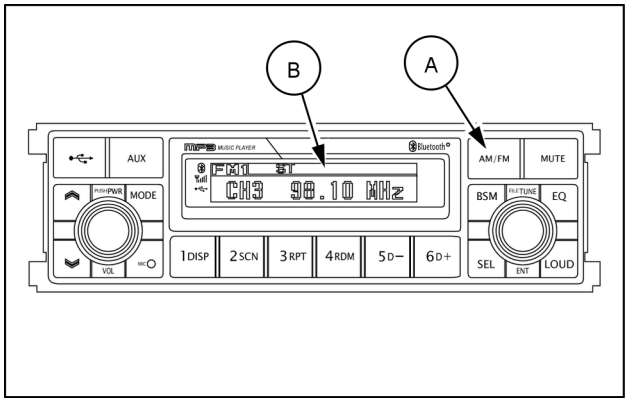
(5) AM/FM selection button

Press the selection button **(A)** to change the radio band.

Each time the selection button **(A)** is pressed, the LCD screen **(B)** shows the bands as follows :

- FM1
- FM2
- FM3
- AM
- LW

NOTE: *LW band is only available for Europe market.*

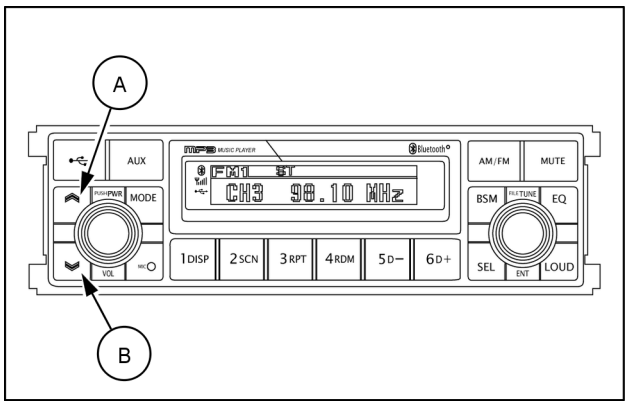


SMIL16MEX3084AA 9

(6) UP/DOWN tuning button

To automatically select a radio station, momentarily press the up tune seek button **(A)** or down tune seek button **(B)** for less than **3 s** to search for the closest radio station.

To manually select a radio station, press the up tune seek button **(A)** or down tune seek button **(B)** for longer than **3 s**. The radio frequency will move up or down step by step each time you press button.

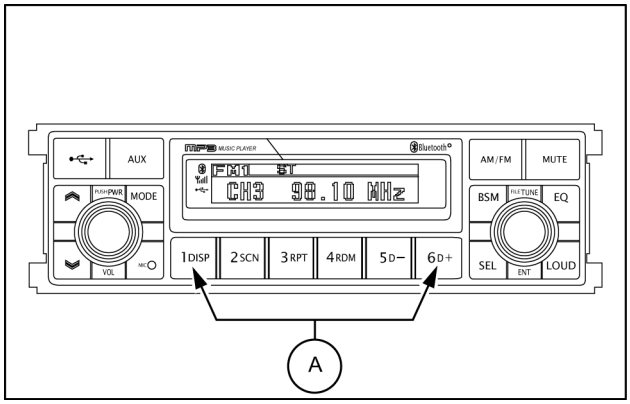


SMIL16MEX3084AA 10

(7) Pre-set memory button

1. Pre-set memory button 1, DISP ID3 v2 display
2. Pre-set memory button 2, SCN File scan
3. Pre-set memory button 3, RPT Repeat play selector
4. Pre-set memory button 4, RDM Random play selector
5. Pre-set memory button 5, D- Directory down
6. Pre-set memory button 6, D+ Directory up

Pressing these buttons **(A)** shortly will recall your favorite pre-set radio stations.



SMIL16MEX3085AB 11

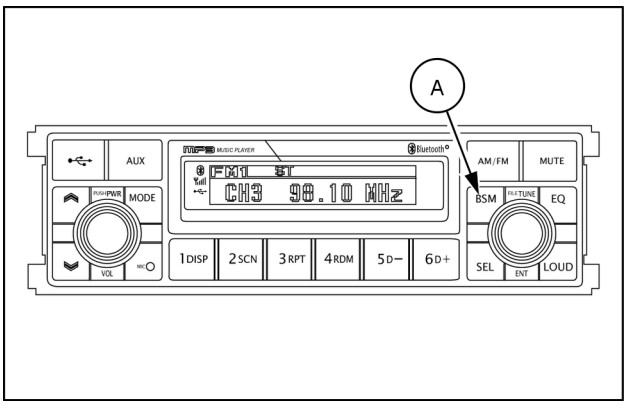
To store your favorite stations into any of the 6 pre-set memories in each band (AM/FM), use the following procedure :

A. Turn the radio ON and select the desired band.

B. Select the first station to be pre-set using the manual up/down or automatic seek tuning control button.

C. Press the chosen pre-set button to store your selected station into and continue to hold it in. The beep sound will be momentarily heard and the pre-set number will appear on the LCD screen indicating that the station is now set into that pre-set memory position and can be recalled at any time, by pressing that pre-set button.

(8) Pre-set scan (PS) / Best Station Memory (BSM) button



SMIL16MEX3084AA 12

Pre-set scan (PS).

Press the BSM button **(A)** shortly to scan the 6 pre-set station stored the memories on each band (AM/FM).

The unit will stop at each pre-set station (the pre-set number on the LCD screen will flash during pre-set scan operation) and remain on the selected frequency.

Press the BSM button **(A)** momentarily again to remain on the station currently being heard.

Best station memory (BSM)

Press the BSM button **(A)** for longer than **2 s** to activate the BSM tuning feature which will automatically scan and enter each station into memory.

If you have already set the pre-set memories to your favorite stations, activating the BSM tuning feature will erase those stations and enter the new ones.

This BSM feature is most useful when traveling in a new area where you are not familiar with the local stations.

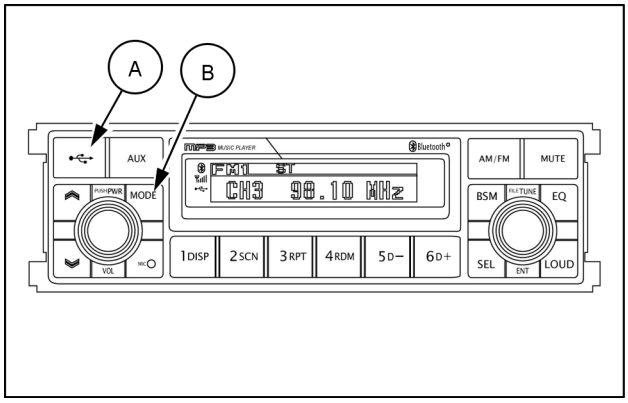
USB player

(9) USB function

Open the cover **(A)** of the USB port, connect a USB device and push the MODE button **(B)** to switch the USB mode if you want to listen to MP3 files stored in a USB device.

The radio will play automatically MP3 files in the USB device while the LCD screen will show “READING USB”.

If there are no files in the USB device, playback will revert back to the previous mode after displaying “NO FILE”.



SMIL16MEX3084AA 13

File selection and cue/review button

File selection function

This button is used to select file up / down.

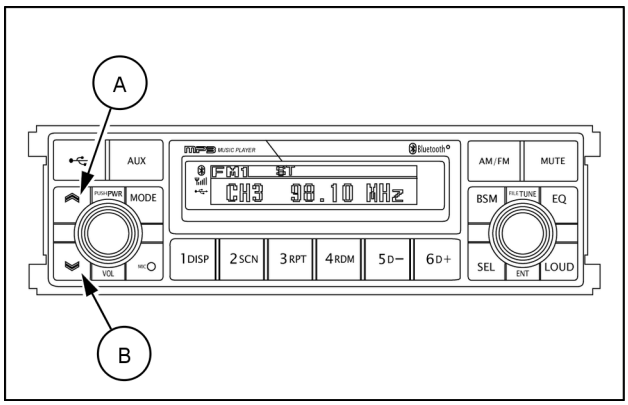
Each time the forward file select **(A)** is pressed, file number is increased.

Each time the backward file select **(B)** is pressed, file number is decreased.

Cue / review functions

High-speed audible search of file on a USB can be made by this button (the cue and review functions).

Press and hold the cue button **(A)** to advance rapidly in the forward direction or the review button **(B)** to advance rapidly in the backward direction.



SMIL16MEX3084AA 14

MP3 directory/file searching

The D- button **(A)** and the D+ button **(B)** are used to select a particular directory and file.

Press and hold for more than **3 s** while playing MP3 file.

Turn right-hand / left-hand the selection knob to search the directory. Press the button when you find the wanted directory.

For example, the directory search generally changes in two methods depending on the order of writing as follows.

Method 1 : ROOT, Dir01, Dir02, Dir03, Dir04, Dir05, Dir06, Dir07, ROOT

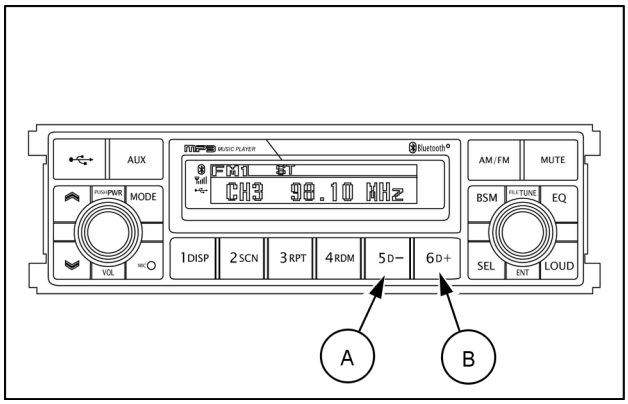
Method 2 : ROOT, Dir01, Dir02, Dir05, Dir03, Dir06, Dir04, Dir07, ROOT

If you want to search the file in the located directory, turn right-hand / left-hand the selection knob consecutively. Press the button when you find the wanted file. The unit will then play the selected file.

For instance, the file search changes in Dir01 as follows.

File01, File02, File03, File04, File01

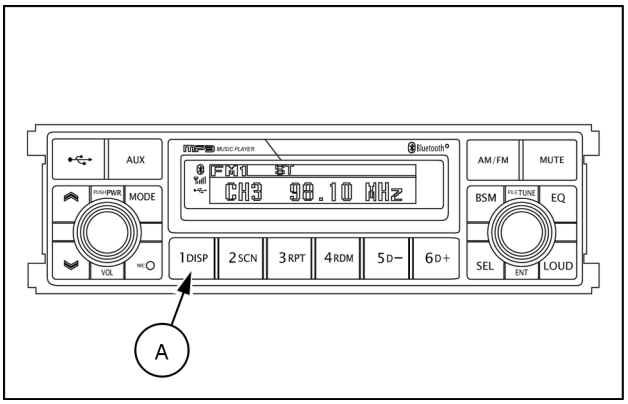
MP3 directory / file configuration



SMIL16MEX3084AA 15

ROOT												
Directory01												
File01	File02	File03	File04	Dir02			Dir03			Dir04		
				File05	File06	Dir05	File07	File08	Dir06	File09	File10	Dir07

ID3 v2 display



SMIL16MEX3084AA 16

Disp button **(A)** is used to change the display information.

While playing an MP3 file, you can change the file information shown on the LCD screen.

Each time you press DISP (display) **(A)**, the display changes to show the following.

NOTE: *if the MP3 disc does not have any ID3 information, the display will show NO ID3 on LCD screen.*

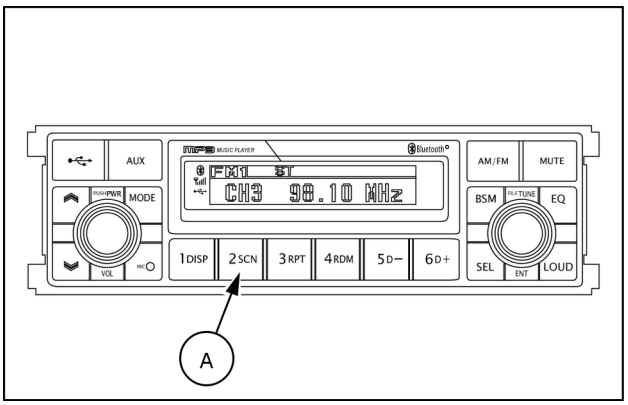
Directory name / file name (normal mode)

Album name / performer / title

File number / elapsed time

Directory name / file name (normal mode)

File scan (SCN)



SMIL16MEX3084AA 17

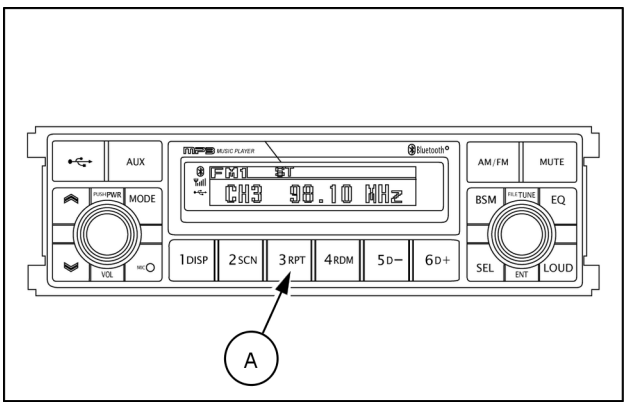
During USB play, press SCN button **(A)** to play the first **10 s** of each file on the whole file on the USB (SCN mark will appear on the LCD screen).

When a desired file is reached, press the SCN button **(A)** again to cancel the function.

The unit will then play the selected file.

NOTE: *in case of playing MP3 file, when the SCN (scan) button is pressed and held for longer than **2 s**, the SCN mark will blink on the LCD screen and all files in the selected directory will be introduced until the file scan mode is cancelled by pressing the SCN button **(A)** again or by activating the random or repeat functions.*

Repeat play selector (RPT)



SMIL16MEX3084AA 18

During USB play, press RPT button **(A)** to play the selected file repeatedly (RPT will appear on the LCD screen).

Play of the file will continue to repeat until this button **(A)** is pressed again and the RPT disappears from the LCD screen.

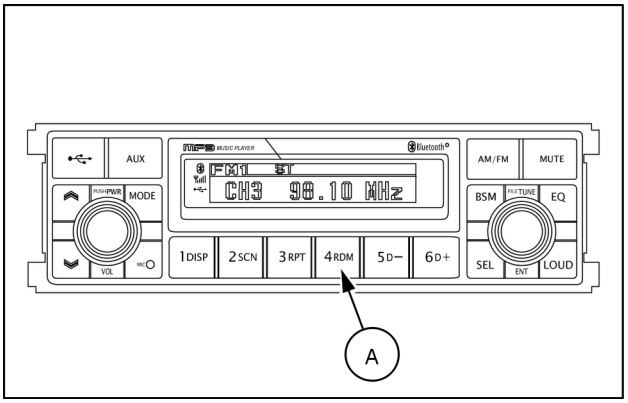
NOTE: *if you press the RPT button and hold the button for more than **2 s** while you play an MP3 file, "RPT" will flash on the display. The system will play all the files in the selected directory on repeat until you cancel repeat mode. To cancel repeat mode, press the RPT button again, or activate the scan or random modes. "RPT" will no longer flash on the display.*

Random play selector (RDM)

During USB play, press RDM button **(A)** to play the files on the USB in a random shuffled order (RDM will appear on the LCD screen). The file select function will also select file in the random order instead of the normal process.

To cancel random play mode, press the RDM button **(A)** again.

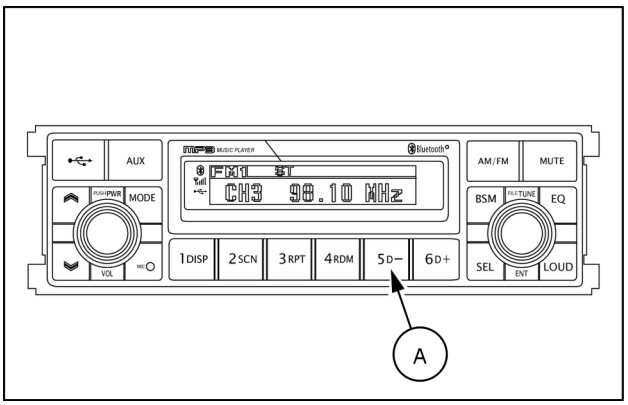
NOTE: *in case of MP3 file, when the random button is pressed and held longer than* ***2 s****, the RDM mark will blink on the LCD screen and play all files in directory randomly until the directory random mode is cancelled by pressing the random button again or by activating the scan or repeat functions (RDM mark will disappear from LCD screen).*



SMIL16MEX3084AA 19

Directory down

Press D- button **(A)** briefly while playing MP3. The previous directory is located each time you press this button.

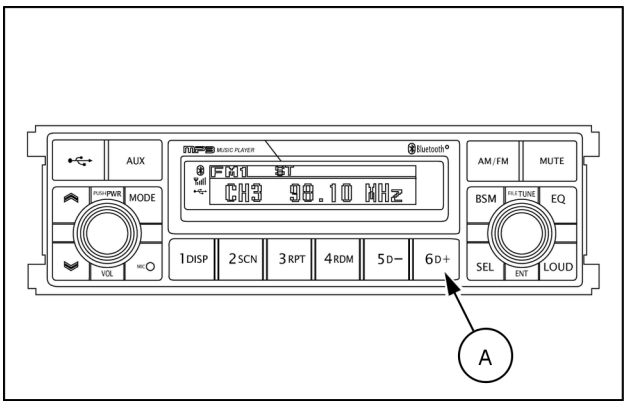


SMIL16MEX3084AA 20

Directory up

Press D+ button **(A)** briefly while playing MP3. The next directory is located each time you press this button.

NOTE: *if the MP3 file does not have a directory, the unit play MP3 at 10-file intervals.*
If any MP3 file does not exist in USB, this button cannot operate.



SMIL16MEX3084AA 21

Exterior controls

Side doors

⚠ WARNING

Moving parts!
Make sure all entry and mechanical access doors are properly closed before operating the machine.
Failure to comply could result in death or serious injury.

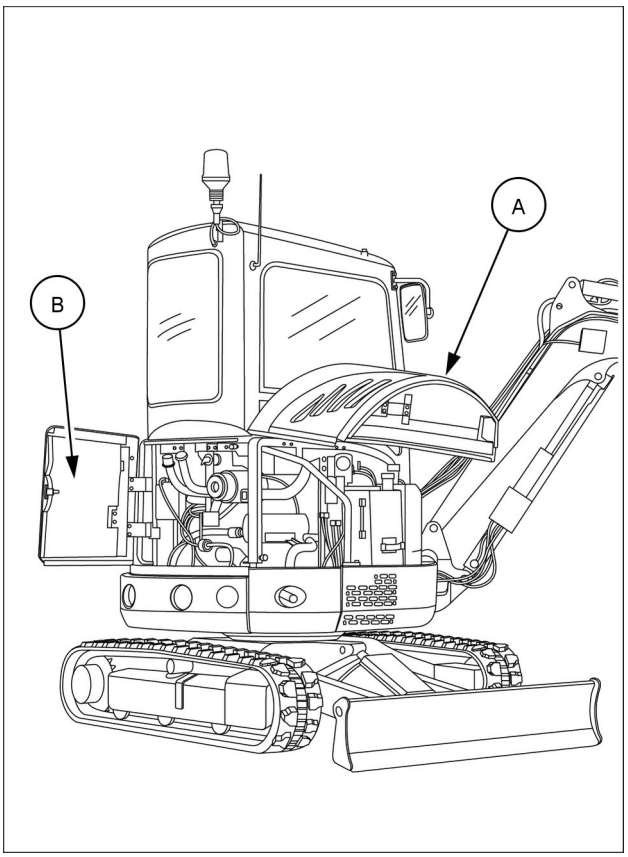
W0238A

Side hood

The side hood **(A)** allows to access to the compartment including the hydraulic oil tank and the fuel tank.

Engine access door

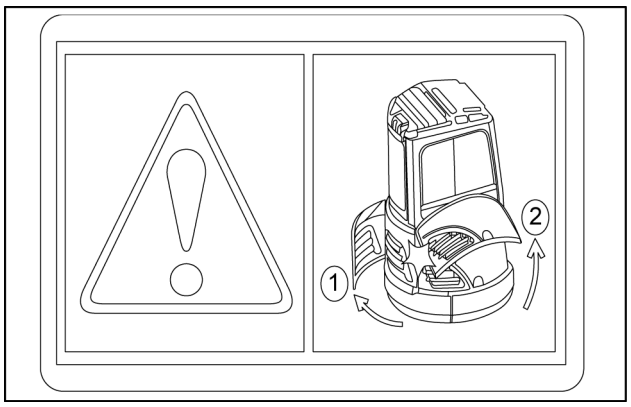
The engine access door **(B)** allows to access to the engine compartment including the filling plugs of the engine oil and the engine coolant, the air cleaner, and the battery disconnect switch.



SMIL16MEX0439BA 1

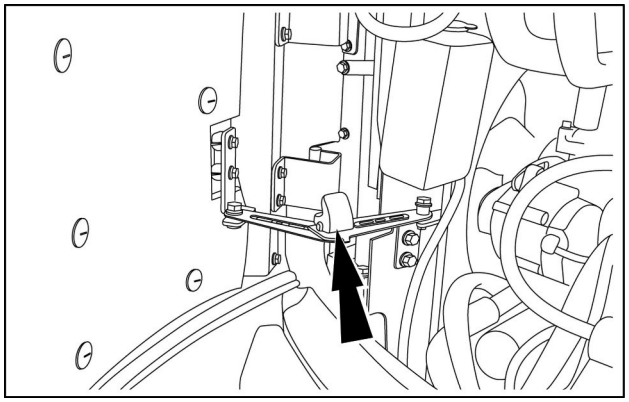
Opening

NOTICE: *if you need to open the right-hand side hood, first open the engine access door and then the right-hand side hood, in order to avoid damage to the seal between the two doors. See the decal located over the side hood handle, and perform the procedure as follows.*



SMIL16MEX0932AA 2

1. Use the starter key to unlock the engine door.
2. Use the handle to open the door and press the hook until the door is completely secured.

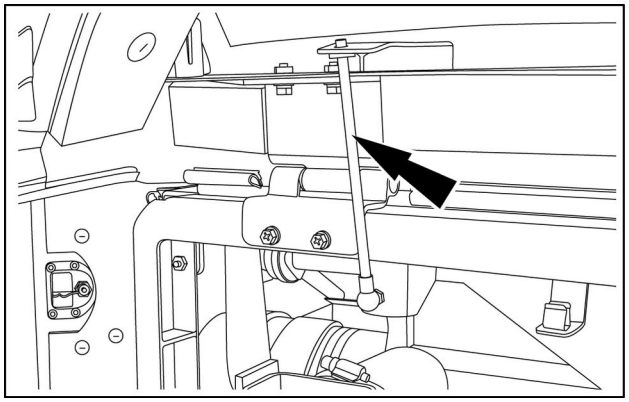


SMIL16MEX0929AA 3

3. Use the starter key to unlock the side hood.
4. Use the hook to gently lift up the hood and use the lifting stem to secure the hood.

   NOTICE: *while lifting the hood, make sure the hood does not contact the cab. Machine damage could result.*

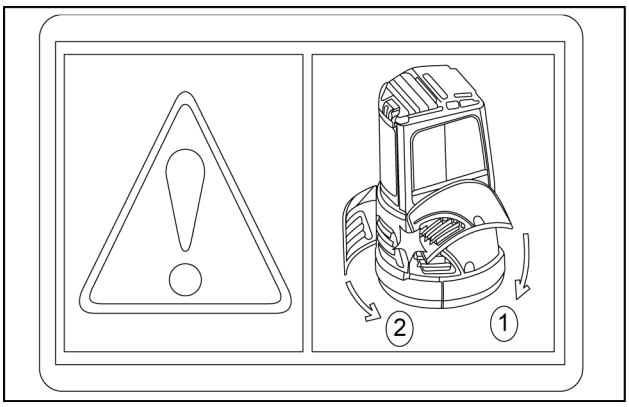
   NOTICE: *never leave tools inside the compartment.*



SMIL16MEX0930AA 4

Closing

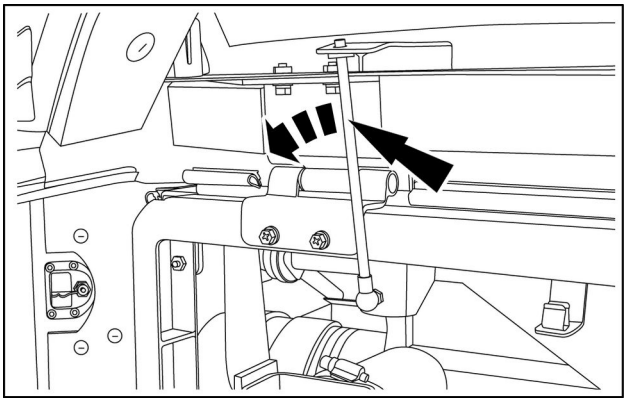
NOTICE: *if you need to close the right-hand side hood, make sure that the engine access door is open. Close first the right-hand side hood and then the engine access door, in order to avoid damage to the seal between the two doors. See the decal located over the side hood handle, and perform the procedure as follows.*



SMIL16MEX0931AA 5

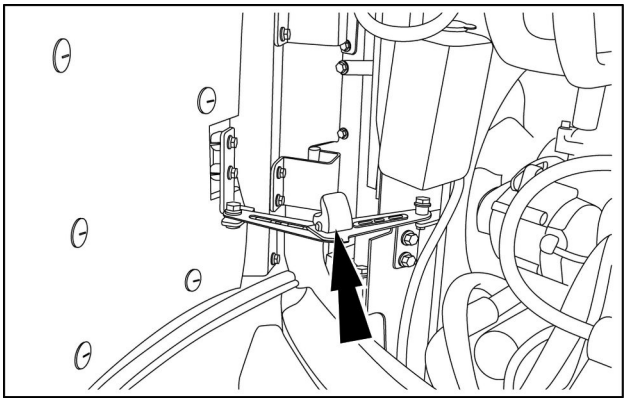
1. Lightly lift up the side hood, lower the lifting stem and use the handle to lower the side hood gently.

   NOTICE: *when you lower the hood, make sure that the hood does not contact the cab. Machine damage could result*
2. Make sure to close the side hood firmly.
3. Use the starter key to lock the hood.



SMIL16MEX0930AA 6

4. Pull the hook in order to unlock the engine access door.
5. Use the handle and close the engine door firmly.
6. Use the starter key to lock the door.



SMIL16MEX0929AA 7

Rear view mirrors

⚠ WARNING

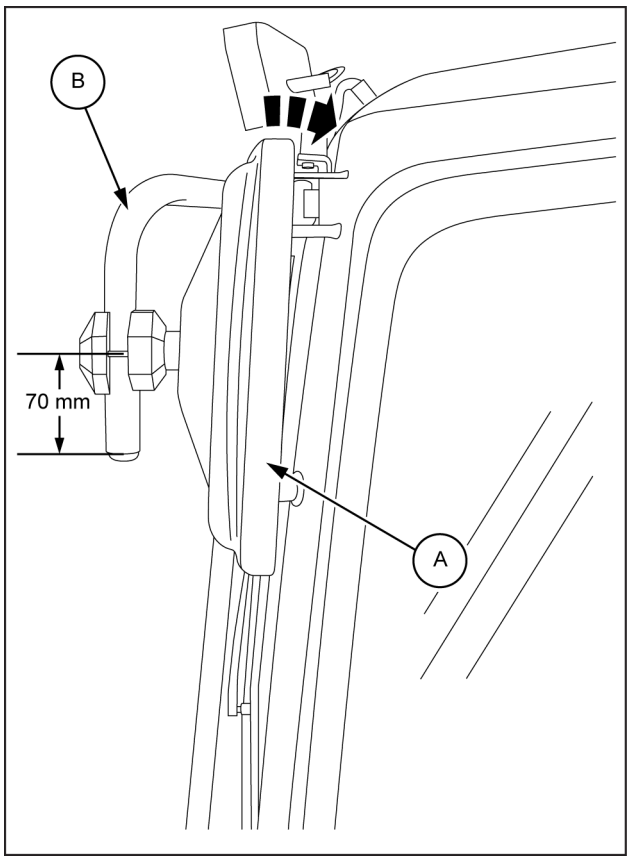
Avoid injury and/or machine damage!
Keep the mirrors clean and properly adjusted.
Failure to comply could result in death or serious injury.

W1078A

Left-hand side mirror

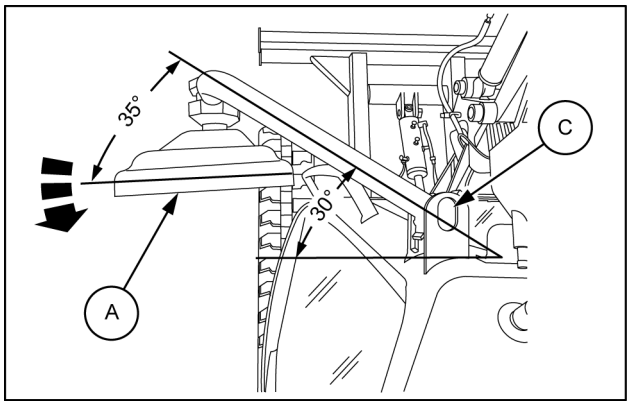
Position the mirror **(A)** on the bracket **(B)** as shown in the figure aside.

Horizontally adjust the mirror location in order to maximize visibility. The mirror inclination depends on the height both of the seat and the operator.



SMIL16MEX1503BB 1

Vertically adjust the mirror location so that the left-rear end of the machine may be visible from the operator's seat. Operate both the mirror **(A)** and the bolt **(C)**.

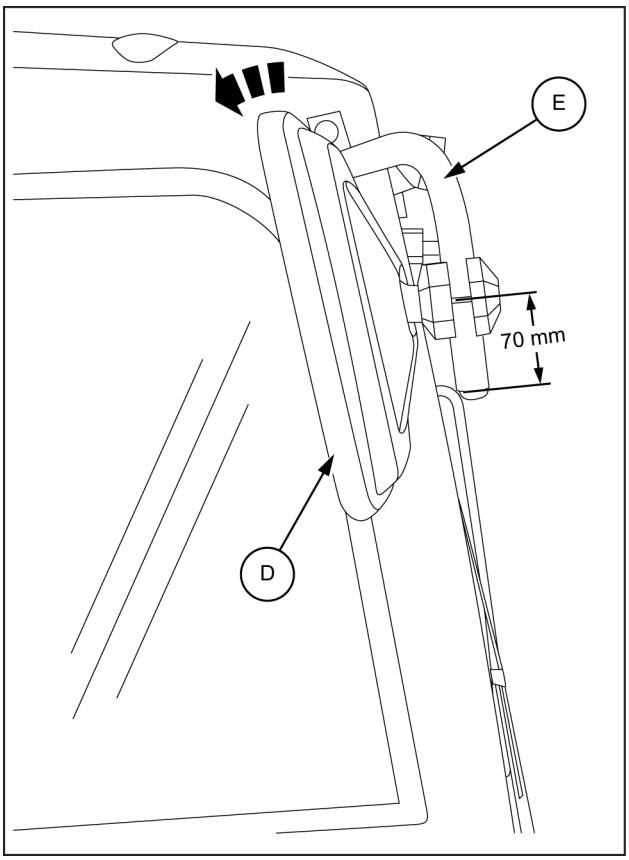


SMIL16MEX1113AB 2

Right-hand side mirror

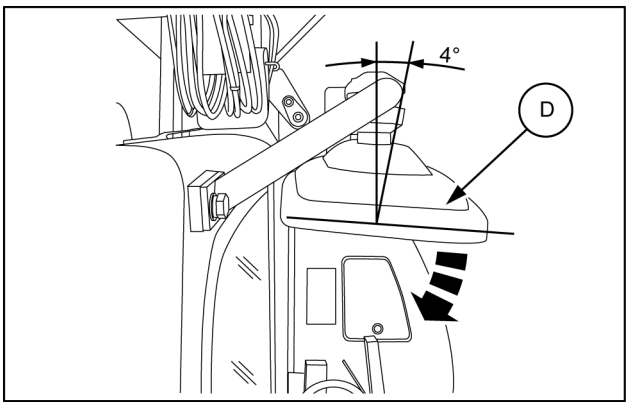
Position the mirror **(D)** on the bracket **(E)** as shown in the figure aside.

Horizontally adjust the mirror location in order to maximize visibility. The mirror inclination depends on the height both of the seat and the operator.



SMIL16MEX1121BB 3

Vertically adjust the mirror location so that the right-rear end of the machine may be visible from the operator's seat. Operate the mirror **(D)**.



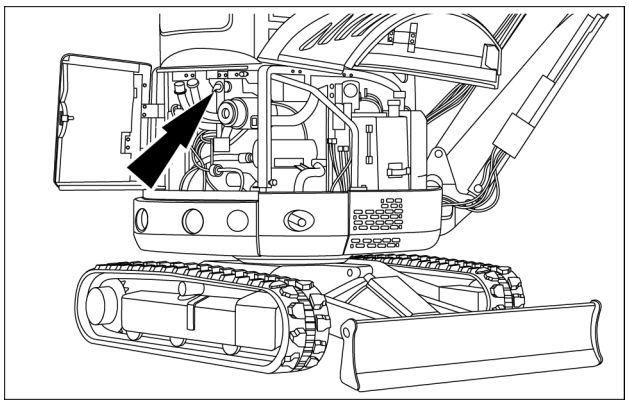
SMIL16MEX1122AB 4

Battery disconnect switch

The battery disconnect switch is located in the engine compartment. Open the engine access door to access to the battery disconnect switch.

The battery disconnect switch allows to cut off any power supply in the electrical system of the machine.

NOTE: *when the switch is turned to OFF position, all electrical circuits are cut off and the stations stored on the radio presets and the time set for the clock will be cleared.*

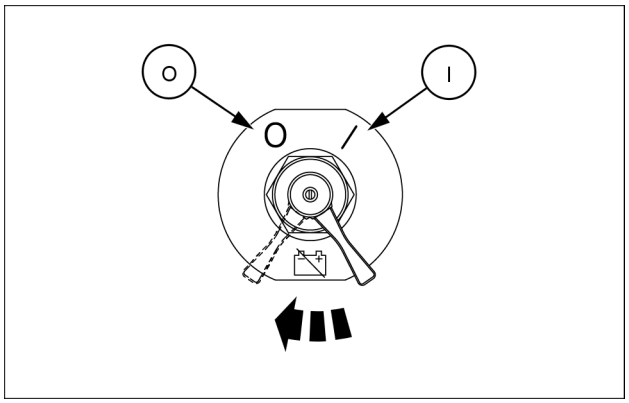


SMIL16MEX0435AA 1

Place the battery disconnect switch in the **(I)** position during normal operation.

Place the battery disconnect switch in the **(O)** position only during the following operations:

- Battery removal
- Electrical system connector removal
- Electrical system service
- Long-term storage
- As required for inspections and repairs
- Welding



SMIL16MEX0410AA 2

NOTICE: *never turn the battery disconnect switch to* ***(O)*** *position with the engine running. This could damage the electrical system.*

NOTICE: *never turn the battery disconnect switch to* ***(O)*** *position within* ***3 min*** *after the starter key is turned off. The machine control system and the engine control system will be damaged.*

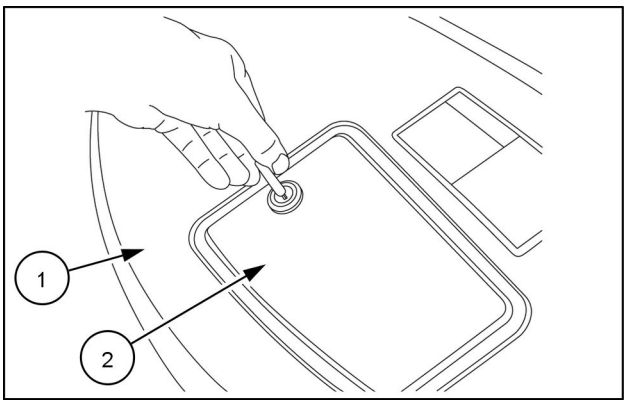
Fuel tank

⚠ WARNING

Fire hazard!
When handling diesel fuel, observe the following precautions:
1. Do not smoke.
2. Never fill the tank when the engine is running.
3. Wipe up spilled fuel immediately.
Failure to comply could result in death or serious injury.

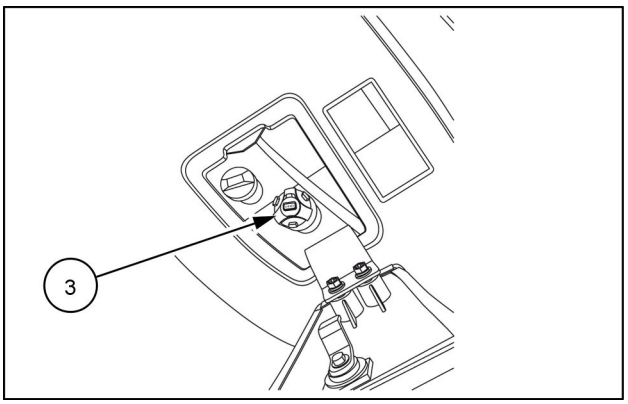
W0099A

Use the starter key to unlock the door **(2)** located in the upper part of the side hood **(1)**.



SMIL16MEX0919AA 1

Open the door **(2)** to gain access to the filling cap **(3)** of the fuel tank.



SMIL16MEX0920AA 2

You can also gain access to the fuel tank **(4)** by opening the side hood.
Use the starter key to unlock the side hood.
Use suitable fuel.

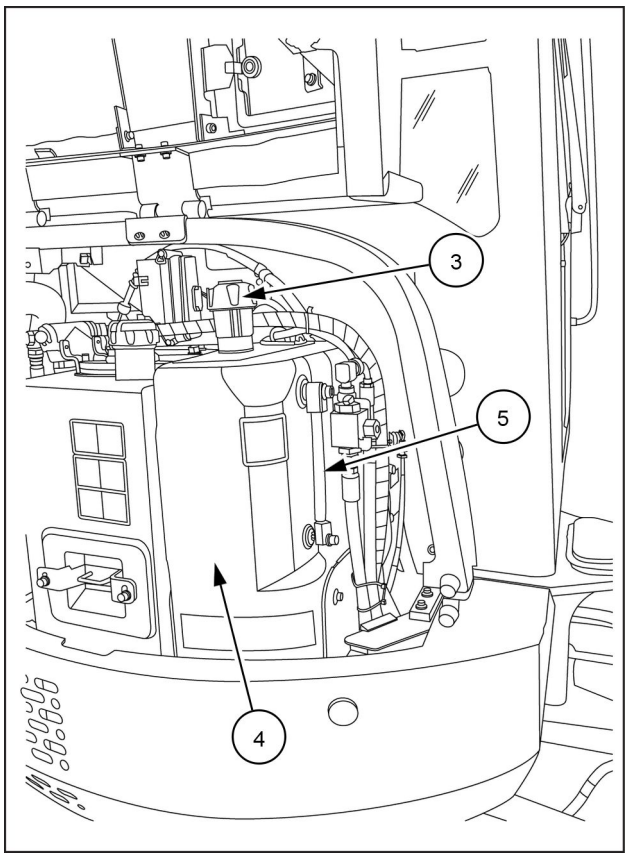
NOTE: *clean around the fuel cap* ***(3)*** *before refueling and do not remove the filter in the neck of the fuel tank.*

NOTICE: *do not put a moisture elimination product (water draining agent) in the fuel tank because It may damage the engine.*

NOTE: *in cold weather, use fuel corresponding to the ambient temperature.*

NOTICE: *in cold weather, fill the fuel tank after each working day to prevent the formation of condensation*

When install the fuel cap **(3)**, be sure to fit it in the neck accurately and then turn it all the way to the stopper to lock it.
The fuel tank is equipped with a maximum level visual gauge **(5)**.



SMIL16MEX0941BA 3

4 - OPERATING INSTRUCTIONS

Starting the unit

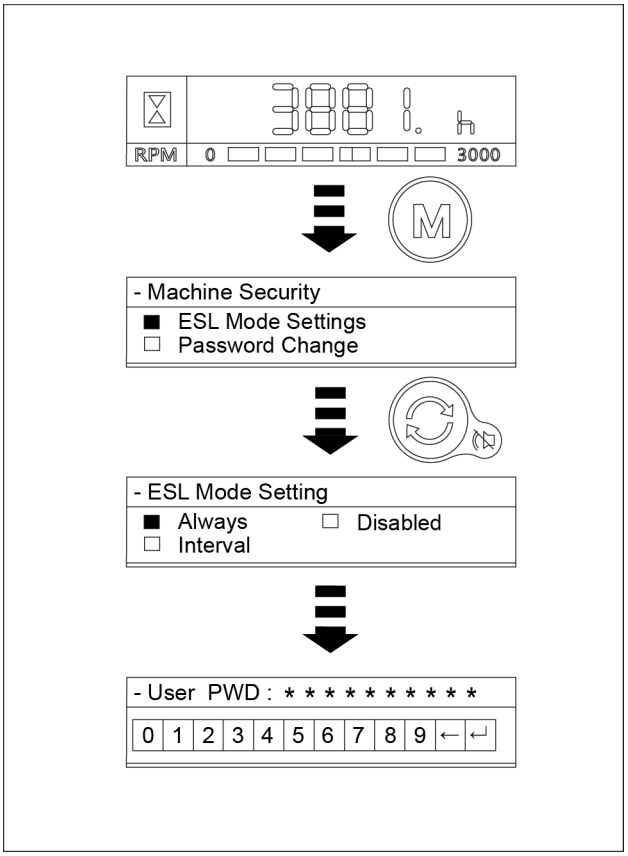
Anti-theft protection

Engine Starting Limit (ESL) mode setting

ESL mode is designed to be a theft deterrent and prevent the unauthorized operation of the machine.
If the ESL mode is selected in “Always” mode, the password is required when the starter switch is turned ON.

- Disabled mode: the ESL function is not used.
- Always mode: the password is required whenever the operator start the engine.
- Interval mode: the password is required when the operator starts the engine first. The operator can restart the engine within the interval time without inputting the password. The interval time can be set maximum 2 days.

For example, if the operator sets 5 minutes interval time, the ESL system is re-activated after 5 minutes time.
If the engine is running, after 5 minutes the engine does not need to be restarted, but the password will be required starting from the subsequent engine start.



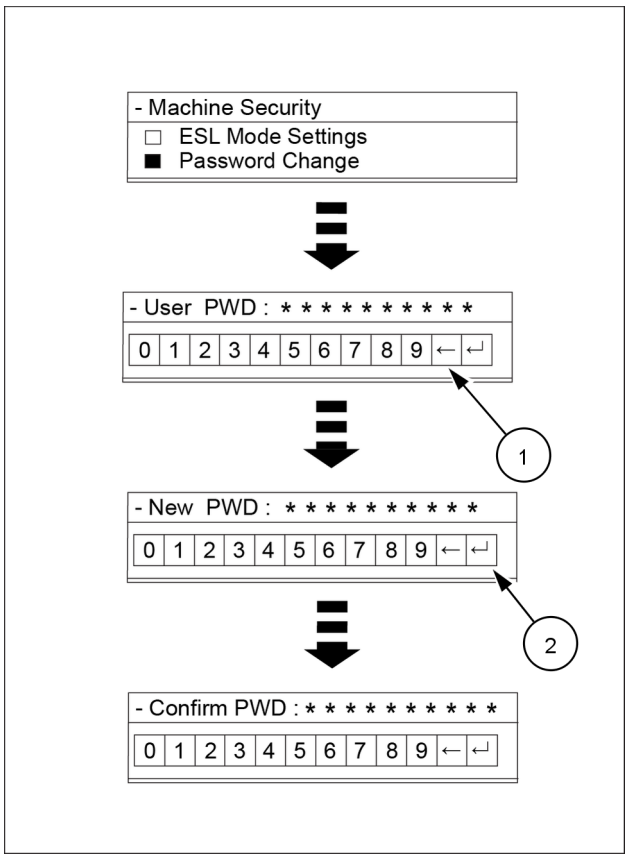
SMIL16MEX0383AA 1

Password change

To change the password, input 5 to 10 digits and press Enter.

1. Delete
2. Enter

NOTE: *the default password is 00000*



SMIL16MEX0384AA 2

Starting the engine

⚠ WARNING

Avoid injury!
Before starting the engine, securely fasten the seat belt. The seat belt can help ensure your safety if it is properly used and maintained. Never wear a seat belt loosely or with slack in the belt system. Never wear the belt if it is twisted or pinched between the seat structures.
Failure to comply could result in death or serious injury.

W0142A

⚠ WARNING

Hazard to bystanders!
Make sure the area surrounding the machine is clear of all persons before starting the engine.
Failure to comply could result in death or serious injury.

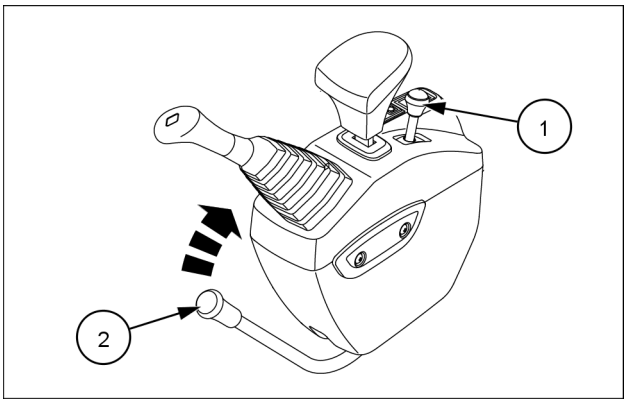
W0090A

⚠ WARNING

Toxic gas and asphyxiation hazard!
Diesel exhaust contains dangerous compounds. Never operate the engine in a closed building or area. Proper ventilation is required under all circumstances.
Failure to comply could result in death or serious injury.

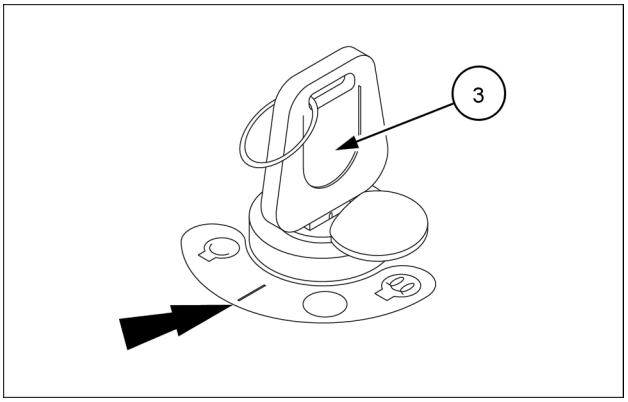
W1302A

1. Check that there is no abnormality in the machine.
2. Confirm that the engine access door and the side hood are closed and locked.
3. Confirm that the engine speed lever **(1)** is in low idle position.
4. Confirm that the safety lock lever **(2)** is in LOCK position (rearward position).
5. Set each operation lever in neutral.
6. Securely fasten the seat belt.



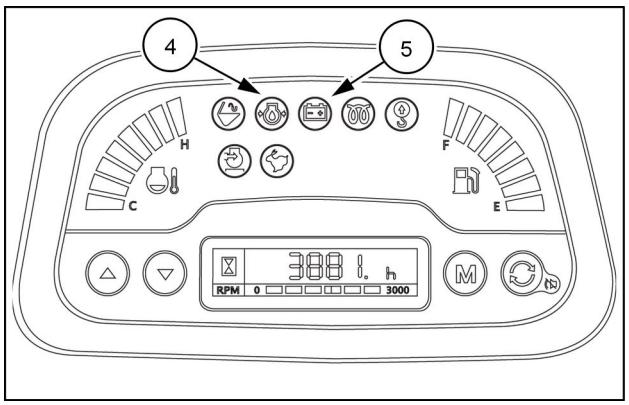
SMIL16MEX0398AA 1

7. Turn the starter key **(3)** to the ON position, and check that all the lights on the instrument cluster turn ON and the buzzer sounds for six seconds.



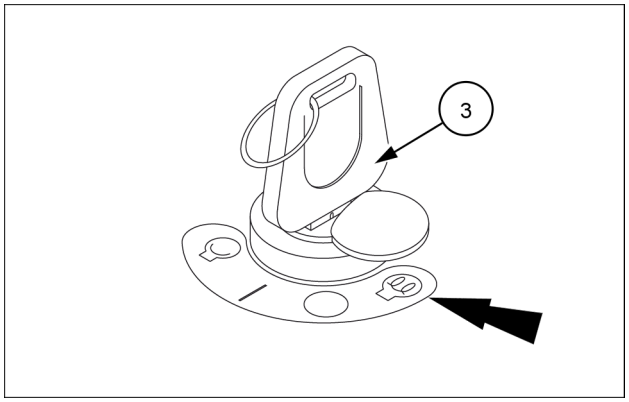
SMIL16MEX0400AA 2

8. After two seconds, check that all the lights on the instrument cluster turn OFF, except the engine oil pressure warning light **(4)** and the battery charging warning light **(5)**.
9. If the ESL mode is set to the Always, enter the password to start the engine.
   If the password has failed 5 times, please wait **10 min** before re-attempting to enter the password.
   (Refer to page **4-1**)



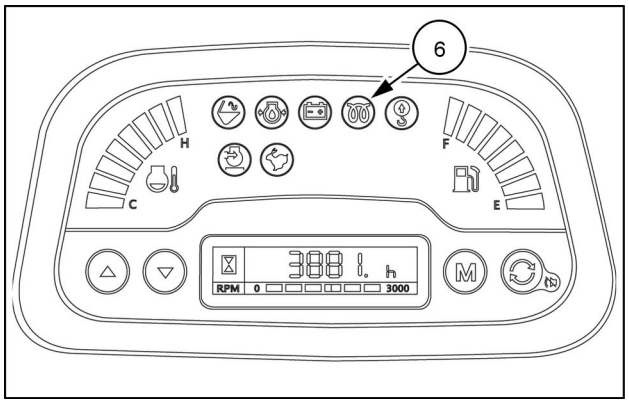
SMIL16MEX1501AA 3

10. If the ambient temperature is below **10 °C** (**50 °F**), turn the starter key **(3)** to the HEAT position.



SMIL16MEX0400AA 4

11. Sound the horn with the button on the right–hand control lever to warn that the machine is starting up.
12. Turn the starter key to START position when the light of the engine preheat **(6)** disappears.
    The engine running takes approximately **1 s** to stabilize after it has been cranked up.
    Release the starter key as soon as the engine is running regularly.



SMIL16MEX1501AA 5

NOTICE: *the cranking up of the engine may be difficult in severe winter climates. If the engine does not start after* ***10 s*** *of operation of the starter motor, turn the key to OFF position and wait* ***2 min*** *before attempting a new cranking.*

NOTICE: *when the engine is started in severe winter climates, moisture vapor may be temporarily generated resulting in a whitened smoke.*

NOTICE: *immediately after the engine is started, the engine sound is louder compared to the sound after the engine is warmed up, and also the color of the exhaust smoke becomes more whitened or more blackened than the smoke emitted during the normal operation. The engine sound and the color of the exhaust smoke get smoothed after the engine is warmed up.*

NOTICE: *due to resonance, vibration might increase while the engine is running at low speed. Increasing slightly the engine speed reduces the vibration.*

Bringing the machine up to operating temperature

Before starting operation, allow the main systems to warm up to their normal operating temperature.

***NOTE:** the normal operating temperature for the hydraulic fluid is **50 – 80 °C** (**122 – 176 °F**).*

***NOTICE:** do not operate the machine if the temperature of the hydraulic fluid is below **25 °C** (**77 °F**).*

The warm-up procedure is necessary for proper and safe machine usage. Proper warm-up allows for the best possible machine performance and fuel efficiency.

***NOTICE:** the warm-up of the machine is mandatory when operating in severe winter climates.*

***NOTICE:** the warm-up of the machine prevents wear and severe damages to the engine, to the fuel system, and to the hydraulic system.*

***NOTICE:** the exhaust pipe becomes extremely hot while the engine is idling. Make sure that there is no flammable material such as plants, dried grass, paper waste, oil and old tires close to the exhaust pipe before starting warm-up procedure.*

***NOTICE:** never cover the grids of the radiators with flammable materials.*

1. Start the engine and let it run for approximately **5 – 10 min** with no load.
2. Set the engine speed lever to mid-range speed.
3. Set the safety lock lever to UNLOCK position (frontward position).
4. Operate the bucket control lever for **5 min**.

   ***NOTICE:** do not operate any control lever except the bucket control lever.*
5. Set the engine speed lever to high speed.
6. Operate the bucket control lever and the arm lever for approximately **5 – 10 min** with no load.

   ***NOTICE:** operate only the bucket control lever and the arm control lever.*
7. Complete the warm-up procedure by operating the controls for all cylinders, travel, and swing for 3 to 4 times to circulate warmed hydraulic fluid into the whole circuit.

Check the following items after reaching normal operating temperature of the fluids:

- Exhaust gas is normal.
- No unusual noise or vibration.
- No leak of oil, fuel or water.
- No unusual noise when activating the hydraulic equipment.
- Inspection of the horn, buzzer, working light, and instrument cluster.
- Proper display of the engine coolant temperature gauge.
- Check the visibility from the view mirrors before operation. Adjust and clean up dirt as necessary.
- Check each operation (travel, front equipment, and swing).

If any of the following occurs during the warm-up procedure, stop the engine immediately.

- Engine speed increases or decreases rapidly.
- Engine sound and exhaust gas color are abnormal.
- The display screen displays any message and warning sound beeps.

Operating the machine in hot or cold weather

In cold weather

- Make sure to use fluids and lubricants which have specifications suitable for operation at low ambient temperatures.
- Check the batteries for full charge state.
- Fill up the fuel tank after completing the work, and then drain water before starting work on the next day in order to prevent dew condensation and invasion of water to the fuel system.
- Use fuel which is rated to the outside air temperature, or proper anti-freeze in order to prevent crystal generation at **-2 °C** (**28 °F**).

  NOTICE: *before transporting the machine to a cold region, fill the tank with fuel that has a low freezing temperature.*

In hot weather

- Make sure to use fluids and lubricants which have specifications suitable for operation at high ambient temperatures.
- Keep the coolant at the correct level in the coolant reservoir and in the radiator.
- Use the correct solution of **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** in the cooling system.
- Test the radiator cap before hot weather starts. Replace the cap as required.
- Clean all dirt and debris from the radiator, cooler and engine area.
- Check the condition of the fan drive belt.

Operation under dusty and sandy conditions

- Frequently inspect the element of the air cleaner and clean or replace the element and the dust cup regardless of service due.
- Tightly close the breather cap of the hydraulic tank to prevent invasion of sand and dust to the hydraulic circuits.
- Make sure to thoroughly clean the grease fittings before greasing any lubrication point of each pin and bush.
- Make sure to clean the radiator fin and oil cooler fin and the radiator grid.

Operation on seashore

- Inspect tightness of the plugs/cocks/bolts in each point in order to prevent salt corrosion.
- Thoroughly wash the machine after the work, especially take good care of the electrical equipment, hydraulic cylinder and track tension cylinder to prevent corrosion.
- Inspect and lubricate more frequently. Supply sufficient grease to replace all old grease in bearings which have been submerged in water for a long time.

Operation in mud, water, or rain work sites

- Keep the machine as dry as possible during operation and make sure to carry out regular lubrication. Moisture and muddy water cause deterioration and corrosion of paints/wiring/metal components.
- After completing operations, clean mud, rocks or debris from the machine. Inspect for damage, cracked welds or loosened parts.
- If the operations are in salt water or other corrosive materials, make sure to flush the affected equipment with fresh water.

Operation in rocky work sites

- Check for damage to the undercarriage and for looseness, flaws, wear and damage in bolts and nut.
- Loosen the track tension a little (not over than **10 mm** (**0.4 in**)) when working in such areas.
- Do not turn the undercarriage directly over the sharp edge rock.

Operating the machine

⚠ WARNING

Misuse hazard!
Follow the operating instructions in this chapter. Any other practice that has not received the prior approval of the manufacturer is considered to be strictly forbidden.
Failure to comply could result in death or serious injury.

W0281A

⚠ WARNING

Hazard to bystanders!
Always know the location of all workers in your area. Warn them before you start working on the machine. Always keep all unauthorized bystanders clear of the area.
Failure to comply could result in death or serious injury.

W0176A

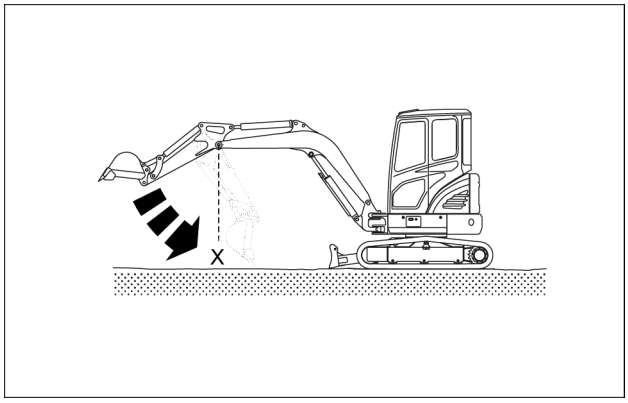
- Before you operate the machine, take notice of the job site ground conditions and characteristics. Take notice of the local climate.
- Inspect the job site for potential risks before operating the machine. Holes on working site, obstructions and hazardous materials such as debris are subject to cause serious accident.
- Pay attention to location of pipes and cables before commencing work. Electric cables, gas pipes, water pipes and underground installations may cause serious injury. If the work takes place adjacent to high voltage power lines make sure to check the following work range:
  Less than **57000 V**: **4 m** (**13.1 ft**)
  57000 V or more: **5 m** (**16.4 ft**)
- Sit on the operator's seat, adjust it so as to be able to easily reach the console, and then fasten the seat belt.
- Check that the cab door is tightly secured at position of open or close.
- Sound the horn to warn other workers in the proximity of the machine.
- Start up the engine.
- Check all the indicator lights and gauges are operating properly.
- Push the safety lock lever forward.

NOTICE: *perform the following operations to avoid damage to the machine.*

- Do not use weight of the machine as an impact force for excavation.
- Do not use traveling force of the machine for excavation.
- Avoid abrupt change of swing direction when swinging the upper structure.
- Never hit or push objects with side of the bucket. Do not sweep ground with the bucket to level rubbles.
- Open and close the bucket for several times to loosen soil and mud when soil and mud are tightly packed in the bucket.
- After work, remove mud from the machine and clean it.

Normal operation of the machine

When rolling in the arm, the roll-in movement stops momentary at point **(X)** as shown, then recovers speed again after passing point **(X)**.



SMIL16MEX0401AB 1

The reason is that the movement by the arm weight is faster than the speed of oil flow into the cylinder. When lowering the boom, a sound may be heard continuously. This is caused by the oil flow in the valve.

If the machine is overloaded, a sound is caused by the relief valves, which protect the hydraulic systems.

NOTICE: *do not exceed the machine performance. It may result in accident or failure.*

NOTICE: *perform lifting operations within the specified load limit.*

The turret swings when the left control lever is moved rightward or leftward. The swinging speed is determined by the stroke of the lever.

- When moving the left control lever leftward, the turret swings leftward.
- When moving the left control lever rightward, the turret swings rightward.
- When returning the left control lever centrally (neutral position) the turret stops moving.

When you stop swinging the machine, a noise near the swing motor may be heard. The noise is generated by the brake valve.

Operating the machine on sloping ground

⚠ WARNING

Driving hazard!
Hillside operations can be dangerous. Rain, snow, ice, loose gravel, or soft ground, etc. can change the ground conditions. You must make a judgment if it is safe to operate your machine on any hillside or ramp.
Failure to comply could result in death or serious injury.

W0144A

⚠ WARNING

Overturning hazard!
Before parking the machine, make sure the ground is stable. Plan the worksite so that the ground is flat, hard, and level.
Failure to comply could result in death or serious injury.

W0258A

When working on a sloping ground, the machine becomes unstable, unbalanced, and difficult to control. Therefore, the following operating prescriptions shall be strictly respected.

If the intended job site is located on a sloping ground, a hard horizontal area shall be prepared as operating base for the machine. Never work on slopes steeper then **10 °**.

Travel along slopes up to **20 °** is allowed only to reach a specific work area. Refer to “Machine travel - Precautions for travelling on slopes” in order to understand proper operating practices and precautions for traveling along slopes.

***NOTICE:** The machine grade ability is **30 °** (**58 %**). Never operate the engine when the incline of the machine is **30 °** or more. The engine or the hydraulic system may be damaged.*

Work with the undercarriage oriented along the slope, never across. Always keep the travel reduction gears pointing down towards the bottom of the slope. Lower and indent the blade into the ground.

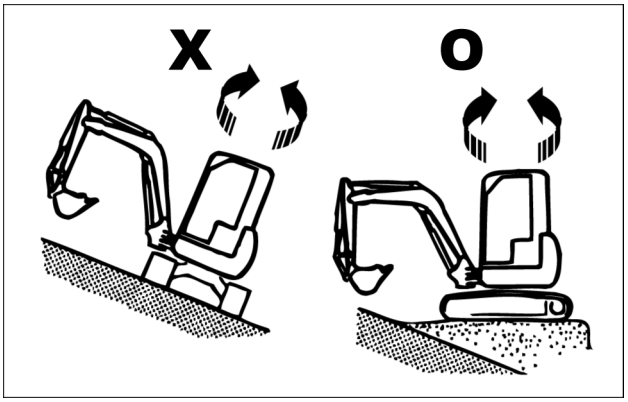
Make sure to define a safe working area around the machine, which shall be equal to the maximum reach of the front equipment plus **2 m** (**6.6 ft**). It is recommended to have a supplementary guiding operator on the ground out of the safe working area, in order to provide proper indications and prompt warnings to the machine operator.

Maintain the maximum engine speed.

Make sure that the low speed travel mode is selected.

Operate the control levers smoothly in order to prevent sudden movements that may cause the machine to slip or tip over.

Avoid full boom raising, as well as swing operation towards the bottom of the slope with the bucket loaded, or swing operation with any heavy attachment installed, in order not to affect the balance of the machine.



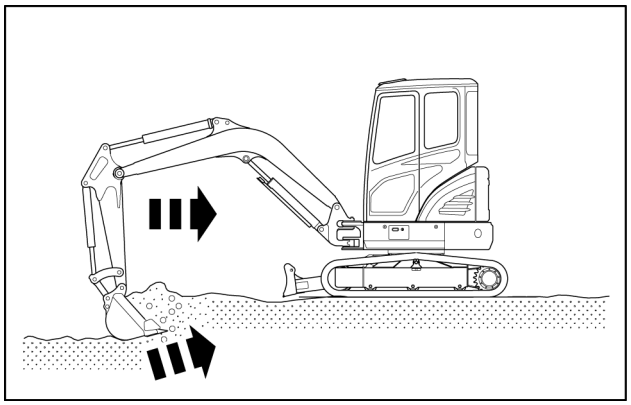
SMIL16MEX3166AB 2

Digging and loading operations

Set the tracks parallel to the line of the ditch to be excavated when digging a ditch. Do not swing while digging.

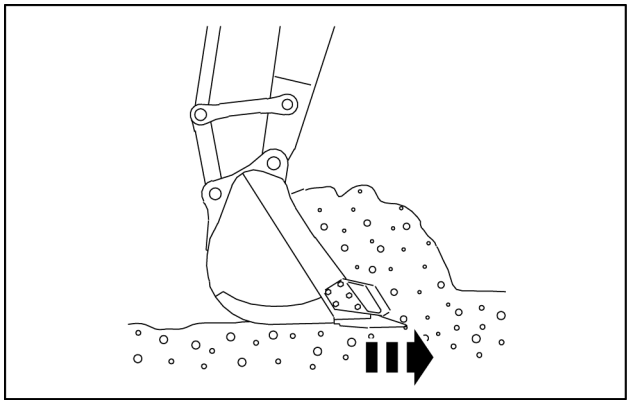
1. Do the digging work by arm.

Use the pulling force of arm for digging and use together with the digging force of the bucket if necessary.



SMIL16MEX1540AB 3

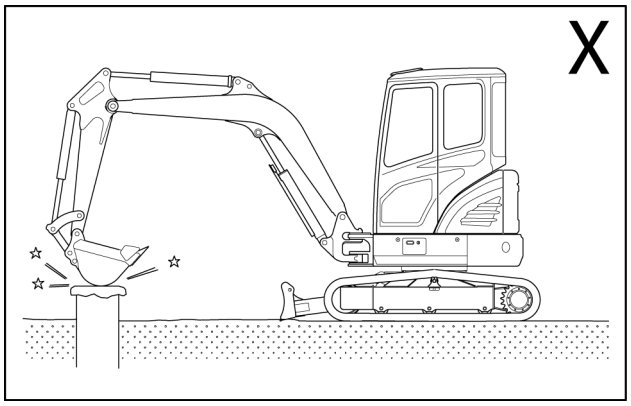
2. The digging resistance and wearing of tooth can be reduced by putting the end of bucket tooth to the digging direction.



SMIL16MEX1541AB 4

3. Do not use the dropping force of the work equipment for digging.

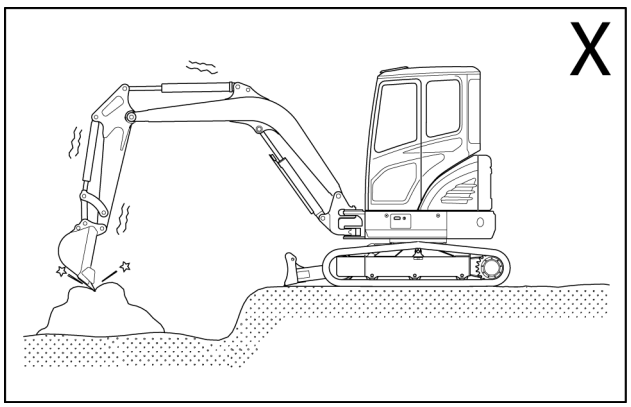
NOTICE: *the machine can be damaged by the impact.*



SMIL16MEX1542AA 5

4. Do not use the bucket to crack hard objects like concrete or rocks.

NOTICE: *this may break a tooth or pin, or bend boom.*



SMIL16MEX1543AA 6

Lowering the attachment in the event of a failure

⚠ WARNING

Unexpected machine movement!
Only use the following procedure in case of machine failure. Always use extreme caution during operations. Keep other persons away from the bucket, attachment, and boom. The bucket or attachment can move unexpectedly during operations due to weight of the bucket, attachment, arm, or boom. Failure to comply could result in death or serious injury.

W1364A

⚠ WARNING

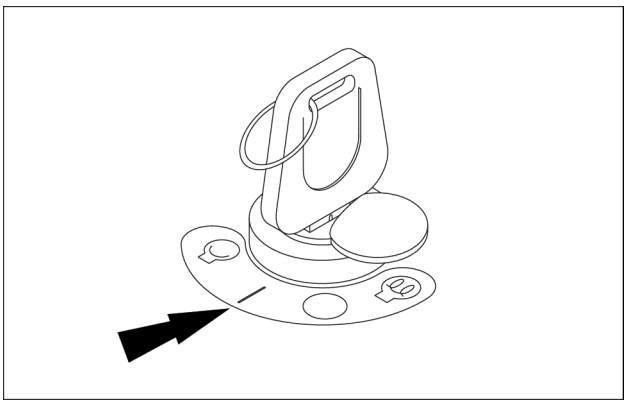
Crushing hazard!
Keep away from the space under the bucket or attachment when lowering the bucket or attachment. In cases where the machine fails and the engine stops, lower the attachment using the procedure described in this manual.
Failure to comply could result in death or serious injury.

W1468A

NOTICE: *the procedure should be completed within five minutes after the engine stops. The accumulator pressure will gradually fall, which will disable the ability to lower the attachment.*

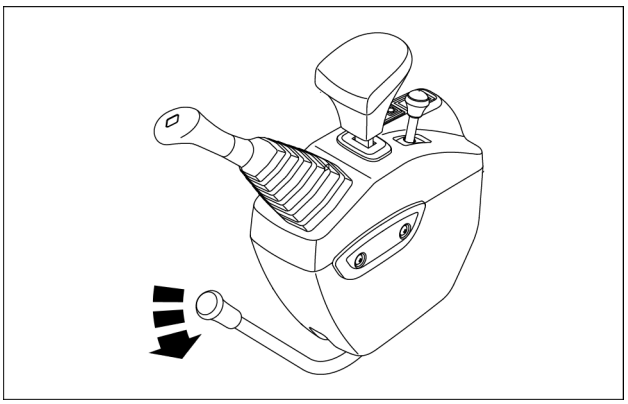
If the engine breaks down, use the following procedure to lower the attachment:

1. Turn the starter key to ON position.



SMIL16MEX0400AA 1

2. Set the safety lock lever in forward position (UNLOCK position).
3. Slowly operate the control levers to lower the attachment to the ground.



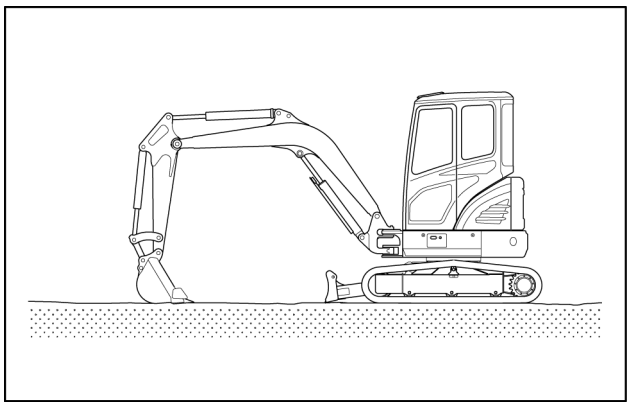
SMIL16MEX0398AA 2

Bucket replacement

⚠ WARNING

Flying object!
Always wear eye or full face protection when performing this procedure.
Failure to comply could result in death or serious injury.

W0313A



SMIL16MEX0040AA 1

1. Lower the bucket to the ground.

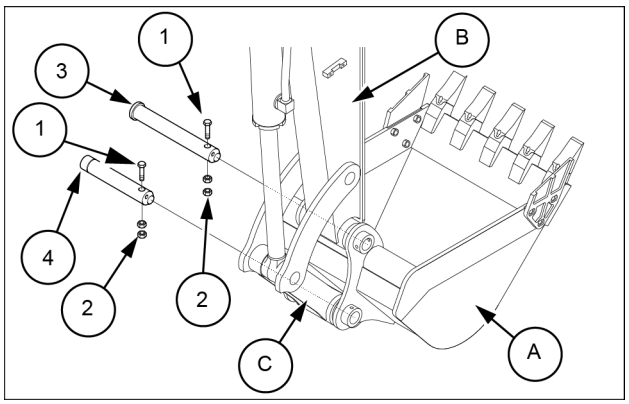
   NOTE: *place the bucket in light contact with the ground. If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins*

2. Put the safety lever in LOCK position (safety lever in rearward position), and stop the engine.

3. Remove the stopper bolts **(1)** and the nuts **(2)**, then remove the pins **(3)** from the arm **(B)** and the pin **(4)** from the link **(C)**.

4. Remove the bucket **(A)**.

   NOTE: *after the removal of the pins, make sure that they are not contaminated with sand or mud and that the seals of the bushing on both sides are not damaged.*

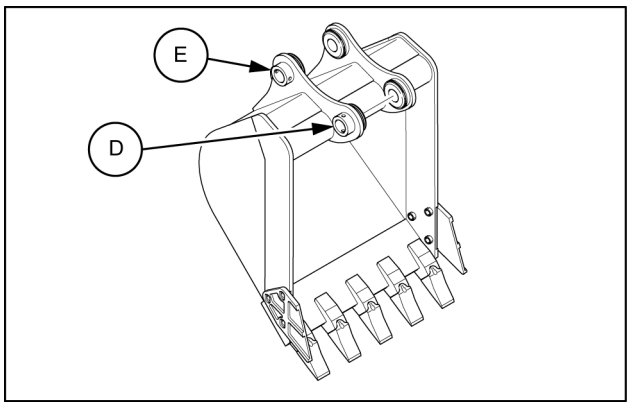


SMIL16MEX0041AB 2

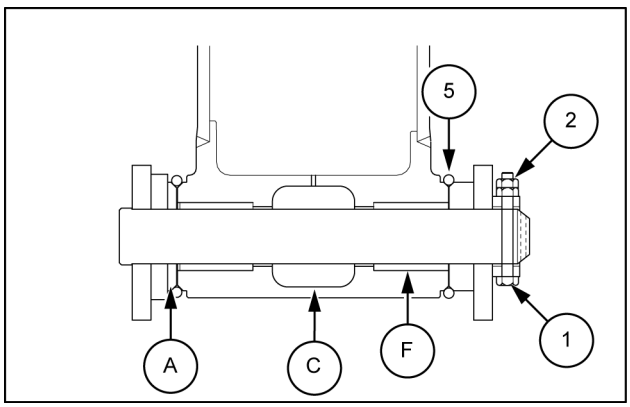
5. Align the arm **(B)** with the holes **(D)** and the link **(C)** with the holes **(E)**, then coat with grease and install the pins **(3)** and **(4)**.

6. When installing the bucket, the O-rings **(5)** are easily damaged, so fit the O-rings **(5)** on the boss of the bucket.

7. After knocking the pins, move the O-ring down to the regular groove. Install the stopper bolts **(1)** and the nuts **(2)** for each pin, then grease the pin.



SMIL16MEX0042AB 3



SMIL16MEX0043AB 4

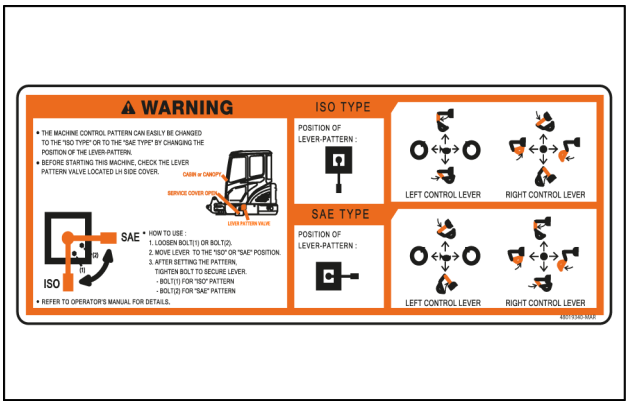
Hydraulic control lever operating pattern

⚠ WARNING

Unexpected machine movement!
Pilot controls have two different backhoe controls patterns; before operating the machine, check which control function is active.
Failure to comply could result in death or serious injury.

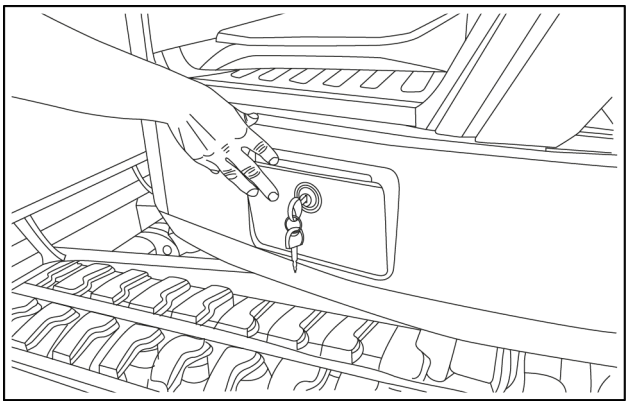
W0185A

NOTICE: *whenever a change is made to the machine control pattern, also replace the pattern label in the cab to match the new pattern.*

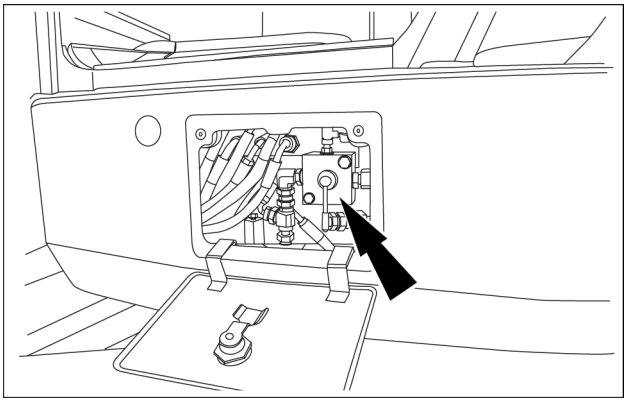


SMIL16MEX3175AA 1

Use the starter key to open the panel located in the left-hand side of the cab.



SMIL16MEX1536AA 2



SMIL16MEX1128AA 3

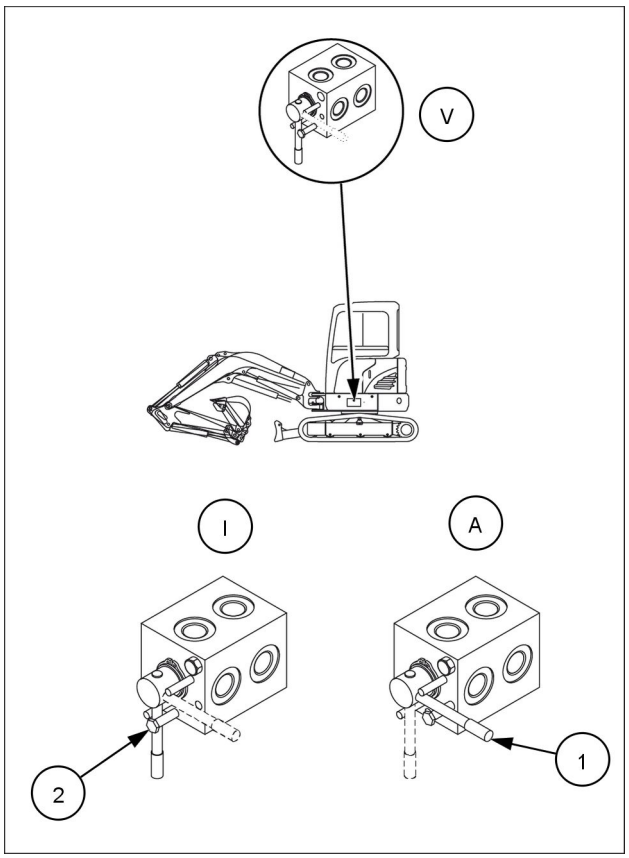
⚠ WARNING

Avoid injury!
Inspect the work area or job site to make sure that machine operation can be done safely. Confirm that the lever operation is the same as indicated on the control pattern labels. If not, immediately change the machine control pattern or the label displayed to match the machine control pattern.
Failure to comply could result in death or serious injury.

W1339A

The machine control pattern can easily be changed to the “ISO” type **(I)** or the “SAE” type **(A)** by changing the position of the lever-pattern **(1)** located on the pattern change valve **(V)**.
To change the pattern, perform the following operations.

1. Loosen the bolt **(2)**.
2. Rotate the lever **(1)** from the “ISO” type pattern **(I)** to the “SAE” type pattern **(A)** or vice versa.
3. Tighten the bolt **(2)** in order to secure the lever **(1)**.

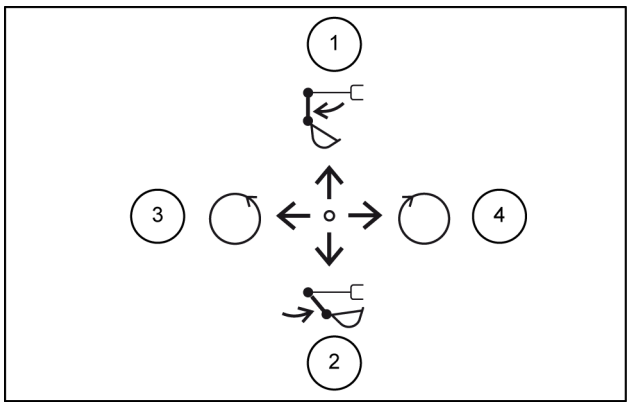


SMIL16MEX0456BB 4

Pattern: ISO type

Left–hand control lever control function

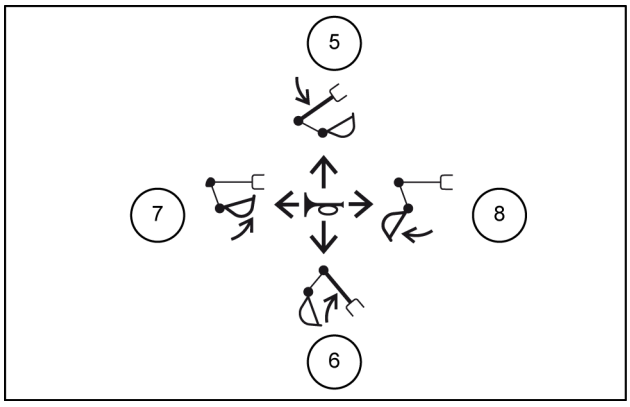
1. Arm out
2. Arm in
3. Swing left-hand
4. Swing right-hand



SMIL16MEX3075AB 5

Right–hand control lever control function

5. Boom lowering
6. Boom raising
7. Bucket in
8. Bucket out

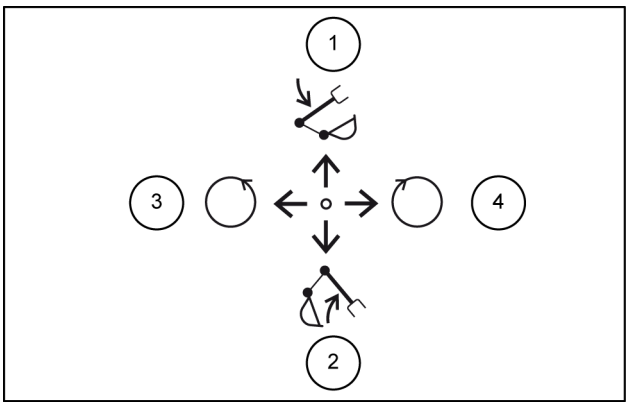


SMIL16MEX3076AB 6

Pattern: SAE type

Left–hand control lever control function

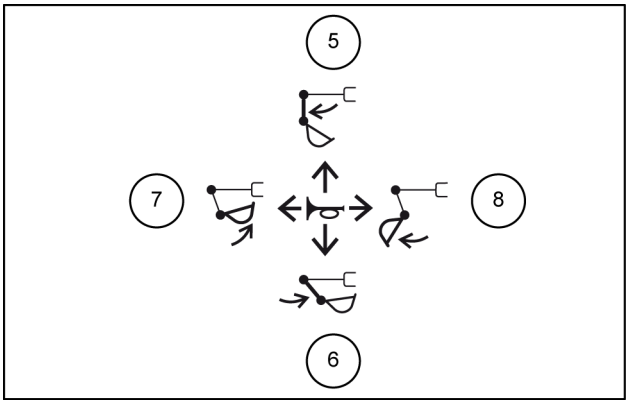
1. Boom lowering
2. Boom raising
3. Swing left-hand
4. Swing right-hand



SMIL16MEX3077AB 7

Right–hand control lever control function

5. Arm out
6. Arm in
7. Bucket in
8. Bucket out



SMIL16MEX3079AB 8

Caution while using rubber crawlers

Proper usage

The rubber crawlers offer excellent features which steel crawlers do not possess.
However, if they are used the same way as the steel crawlers, then their advantages cannot be fully exploited. Operation of the machine varies upon working site and conditions.

Although the rubber crawler offers many advantages thanks to the properties of its material, it also has disadvantages in terms of strength. As a consequence, it is necessary to be familiar with the characteristics of this kind of crawler.

	Rubber belt
Less vibration	⊗
Smooth operation	⊗
Low noise	⊗
Harmless for paved road	⊗
Easy handling	⊗
Resistant	Δ
Large traction force	⊗
⊗: Excellent O: Good	Δ: Normal

Rubber crawler warranty

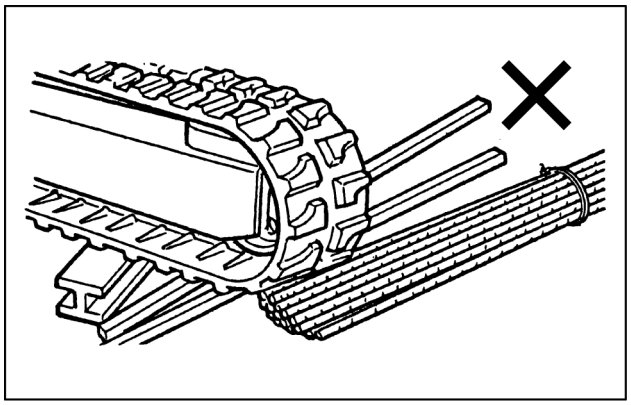
The warranty does not cover such damages to the rubber crawlers resulting from improper working or if their tension is inaccurate.

Forbidden operations

Do not carry out the following operations:

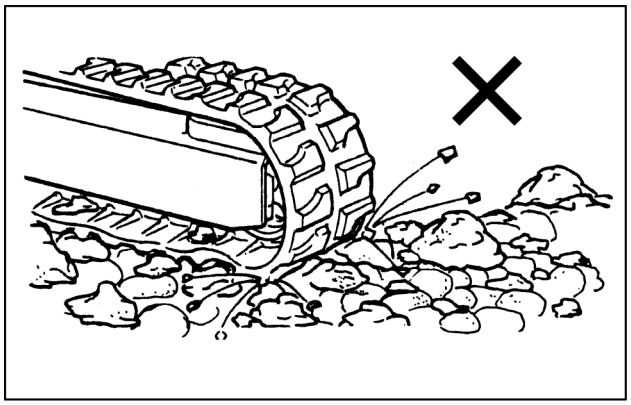
Do not travel nor work on following surfaces:

- Gravel.
- Rugged and solid rock bed.
- Reinforced concrete.
- Steel plate edges.



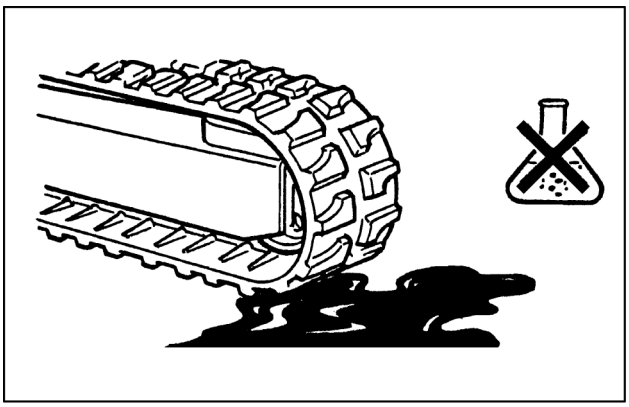
LELI11E0259AA 1

Do not operate and/or travel in such places as river beds where there are lots of stones of different sizes. Rocks may get caught into the grooves of the rubber crawlers, thus damaging the crawler or causing it to come off. The life of rubber crawler is shorter, if it skids or rubs against the soil.



LELI11E0260AA 2

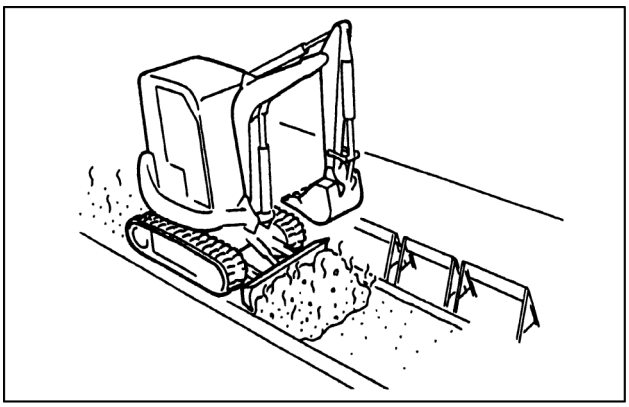
Do not let oil, fuel, solvents, etc., come in contact with rubber shoes. If this happens, wipe off crawlers with a cloth immediately.



LELI11E0261AA 3

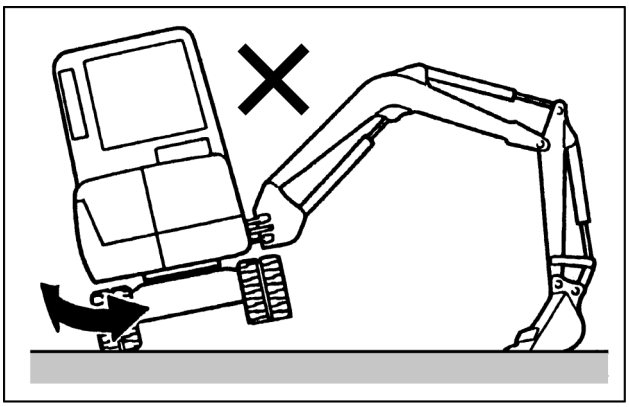
Do not enter such hot places as an open-air fire, or a steel plate left in the open sun.
Do not work in asphalt leveling.

When storing the machine for a long period (more than three months), keep it in a closed room where it will not be exposed to direct sunshine or rain.



LELI11E0262AA 4

When the machine travels only on one side of the crawler, and keeps the other side floating, the crawler may come off of the rollers or get damaged.



LELI11E0263AB 5

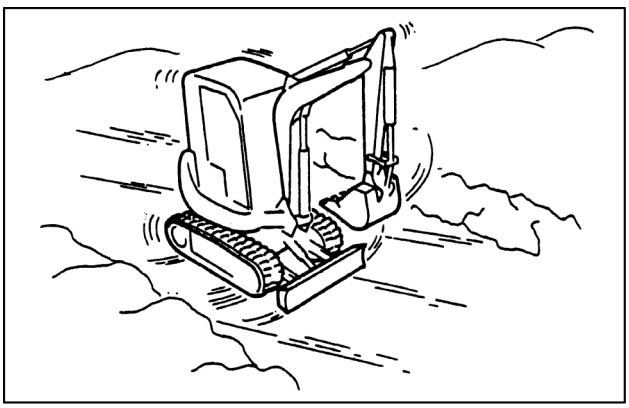
Precautions for use

Use care of the following when working.

Rubber crawlers slip easily on icy surfaces.
Take the necessary safety precautions.

Avoid making a spin turn on concrete surfaces.

Avoid abrupt changes of direction as this will cause an early wear or damage of the rubber crawlers.

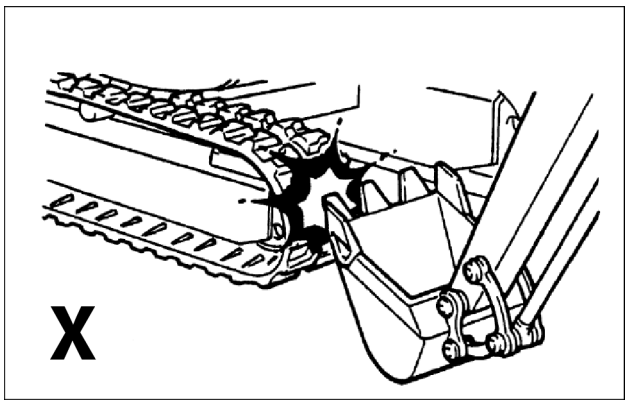


LELI11E0264AA 6

Use care so that the bucket does not damage the rubber crawler while working.

Do not move the machine pressing the bucket against a concrete surface or walls.

Lower the machine slowly, if it had previously been lifted by means of the attachment.

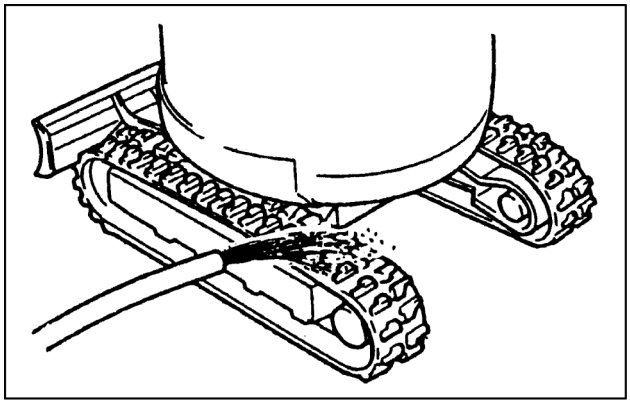


LELI11E00265AA 7

If the machine is operated in salty corrosive places, the core metal can detach easily. Do not use the rubber crawler under such circumstances. If the rubber crawlers come in contact with these substances wash them with water.

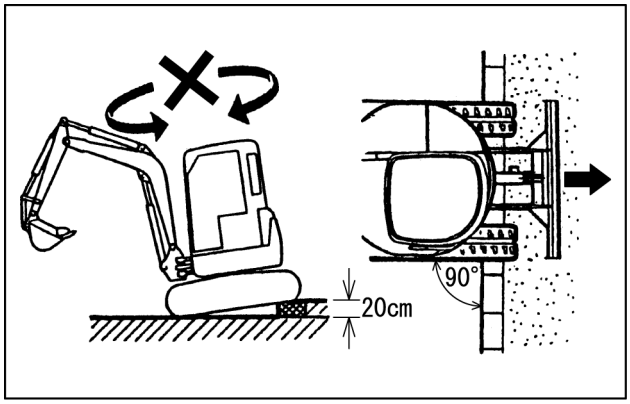
The rubber crawlers have to be used with a temperature range between **-25 °C** (**-13 °F**) and **+55 °C** (**131 °F**).

NOTE: *Use the rubber crawlers under proper tension, to prevent them from coming off the rollers. Operate the rubber crawler carefully even when tensioning is proper.*



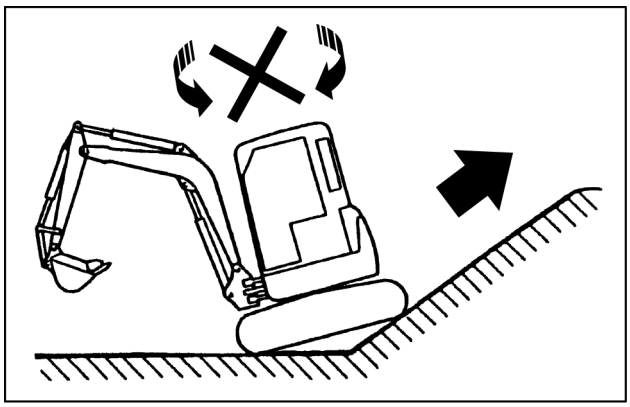
LELI11E0266AA 8

Avoid changing direction of the machine on places with different level (about **20 cm** (**7.87 in**)). To overcome the gap, place the machine perpendicular to the obstacle.



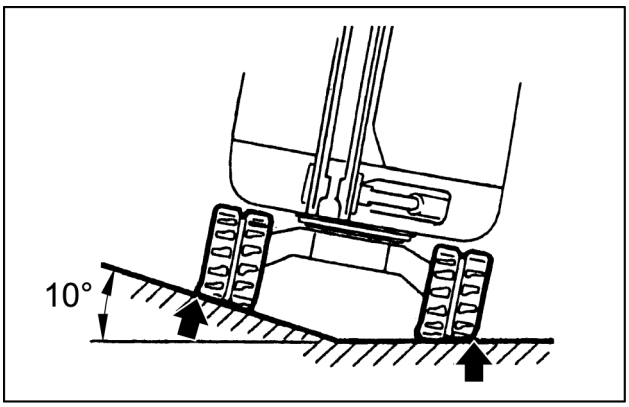
LELI11E0267AB 9

If approaching a slope in reverse is unavoidable, make sure not to make turns and not to change the travel direction while climbing between the level ground and the slope.



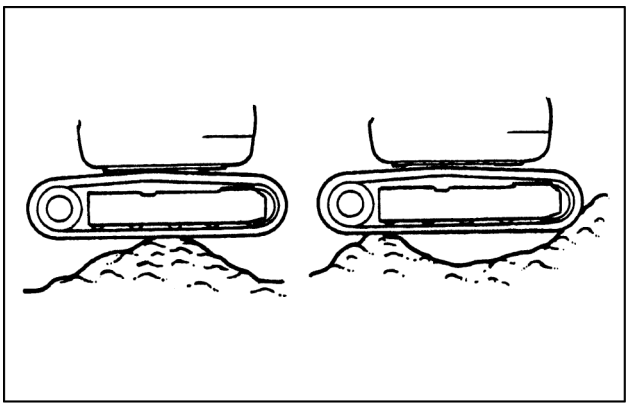
LELI11E0268AB 10

If you travel on a slope with the machine higher at one side, this will risks to damage the rubber crawler. Both machine sides must travel at the same level.



LELI11E0269AB 11

Do not change the direction of the machine with the rubber crawlers positioned on earth heaps, as this could cause the rubber crawler to come off or get damaged.



LELI11E0270AA 12

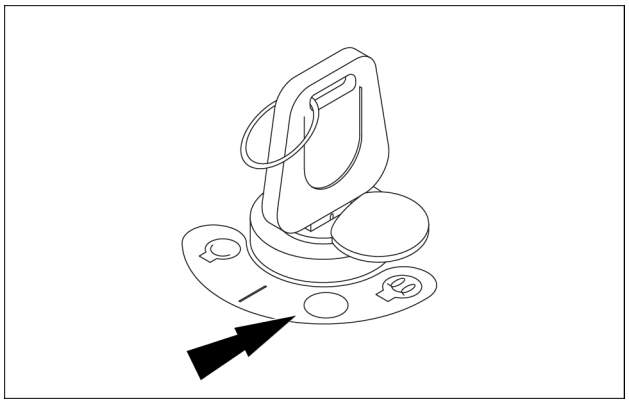
Stopping the unit

Stopping the engine

1. Lower the attachment until it is resting on the ground.
2. Set the safety lever backward (LOCK position).
3. Set the engine speed lever to low idle position and let the engine run for about **5 min**.

   NOTICE: *run the engine in idling for about **5 min**. Stopping the engine immediately after operating may cause a failure such as the engine seizing. Stop the engine after the engine temperature has dropped.*

   NOTICE: *make sure to run the engine in idling status before completely stopping it except for emergency.*
4. Turn the starter key to the OFF position.
5. Remove the starter key to prevent other people using the machine.

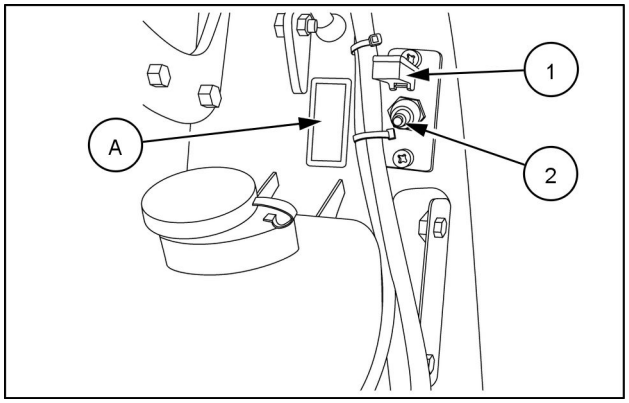


SMIL16MEX0400AA 1

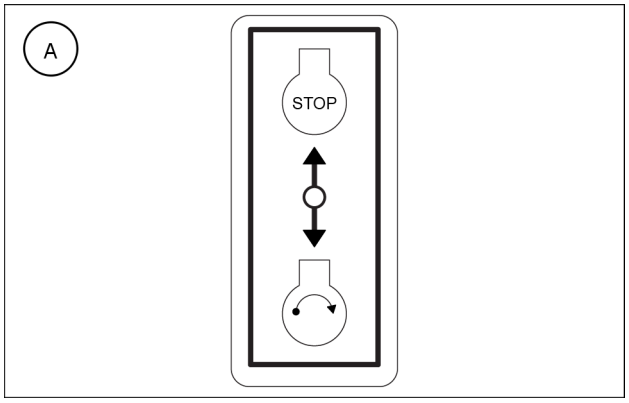
Emergency stop of the engine

Only in case of emergency the engine can be stopped by operating the switch **(1)** located on the left-hand side of the cab, next to the windshield washer reservoir.

1. Lift up the red toggle **(1)**.
2. Operate the switch **(2)** upwards.



SMIL16MEX0912AA 2



SMIL16MEX0644AA 3

Moving the unit

Machine travel

⚠ WARNING

Controls can be reversed!
In the normal travel position, the operator's compartment is above the idler wheels and the travel reduction gears are to the rear of the upper structure. If the upper structure is turned 180 degrees in relation to the undercarriage, the controls are reversed.
Failure to comply could result in death or serious injury.

W0289A

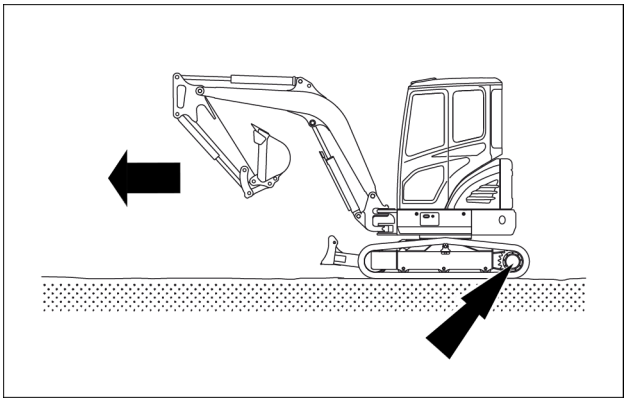
⚠ WARNING

Hazard to bystanders!
Always sound the horn before starting the machine. Make sure the work area is clear of other persons, domestic animals, tools, etc. before you operate the machine. Never allow anyone in the work area during machine operation.
Failure to comply could result in death or serious injury.

W0304A

NOTE: *increase the engine speed before you start traveling. In order to maximize visibility, fully retract the arm and completely close the bucket.*

NOTICE: *before start traveling, make sure to fully raise the blade in order not to stick on the ground while traveling.*



SMIL16MEX0402AA 1

Selection of travel speed

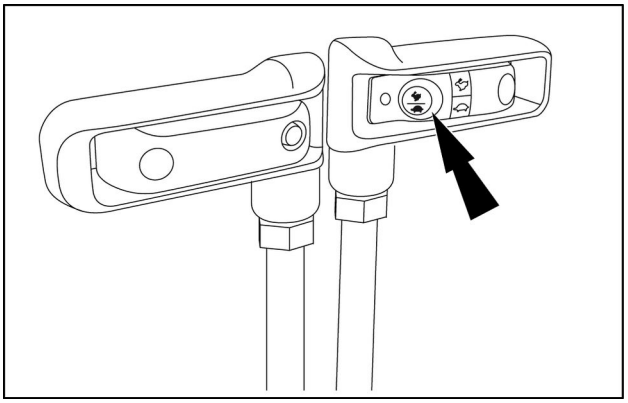
⚠ WARNING

Loss of control hazard!
Avoid pressing the travel speed button while traveling. Avoid shifting to FAST speed when traveling downhill or when loading/unloading from a trailer.
Failure to comply could result in death or serious injury.

W0390A

Before start traveling, make sure to select the proper travel mode between "Turtle" (slow) and "Rabbit" (fast).

As the travel mode is selected, the travel speed varies with the tilting angle of the travel control levers and pedals.



SMIL16MEX1499AA 2

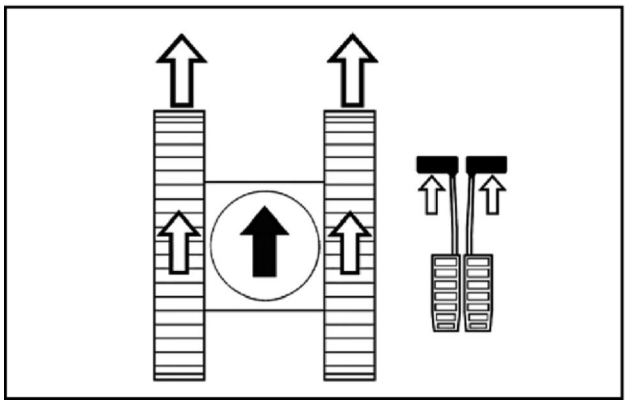
Travel alarm (optional)

The travel alarm is active when the travel alarm switch is turned ON.

A buzzer sounds continuously when the machine starts traveling forward or backward.

Straight line travel (forward travel)

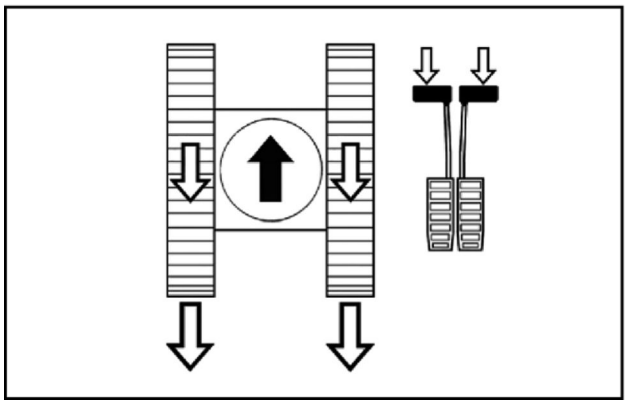
Press the two pedals (or push the two levers) forward at the same time.



SMIL13CEX2679AB 3

Straight line travel (reverse travel)

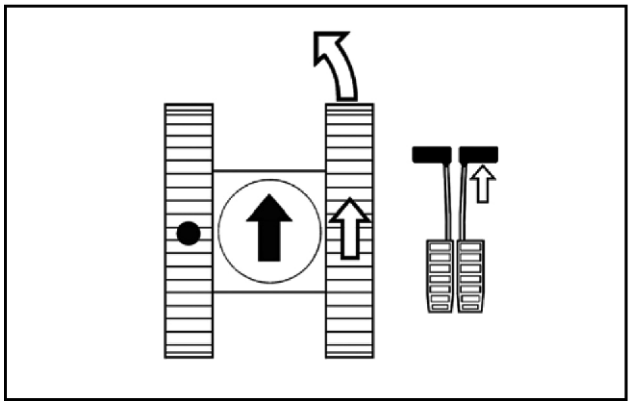
Press the two pedals (or pull the two levers) rearwards at the same time.



SMIL13CEX2680AB 4

Turning to the left (forward travel)

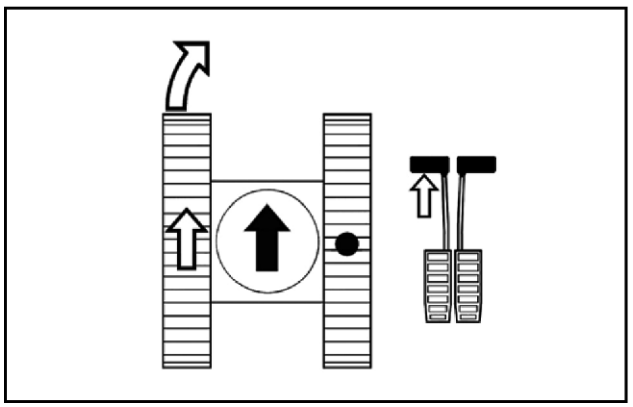
Press the right-hand pedal or push the right-hand lever forwards.



SMIL13CEX2681AB 5

Turning to the right (forward travel)

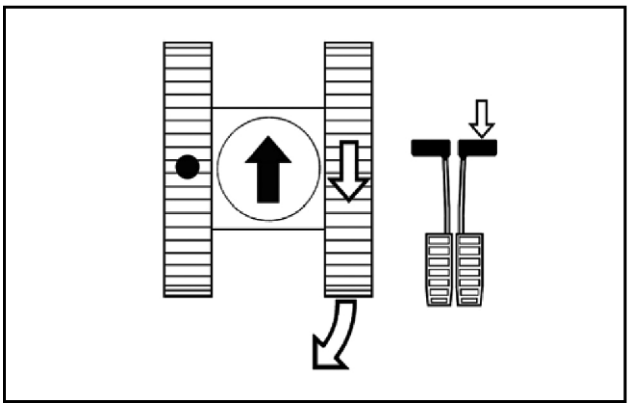
Press the left-hand pedal or push the left-hand lever forwards.



SMIL13CEX2682AB 6

Turning to the left (reverse travel)

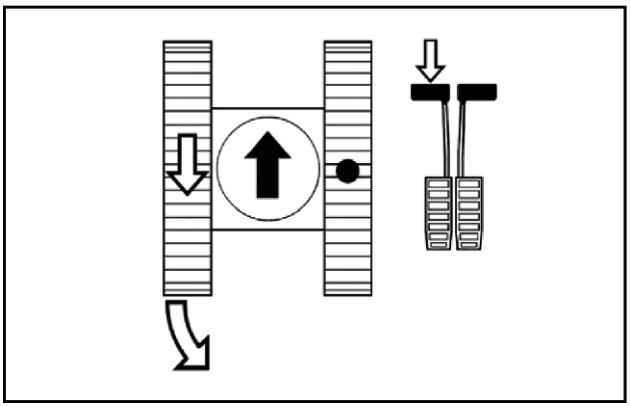
Press the right-hand pedal or pull the right-hand lever rearwards.



SMIL13CEX2683AB 7

Turning to the right (reverse travel)

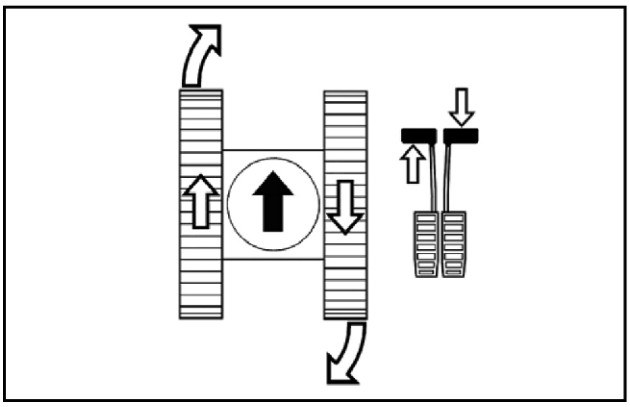
Press the left-hand pedal or pull the left-hand lever rearwards.



SMIL13CEX2684AB 8

Turning on the spot, to the right

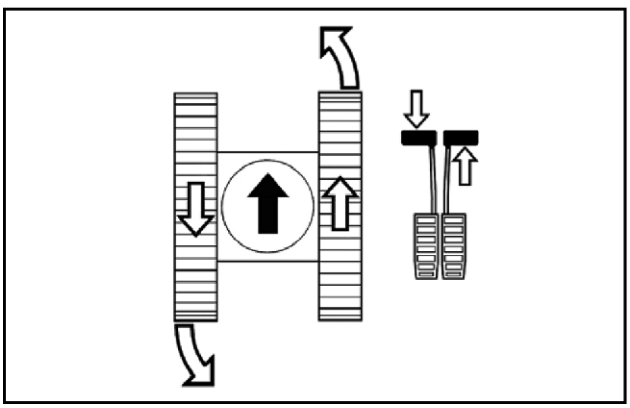
Press the left-hand pedal or push the left-hand lever forwards and at the same time press the right-hand pedal or pull the right-hand lever rearwards.



SMIL13CEX2685AB 9

Turning on the spot, to the left

Press the right-hand pedal or push the right-hand lever forwards and at the same time press the left-hand pedal or pull the left-hand lever rearwards.



SMIL13CEX2686AB 10

Gradual turn on the move

Press one of the pedals or push one of the levers and, at the same time, press the other pedal or push the other lever in the same direction, but slightly harder.

Stopping travel

To come to a complete halt, release the levers or pedals and they will return to neutral.

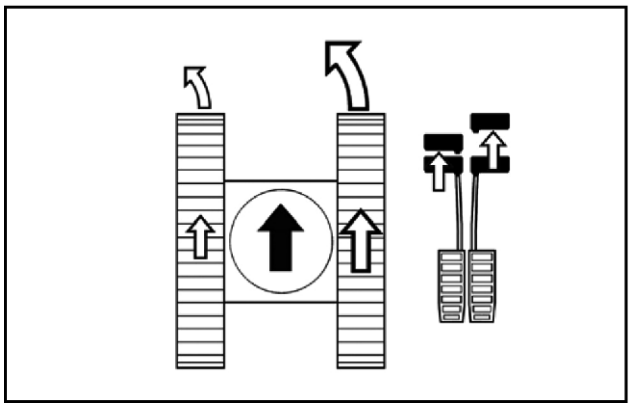
NOTICE: *allow as much time as possible to stop the machine.*

NOTICE: *avoid abrupt stopping as much as practicable.*

NOTICE: *park or stop the machine on level solid ground in safe area.*

Cautions for traveling

1. Check the location of the travel unit before you start traveling.
2. Select ground as flat and solid as possible for traveling.
3. Bypass obstructions during travel.
4. Travel with decreased traveling speed on rough ground.
5. Encourage a large turn for changing direction and avoid abrupt pivoting turns or spinning turns as much as possible.
6. Check the route to travel in advance.
7. Prepare a person to signal the operator whenever moving the machine in a location with poor visibility. Pay attention to permissible weight of bridge when crossing the bridge.
8. Take necessary measures such as placing plates so as not to damage surface of paved road.
9. Slow down and loosen tension of the track shoes when traveling on place with gravels and cobbles.



SMIL13CEX2687AB 11

Precautions for travelling on slopes

When traveling on a sloping ground, the machine becomes unstable, unbalanced, and difficult to control. Therefore, the following operating prescriptions shall be strictly respected.

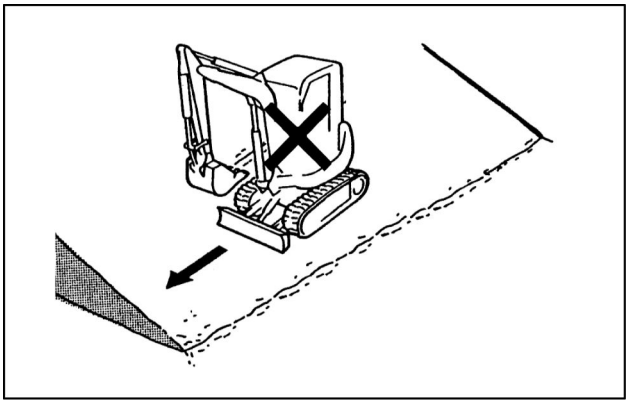
Always travel with the undercarriage oriented along the slope, never across. Never travel along a slope steeper than **20 °**.

If going across a slope is needed to reach a specific work place, make sure to follow an alternative path that is made by traveling along the slope, as outlined in the pictures.

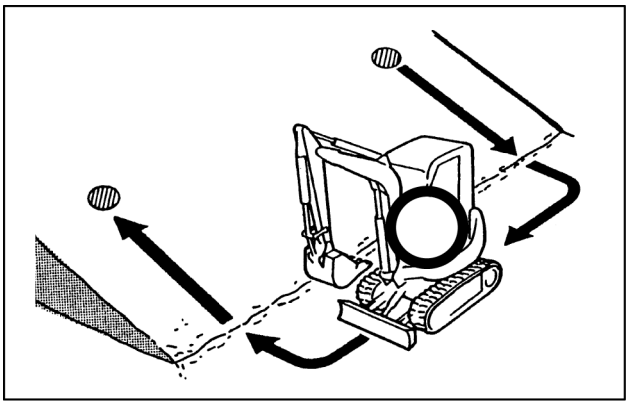
Always select the slow speed travel mode, and operate the travel controls in order not to suddenly increase or decrease the speed of the machine.

NOTICE: *never shift the travel mode to the fast speed range while traveling on slopes, as this suddenly increases the speed and makes the machine unstable and difficult to control.*

NOTICE: *when the hydraulic oil is not sufficiently warm, the machine may not be able to develop its full performance. Before traveling on a steep slope, make sure to carry out a complete preheat of the machine main systems.*



LELI11E0219AB 12



LELI11E0218AB 13

For uphill and downhill travel, approach the slope as outlined in the pictures.

The undercarriage shall be oriented along the slope, with the blade facing the direction of travel, and with the travel reduction gears on the back side.

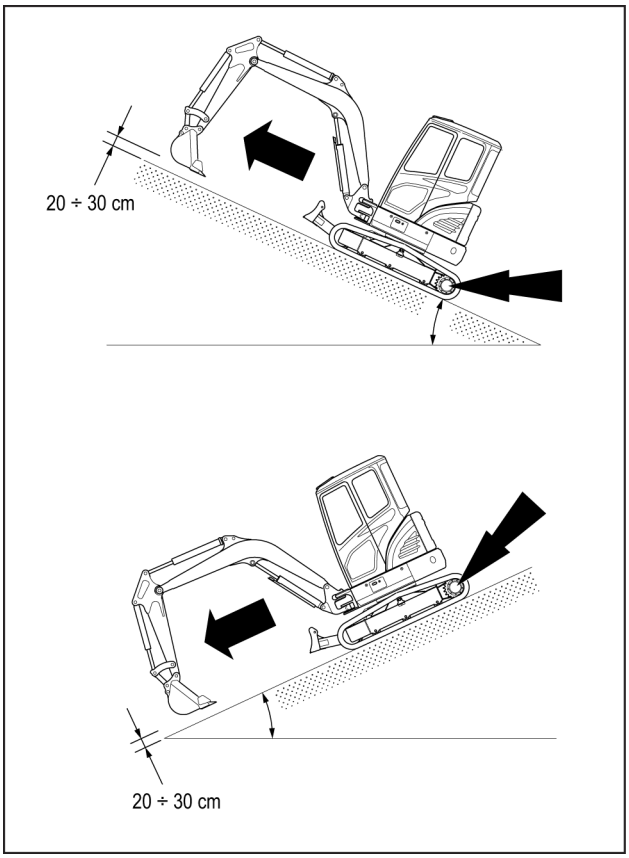
The upper-structure shall be aligned to the undercarriage, and shall be oriented in order to grant straight visibility to the direction of travel.

The front equipment shall be aligned to the direction of travel, and shall be positioned in order to have the arm in vertical position, and the bottom side of the bucket **20 – 30 cm** (**7.9 – 11.8 in**) from the ground.

When traveling along a slope, never swing the upperstructure or the boom from the straight position. In particular during uphill travel, never attempt to swing the upper structure towards the bottom of the slope: the machine could tip over.

If the machine starts to slide or loses stability when traveling along a slope, immediately lower the bucket to the ground and release the travel controls.

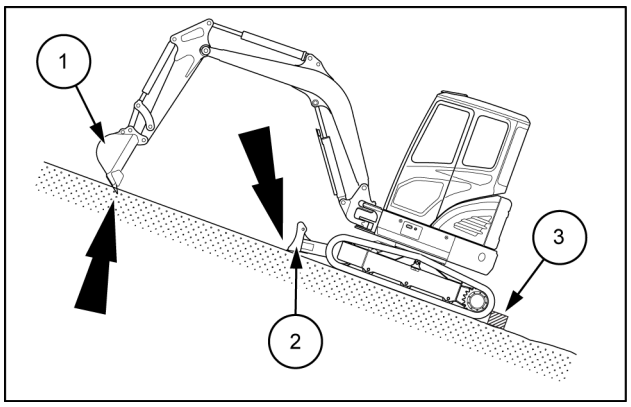
Never make turns when traveling along a slope in order not to affect the balance of the machine. If changing of the travel direction is needed, make sure to reach a horizontal area in order to complete the turning movement.



SMIL16MEX3073BB 14

If the engine stops when traveling along a slope, immediately lower and indent the bucket **(1)** and the dozer blade **(2)** into the ground. Release all the controls, set the safety lever to the LOCK position, set the engine speed throttle to the low idle position, and then start the engine again.

If the engine does not start, remove the starter key, and place the "Do not operate" tag on the machine controls. Get off the operator's compartment, and close the cab door. Block both crawlers by means of wedges **(3)**, and define a safe area of at least **3 m** (**9.8 ft**) around the machine, cleaning this area from obstacles and bystanders. Call the CASE CONSTRUCTION dealer for assistance.



SMIL16MEX3074AB 15

Parking the unit

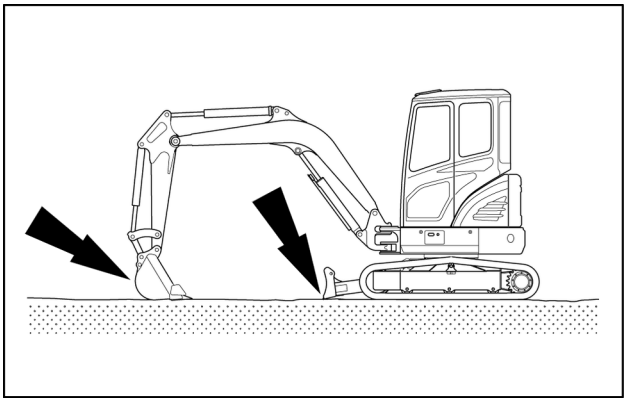
Parking the machine

⚠ WARNING

Fall hazard!
Jumping on or off the machine could cause an injury. Always face the machine, use the handrails and steps, and get on or off slowly. Maintain a three-point contact to avoid falling: both hands on the handrails and one foot on the step, or one hand on the handrail and both feet on the steps.
Failure to comply could result in death or serious injury.

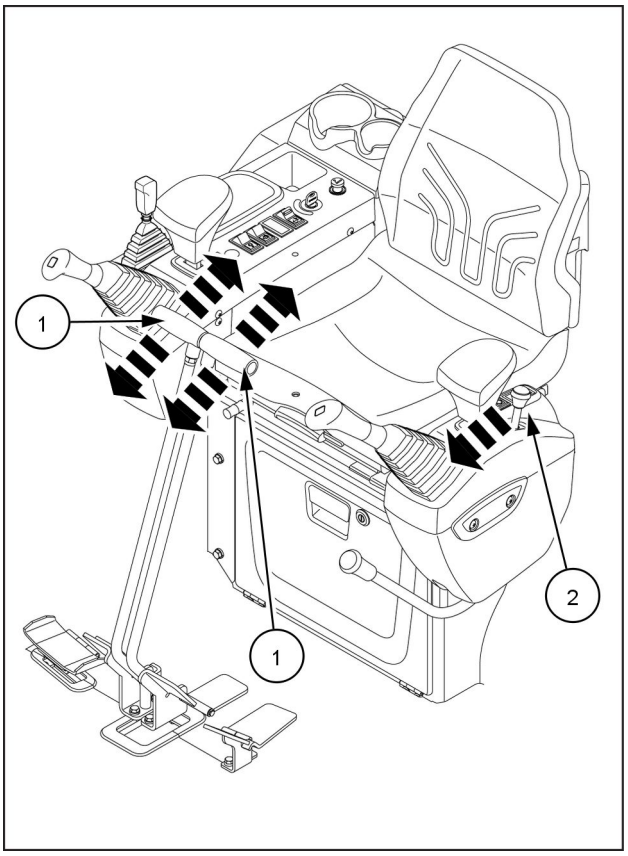
W0141A

- Always park the machine on a level and firm ground.
- Orient the upper structure frame parallel to the undercarriage. The front equipment shall be positioned on the same side of the blade, as indicated in the picture.
- Align the front equipment parallel to the upper structure.
- Lower the bucket to the ground.
- Lower the dozer blade to the ground.



SMIL16MEX0040AA 1

- Move both travel control levers **(1)** to the neutral position.
- Set the throttle lever **(2)** to LOW IDLING.

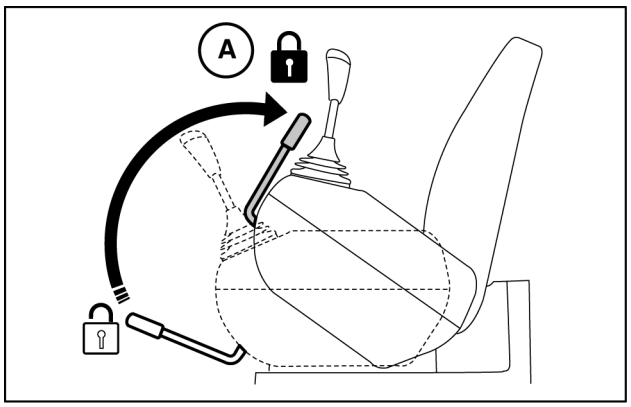


SMIL16MEX1495BA 2

- Set the safety lever to the LOCK position **(A)**.
- Stop the engine, and remove the starter key.

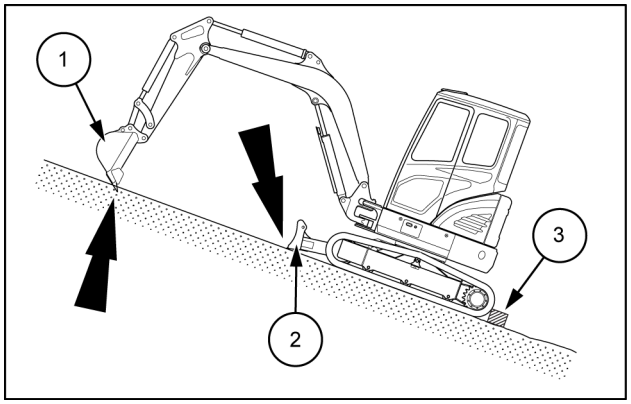
  NOTICE: *do not shut off the engine when running at full speed, but let it run at low idle speed for* ***5 min*** *in order to cool it down.*
- Block both crawlers by means of wedges.
- Close all windows of the cab.
- Using the starter key, lock the cab door, the engine guards, the cooler cover, and the fuel filler cover.

NOTE: *make sure that no part of the machine is interfering with any public road. Install appropriate traffic signs if any portion interferes public road.*



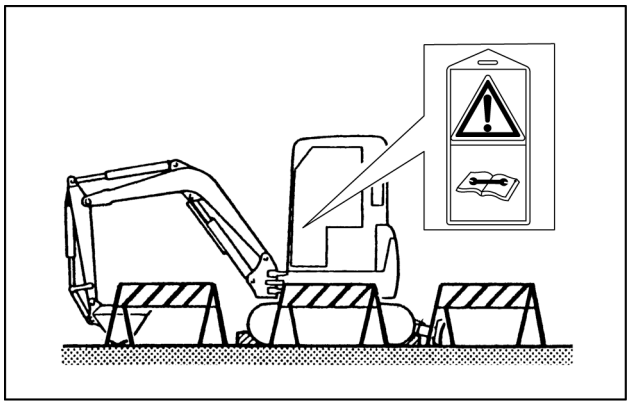
LELI11E0241AB 3

If parking on a slope is unavoidable, orient the undercarriage along the slope, and lower and indent the bucket **(1)** and the dozer blade **(2)** into the ground. Follow the parking procedure described above, and then make sure to block both crawlers by means of wedges **(3)** as outlined in the picture.



SMIL16MEX3074AB 4

If the machine is parked after an emergency stop, remove the starter key, and place the "Do not operate" tag on the machine controls. Get off the operator compartment, and close the cab door. Block both crawlers by means of wedges, and define a safe area of at least **3 m** (**9.8 ft**) around the machine, cleaning this area from obstacles and bystanders. Call the CASE CONSTRUCTION dealer for assistance.



LELI11E0243AA 5

5 - TRANSPORT OPERATIONS

Road transport

Loading the machine onto a transport trailer

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Assign a supervisor to direct worksite operations. Agree on all safety measures, procedures, and suitable hand signals.
Failure to comply could result in death or serious injury.

W0287A

⚠ WARNING

Transport hazard!
The machine can slip or fall from a ramp or trailer. Make sure the ramp and trailer are not slippery. Remove all oil, grease, ice, etc. Move the machine on or off the trailer with machine centered on the trailer or ramp.
Failure to comply could result in death or serious injury.

W0152A

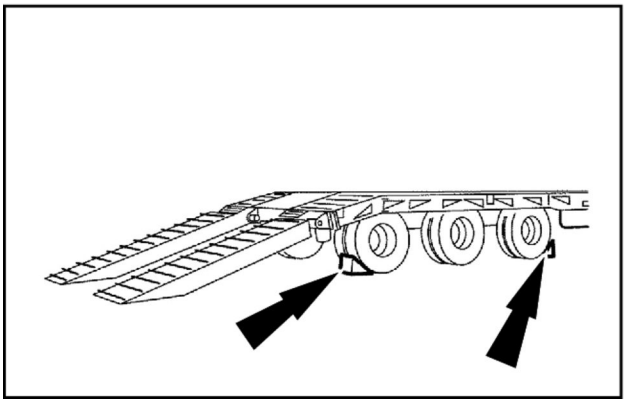
Make sure to check the total weight, length, width and height of the machine to be transported. Refer to Chapter 8.

Make sure to use a trailer with a rated capacity and dimensions sufficient to transport the machine. If a rear loading type trailer is used for road transport, make sure that ramps are available to climb onto the trailer bed. Use ramps which have sufficient width, length, thickness and strength. The ramp slope should be **15 °** or less.

Investigate beforehand the conditions of the road to be traveled, weight and size limits, and special local traffic regulations. Obtain any permits required from proper government agencies for machine transportation.

Trailer setup

1. Position the trailer on firm and level ground.
2. Put blocks to the tires of the trailer to prevent trailer from moving.
3. If a rear loading type trailer is used for road transport, prepare the loading ramps. If the ramps are included in the trailer frame, lower them to the ground. If the ramps are external to the trailer, match them to the rear edge of the trailer avoiding any bump between trailer bed and external ramps.



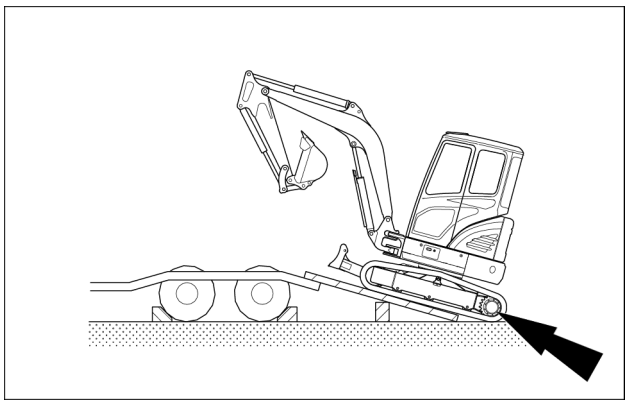
SMIL13CEX2717AB 1

Machine setup

1. Clean the machine undercarriage and tracks to prevent mud or debris from skidding during transport.
2. Select the low travel speed.
3. Lock the boom swing pedal.
4. Fully raise the dozer blade.

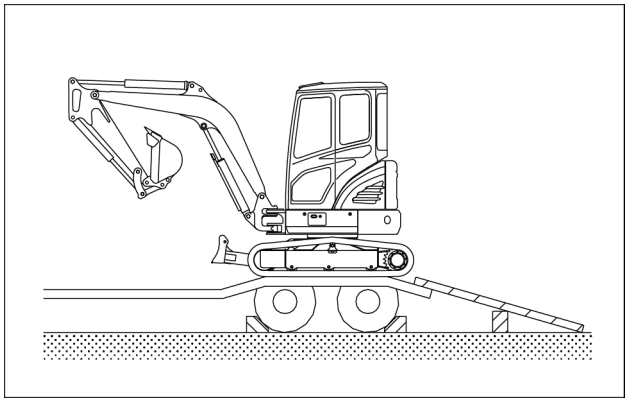
Loading the machine on a rear loading type trailer

1. Align the machine to the trailer, so as the travel motors are in the rear.
2. Slowly travel on the trailer bed to reach the resting position, giving particular attention to the attachment so as not to touch the trailer bed.



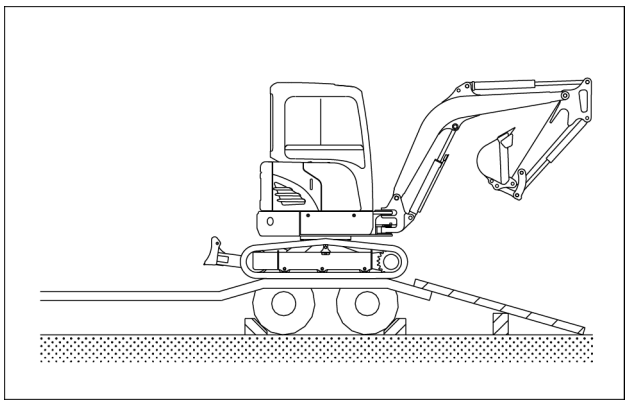
SMIL16MEX0403AA 2

3. Stop loading when the machine is located horizontally in the trailer, within the rear wheel of the trailer.



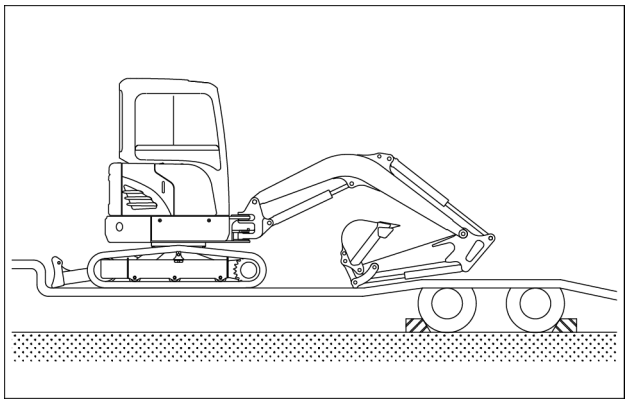
SMIL16MEX0404AA 3

4. Slowly turn the upper structure **180 °**.



SMIL16MEX0405AA 4

5. Lower the working equipment and the dozer blade.

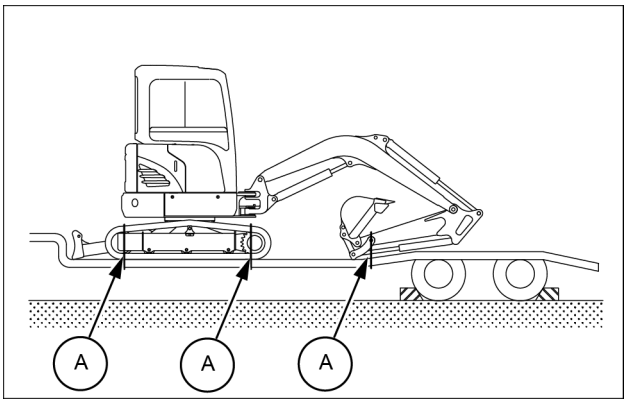


SMIL16MEX0406AA 5

Preparing for road transport

Tie downs for shipping

1. Set the machine in the position for transport: fully retract the arm and curl the bucket slowly.
2. Lower the dozer blade.
3. Check the overall height between the ground and the highest point of the machine and check the overall width of the machine. Make sure to be within the size limits defined on the documents and permissions of the local traffic regulations.
4. Set the safety lever to rearward position (LOCK position)
5. Turn off the engine and remove the starter key.
6. Get off the machine.
7. Use the starter key to close and secure the cab door, the engine access door, the tool box, and the service door.
8. Check the condition of the tie-down points on the trailer.
9. Secure the machine onto the trailer using wire ropes **(A)** to prevent the machine from swaying (oscillation) during transport.
10. Carry out a final check of the tie-down condition.
11. If a rear loading type trailer is used for road transport, lift or remove the loading ramps.
12. Remove blocks from the tires of the trailer.



SMIL16MEX0407AB 1

Unloading the machine from a transport trailer

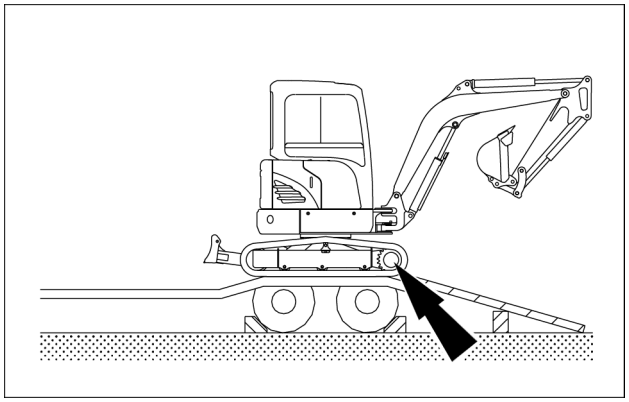
Rear loading type transport trailer

1. Position the trailer on firm and level ground. Put blocks at the tires of trailer to prevent trailer from moving.
2. Remove wire ropes, chocks, blocks and other devices used to secure the machine during road transport.
3. Prepare the loading ramps. If the ramps are included in the trailer frame, lower them to the ground. If the ramps are external to the trailer, match them to the rear edge of the trailer avoiding any bump between trailer bed and external ramps.

   NOTICE: *the ramp slope should be* ***15 °*** *or less.*
4. Get on the machine and start the engine.
5. Select the low travel mode.
6. Raise the dozer blade and operate the arm and bucket controls so the bottom of the bucket is about **20 cm** (**7.9 in**) above the trailer bed.

   NOTICE: *in this position, traveling and steering control become opposite to each other.*
7. Travel slowly towards the back of the trailer and stop as you reach the ramps. Operate the boom and the arm softly in order to get the bucket close to the ground ahead of the ramps.

   NOTICE: *avoid fully extending the bucket cylinder to prevent damaging it due to accidental impacts with the ground.*
8. Move down on ramps with extreme care while operating the boom and the arm softly in order to keep the bucket close to the ground and so to grant machine stability.
9. Pass through the ramps completely and stop the machine once it gets on the ground.



SMIL16MEX0405AA 1

Shipping transport

Handling the machine

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Assign a supervisor to direct worksite operations. Agree on all safety measures, procedures, and suitable hand signals.
Failure to comply could result in death or serious injury.

W0287A

⚠ WARNING

Crushing hazard!
The lifting systems must be operated by qualified personnel who are aware of the correct procedures to follow. Make sure all lifting equipment is in good condition, and all hooks are equipped with safety latches.
Failure to comply could result in death or serious injury.

W0256A

⚠ WARNING

Crushing hazard!
This operation may be dangerous. You are advised to wear suitable clothing and respect all relevant safety messages.
Failure to comply could result in death or serious injury.

W0283A

⚠ WARNING

Hazard to bystanders!
ALWAYS make sure the work area is clear of bystanders and domestic animals before starting this procedure. Know the full area of movement of the machine. Do not permit anyone to enter the area of movement during this procedure.
Failure to comply could result in death or serious injury.

W0245A

1. Retract the boom, bucket and dipper cylinders fully extended.
2. Set the safety lock lever in rearward position (LOCK position). Shutdown the engine and leave the operator's compartment.
3. Use wire rope and stay to keep safety distance from the machine, avoiding the touch with the machine.
4. Put a rubber plate where the wire ropes touch the machine, to prevent damage.

   NOTICE: *it is imperative to use the sling points indicated by the machine decals.*

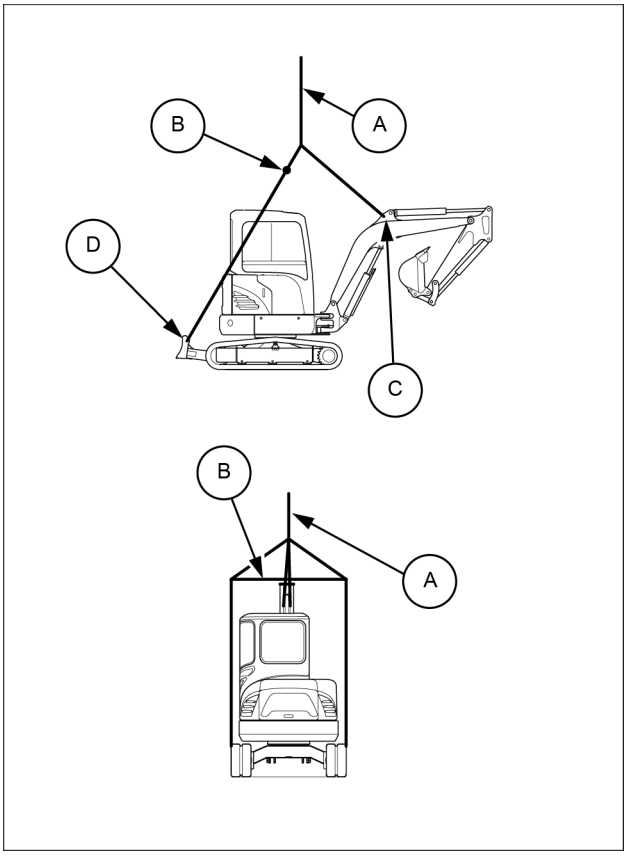
   NOTICE: *the machine must be handled very slowly and horizontally.*

   (A) Wire rope

   (B) Stay

   (C) Boom hoisting point

   (D) Dozer blade hoisting point



SMIL16MEX0408BB 1

Recovery transport

Towing the machine

⚠ WARNING

Misuse hazard!
Towing is a delicate maneuver that is always carried out at the risk of the user. The manufacturer's warranty does not apply to incidents or accidents that occur during towing. Where possible, carry out the repairs at the site.
Failure to comply could result in death or serious injury.

W0286A

⚠ WARNING

Hazard to bystanders!
The operator must be the only person on the machine when towing. Make sure that nobody else is on the machine or within its working range.
Failure to comply could result in death or serious injury.

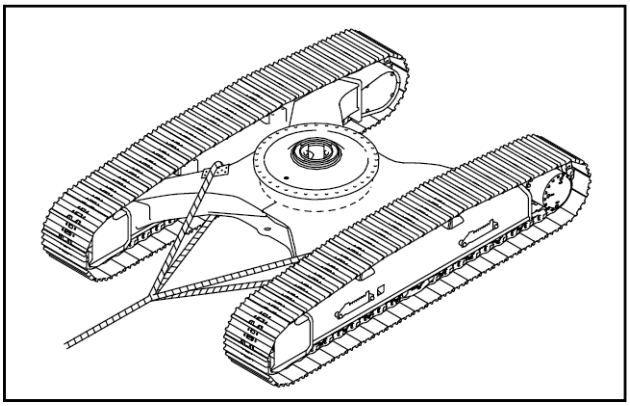
W0259A

As far as possible try to carry out repairs on spot or consult your CASE CONSTRUCTION Dealer.

NOTICE: *the machine must be towed very slowly, over a short distance and only if it is really unavoidable. Always tow the machine in alignment with the undercarriage.*

If the machine is stuck, it must be towed as follows:

1. Make sure that it can be towed without risk of further damage.
2. Make sure that the shackles, chains and tackle are in perfect condition and strong enough to move the load.
3. Attach the shackles, chains and tackle to the under-carriage taking care to protect any protruding angles.
4. Pull the machine without jerking, very slowly and in alignment with the undercarriage.



SMIL13CEX2731AA 1

6 - MAINTENANCE

General information

Basic instructions

⚠ WARNING

Improper operation or service of this machine can result in an accident.
If you do not understand a maintenance procedure, or doubt your ability to perform a maintenance procedure correctly, see your authorized dealer.
Failure to comply could result in death or serious injury.

W0157A

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Raised equipment or machine movement without an operator can cause serious injury. Always do the following before performing any maintenance:
Park the machine on flat, level ground.
Lower the attachment to the ground.
Shut down the engine and remove the ignition key.
Lock the tracks.
Failure to comply could result in death or serious injury.

W0944D

⚠ WARNING

Falling object hazard!
Risk of injury from FALLING ENGINE HOOD. Latch the hood in the fully open position prior to working within the engine compartment.
Failure to comply could result in death or serious injury.

W1090B

NOTICE: *be sure all the service operations in this section are carried out punctually at the intervals given, in order to ensure optimum performance levels and maximum safety when using the machine.*

NOTICE: *while any company can perform necessary maintenance or repairs on your equipment, CASE CONSTRUCTION strongly recommends that you use only authorized CASE CONSTRUCTION dealers and products that meet given specifications. Improperly or incorrectly performed maintenance and repair voids the equipment warranty and may affect service intervals.*

- Respect the maintenance intervals by checking the hour meter every day. Before starting maintenance, park the machine on flat, firm ground, away from any obstacles, with the arm retracted and the bucket on the ground. Lower the dozer blade (if equipped) until it rests on the ground. Unless otherwise specified, all maintenance operations must be carried out with the engine stopped and the key removed from the starter switch. Wait for all circuits to cool down before starting work.
- Clean the grease fittings before lubrication. Clean around plugs and filler holes before adding fluid. No dust or dirt must enter the components or the circuits. Wear suitable clothing and remember to use the necessary safety equipment.
- When carrying out service work on the machine, place a "Do not operate" tag on the instrument panel. Never climb down from the operator's compartment leaving the engine running.
- Remove the necessary lower panels during maintenance of certain machine components. Make sure the lower panels are properly closed before operating the machine.

Any modification to the machine without prior authorization could cause serious injury. Do not make any modifications without authorization. Consult your CASE CONSTRUCTION Dealer.

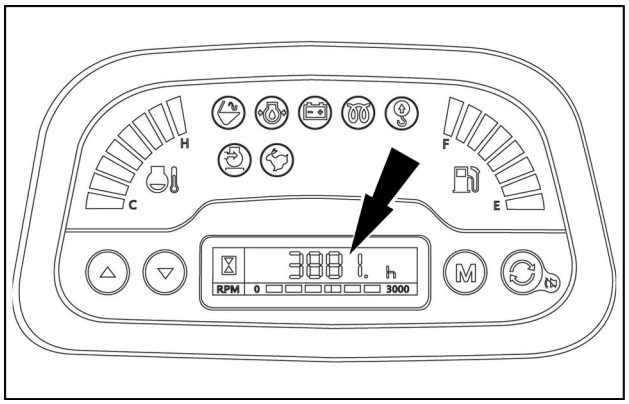
NOTICE: *if you use your machine in particularly harsh conditions (dusty or corrosive atmosphere, etc.), the servicing intervals should be reduced accordingly.*

NOTICE: *take particular care to replace all filters regularly. Clean filters mean longer engine running life.*

NOTE: *oil and fluid should not be thrown on the ground. They must be stored and removed by a company which is responsible for their recycling or their disposal.*

Hourmeter

The hourmeter enables service operations to be scheduled. Its hourly indications are the same as those of a clock when the engine is running. Servicing intervals are carefully calculated to ensure safe and efficient machine operation. Be sure to carry out all the servicing operations properly as defined in this manual.



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Daily inspections

Every day, before starting work, it is necessary to inspect the machine and service certain of its components.

General remarks

- Check signs of leaking oil or water.
- Check that all screws and nuts are correctly tightened.
- Wipe off any dust (engine, operator's compartment etc.).
- Check for any signs of damage.

Engine

- Check the oil level and change the oil if necessary.
- Check the coolant level.
- Check the radiator for signs of clogging or deterioration.
- Check the radiator fan belt tension.
- Check the air filter is clean and not restricted.
- Check the components for signs of leaking oil or water.
- Check the condition of all lines.

Undercarriage

- Check the pad hardware.
- Check the condition of the tracks.
- Check that the upper and lower track rollers and the idler wheels are not leaking oil.

Upperstructure

- Check the fuel tank level.
- Check the hydraulic tank level.
- Check that the hydraulic oil is clean.
- Check the components for signs of leaking oil or water.
- Check the condition of all lines.
- Make sure there are no electrical short circuits.
- Check the battery connections are properly tightened.
- Adjust the rear view mirrors.

Attachment

- Check that the cylinders are not leaking oil.
- Check the condition of all lines.
- Check the condition of the bucket teeth.

After starting the engine

- Did the engine start correctly? Are the exhaust fumes normal? Any strange noises?
- Check for abnormal noise on the hydraulic components.
- Check the components for signs of leaking oil or water.
- Check the audible alarm devices, working lights and windshield wipers.
- Check that all circuits (travel, swing and tool) are functioning correctly.

NOTICE: *if the slightest defect is found, repair it immediately before using the machine or consult your CASE CONSTRUCTION Dealer.*

General specification - Biodiesel fuels

Biodiesel usage in CASE CONSTRUCTION products

Introduction to Fatty Acid Methyl Ester (FAME) biodiesel

FAME biodiesel, called biodiesel fuel in the following section, consists of a family of fuels derived from vegetable oils treated with methyl esters.

There are two main biodiesel fuel types: Rapeseed Methyl Ester (RME) and Soybean Methyl Ester (SME). RME is a blend of rapeseed and sunflower methyl ester, and is the preferred crop in Europe. SME is the preferred crop in the United States.

Biodiesel fuel is a renewable alternative fuel source. Its use and development is promoted worldwide, especially in Europe and in the United States.

NOTICE: *Your emissions control system is compatible with up to **5 %** biodiesel fuel (B5). Be aware that the use of biodiesel fuel that does not comply with the standards mentioned in this section could lead to severe damage to the engine, fuel system or after treatment system of your machine. The use of non-approved fuels may void CASE CONSTRUCTION Warranty coverage.*

Biodiesel fuel can be used to run diesel engines as pure biodiesel fuel or when blended with standard diesel fuel:

- B5 : indicates the blend of **5 %** biodiesel and **95 %** diesel fuels.

NOTICE: *Never use biodiesel blends higher than B5.*

Biodiesel fuel has several positive features in comparison with diesel fuel:

- Biodiesel fuel adds lubricity to the fuel, which is beneficial in many circumstances, particularly as sulfur and aromatics are removed from the fuel.
- Biodiesel has a greater cetane number and burns cleaner.
- Biodiesel produces less particulate matter and reduces smoke emissions.
- Biodiesel is fully biodegradable and non-toxic.

Diesel and biodiesel fuel specifications

TIER 4 FINAL diesel fuel specifications are covered by the following:

- **ASTM D975**, Standard Specification for Diesel Fuel Oils. (15 ppm sulfur maximum.)

Biodiesel blends are covered by:

- United States Diesel Fuel Specification **ASTM D975** allows up to **5 %** biodiesel since 2009. United States fuel suppliers are allowed to use up to **5 %** biodiesel fuel (B5) to supply the network.
- United States Biodiesel Fuel Specification **ASTM D7467** provides specifications for biodiesel blends from B6 to B20.

Pure biodiesel (B100) specification is covered by the following requirements:

- **ASTM D6751** - Standard specification for biodiesel fuel blend stock (B100) for middle distillate fuels.

Before raw oil can be converted into usable biodiesel fuel, it must undergo transesterification to remove glycerides. During the transesterification process, the oil reacts with an alcohol to separate the glycerine from the fat or vegetable oil. This process leaves behind two products: methyl ester (the chemical name for biodiesel) and glycerine (a byproduct usually sold for use in soaps or other products).

NOTICE: *Biodiesel fuels approved for use in the CASE CONSTRUCTION equipment must be transesterified and comply with the North America Standard **ASTM D6751**.*

NOTICE: *Cold Pressed Biodiesel, Cold Pressed Oil, Straight Vegetable Oil (SVO), or more generally unrefined vegetable oils used as motor fuel, are fuels that are normally made from Rapeseed oil or similar high oil content crops. These kinds of fuel are not transesterified, so they do not fulfil the **ASTM D6751** requirements. There is no recognized quality standard available for these types of fuel. Therefore the use of Cold Pressed Biodiesel, Cold Pressed Oil, Straight Vegetable Oil (SVO), or more generally unrefined vegetable oils used as motor fuel are NOT APPROVED at any blend in any CASE CONSTRUCTION product.*

NOTICE: *Any engine and fuel injection equipment fitted to a CASE CONSTRUCTION vehicle found to have run with any blend of NON-APPROVED fuel (fuel not fulfilling the specification described in the requirement **ASTM D6751**) will no longer be covered for Warranty by CASE CONSTRUCTION.*

Biodiesel fuel usage conditions

You must stringently follow the biodiesel fuel usage conditions. Incorrect application of the biodiesel fuel usage conditions could lead to severe damage to the engine, fuel injection equipment and aftertreatment system.

The main concerns related to operation with biodiesel fuels are:

- Filters and injector blockage caused by poor fuel quality.
- Wear and corrosion of internal components due to water content, which affects lubricity.
- Deterioration of some rubber sealing compounds in the fuel system.
- Biodiesel oxidation, which can lead to the formation of deposits that can harm the fuel injection system.

NOTICE: *Any problem in the engine fuel injection equipment associated with non-compliance to the following conditions for biodiesel fuel handling and maintenance will not be covered for Warranty by CASE CONSTRUCTION.*

Purchase biodiesel fuel from a trusted supplier who understands the product and maintains acceptable fuel quality. It is highly recommended that you use biodiesel from BQ 9000 accredited suppliers to maintain the quality and consistency of the fuel. The BQ 9000 Quality Management Program is accredited by the National Biodiesel Board for producers and marketers of biodiesel fuel. See the National Biodiesel Board website at www.biodiesel.org for more information.

Storage

The machine should not be stored for long periods without changing the diesel fuel in the fuel system.

NOTICE: *Biodiesel is highly hygroscopic and tends to collect water more than diesel fuel. This increases the risk of algae and bacteria growth which can cause severe damage to the fuel injection system. Keep the machine fuel tanks and on-site storage tanks as full as possible to limit the amount of air and water vapors inside the tank. Drain water from the tanks at least once a week.*

If the machine should be stored for long periods, make sure to replace the diesel fuel every three months at most.

Fluids and lubricants

By using appropriate fluids and lubricants the excavator can operate in ambient temperatures ranging from **-15 °C** (**-4 °F**) to **45 °C** (**113 °F**).

NOTICE: *when operating the machine in ambient temperatures outside the above mentioned range, consult your CASE CONSTRUCTION dealer for specific machine provision and for specific fluids and lubricants to be used.*

	Quantity		CASE CONSTRUCTION specification	Reference specification
Fuel tank	**30 L** (**7.9 US gal**)	—	—	**ASTM D975** **EN 590**
Engine oil	**5.7 L** (**1.5 US gal**)	**CASE AKCELA NO. 1™ ENGINE OIL SAE 15W-40**	MS 1121	**SAE 15W-40** **ACEA E7/E5** **API CI-4**
Travel reduction unit	**0.6 L** (**0.16 US gal**) x2	**CASE AKCELA GEAR 135 H EP 80W-90**	**MAT3511**	**SAE 80W90** **API GL-5**
Engine coolant	**5 L** (**1.3 US gal**)	**CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** CONCENTRATE	**MAT3624** Grade OAT-EG1	**ASTM D6210** TYPE I-FF
		CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT 50/50 PREMIXED	**MAT3624** Grade OAT-EG2	**ASTM D6210** TYPE III-FF
Hydraulic oil tank (*)	**27 L** (**7.1 US gal**)	**CASE AKCELA HYDRAULIC LL 46**	—	**ISO 11158** L-HV46
Grease (Attachment)	—	**CASE AKCELA MOLY GREASE**	**MAT3550**	**NLGI 2**
Grease (Swing bearing)	—	**CASE AKCELA 251H EP MULTI-PURPOSE GREASE**	**MAT3550** Grade A	**NLGI 2**

(*) The total capacity of the hydraulic system is **55 L** (**14.5 US gal**).

Engine coolant

CASE CONSTRUCTION requires the use of a fully formulated Organic Acid Technology (OAT) based coolant. **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** is the reference genuine product.

NOTICE: *use of different coolant brands is not recommended.*

NOTICE: *never add Supplemental Coolant Additives (SCA) when using* ***CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT****.*

NOTICE: *never mix* ***CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT*** *coolant with conventional coolant. Mixing OAT based coolant with conventional coolant will reduce the effectiveness of OAT coolant.*

NOTICE: *if only conventional coolant is available, a complete changeover of the fluid into the cooling system shall be carried out.*

the engine cooling system shall always be refilled with coolant solution made by mixture of antifreeze and distilled (deionized) water.

NOTICE: *never refill the cooling system with only antifreeze. Never refill the cooling system with only water.*

Using **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**, a 50/50 mixture of antifreeze and distilled (deionized) water grants proper performance of the engine cooling system in the above mentioned operating temperature range of the machine.

CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT is available as:

- 50/50 PREMIXED coolant solution ready for usage.
- CONCENTRATE antifreeze to be mixed 50/50 with distilled (deionized) water.

NOTICE: *if operating in extreme winter climate, a coolant solution made by 60/40 antifreeze/distilled (deionized) water mixture shall be used in order to grant proper performance of the engine cooling system.*

NOTICE: *never use coolant solution with more than* ***60 %*** *of antifreeze. This affects the cooling capacity of the mixture.*

When the coolant solution is prepared starting from the CONCENTRATE product, the antifreeze concentration in the mixture of antifreeze and distilled (deionized) water can be determined with a refractometer designed to measure ethylene glycol content.

If distilled (deionized) water is not available, use water for dilution with the following properties:

Property	Maximum limit
Total Solids	**340 ppm**
Total Hardness	**340 ppm**
Chloride (Cl)	**340 ppm**
Sulfate (SO4)	**100 ppm**
Acidity pH	5.5 to 9.0

NOTICE: *never use hard water, sea water and softened sea water that has been conditioned with salt. The minerals and salts present in potable water can cause corrosion and deposits resulting in shortened engine life.*

Fuel

For Europe only: use only Ultra-Low Sulphur Diesel (S10) that meets **EN 590** specifications.

For North America only: use only No. 2-D Ultra-Low Sulphur Diesel (S15) that meets **ASTM D975** specifications.

Using other types of fuel may lead to stalled engine output or deterioration in fuel economy.

NOTICE: *the warranty shall be invalid if any serious defect is caused by usage of any other fuel. Using fuel other than recommended may cause damage to the fuel injection pump, injector, and other fuel supply system or the engine. CASE CONSTRUCTION may not be responsible to any of such damages.*

If the temperature drops below the fuel cloud point, output deficiency or engine start problems may occur due to wax crystals.

For North America only: during cold weather, lower than **-7 °C** (**19.4 °F**), it is temporarily acceptable to use a mixture of No. 1-D (S15) and No. 2-D (S15).

NOTICE: *if operating in severe winter climate, consult the fuel supplier or the CASE CONSTRUCTION dealer for specific diesel fuel to be used.*

The diesel fuel to be used on the machine shall:

- be free from dust particles, even minute ones.
- have the proper viscosity.
- have a high cetane number.
- present great fluidity at low temperatures.
- have low sulphur content.
- have very little residual carbon.

NOTICE: *never use a mix of diesel fuel and old engine oil. The fuel injection system and the exhaust after treatment system will be severely damaged.*

NOTICE: *consult the fuel supplier or the CASE CONSTRUCTION dealer regarding appropriate use of fuel additives.*

NOTICE: *in order to prevent condensation during cold weather, fill the fuel tank to full after completing the day's work.*

Fuel storage:

Long storage can lead to the accumulation of impurities and condensation in the fuel. Engine trouble can often be traced to the presence of water in the fuel. The storage tank must be placed outside and the temperature of the fuel should be kept as low as possible. Drain off water and impurities regularly.

Disposal of fluids, lubricants, and spare parts

Fluids, lubricants and spare parts used on the machine are not fully compatible with the environment. Make sure to carry out all maintenance operations using appropriate tools, in order to avoid any risk of damaging the environment.

NOTE: *for example, make sure that the receptacle for collecting oil to be replaced is not leaking.*

Never spread fluids or lubricants on the ground or into water. Consult the CASE CONSTRUCTION dealer or the Local Environmental Agency in order to obtain information on the correct method of disposing fluids and lubricants used on the machine.

Never throw away spare parts as filters or batteries. Consult the CASE CONSTRUCTION dealer or the Local Environmental Agency in order to obtain information on the correct method of disposing filters, batteries or other spare parts used on the machine.

Engine oil recommended operating temperature range

(H)	15W-40 API CI-4								
-40 °C -40 °F	-30 °C -22 °F	-20 °C -4 °F	-10 °C 14 °F	0 °C 32 °F	10 °C 50 °F	20 °C 68 °F	30 °C 86 °F	40 °C 104 °F	50 °C 122 °F

(H) Engine oil pan or coolant block heater recommended in this range

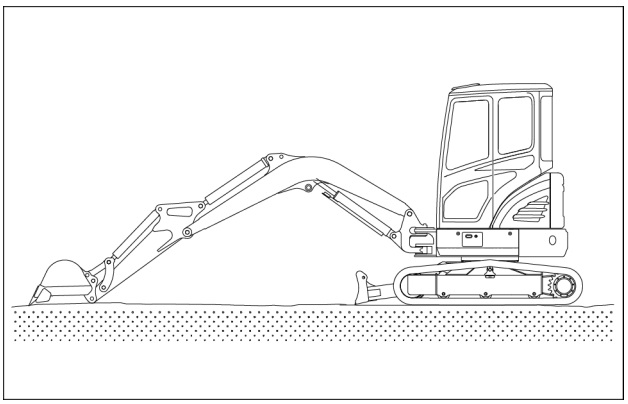
Releasing pressure in the hydraulic system

⚠ WARNING

Pressurized system!
System is still under pressure. Release pressure according to instructions in this manual.
Failure to comply could result in death or serious injury.

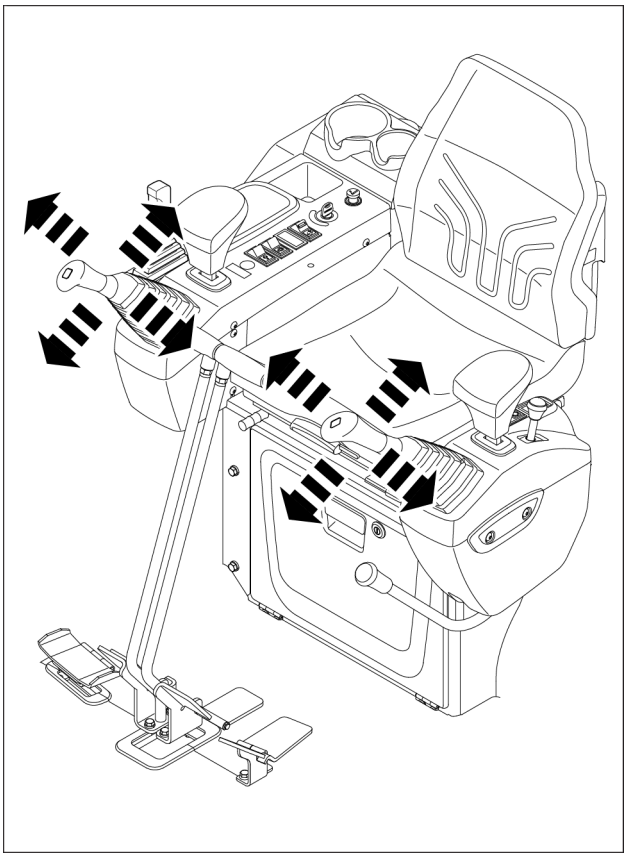
W1044A

1. Place the machine on a flat and level ground. Lower the attachment to the ground and stop the engine.
2. Put the safety lever in UNLOCK position (forward position).



SMIL16MEX0376AA 1

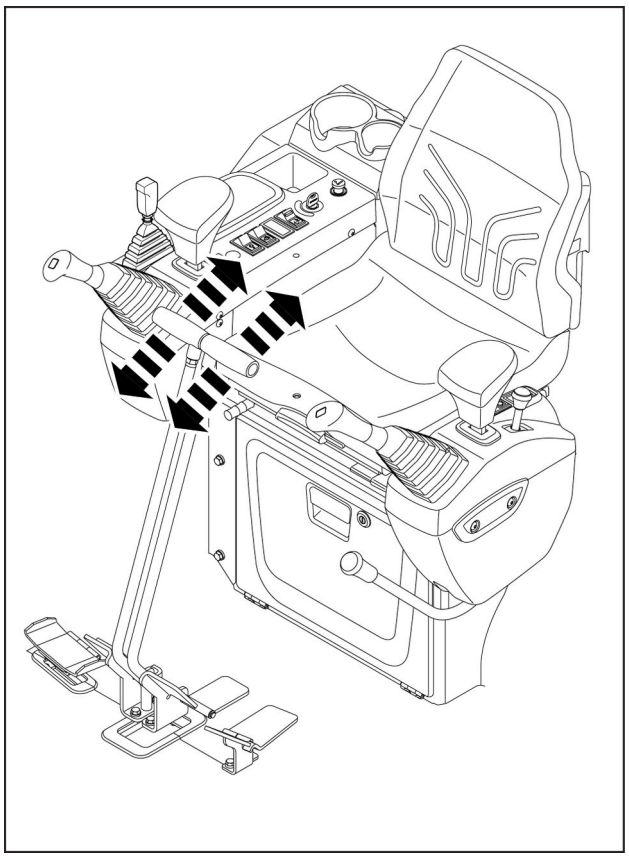
3. Operate the control levers from right–hand to left-hand and front to rear a dozen times approximately.



SMIL16MEX0374BB 2

4. Operate the travel levers from front to rear a dozen times approximately.

   NOTE: *this procedure does not completely release the pressure, so when operate on the hydraulic system, loosen the connections slowly and do not stand in the direction where the oil drains out.*



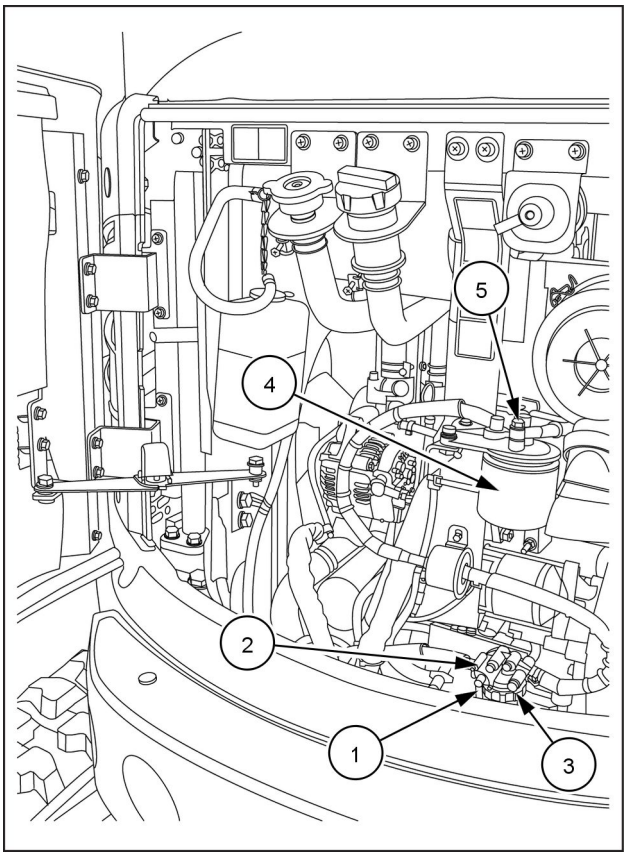
SMIL16MEX1495BA 3

Fuel system bleeding

In the following cases, drainage from the fuel system is required:

- The tank has become empty completely.
- The fuel filter is replaced.
- The components of the fuel system are removed for service or repair.
- The machine has been stored for longer than one month.

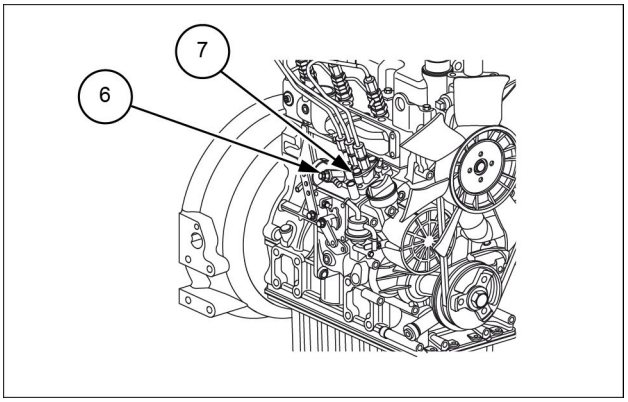
1. Locate the water separator **(2)** and the fuel filter **(4)** inside the engine compartment.
2. Fill the fuel tank with suitable fuel.
3. Open the cock **(1)** located on the water separator **(2)**.
4. Loosen the air vent plug **(3)** located on the water separator **(2)**.
5. Loosen the air vent plug **(5)** located on the fuel filter **(4)**.
6. Tighten the air vent plugs **(3)** and **(5)** when bubbles do not come up any more.



SMIL16MEX0923BA 1

7. Open the air vent cock **(6)** located on top of the fuel injection pump **(7)**.
8. Turn the starter switch to ON position and hold it in the position for **10 – 15 s** to operate the fuel injection pump **(7)**.
9. Turn the starter switch to OFF position.
10. Close the air vent cock **(6)** located on top of the fuel injection pump **(7)**.
11. Close the air vent cock **(1)** located on the water separator **(2)** after air bleeding.

NOTICE: *always keep the air vent cock **(6)** located on the fuel injection pump **(7)** closed except during fuel system bleeding, or it may cause the engine stop.*



SMIL16MEX0412AB 2

Protecting the electronic and electrical systems during battery charging or welding

⚠ DANGER

Improper operation or service of this machine can result in an accident.
Any unauthorized modifications made to this machine can have serious consequences. Consult an authorized dealer on changes, additions, or modifications that may be required for this machine. Do not make any unauthorized modifications.
Failure to comply will result in death or serious injury.

D0030A

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.
Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0111A

Whenever carrying out a welding operation on the undercarriage or upper-structure carriage as authorized by CASE CONSTRUCTION and in accordance with their instructions, disconnect the batteries, disconnect the alternator B+, D+ terminal wires, and the instrument cluster connector and connect the welding apparatus ground cable to the component on which the welding operation is to be performed. Never connect the welding apparatus to the undercarriage when welding on the upper-structure (or vice-versa). Never connect the welding apparatus ground to a component of the hydraulic system.

To avoid damage to the electronic/electrical systems, always observe the following:

- Never make or break any of the charging circuit connections, including the battery connections, when the engine is running.
- Never short any of the charging components to ground.
- Make sure to set the battery disconnect switch to O position (OFF position) in advance or cut-off the connection of the ground cable when executing arc welding to the machine.
- Always disconnect the negative cable from the battery when charging the battery in the machine with a battery charger.

NOTICE: *position the welder ground clamp as close to the welding area as possible. If welding in close proximity to a computer module, then the module should be removed from the machine. Never allow welding cables to lay on, near or across any electrical wiring or electronic component while welding is in progress.*

NOTICE: *if welding must be performed on the unit, either the machine, the battery ground cable must be disconnected from the machine battery. The electronic monitoring system and charging system will be damaged if this is not done.*

Maintenance planning

Maintenance chart

Maintenance action	Change fluid	Replace	Grease	Check	Cleaning	Adjust	Drain fluid	Page no.
Break-in period								
Engine oil and filter	x							**6-17**
Fuel filter		x						**6-17**
Hydraulic oil return filter		x						**6-17**
Pilot line filter		x						**6-17**
Travel reduction gears	x							**6-17**
Swing bearing			x					**6-17**
Grease points (Bucket)			x					**6-18**
Every 10 hours								
Engine oil level				x				**6-18**
Engine coolant level				x				**6-19**
Hydraulic oil level				x				**6-20**
Fuel filter water separator					x			**6-21**
Fan and alternator drive belt						x		**6-22**
Every 50 hours								
Grease points (Bucket)			x					**6-23**
Grease points (Boom and arm)			x					**6-24**
Grease points (Blade)			x					**6-25**
Track tension				x				**6-26**
Every 100 hours								
Fuel filter water separator						x		**6-28**
Every 250 hours								
Engine oil and filter	x							**6-28**
Battery				x				**6-31**
Swing bearing			x					**6-35**
Tightening torques				x				**6-36**
Every 400 hours								
Fuel filter		x						**6-37**
Fuel filter water separator		x						**6-38**
Every 500 hours								
Air cleaner						x		**6-39**
Radiator and coolers						x		**6-42**
Radiator fan				x				**6-43**
Travel reduction gears				x				**6-43**
Every 1000 hours								
Hydraulic oil return filter		x						**6-44**
Pilot line filter		x						**6-45**
Travel reduction gears	x							**6-46**
Every 2000 hours								
Engine coolant	x							**6-47**
Hydraulic oil suction filter						x		**6-49**
Hydraulic hoses				x				**6-49**
Every 5000 hours								
Hydraulic oil	x							**6-50**
When necessary								
Bulb replacement		x						**6-52**
Cab air filter						x		**6-54**

Maintenance action	Check	Change fluid	Replace	Grease	Drain fluid	Adjust	Cleaning	Page no.
Fuel tank drain					x			6-55
Fuel tank strainer						x		6-56
Control levers				x				6-57
Plastic and resin parts						x		6-57

Break-in period

Engine oil and filter

Replace the engine oil and the engine oil filter after the first **250 h** of service, then replace the engine oil and the engine oil filter every **250 h**.

To replace the engine oil and the engine oil filter perform the operations described on page **6-28**.

Fuel filter

Replace the fuel filter after the first **250 h** of service, then replace the fuel filter every **400 h**.

To replace the fuel filter perform the operations described on page **6-37**.

Hydraulic oil return filter

Replace the hydraulic oil return filter after the first **250 h** of service, then replace the hydraulic oil return filter every **1000 h**.

To replace the hydraulic oil return filter perform the operations described on page **6-44**.

NOTE: *replace the hydraulic oil return filter every **100 h** of service if hydraulic breaker is used continuously.*

Pilot line filter

Replace the pilot line filter after the first **250 h** of service, then replace the pilot line filter every **1000 h**.

To replace the pilot line filter perform the operations described on page **6-45**.

NOTE: *replace the pilot line filter every **100 h** of service if hydraulic breaker is used continuously.*

Travel reduction gears

Replace the travel reduction gears oil after the first **250 h** of service, then replace the travel reduction gears oil every **1000 h**.

To replace the travel reduction gears oil perform the operations described on page **6-46**.

Swing bearing

Grease the swing bearing after the first **50 h**, then every **250 h**.

To lubricate the swing bearing, refer to page **6-35**.

Grease points (Bucket)

Lubricate the bucket linkage every **10 h** within the first **100 h**, then lubricate every **50 h**.

To lubricate the bucket linkage refer to page **6-23**.

Every 10 hours

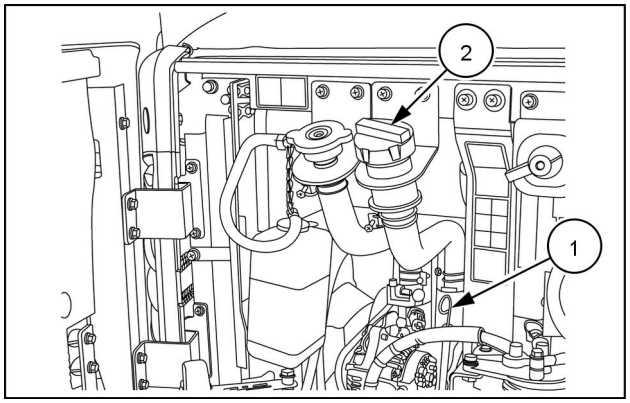
Engine oil level

Check the engine oil level every **10 h** or every day
Lubricant: **CASE AKCELA NO. 1™ ENGINE OIL SAE 15W-40**

1. Park the machine on a flat and level place. Stop the engine, and remove the starter key.
2. After stopping the engine for **15 min** or more, open the engine door.

   Remove the dipstick **(1)**, and wipe oil off the dipstick with a clean cloth.

   Reinsert the dipstick **(1)** into the guide tube as far as it will go, and then take it out.

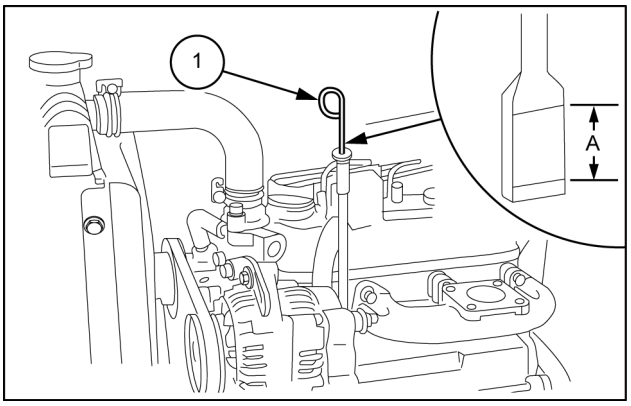


SMIL16MEX0924AA 1

3. The engine oil level is optimal when the level is between the lower (minimum) and the upper (maximum) marks **(A)**.
4. If the oil level is at or below the lower mark on the dipstick **(1)**, remove the fill plug **(2)** and pour in oil until the level reaches the upper mark.

NOTE: *make sure that the oil level is not above the upper mark (maximum) on the dipstick **(1)**. Doing so will cause such problems as poor fuel economy and an abnormal rise in coolant temperature.*

5. Install the fill plug **(2)**.



SMIL16MEX0708AB 2

Engine coolant level

⚠ WARNING

Hazardous chemicals!
Coolant can be toxic. Avoid contact with skin, eyes, and clothing. Antidotes:
EXTERNAL - Rinse thoroughly with water. Remove soiled clothing.
INTERNAL - Rinse the mouth with water. DO NOT induce vomiting. Seek immediate medical attention.
EYES - Flush with water. Seek immediate medical attention.
Failure to comply could result in death or serious injury.

W0282A

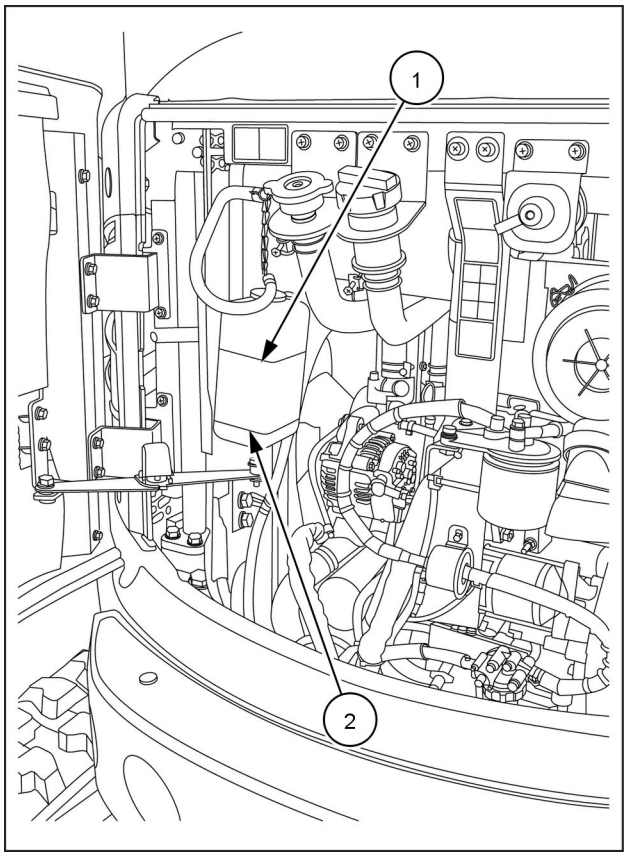
⚠ CAUTION

Burn hazard!
Take care if removing the filler cap while the system is hot. Before removing the cap: completely cover the cap using a thick cloth, and slowly open the filler cap to allow the pressure to escape. Do not add cold water to a hot coolant reservoir.
Failure to comply could result in minor or moderate injury.

C0031A

Check the coolant level in the reserve tank every **10 h** or every day
Fluid: **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**

1. Park the machine on a flat and level place. Stop the engine, and remove the starter key.
2. Open the engine access door.
3. Check that the level of reserve tank is between the FULL **(1)** mark and the LOW **(2)** mark.



SMIL16MEX0923BA 1

Hydraulic oil level

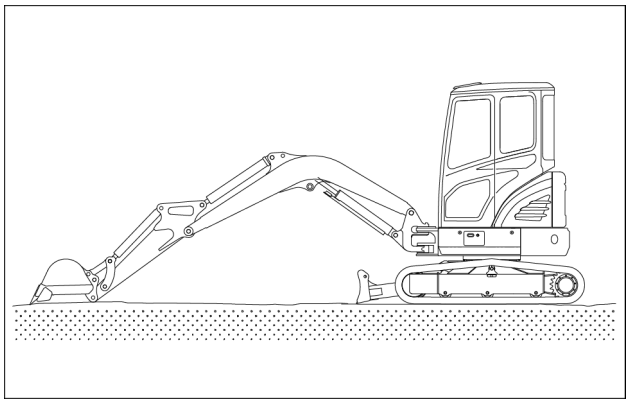
⚠ WARNING

Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

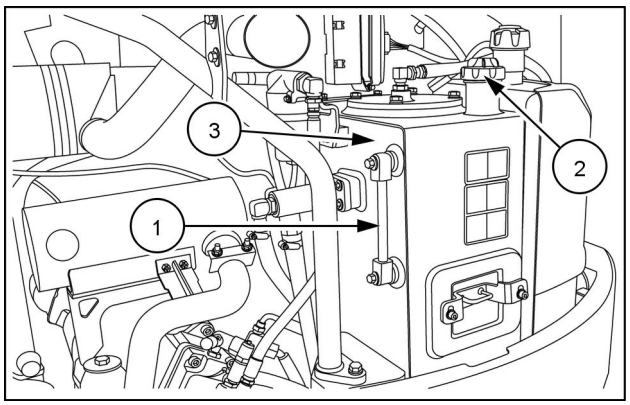
Check the hydraulic oil level every **10 h** or every day
Fluid: **CASE AKCELA HYDRAULIC LL 46**

1. Park the machine on a flat and level place, and arrange the attachment as shown in the figure. Stop the engine, and remove the starter key.



SMIL16MEX0376AA 1

2. Open the side hood to access the hydraulic oil tank **(3)**. The oil level is normal if between the red lines of the level gauge **(1)**.
3. If the hydraulic oil level is not in the correct range proceed as follows:
   - Release all pressure in the hydraulic tank. Refer to page **6-11**.
   - Clean the cap **(2)** and the area around the cap.
   - Remove the cap **(2)**, and supply hydraulic fluid to the hydraulic oil tank.
   - Install the cap **(2)**.



SMIL16MEX0928AA 2

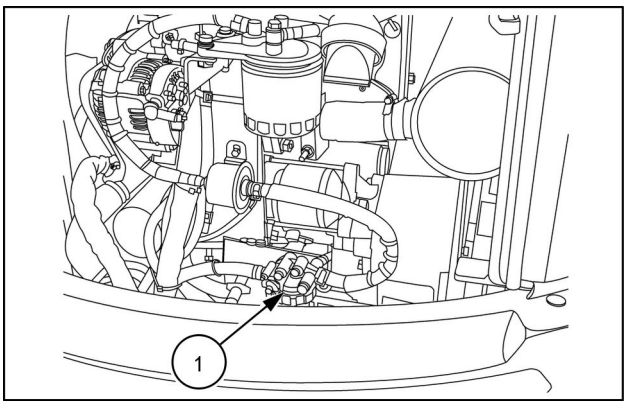
NOTICE: *make sure that no contaminant (water, sand etc.) enters the reservoir during filling.*

4. Start the engine after filling and operate the work equipment several times.
5. Check the oil level after engine stops. Close the side hood.

Fuel filter water separator

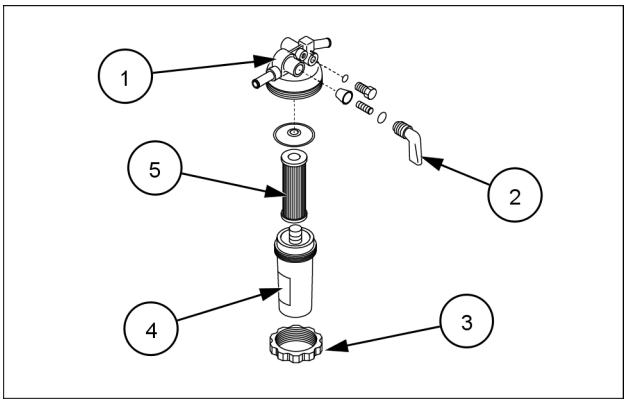
Drain water and sediment from the fuel filter water separator every **10 h** or every day.
Clean the filter element of the fuel filter water separator every **100 h**.
Replace the filter element of the fuel filter separator every **400 h**

1. Open the engine door and place a container with a capacity of **2 L** (**0.5 US gal**) under the fuel filter water separator **(1)**.



SMIL16MEX0925AA 1

2. Close the fuel cock **(2)** of the fuel filter water separator **(1)**.
3. Loosen the retaining ring **(3)** and remove the cup **(4)** from the fuel filter water separator **(1)**.
4. Remove the filter element **(5)**, clean and replace if necessary.
5. Empty the cup **(4)** and rinse the inside with kerosene.
6. Reassemble the fuel filter water separator **(1)** and tighten the retaining ring **(3)**.



SMIL16MEX0039AA 2

Fan and alternator drive belt

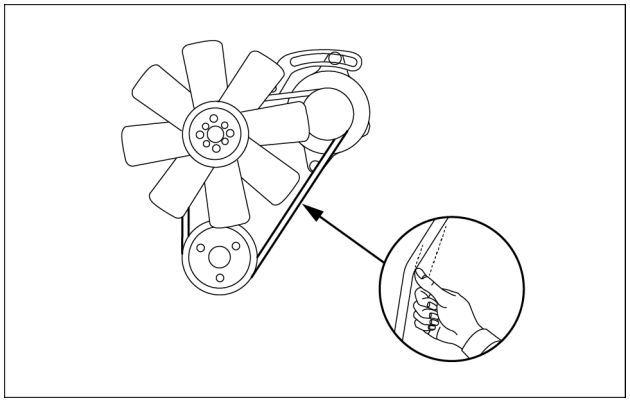
Check the belt tension every **10 h** or every day.

NOTICE: *Operating the engine with loosened belt may cause over heat of the engine or insufficient charging of the battery due to slipping belt in its housing.*

Inspection of tension

1. Apply finger pressure of about **10 kg** (**22.0 lb**) at the midpoint of the belt, between the alternator pulley and the crankshaft pulley, while the engine is shut down and the starter key is removed.
2. Loose of tension should be about **7 – 9 mm** (**0.3 – 0.4 in**).

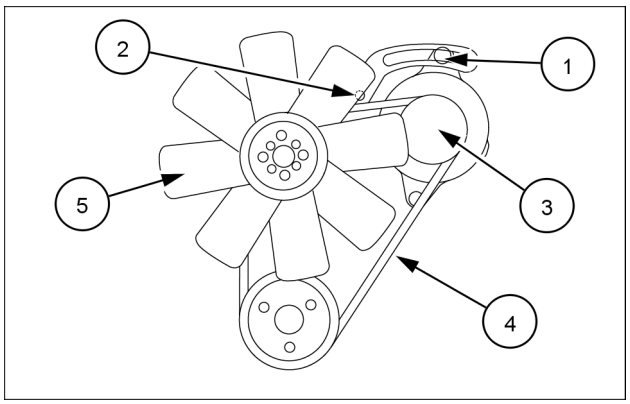
NOTE: *check any indication of damage on the pulley or belt due to wear. Check thoroughly to make sure that the belt is correctly engaged to groove of the pulley. The belt must be replaced if it is elongated, it has cracks or it is worn out.*



SMIL16MEX0418AA 1

Adjustment of tension

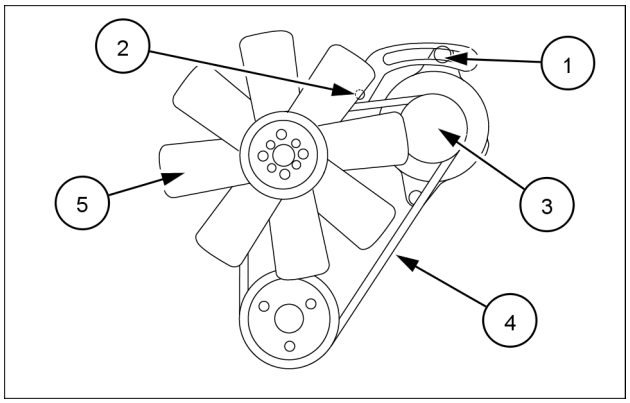
1. Loosen the adjusting bolt **(1)** and the mounting bolt **(2)**.
2. Rotate the alternator **(3)** to obtain the correct value of tension.
3. Tighten the mounting bolt **(2)** and the adjusting bolt **(1)**.



SMIL16MEX0419AA 2

Replacement of belt

1. Loosen the adjusting bolt **(1)** and the mounting bolt **(2)**.
2. Lightly tighten the adjusting bolt **(1)** until its seating face touches.
3. Remove the belt **(4)** from the pulleys to pull it out from the radiator fan **(5)**.
4. Insert the new belt from the radiator fan **(5)** to mount it by aligning it to groove of each pulley. Rotate the alternator **(3)** to obtain the correct value of tension.
5. Tighten the adjusting bolt **(1)** and the mounting bolt **(2)**.
6. After adjustment, run the engine in idling speed for approximately **5 min**, and then stop the engine to re-check tension of the belt.

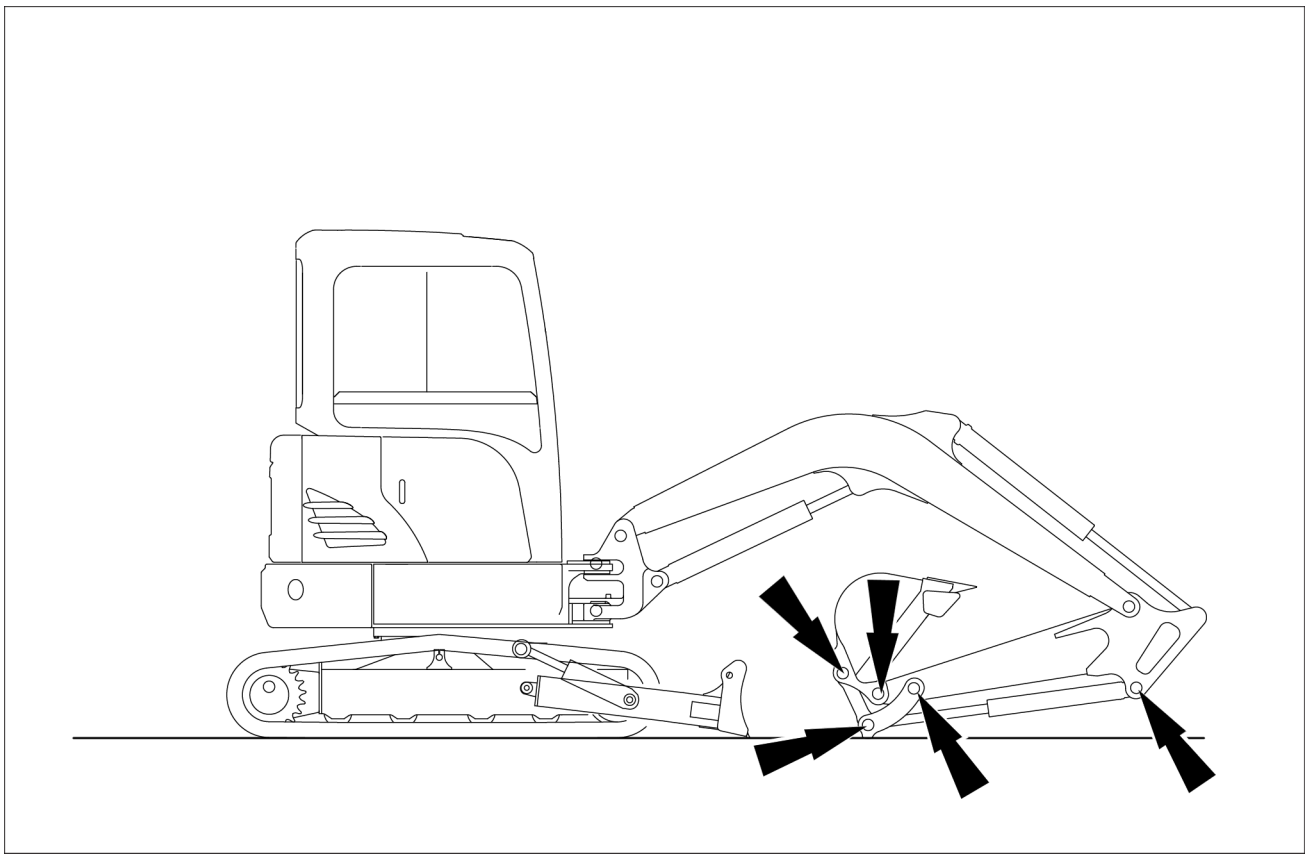


SMIL16MEX0419AA 3

Every 50 hours

Grease points (Bucket)

Grease the bucket linkage every **50 h**.
Lubricant: **CASE AKCELA MOLY GREASE**



SMIL16MEX0420FA 1

Bucket cylinder pin (head): one grease fitting

Bucket cylinder pin (rod): one grease fitting

Bucket link (control rod): one grease fitting

Arm and bucket connection pin: one grease fitting

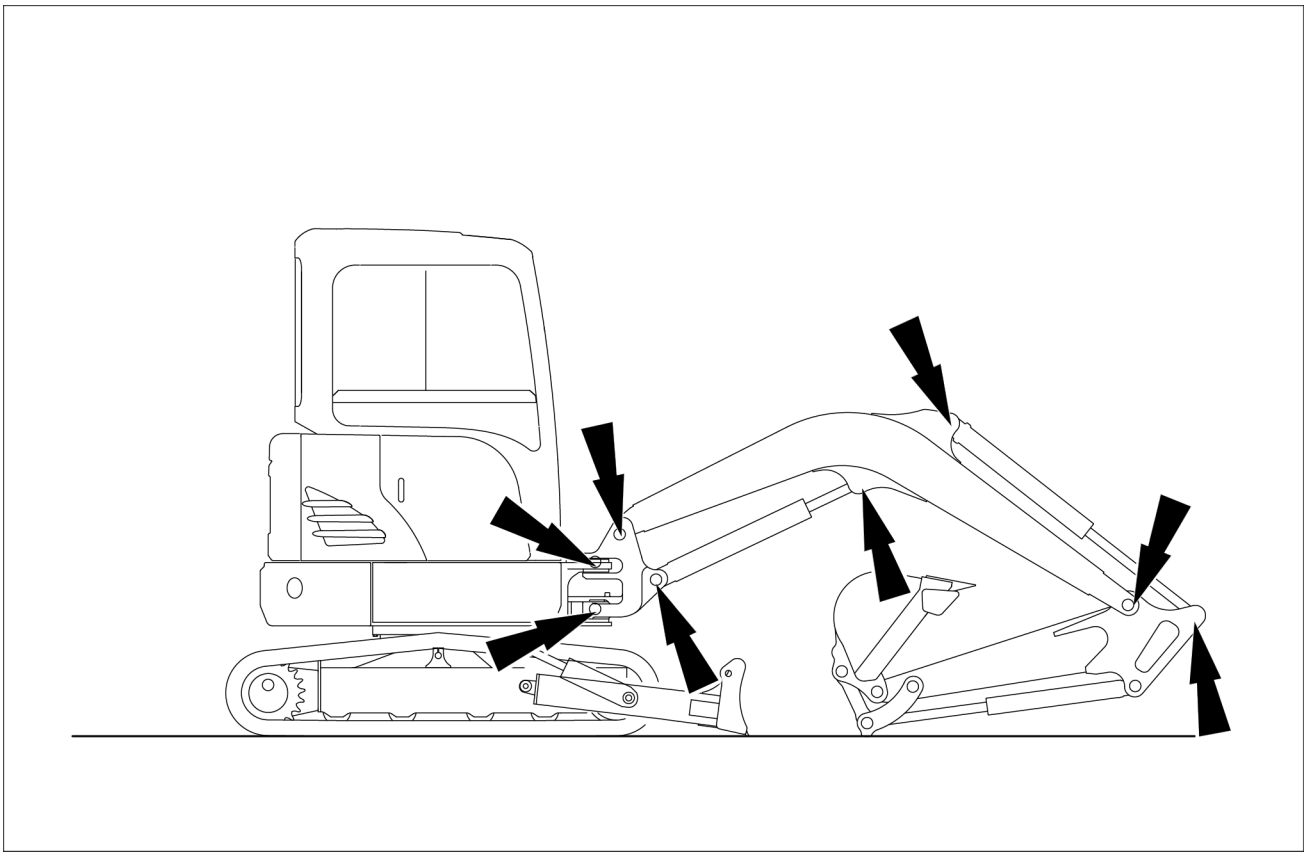
Arm and control link connection pin: one grease fitting

NOTICE: *if you operate the machine in water or mud, you must lubricate the bucket linkage every* ***10 h****.*

NOTICE: *if you operate the machine with any attachment other than a bucket, you must lubricate the bucket linkage every* ***10 h****.*

Grease points (Boom and arm)

Grease the boom, the arm and the swing system every **50 h**.
Lubricant: **CASE AKCELA MOLY GREASE**



SMIL16MEX0420FA 1

Boom connection pin: two grease fittings

Boom cylinder (head and rod side): two grease fittings

Arm cylinder pin (head and rod side): two grease fittings

Boom and arm connection pin: one grease fitting

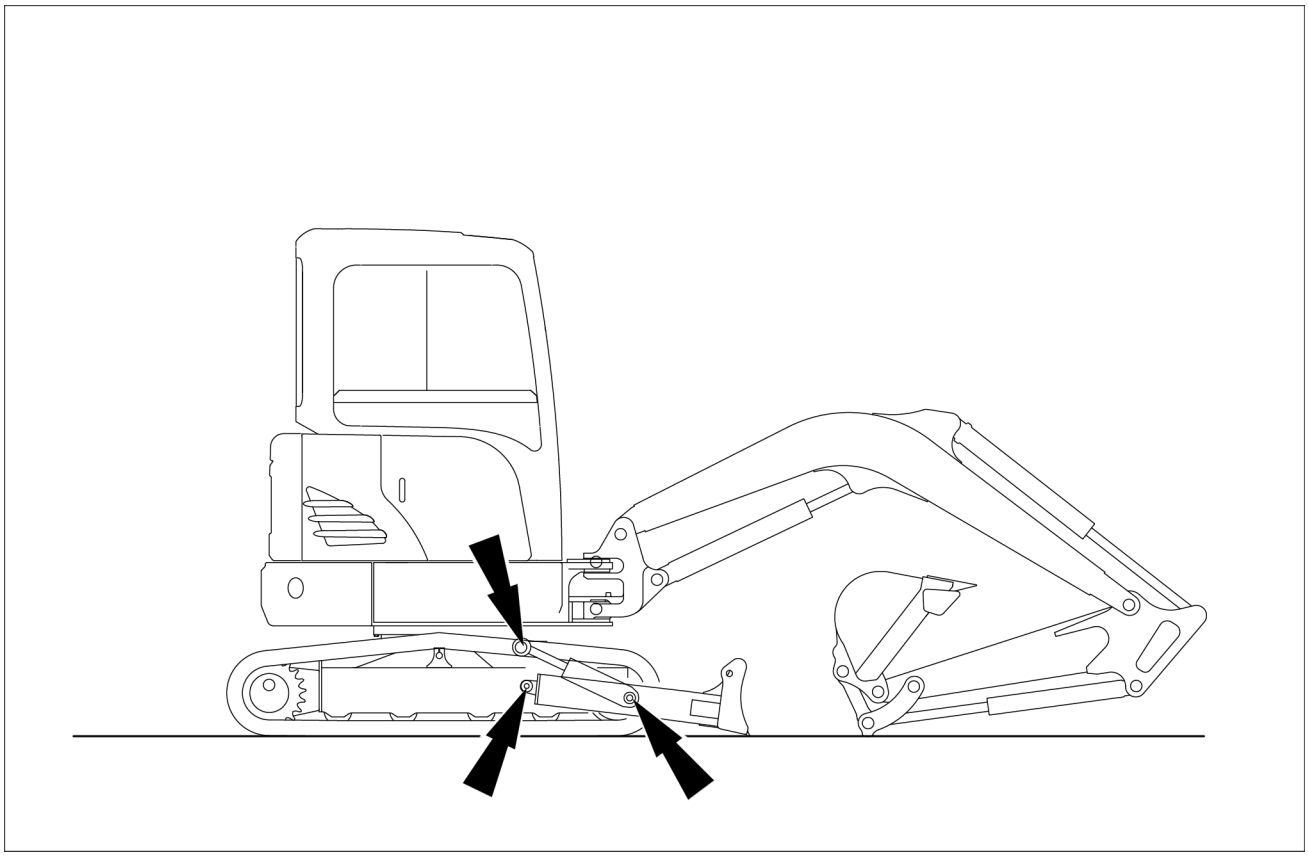
Boom swing cylinder (head and rod side): two grease fittings

Lubrication manifold at upper frame: three grease fittings

NOTICE: *if you operate the machine in water or mud, you must lubricate the boom, the arm and the swing system every* ***10 h****.*

Grease points (Blade)

Grease the blade every **50 h**.
Lubricant: **CASE AKCELA MOLY GREASE**



SMIL16MEX0420FA 1

Dozer blade connection pin: two grease fittings

Dozer blade cylinder pin: two grease fittings

NOTICE: *if you operate the machine in water or mud, you must lubricate the dozer blade connection pin and the dozer blade cylinder pin every* ***10 h****.*

Track tension

⚠ WARNING

Tip-over hazard!
Only raise the track as little as necessary.
Failure to comply could result in death or serious injury.

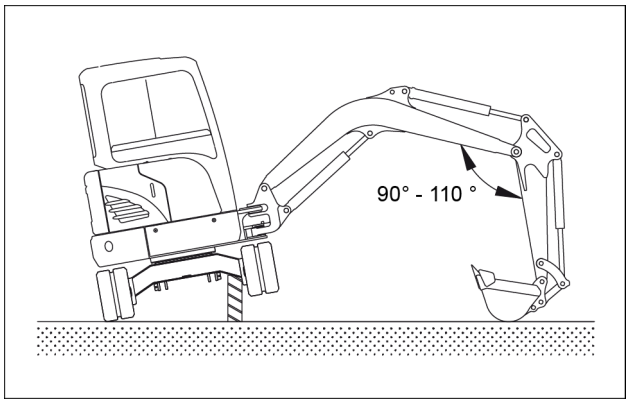
W0276A

Check the track tension every **50 h**

NOTICE: *if the tracks are too tight, they wear quickly. If tracks are not tight enough, they wear quickly and can catch on the sprocket wheel or slide off the idler wheel or the sprocket wheel. Clean the tracks after work.*

To check the tracks tension, proceed as follows:

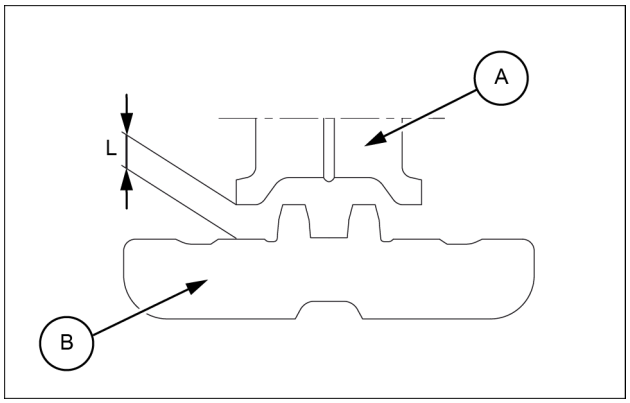
1. Swing the upper structure perpendicular to the undercarriage. Lower the attachment to the ground, then lower the boom until the track is raised off the ground. Place a block under the undercarriage and raise the attachment off the ground.
2. Set the engine speed lever to the maximum speed position.
3. Operate the travel control lever to move the raised track forward and backward and shake off the mud.
4. Repeat the same operations for the other track.



SMIL16MEX0422AB 1

Checking the tension

1. Stop the engine, then remove the key from the starter switch.
2. At the center of the track, measure the slack **(L)** between the bottom of the lower roller **(A)** and the rubber track shoe **(B)**.
   The value must be within **5 – 10 mm** (**0.2 – 0.4 in**).
4. Adjust the tension as necessary, then lower the track to the ground.
5. Repeat the same operations for the other track.



SMIL16MEX0423AB 2

Adjusting the tension

To increase the tension:

1. Clean the grease fitting adapter and the grease fitting.
2. Connect the grease pump. Inject the grease to obtain the right amount of track tension.
3. Remove the grease pump and clean the grease fitting.
4. Repeat the same operations for the other track.

⚠ WARNING

Pressurized fluid can penetrate the skin and cause severe injuries.
The grease in the cylinder is under high pressure. Never loosen the grease fitting adaptor completely in order to speed up the flow of grease.
Failure to comply could result in death or serious injury.

W0261A

To reduce the tension:

1. Loosen the grease fitting adapter and drain grease from the cylinder.
2. When the track tension is correct, tighten the grease fitting adapter.
3. Clean the grease fitting adapter, then lower the track to the ground.
4. Repeat the same operations for the other track.

NOTICE: *if the grease fitting adapter is damaged, grease may leak out. Check the condition of the grease fitting adapter regularly and replace it if necessary.*

Every 100 hours

Fuel filter water separator

Clean the filter element of the fuel filter water separator every **100 h**.

To clean the filter element of the fuel filter water separator, refer to page **6-21**.

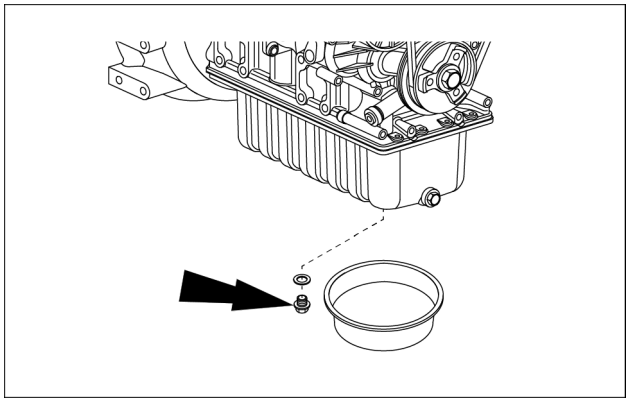
Every 250 hours

Engine oil and filter

Replace the engine oil and the engine oil filter every **250 h**
Lubricant: **CASE AKCELA NO. 1™ ENGINE OIL SAE 15W-40**
Quantity: **5.7 L** (**1.5 US gal**)

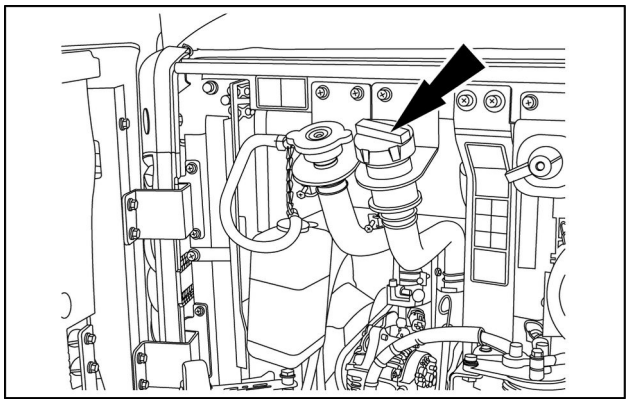
NOTE: *replace the oil while the engine is warm but not hot. Doing so helps the oil in flowing.*

1. Park the machine on a flat and level place. Stop the engine, remove the starter key.
2. Remove the cover of the drain plug.
3. Place a container with a capacity of **7 L** (**1.8 US gal**) under the drain plug.



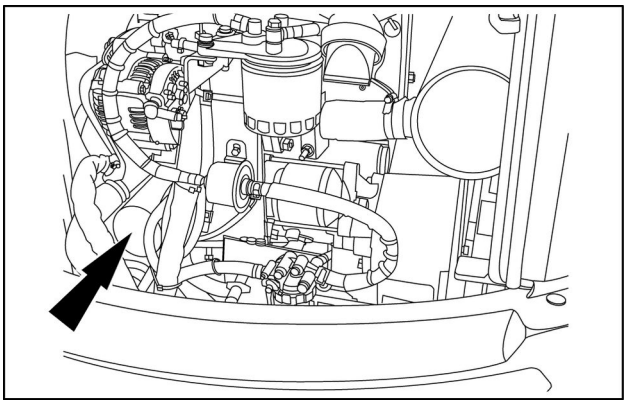
SMIL16MEX0425AA 1

4. Open the engine access door and remove the filling plug.
5. Remove the drain plug and drain the oil.
6. Install the drain plug.

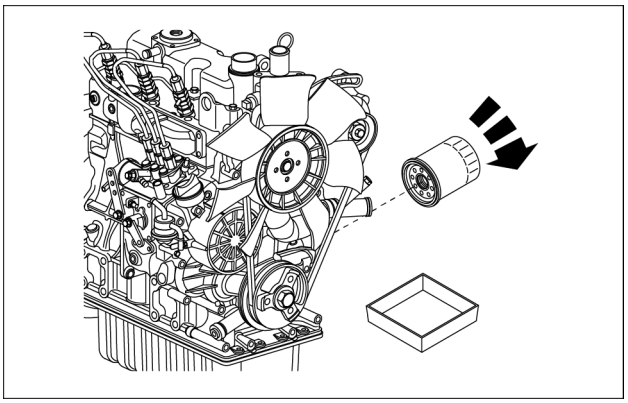


SMIL16MEX0924AA 2

7. Clean the area around the engine oil filter and remove it with the specific tool provided with the machine.

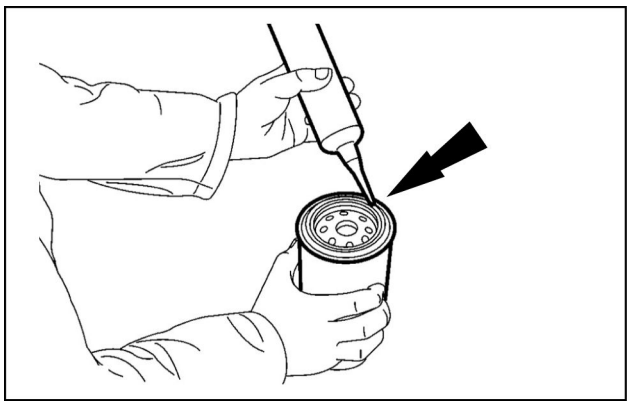


SMIL16MEX0925AA 3



SMIL16MEX0426AA 4

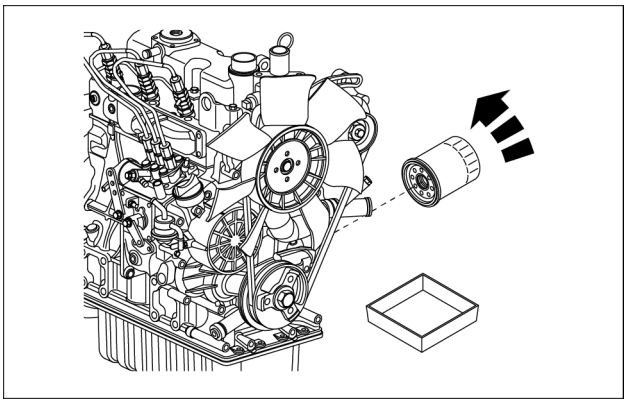
8. Apply an oil film finely to the seal of a new filter.



SMIL14CEX2751AA 5

9. Attach a new filter. Turn the filter until the seal touches the filter head, and then tighten it further a half turn by hand.

NOTE: *do not use a filter wrench for tightening the filter. Overtightening can damage the filter and its seal.*

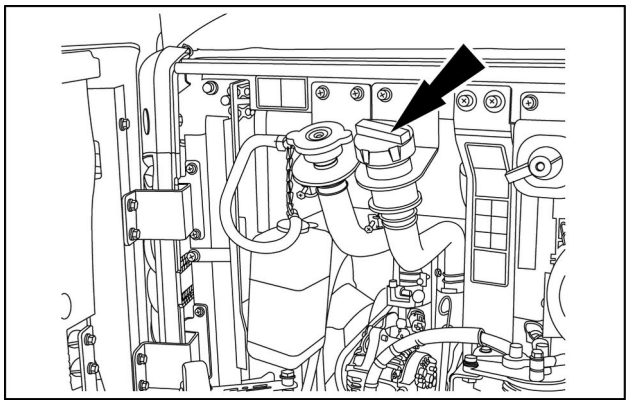


SMIL16MEX0426AA 6

10. Add new engine oil to the engine. Install the filling plug.
11. Run the engine for several minutes to check that there are no leaks at the filter and at the drain plug.
12. Stop the engine and check the oil level with the dip-stick. Add oil if necessary.

NOTE: *always wait* ***15 min*** *to allow the oil to return to the sump before checking the oil level.*

13. Install the cover of the drain plug.



SMIL16MEX0924AA 7

Battery

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Before working on any component(s) of the electrical circuit, put the ignition key in the off (shut down) position. When disconnecting batteries, always disconnect the negative (-) cable first. When reconnecting batteries, always connect the negative (-) cable last.
Failure to comply could result in death or serious injury.

W0943A

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.
Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0111A

⚠ WARNING

Battery gas can explode!
To prevent an explosion: 1. Always disconnect the negative (-) battery cable first. 2. Always connect the negative (-) battery cable last. 3. Do not short circuit the battery posts with metal objects. 4. Do not weld, grind, or smoke near a battery.
Failure to comply could result in death or serious injury.

W0011A

⚠ WARNING

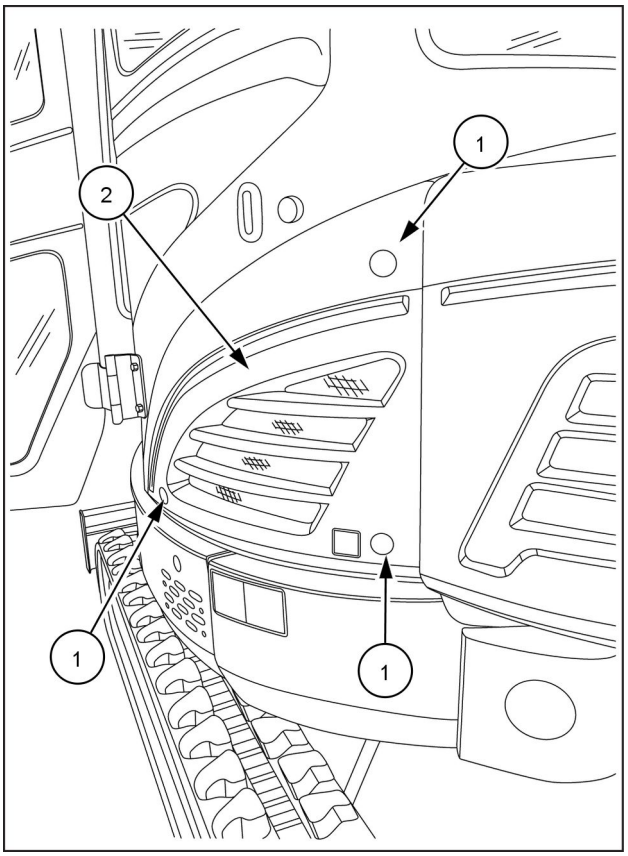
Explosive gas!
Batteries emit explosive hydrogen gas and other fumes while charging. Ventilate the charging area. Keep the battery away from sparks, open flames, and other ignition sources. Never charge a frozen battery.
Failure to comply could result in death or serious injury.

W0005A

Check the battery voltage every **250 h**.

To access the battery proceed as follow:

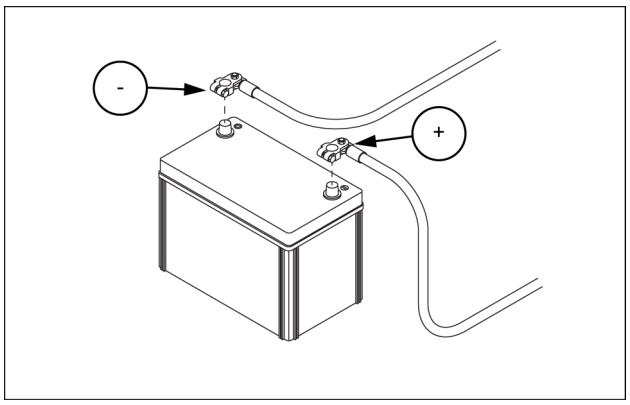
1. Remove the three bolts **(1)**.
2. Remove the side panel **(2)**.



SMIL16MEX1286BA 1

Cleaning of the battery

1. Wash the terminal with hot water, and apply grease to the terminals after washing.



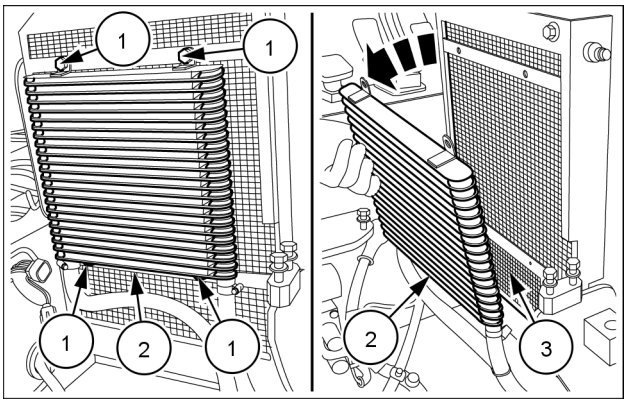
SMIL16MEX2595AB 2

Replacement of the battery

To replace the batteries proceed as follows:

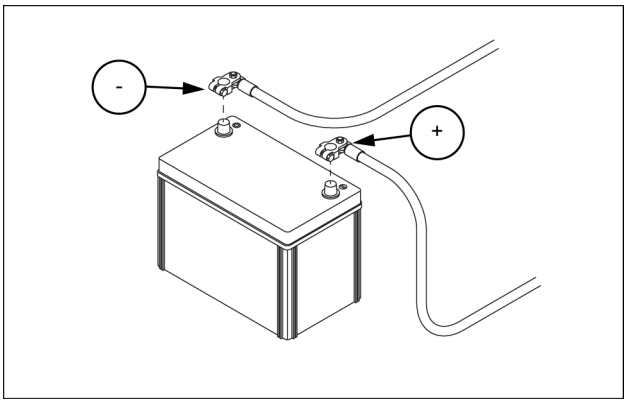
1. Use a wrench [**17 mm**] to remove the bolts **(1)** of the hydraulic oil cooler **(2)**.
2. Move the hydraulic oil cooler **(2)** and detach it from the radiator **(3)**.

   NOTICE: *do not remove the hydraulic oil hoses from the hydraulic oil cooler **(2)**.*



SMIL16MEX3029AA 3

3. Set the battery disconnect switch to the OFF position. Cut-off the negative-terminal cable **(-)**. Next, cut-off the positive-terminal cable **(+)**.
4. Remove the battery and install a new one.
5. Clean the cables and the battery terminals, and apply grease.
6. Connect the positive **(+)** and the negative **(-)** cable to the positive and the negative terminal of the battery respectively. Set the battery disconnect switch to the ON position.



SMIL16MEX2595AB 4

Starting the engine with booster cable

⚠ WARNING

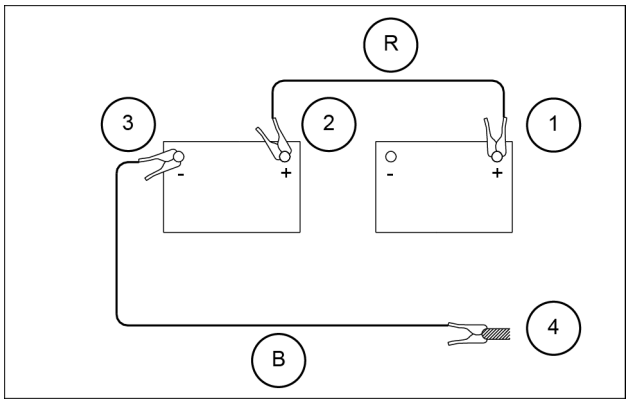
Improper operation or service of this machine can result in an accident.
An error connecting auxiliary starting cables or short-circuiting battery terminals can cause an accident. Connect auxiliary starting cables as instructed in this manual.
Failure to comply could result in death or serious injury.

W0263A

Connection of booster cable

Make sure that the booster battery voltage corresponds to the voltage system of the machine.
Make sure that the starter key is in OFF position and the safety lock lever in rearward position (LOCK position).
Make sure to use supply cables of appropriate dimensions.
Make sure that the starter key of the machine with the charged battery is in OFF position.

1. Connect the red terminals **(R)** of booster cable to the battery **(+)** terminals between exhausted battery positive terminal **(1)** and new battery positive terminal **(2)**.
2. Connect the black terminal **(B)** of the booster cable to the battery **(-)** terminals between new battery negative terminal **(3)** and chassis **(4)** of the machine with the exhausted battery.
3. Connection order: **(1)**, **(2)**, **(3)**, **(4)**



SMIL16MEX0459AB 5

Starting the engine of the machine

1. Start the engine of the machine with the charged battery and keep it to run at high RPM.
2. Start the engine of the machine with the exhausted battery
3. If the engine does not start, restart after two minutes.

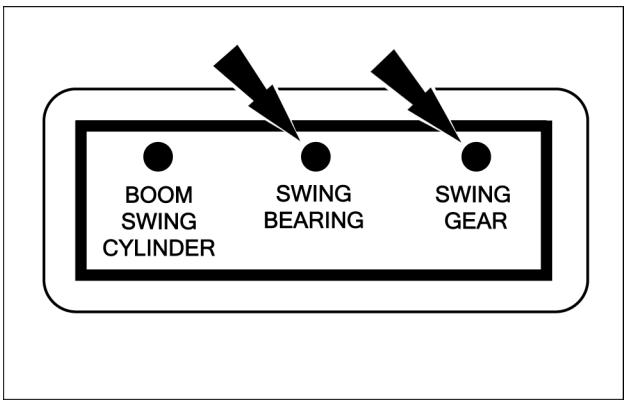
Disconnection of booster cable

1. Disconnection order: **(4)**, **(3)**, **(2)**, **(1)**
2. Remove the black booster cable **(B)**.
3. Remove the red booster cable **(R)**.
4. Run the engine at high RPM.

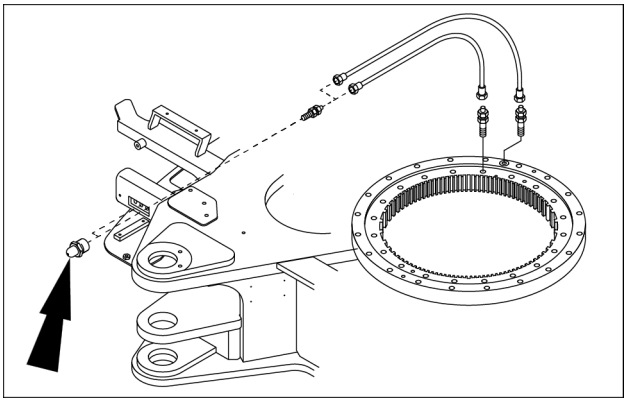
Swing bearing

Grease the swing bearing every **250 h**.
Lubricant: **CASE AKCELA 251H EP MULTI-PURPOSE GREASE**

Swing bearing: two grease fittings
Using a grease gun, inject grease of the specified type in the grease points shown in figure.



SMIL16MEX1424AA 1



SMIL16MEX0421AA 2

Tightening torques

Check the tightening torques every **250 h** (after the first **50 h** during the run-in period).

Component		Bolt size	Wrench	Tightening torque
Travel motor		M12 x 1.75	**19 mm**	**88 – 113 N·m** (**65.10 – 83.18 lb ft**)
Sprocket		M12 x 1.75	**19 mm**	**109 – 132 N·m** (**80.29 – 97.65 lb ft**)
Idler wheel		M8 x 1.25	**13 mm**	**29 – 35 N·m** (**21.70 – 26.04 lb ft**)
Track support roller		M12 x 1.75	**19 mm**	**109 – 132 N·m** (**80.29 – 97.65 lb ft**)
Track frame roller		M16 x 2.0	**24 mm**	**262 – 321 N·m** (**193.12 – 236.52 lb ft**)
Grease valve cover		M10 x 1.5	**17 mm**	**54 – 81 N·m** (**39.80 – 60.00 lb ft**)
Travel motor cover		M10 x 1.5	**17 mm**	**54 – 81 N·m** (**39.80 – 60.00 lb ft**)
Counterweight		M20 x 2.5	**30 mm**	**514 – 642 N·m** (**379.1 – 473.5 lb ft**)
Additional counterweight		M24 x 3.0	**36 mm**	**850 – 1150 N·m** (**626.9 – 848.2 lb ft**)
Swing bearing		M12 x 1.75	**19 mm**	**109 – 132 N·m** (**80.29 – 97.65 lb ft**)
Swing unit		M16 x 2.0	**24 mm**	**252 – 342 N·m** (**185.9 – 252.2 lb ft**)
Engine	Mount (front)	M12 x 1.75	**19 mm**	**120 – 140 N·m** (**88.5 – 103.3 lb ft**)
	Front bracket	M10 x 1.25	**17 mm**	**59 – 89 N·m** (**43.5 – 65.6 lb ft**)
	Mount (coupling)	M12 x 1.75	**19 mm**	**90 – 95 N·m** (**66.4 – 70.1 lb ft**)
Radiator		M12 x 1.75	**19 mm**	**98 – 158 N·m** (**72.3 – 116.5 lb ft**)
Hydraulic pump	Pump	M12 x 1.75	**19 mm**	**90 – 110 N·m** (**66.4 – 81.1 lb ft**)
Hydraulic oil tank		M12 x 1.75	**19 mm**	**98 – 158 N·m** (**72.3 – 116.5 lb ft**)
Fuel tank		M8 x 1.25	**13 mm**	**20 – 29 N·m** (**14.50 – 21.70 lb ft**)
		M12 x 1.75	**19 mm**	**73 – 110 N·m** (**53.60 – 81.00 lb ft**)
		M12 x 1.75	**19 mm**	**98 – 158 N·m** (**72.3 – 116.5 lb ft**)
Main control valve		M10 x 1.5	**17 mm**	**55 – 83 N·m** (**40.6 – 61.2 lb ft**)
Main control valve (bracket)		M10 x 1.5	**17 mm**	**55 – 83 N·m** (**40.6 – 61.2 lb ft**)
Hydraulic swivel		M10 x 1.5	**17 mm**	**55 – 83 N·m** (**40.6 – 61.2 lb ft**)
Remote control valve - Hand control lever		M6 x 1	**10 mm**	**8 – 12 N·m** (**6.15 – 9.05 lb ft**)
Remote control valve - Dozer lever		M8 x 1.25	**13 mm**	**20 – 29 N·m** (**14.50 – 21.70 lb ft**)
Remote control valve - Boom swing pedal		M8 x 1.25	**13 mm**	**20 – 29 N·m** (**14.50 – 21.70 lb ft**)
Remote control valve - Travel pedal		M8 x 1.25	**13 mm**	**20 – 29 N·m** (**14.50 – 21.70 lb ft**)
Cab		M12 x 1.75	**19 mm**	**98 – 158 N·m** (**72.3 – 116.5 lb ft**)

Every 400 hours

Fuel filter

⚠ WARNING

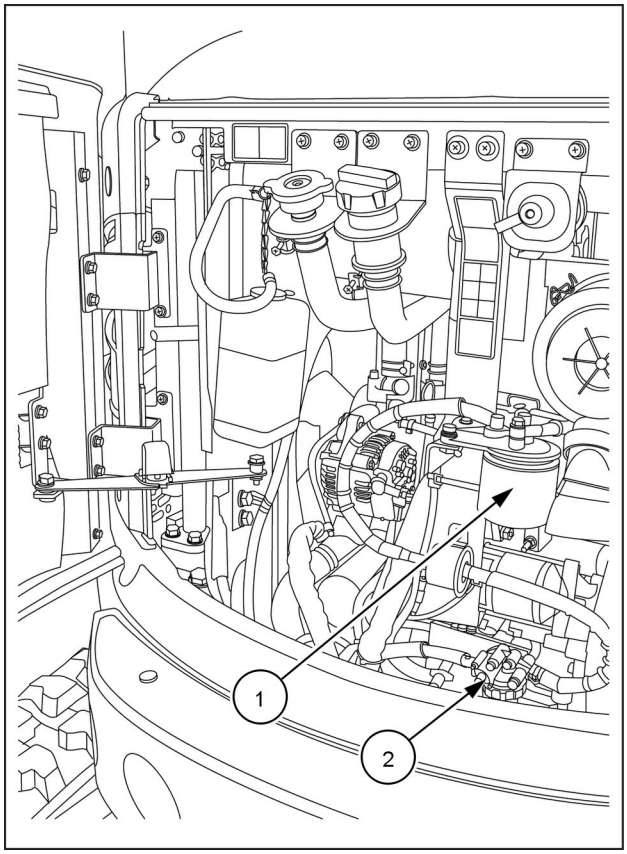
Fire hazard!
When handling diesel fuel, observe the following precautions:
1. Do not smoke.
2. Never fill the tank when the engine is running.
3. Wipe up spilled fuel immediately.
Failure to comply could result in death or serious injury.

W0099A

Replace the fuel filter element every **400 h**

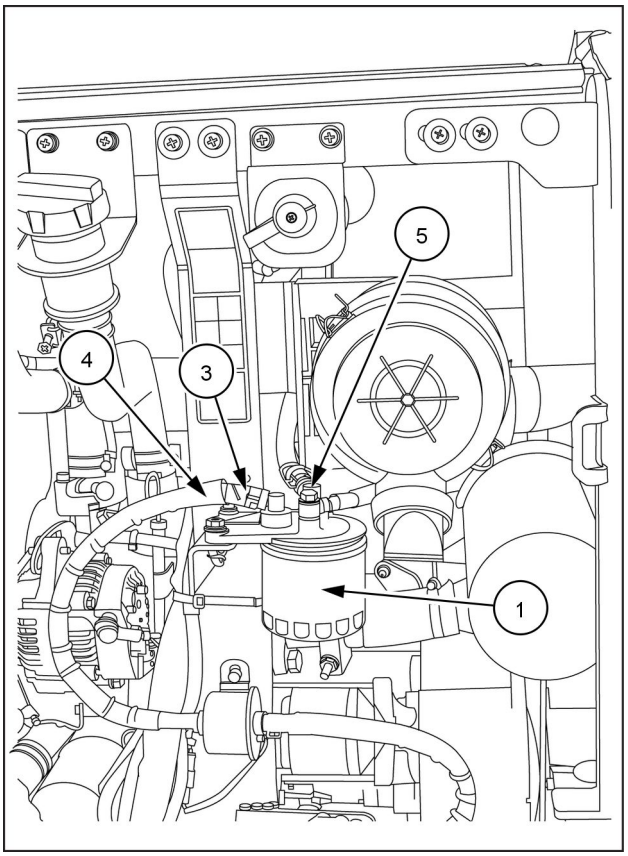
NOTICE: *do not work in any environment in which anything other than fuel will get into fuel lines. (Sites with strong wind, blowing dust, etc.). Wash hands before operations. Do not use gloves. Do not open the packaging for the filter kit until you start the installation work. Do not reuse any fuel remaining within the cover. For persistent dirt within the cover, wipe it off with a clean rag, then clean with clean diesel fuel. Do not use parts cleaner because it could affect the case cover. Do not touch the inside of the element. Completely wipe off any spilled fuel after changing the filter element.*

1. Open the engine door to access to the fuel filter **(1)**.
2. Close the fuel cock **(2)** on the water separator.
3. Clean the area around the fuel filter body and place a container with an appropriate capacity under the fuel filter.



SMIL16MEX0923BA 1

4. Remove the clamps **(3)** and disconnect the fuel hoses **(4)** from the fuel filter **(1)**.
5. Remove the fuel filter **(1)** with the specific wrench. Install a new filter element.
6. Apply a thin film of fuel to the surface of the new fuel filter gasket before tighten it.
7. Connect the fuel hoses **(4)** and install the clamps **(3)** to the fuel filter **(1)**.
8. Loosen the air vent plug **(5)** to let the air out. Start engine and check for fuel leakage.
9. Bleed the fuel system. Refer to page **6-13**.



SMIL16MEX0926BA 2

Fuel filter water separator

Replace the fuel filter water separator every **400 h**.

To replace the element of the fuel filter water separator, refer to page **6-21**.

Every 500 hours

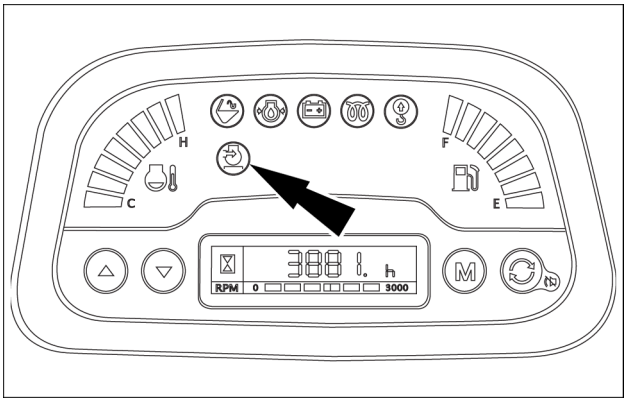
Air cleaner

⚠ CAUTION

Flying debris!
Compressed air can propel dirt, rust, etc. into the air. Wear eye and face protection when using compressed air.
Failure to comply could result in minor or moderate injury.

C0049A

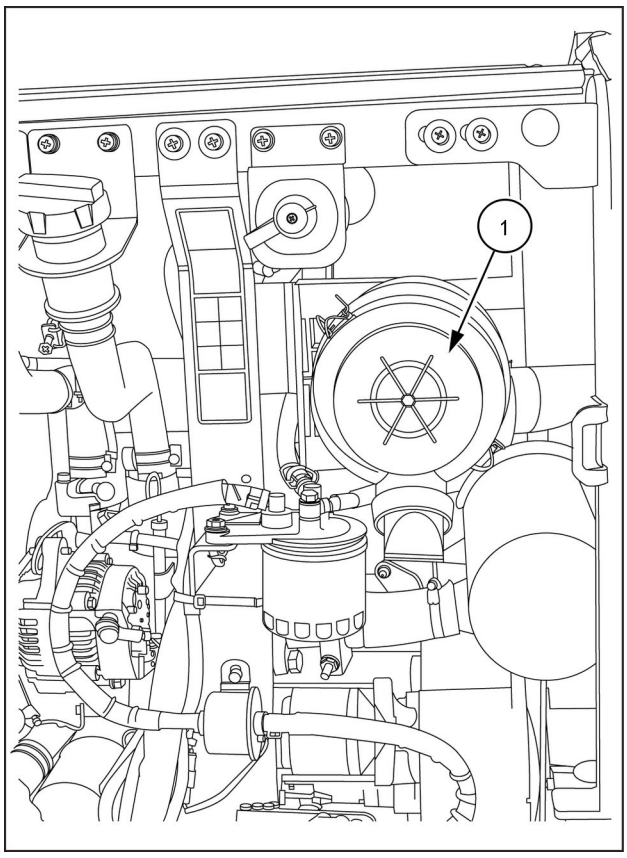
Clean the air filter every **500 h** or when the “air cleaner warning light” appears on the instrument cluster.



SMIL16MEX0382AA 1

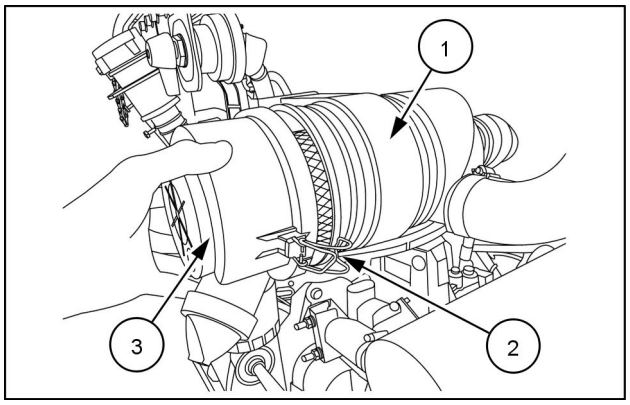
Replace the primary air filter element after four times cleaning. Replace the secondary air filter element only when the primary element is cleaned for the four times.

1. Open the engine access door to access to the air cleaner **(1)**.



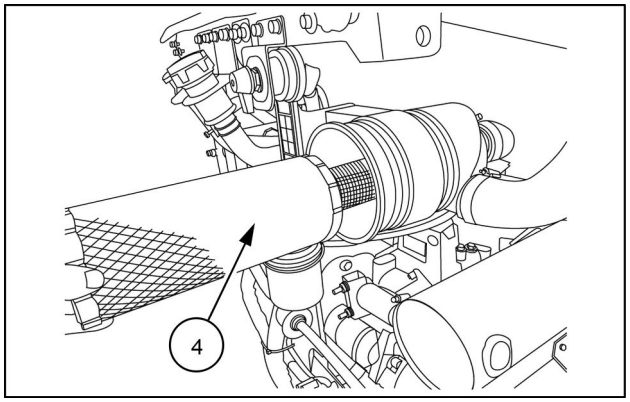
SMIL16MEX0926BA 2

2. Release the two fasteners **(2)** and remove the cover **(3)** of the air cleaner **(1)**.



SMIL16MEX0916AA 3

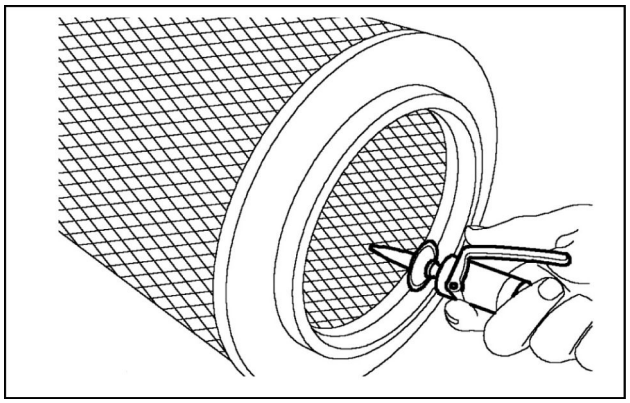
3. Remove the primary element **(4)**.
4. Clean the primary element **(4)**.



SMIL16MEX0917AA 4

When the primary element is dry:
Blow compressed air at very low pressure from the inside to the outside.
Hold the compressed air nozzle at a position at least **3 cm** (**1.181 in**) away from the inside wall of the element. When no more dust comes out of the primary element, cleaning is complete.

NOTE: *be sure to keep the compressed air pressure below* ***3 bar****.*

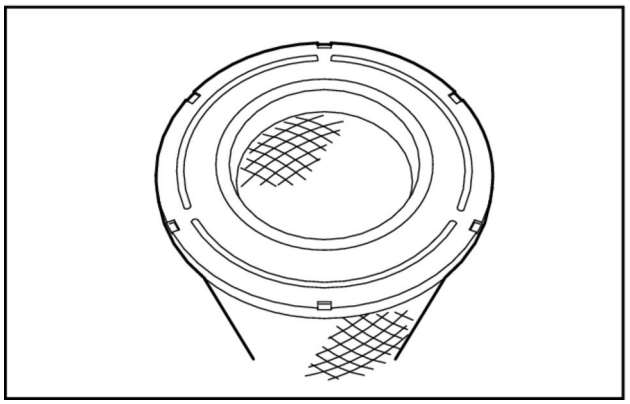


SMIL14CEX2795AA 5

NOTE: *do not use compressed air if there is oil or soot in the element.*

If the cartridge is greasy:
Clean it in water, with suitable detergent. (Consult your CASE CONSTRUCTION dealer).
Instructions for using the detergent are printed on the package.

NOTE: *dry the element out completely before installing it. It is advisable to keep a clean spare element ready that can be installed on the air cleaner while the cleaned element is drying.*

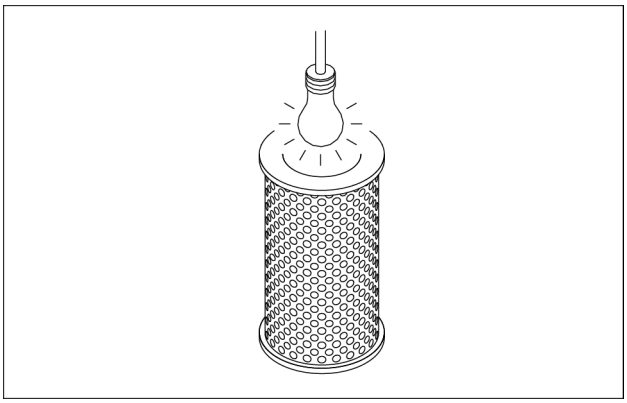


SMIL13CEX2757AA 6

Inspecting the element

Check the element for damage by placing an inspection light inside the element.

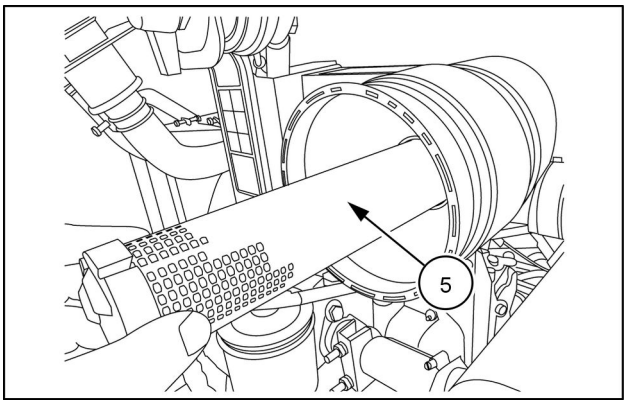
NOTE: *change the element if light can be seen through a hole, however small.*



SMIL16MEX0434AA 7

5. Remove the secondary element **(5)**.

NOTE: *the secondary element **(5)** cannot be cleaned and must be changed.*

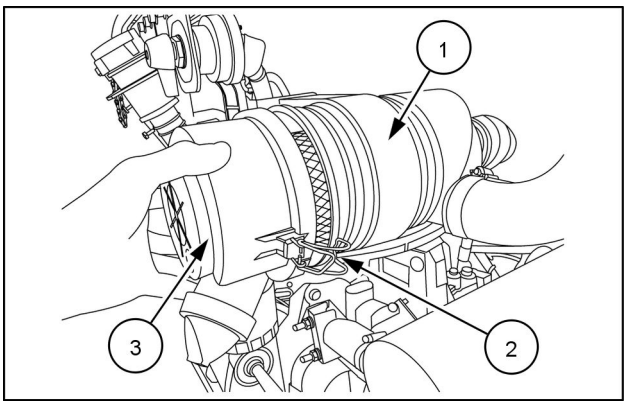


SMIL16MEX0918AA 8

6. Install the secondary element and the primary element into the air cleaner **(1)**
7. Install the cover **(3)** and lock the fasteners **(2)**.

NOTICE: *the air flow sensor is installed on the inlet duct of the air cleaner. Pay attention not to allow dust to invade the inlet duct when replacing the air cleaner element.*

NOTE: *if, after cleaning, smoke exhaust is abnormal, be sure to replace the primary element of the air cleaner.*



SMIL16MEX0916AA 9

Radiator and coolers

⚠ CAUTION

Flying debris!
Compressed air can propel dirt, rust, etc. into the air. Wear eye and face protection when using compressed air.
Failure to comply could result in minor or moderate injury.

C0049A

Clean the radiator every **500 h**

1. Stop the engine and remove the starter key.
2. Open the engine access door.
3. Visually inspect the radiator for clogged radiator fins.

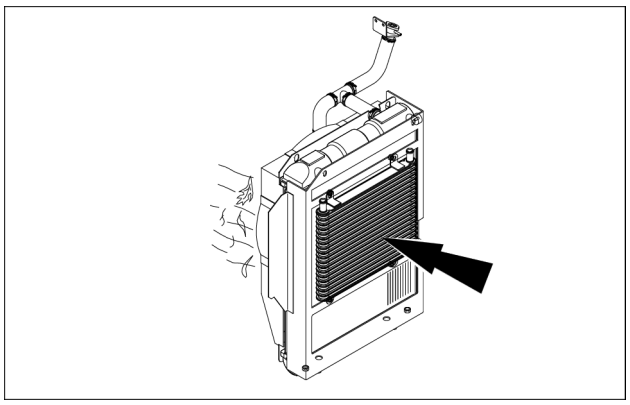
NOTICE: *overheat may occur if the radiator fin, or the oil cooler fin is clogged.*

NOTE: *after working in a dusty place, clean radiator more frequently.*

4. Use compressed air to blow away mud or dirt that have clogged the radiator fin. Blow the air in the opposite direction of the fan air flow.

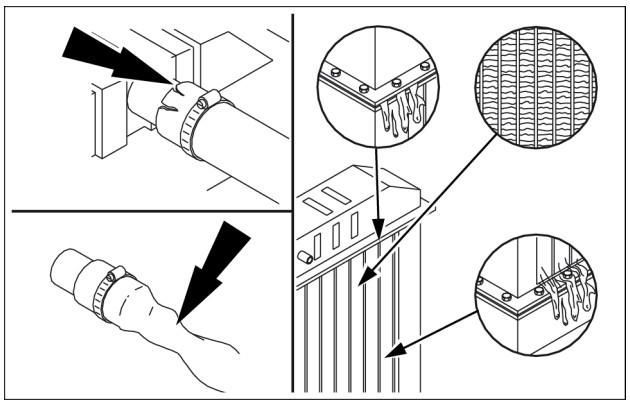
NOTICE: *in presence of greasy or oily dust, consult your CASE CONSTRUCTION dealer in order to carry out a special cleaning operation.*

NOTICE: *use compressed air pressure of maximum* ***550 kPa*** *(****79.8 psi****).*



SMIL16MEX0430AA 1

5. Visually inspect the radiator for bent or broken fins.
6. Visually inspect the radiator for core and gasket leaks.



SMIL16MEX0431AA 2

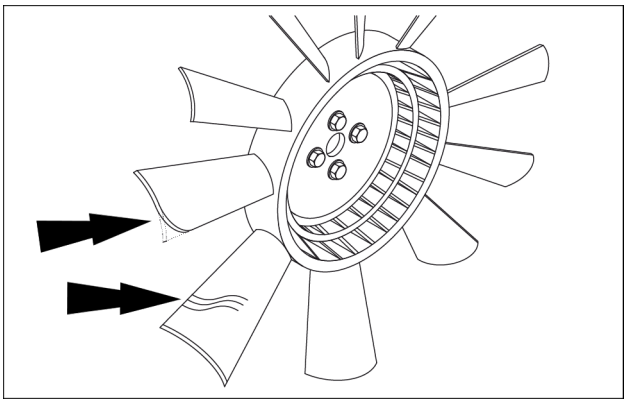
Radiator fan

Visual inspect the radiator fan daily, check every **500 h**

1. Rotate the crankshaft by using the engine barring gear. Check for cracks, loose rivets, and bent or loose blades.

NOTE: *never pull or pry on the fan.*

2. Check the fan to make sure it is securely mounted.
3. Tighten the cap-screws if necessary. If the fan is damaged, consult your CASE CONSTRUCTION dealer to replace the fan.



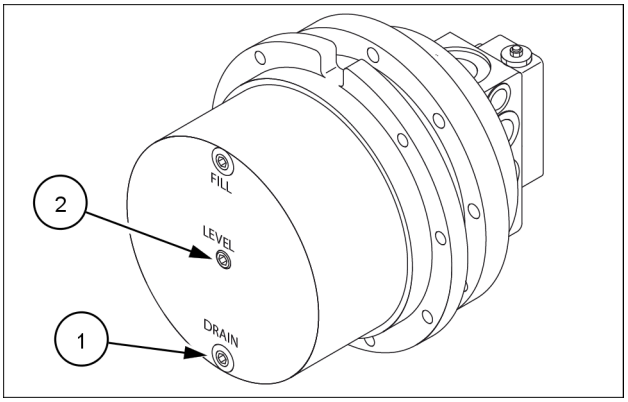
SMIL16MEX0436AA 1

Travel reduction gears

Check the travel reduction gears oil level every **500 h**.
Lubricant: **CASE AKCELA GEAR 135 H EP 80W-90**

1. Park the machine on flat, horizontal ground.
2. Move the machine so that the drain plug **(1)** comes down to the lowest position.
3. Stop the engine and remove the starter key.
4. Remove the level plug **(2)**, and check the oil level. If the level comes up to the bottom edge of port **(2)**, it is sufficient.

   If necessary, add oil through port **(2)** until the oil comes up to the bottom edge of port **(2)**.
5. Check the O-ring seal of the level plug **(2)** for damages, and replace it if necessary.
6. Insert the level plug **(2)** with seal tape wrapped around it.
7. Repeat Steps **2** to **6** for the other travel reduction gear.
8. Run the machine slowly to check that there are no leaks.



SMIL16MEX0442AA 1

Every 1000 hours

Hydraulic oil return filter

⚠ WARNING

Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

⚠ WARNING

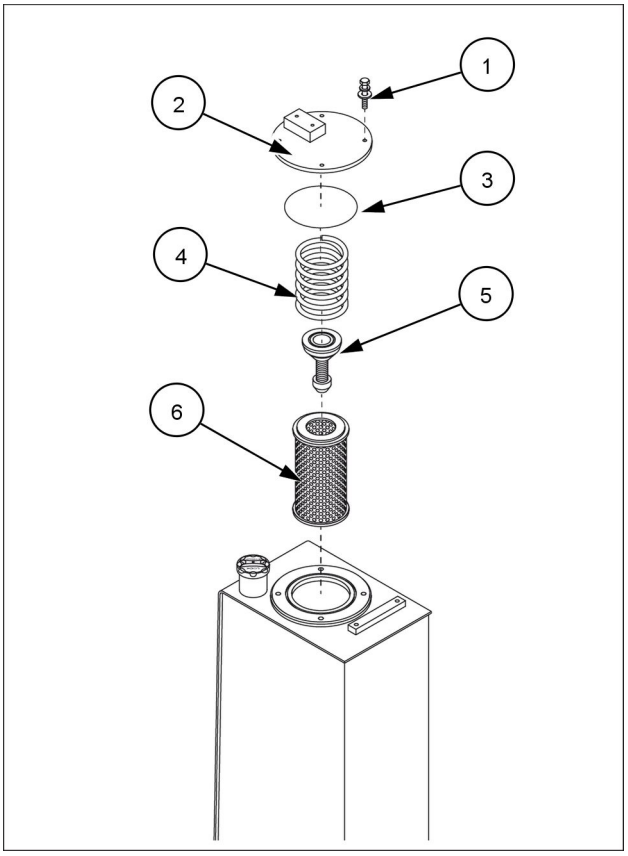
Pressurized system!
Never attempt to drain fluids or remove filters when the engine is running. Turn off the engine and relieve all pressure from pressurized systems before servicing the machine.
Failure to comply could result in death or serious injury.

W0905A

Replace the hydraulic oil return filter every **1000 h** (After **250 h** of operation in run-in period).

NOTICE: *when the machine is a new vehicle, or when the main components of the hydraulic system are already overhauled or replaced, replace the oil return filter after **250 h** of operation. After that, replace the filter at specified intervals.*

1. Release all the pressure in the hydraulic tank. Refer to page **6-11**.
2. Clean the top of the hydraulic oil tank, and clean the cover of the return filter.
3. Remove the bolts **(1)**, the cover **(2)** and the O-ring **(3)**.
4. Take out the spring **(4)**, the by-pass valve **(5)**, and the return filter **(6)**.
5. Install a new filter **(6)**.
6. Clean and install the spring **(4)** and the by-pass valve **(5)**. Check the O-ring **(3)**, and replace it if any wear or damage is found.
7. Install the cover **(2)** and lock with the bolts **(1)**. Tighten the bolts **(1)** to **55 – 83 N·m** (**40.6 – 61.2 lb ft**).
8. Check the hydraulic fluid level, and supply it if necessary.



SMIL16MEX0440BA 1

Pilot line filter

⚠ WARNING

Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

⚠ WARNING

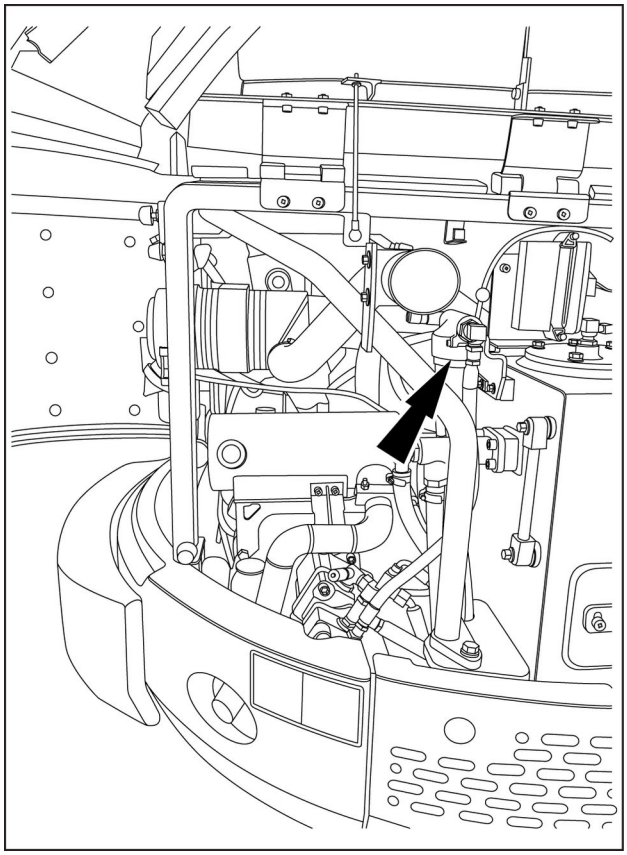
Pressurized system!
Never attempt to drain fluids or remove filters when the engine is running. Turn off the engine and relieve all pressure from pressurized systems before servicing the machine.
Failure to comply could result in death or serious injury.

W0905A

Replace the pilot line filter every **1000 h** (After **250 h** of operation in run-in period).

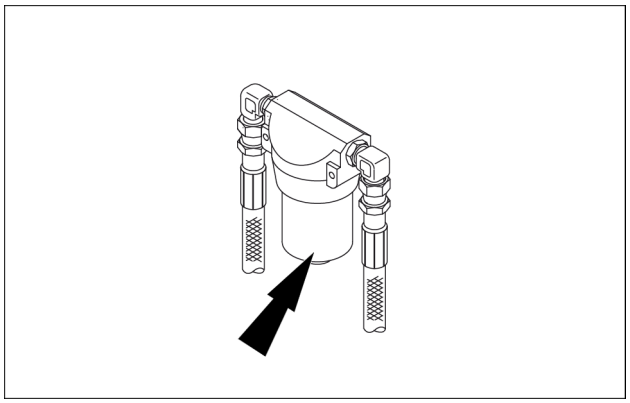
NOTICE: *when the machine is a new vehicle, or when the main components of the hydraulic system are already overhauled or replaced, replace the oil return filter after **250 h** of operation. After that, replace the filter at specified intervals.*

1. Release all the pressure in the hydraulic tank. Refer to page **6-11**.
2. Open the side hood and locate the pilot line filter.



SMIL16MEX0927BA 1

3. Loosen the nut positioned on the filter body.
4. Pull out the pilot line filter element and clean the filter housing.
5. Install the new filter and tighten.



SMIL16MEX0441AA 2

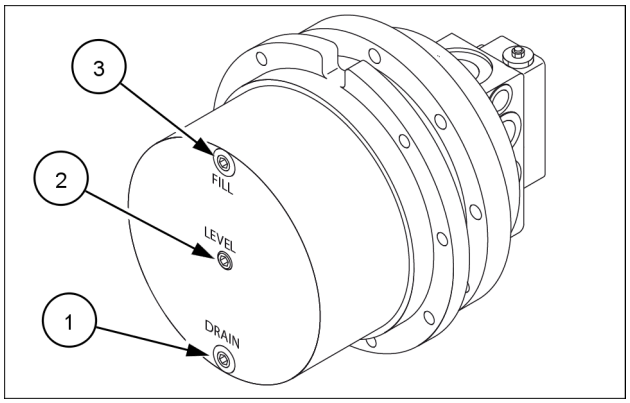
Travel reduction gears

Replace the travel reduction gears oil every **1000 h** (After **500 h** of operation in run-in period)
Lubricant: **CASE AKCELA GEAR 135 H EP 80W-90**
Quantity: **0.6 L** (**0.2 US gal**) (per travel reduction gear)

1. Park the machine on flat, horizontal ground.
2. Move the machine so that the drain plug **(1)** comes down to the lowest position.
3. Stop the engine, and remove the starter key.
4. Place a container with an appropriate capacity under the travel reduction gear.
5. Remove the level plug **(2)**.
6. Remove the drain plug **(1)**.

NOTE: *check the condition of the drained oil. If there are pieces of metal or foreign objects in the oil, consult the CASE CONSTRUCTION dealer.*

7. Replace the O-ring seal of the drain plug **(1)**.
8. Insert the drain plug **(1)** with seal tape wrapped around it.
9. Replace the O-ring seal of the level plug **(2)** and the O-ring seal of the fill plug **(3)**. Insert the level plug **(2)** with seal tape wrapped around it, then do the same for the fill plug **(3)**.
10. Add oil through fill port **(3)** until the oil comes up to the bottom edge of the port **(2)**.
11. Repeat steps **2** to **10** for the other travel reduction gear.
12. Run the machine slowly to check that there are no leaks.



SMIL16MEX0442AA 1

Every 2000 hours

Engine coolant

⚠ WARNING

Hazardous chemicals!
Coolant can be toxic. Avoid contact with skin, eyes, and clothing. Antidotes:
EXTERNAL - Rinse thoroughly with water. Remove soiled clothing.
INTERNAL - Rinse the mouth with water. DO NOT induce vomiting. Seek immediate medical attention.
EYES - Flush with water. Seek immediate medical attention.
Failure to comply could result in death or serious injury.

W0282A

⚠ WARNING

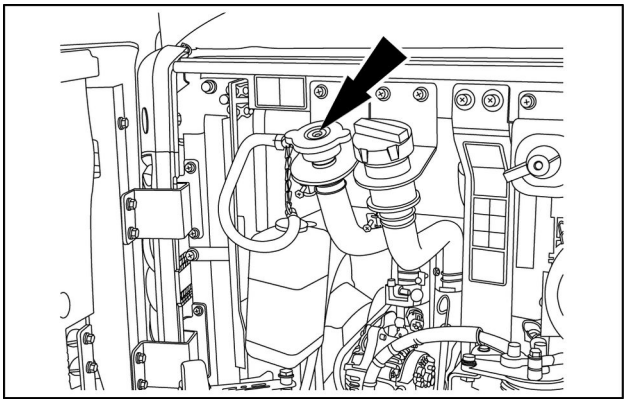
Burn hazard!
Hot coolant can spray out if you remove the filler cap while the system is hot. After the system has cooled, turn the filler cap to the first notch and wait for all pressure to release before proceeding.
Failure to comply could result in death or serious injury.

W1469A

Replace the engine coolant every **2000 h**
Fluid: **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**
Quantity (antifreeze/water mixture): **5 L** (**1.3 US gal**)

Draining the radiator

1. Open the engine access door to access to the radiator.
2. Remove the radiator cap.

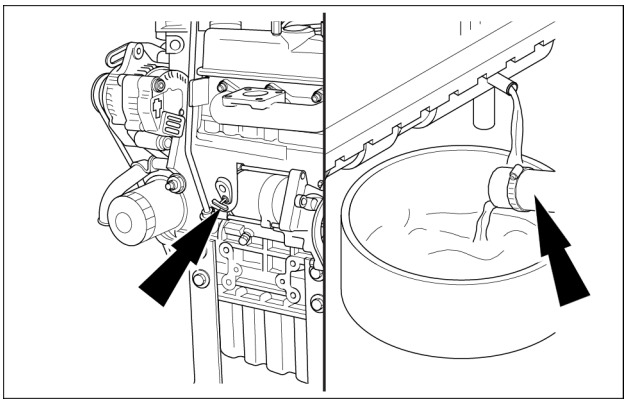


SMIL16MEX0924AA 1

3. Place a container with a capacity of **10 L** (**2.6 US gal**) under the radiator drain plug.
4. Drain the engine coolant by opening the drain valve on the radiator and the drain cock on the engine.
5. Close the drain valve on the radiator and the drain cock on the engine.

NOTICE: *after draining coolant, do not start the engine with no water in the radiator. Failure to observe this causes the engine to seize up.*

NOTE: *drained coolant should be disposed of by the specified method.*



SMIL16MEX0427AA 2

Flushing the radiator

6. Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).

***NOTE:** use **0.5 kg** (**1.1 lb**) of sodium carbonate for every **23 L** (**6.1 US gal**) of water.*

7. Do not install the radiator cap. The engine is to be operated without the cap for this process.
8. Operate the engine for **5 min** and let the coolant temperature arrives above **80 °C** (**176 °F**).
9. Stop the engine and drain the cleaning mixture.
10. Fill the cooling system with clean water.

***NOTE:** be sure to vent the engine and radiator for complete filling. Do not install the radiator cap or new coolant filter.*

11. Operate the engine for **5 min** and let the coolant temperature arrives above **80 °C** (**176 °F**).
12. Stop the engine, and drain the cooling system.

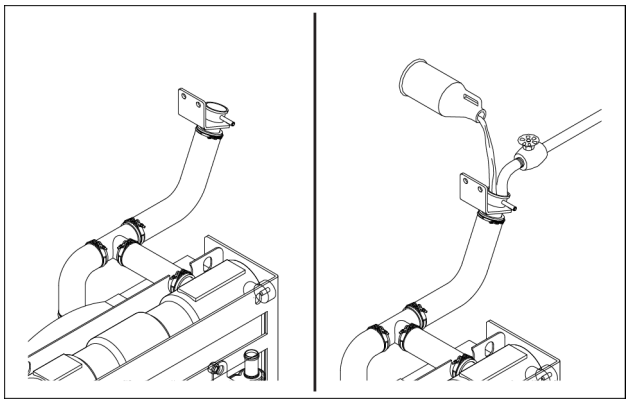
***NOTE:** if the water being drained is still dirty, the system must be flushed again until the water is clean.*

Filling the radiator

13. Fill the cooling system with coolant.

***NOTE:** the system has a maximum fill rate of **14 L/min** (**3.7 US gpm**). Do not exceed this fill rate.*

14. The system must be filled slowly to prevent air locks. Supply coolant up to the FULL mark of the reserve tank.
15. During filling, air must be vented from the engine coolant passage.
16. Install the radiator cap.
17. Start the engine until it reaches a temperature of **80 °C** (**176 °F**), and check for coolant leaks.
18. Check the coolant level again to make sure the system is full of coolant.



SMIL16MEX0429AA 3

Hydraulic oil suction filter

⚠ WARNING

Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

⚠ WARNING

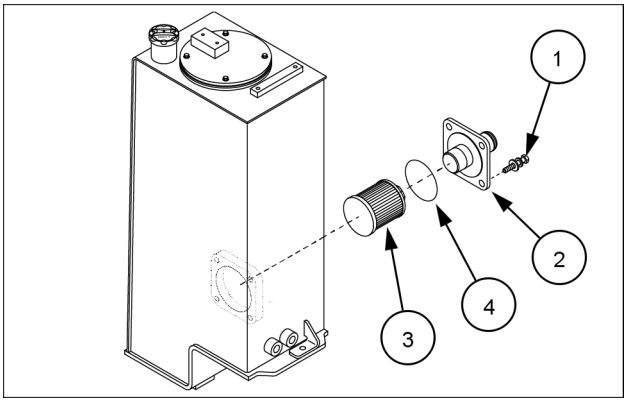
Pressurized system!
Never attempt to drain fluids or remove filters when the engine is running. Turn off the engine and relieve all pressure from pressurized systems before servicing the machine.
Failure to comply could result in death or serious injury.

W0905A

Clean the hydraulic oil suction filter every **2000 h**

NOTICE: *do not remove the hydraulic oil suction filter from the hydraulic tank before the hydraulic tank was empty.*

1. Clean the top of the hydraulic tank, and clean the cover of the inlet filter.
2. Remove the four bolts **(1)**, and the suction cover **(2)** from the hydraulic oil tank.
3. Remove the oil suction filter **(3)**, and clean it with a solvent.
4. Let it dry completely, and check for damage. If any damage is found on its surface, replace it with a new component.
5. Install a new O-ring **(4)**, and install the oil suction filter on the suction cover **(2)**. Lock the suction cover **(2)** with the four bolts **(1)**.
   Tighten the bolts **(1)** to **55 – 83 N·m** (**40.6 – 61.2 lb ft**).
6. Check the hydraulic fluid level, and supply it if necessary.



SMIL16MEX0438AA 1

Hydraulic hoses

⚠ WARNING

Escaping fluid!
Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: Relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately.
Failure to comply could result in death or serious injury.

W0178A

Check the boom, arm, and bucket cylinder hose: Every 2 years or every **2000 h** (whichever comes first)

Checking the hydraulic system piping

Make sure there are no leaks from the hydraulic system hoses, pipes, plugs, connections and fittings and check that all nuts and screws are correctly tightened. In the event of problems, repair, change or tighten the component (s) concerned.

Every 5000 hours

Hydraulic oil

⚠ WARNING

Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

⚠ WARNING

Pressurized system!
Never attempt to drain fluids or remove filters when the engine is running. Turn off the engine and relieve all pressure from pressurized systems before servicing the machine.
Failure to comply could result in death or serious injury.

W0905A

⚠ WARNING

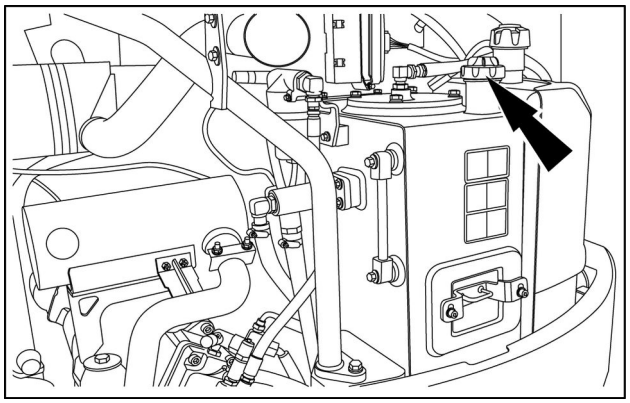
Escaping fluid!
Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: Relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately.
Failure to comply could result in death or serious injury.

W0178A

Replace the hydraulic oil every **2000 h**
Fluid: **CASE AKCELA HYDRAULIC LL 46**
Quantity: **27 L** (**7.1 US gal**)

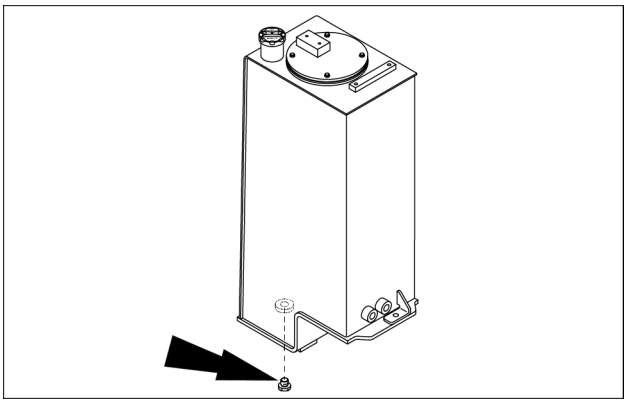
NOTICE: *when using the hydraulic breaker, reduce the interval of the hydraulic oil replacement. Replace the hydraulic oil every* ***600 h****.*

1. Release all the pressure in the hydraulic tank. Refer to page **6-11**.
2. Lower the bucket on the ground pulling the arm and bucket cylinder to the maximum cylinder extension.
3. Open the side hood and loosen the filling cap.



SMIL16MEX0928AA 1

4. Place a container with a capacity of **30 L** (**7.9 US gal**) under the drain plug. Loosen the drain plug at the bottom of the hydraulic oil tank.
5. When the hydraulic oil is drained, clean the hydraulic oil suction filter, refer to page **6-49**.
6. Install the drain plug.
7. Add new hydraulic oil to the tank.
8. Tighten the filling cap on the hydraulic oil tank.
9. Using a solvent, clean the periphery of the air bleed plug at top of the hydraulic pump. Loosen the air bleed plug. If any fluid comes out, remove the plug, and fill the pump with new clean hydraulic fluid.
10. Tighten the air bleed plug on the hydraulic pump.
11. Start the engine, and run it with no load for about **5 min**.
12. Move each control several times to remove all air from the system.
13. Park the machine at the specified position, and then stop the engine.
14. Check the oil level of the hydraulic tank, refill it with oil as necessary. Check that there are no bubbles in the hydraulic tank.
15. Loosen the air bleed plug on the pump, and check that air free fluid comes out from the bleed port.



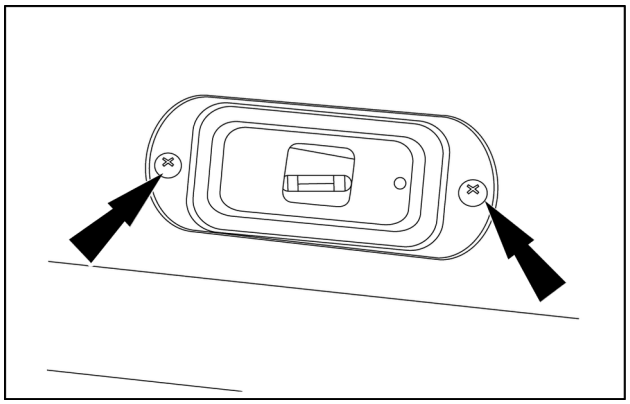
SMIL16MEX0437AA 2

When necessary

Bulb replacement

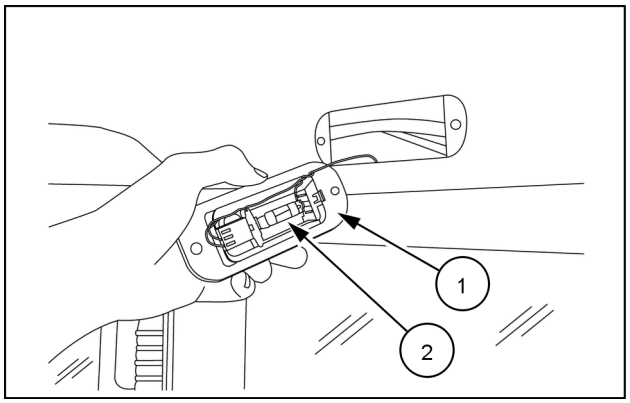
Lighting in the operator compartment

1. Remove the two retaining screws.



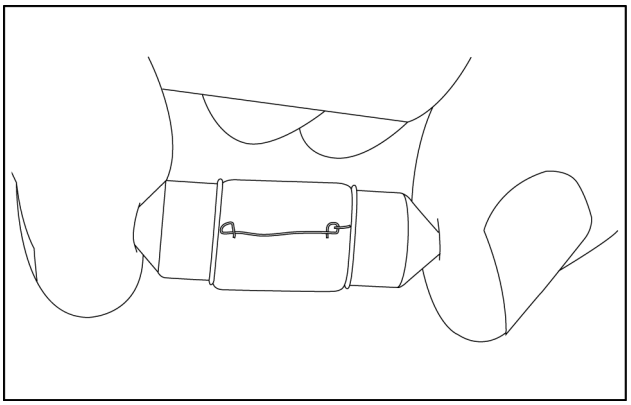
SMIL16MEX0921AA 1

2. Extract the ceiling light **(1)** and pull out the bulb **(2)**.



SMIL16MEX0922AA 2

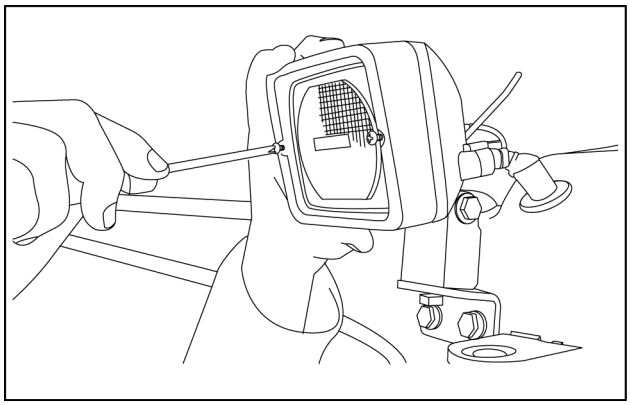
3. Install a new **5 W** bulb in the ceiling light.
4. Put the ceiling light back into position and tighten by means of the two retaining screws.



SMIL16MEX0934AA 3

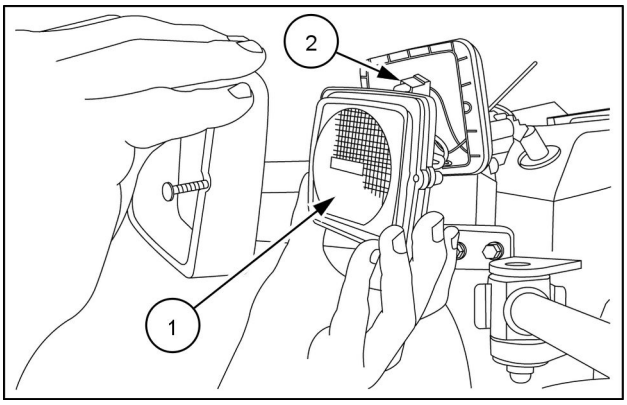
Working lights

1. Remove the two retaining screws.



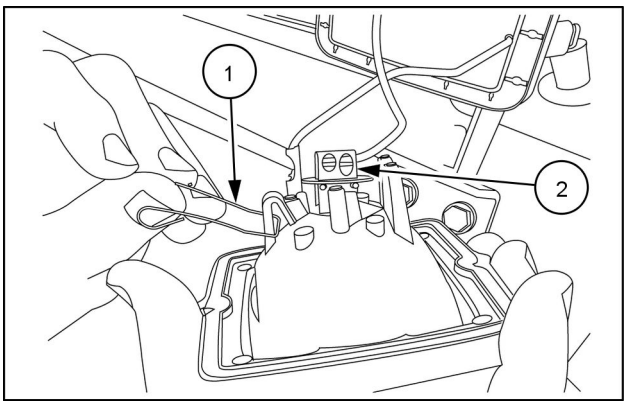
SMIL16MEX0939AA 4

2. Extract the working light **(1)** and disconnect the bulb plug **(2)**.



SMIL16MEX0935AA 5

3. Pull the clip outwards **(1)** and remove the bulb **(2)**.

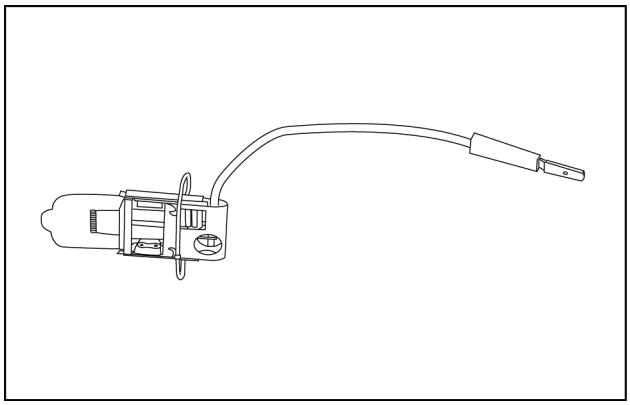


SMIL16MEX0937AA 6

4. Install a new **24 W** bulb in the working light.

NOTE: *make sure of the correct position of the bulb.*

5. Push the clip inwards in order to lock the bulb.
6. Connect the bulb plug.
7. Put the working light back into position and tighten by means of the two retaining screws.



SMIL16MEX0938AA 7

Cab air filter

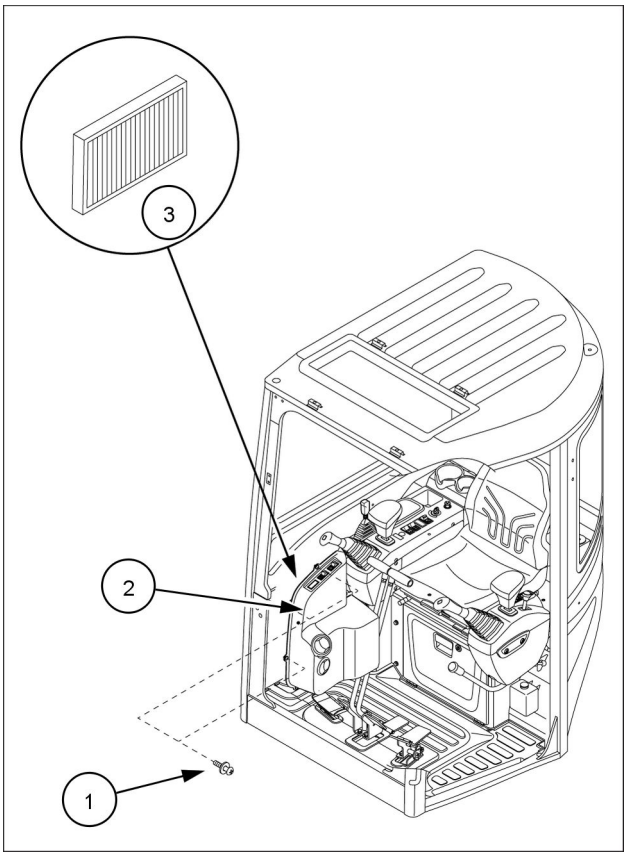
⚠ CAUTION

Flying debris!
Compressed air can propel dirt, rust, etc. into the air. Wear eye and face protection when using compressed air.
Failure to comply could result in minor or moderate injury.

C0049A

Clean the cab heater filter when necessary.

1. Stop the engine before remove the cab heater filter.
2. Remove the screws **(1)** and the heater cover **(2)** located on the right-hand side of the cab.
3. Remove the cab heater filter **(3)** from its housing.
4. Clean the cab heater filter using compressed air. Inspect the cab heater filter after cleaning. If it is damaged or badly contaminated, replace it.
5. Install the cleaned filter in the housing, insert the heater cover **(2)** and lock with the screws **(1)**.



SMIL16MEX1429BA 1

Fuel tank drain

⚠ WARNING

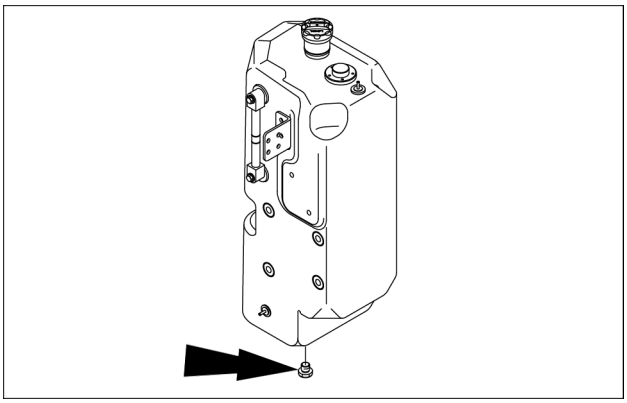
Fire hazard!
When handling diesel fuel, observe the following precautions:
1. Do not smoke.
2. Never fill the tank when the engine is running.
3. Wipe up spilled fuel immediately.
Failure to comply could result in death or serious injury.

W0099A

Drain water and sediment from the fuel tank when necessary.

NOTE: *take all necessary precautions during the following operations; no foreign matter must enter the fuel system.*

1. Place a receptacle of a suitable capacity under the drain plug.
2. Open the drain plug located at the bottom of the tank and drain the accumulated sediment and water.
3. After draining, close the drain plug.



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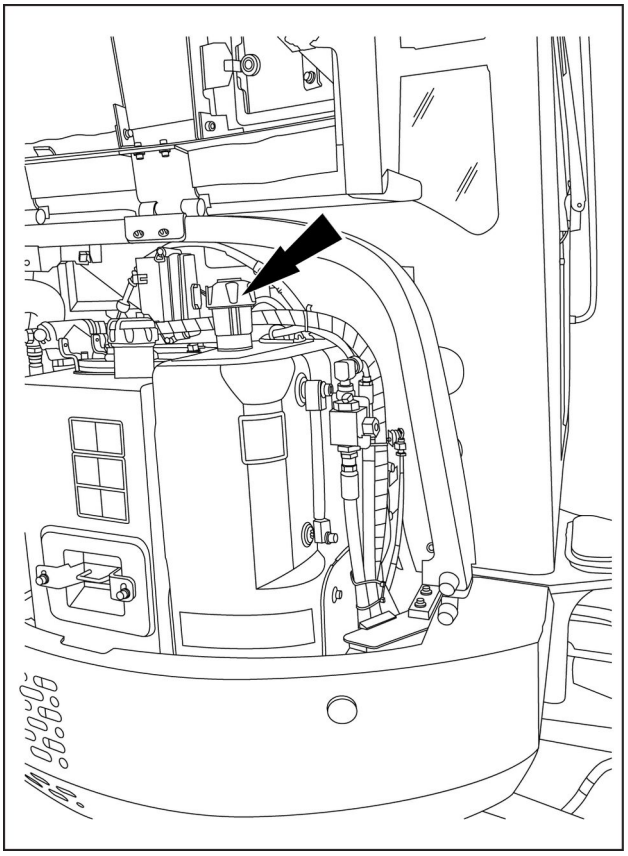
Fuel tank strainer

Clean the fuel tank strainer periodically

1. Remove the fuel cap.
2. Remove the fuel tank strainer located inside the fuel filler neck.
3. Inspect the fuel tank strainer for damage. If damaged, discard and replace. If in good condition, clean it in an environmentally safe manner.

NOTE: *diesel fuel is a preferred cleaning agent. Fuel must not be added to the tank unless the strainer is in place and in good working condition.*



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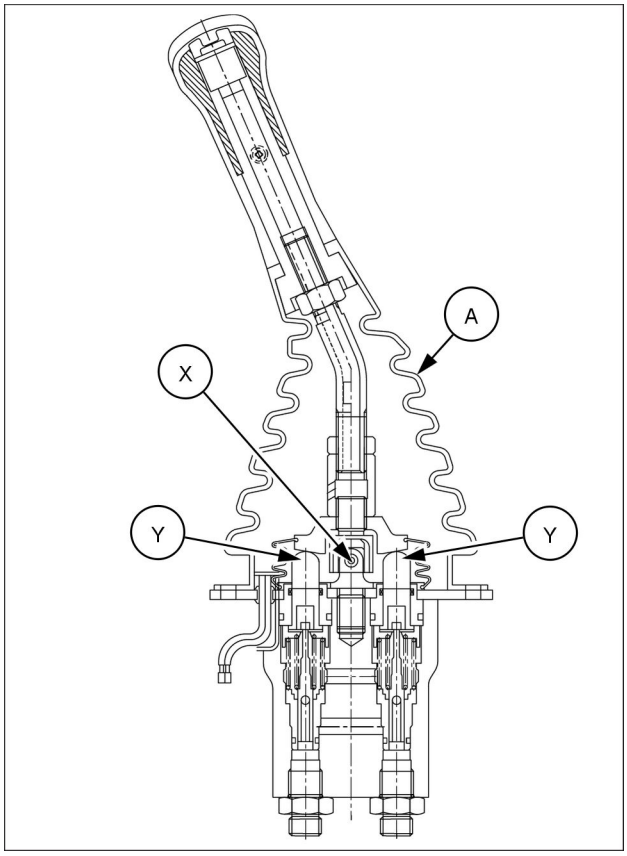
Control levers

Grease the hydraulic control levers when necessary
Fluid: **CASE AKCELA MOLY GREASE**

1. Remove the bellow **(A)** from the control lever.
2. Use a grease gun and grease the joint part **(X)** and the sliding parts **(Y)**.
3. Repeat the same operation for the other hydraulic control lever.



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Plastic and resin parts

Use a soft, slightly humid, cloth to clean the panels, the consoles, and the switches. Use a soft, dry cloth to clean the instrument cluster.

NOTICE: *do not use gasoline, kerosene, paint solvents. The use of gasoline, kerosene, paint solvents, etc. will cause discoloration, cracks or deformation of the parts.*

Fuse and relay locations

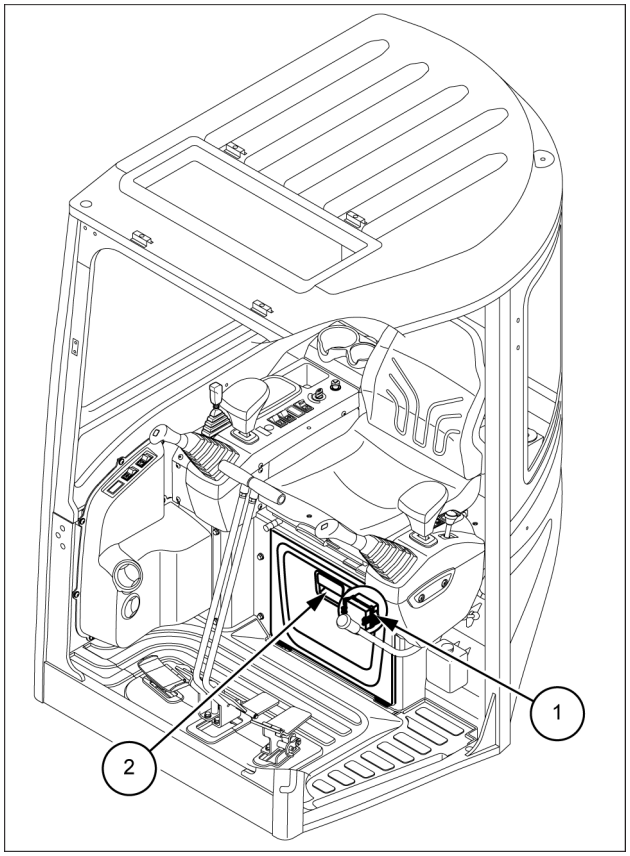
Fuses

To access the fuse box **(1)**, open the door **(2)** located below the operator's seat.
The fuse box cover indicates the function and amperage of each fuse.

NOTICE: *before changing fuses or relays, turn the starter key to the OFF position.*

NOTICE: *never replace a fuse with a fuse of a different amperage.*

NOTE: *use the provided fuse puller to remove and install the fuses.*



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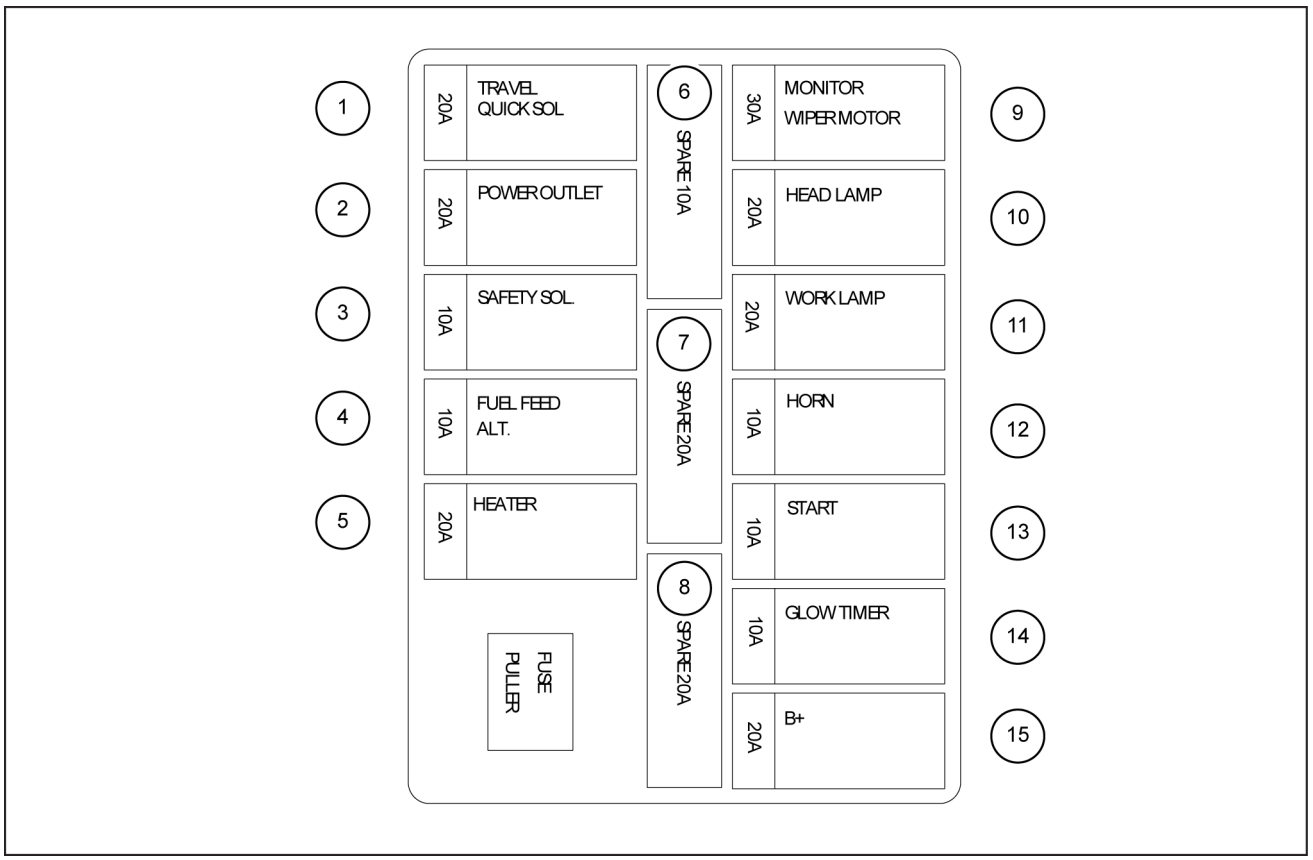

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Fuse functions

(1) Travel quick solenoid **20 A**	**(9)** Monitor wiper motor **30 A**
(2) Power outlet **20 A**	**(10)** Head lamp **30 A**
(3) Safety solenoid **10 A**	**(11)** Work lamp **20 A**
(4) Fuel feed alt **10 A**	**(12)** Horn **10 A**
(5) Heater **20 A**	**(13)** Start **10 A**
(6) Spare **10 A**	**(14)** Glow timer **10 A**
(7) Spare **20 A**	**(15)** B+ **20 A**
(8) Spare **20 A**	

Storage

Preparing for storage

- The following procedure applies when the machine is to be stored for a month or more. Store the machine on flat, level ground, inside a building or, if not possible, outside and covered with a tarpaulin. Before storing the machine, carry out the following operations:

1. Clean the machine.
2. Make sure that the machine has no damaged or missing parts. Replace them if necessary.
3. Retract the cylinder rods as for as possible and lower the boom until the attachment is resting on the ground. Lower the dozer blade to the ground.
4. Grease the machine thoroughly. The exposed surfaces of the cylinder rods should be greased or covered with a protective film. Consult your CASE CONSTRUCTION Dealer.

NOTE: *when the machine resumes service, the film will disappear automatically.*

5. While the engine is still warm, drain the oil sump, replace the oil filter and fill with specified oil. Check the oil level and add more if necessary.
6. Clean or replace the air filter element.
7. Check the level of coolant solution. If the machine is within **100 h** of the next scheduled coolant change, change the coolant now.
8. Remove the battery, clean the battery housing, and check that there is no adhesion of battery fluid. Store the battery safely in a cool and dry place where temperature is **0 °C** (**32 °F**) or more. Alternatively, cut-off the cable from the negative (-) terminal of the battery, or turn the battery disconnect switch to the OFF position.
9. Plug the air cleaner inlet and the exhaust pipe.
10. Remove the starter key, put the decal "NO OPERATION" on the console, and set the safety lock lever to rearward position (LOCK position).
11. Lock the engine door, and the cab door.

Periodic checks

⚠ WARNING

Inhalation hazard! Risk to operators and bystanders.
Avoid running the engine in confined areas. Make sure there is adequate ventilation at all times.
Failure to comply could result in death or serious injury.

W0156A

Every month, check:

1. The battery charge and recharge the batteries if required.
2. The levels and top up if necessary.
3. The condition of all lines, connectors and clamps (rust). Grease if necessary.
4. The condition of the paintwork. Apply a coat of anti-rust treatment where necessary.
5. Unplug the air filter inlet and the exhaust pipe.
6. Run the engine at low speed following the starting up procedure and operate the attachment, swing and travel controls.
7. The grease on the cylinder rods.
8. Plug the air filter inlet and the exhaust pipe.

Starting up the machine after storage

⚠ WARNING

Unexpected machine movement!
Before starting the engine, make sure all controls are in the neutral position.
Failure to comply could result in death or serious injury.

W0311A

⚠ WARNING

Inhalation hazard! Risk to operators and bystanders.
Avoid running the engine in confined areas. Make sure there is adequate ventilation at all times.
Failure to comply could result in death or serious injury.

W0156A

1. Drain the fuel tank and clean the fuel filter. Replace the filter element as required.
2. Fill the fuel tank with suitable fuel.
3. Install the batteries or reconnect the cable to the negative (-) terminal.
4. Grease the machine thoroughly.
5. Check the condition of the fan drive belt and replace it if necessary.
6. Check the condition of the air conditioning drive belt and replace it if necessary (if equipped).
7. Check the cooling system level and add more coolant if necessary.
8. Check the hydraulic fluid level, and supply it as necessary.
9. Check the gear oil level of the travel reduction gear and that of the swing reduction gear, and supply it as necessary.
10. Clean the cylinder rod.
11. Remove the lid of the air cleaner inlet and that of the exhaust pipe.
12. When starting the engine after long-term storage (one month or more), you need to check whether the turbocharger has run out of an oil film and make preparations for starting the engine. Be sure to consult our authorized service shop. For details of work, refer to the attached engine manual.
13. Remove the "Do not operate" label, and start the engine following the engine starting procedure.
14. Check all the indicators and lights carefully.

NOTICE: *check the machine and the engine for leaks or for any parts that are broken, defective or missing.*

7 - TROUBLESHOOTING

Fault code resolution

Engine - Troubleshooting

NOTE: *This chapter describes the easy diagnostic methods for engine-related problems and the remedies for them. If you cannot find the cause of a problem or solve a problem, consult the CASE CONSTRUCTION dealer.*

Problem	Possible Cause	Correction
The engine oil pressure indicator light appears when the engine speed is raised after completion of warm up	Low oil level	Add the oil to the specified level
	Clogging in oil filter	Replace the oil filter cartridge
	Oil leaks	Check the correct tightening torque of pipes and joints
	Defect in cluster	See your authorized dealer
Steam is emitted from the top part of the radiator (the pressure valve). Coolant level warning light appears.	Low coolant level	Supply the coolant and check leakage
	Incorrect tension of fan belt	Adjust fan belt tension
	Dirty cooling system	Wash out inside of cooling system
	Dirty or damage on radiator fin	Clean the radiator fin or see your authorized dealer.
	Defect on thermostat	See your authorized dealer
	Incorrect tightening torque of radiator cap	Tighten the radiator cap firmly or replace the packing of it
	Defect in cluster	See your authorized dealer
The engine does not start when the starting motor is turned over	Low fuel level	Add fuel
	Air leaking in the fuel system	See your authorized dealer
	Defect or damage in the fuel injection pump or in the nozzle	See your authorized dealer
	Incorrect valve clearance	See your authorized dealer
	Incorrect engine compression pressure	See your authorized dealer
Exhaust gas is white or blue	Wrong oil quantity	Adjust to specified oil quantity
	Wrong fuel	Replace with specified fuel
Exhaust gas occasionally turns black	Air cleaner element dirty or damaged	Clean or replace the air cleaner element
	Defect in nozzle	See your authorized dealer
	Wrong engine compression pressure	See your authorized dealer
	Defect in turbocharger	See your authorized dealer
Combustion noise occasionally changes to breathing sound	Defect in nozzle	See your authorized dealer
Unusual combustion noise or mechanical noise	Wrong fuel	Check with specified fuel
	Over-heating	Check over-heating
	Defect in muffler	See your authorized dealer
	Incorrect valve clearance	See your authorized dealer

Electrical systems - Troubleshooting

NOTE: *this chapter describes the easy diagnostic methods for electrical system-related problems and the remedies for them. If you cannot find the cause of a problem or solve a problem, consult the CASE CONSTRUCTION dealer.*

Problem	Possible Cause	Correction
Instrument cluster lights does not glow brightly even when engine runs at high speed. Lights flicker while engine runs	Terminals loosened or open circuit	See your authorized dealer
	Incorrect belt tension	Adjust belt tension
Battery charging light does not go out even when engine runs at high speed	Damaged alternator	See your authorized dealer
	Damaged wiring	See your authorized dealer
Unusual noise is emitted from the alternator	Damaged alternator	See your authorized dealer
Starter motor does not turn when starter switch is turned to START	Damaged wiring	See your authorized dealer
	Battery not charged	Charge the battery
	Damaged starter motor	See your authorized dealer
	Damaged safety relay	See your authorized dealer
The pinion of the starter motor keeps going in and out	Battery not charged	Charge the battery
	Damaged safety relay	See your authorized dealer
Starter motor turns the engine sluggishly	Battery not charged	Charge the battery
	Damaged starter motor	See your authorized dealer
The starter motor disengages before the engine starts up	Damaged wiring	See your authorized dealer
	Battery not charged	Charge the battery
The engine oil pressure light does not appear when engine is stationary (when the starter switch is in ON position)	Damaged engine oil pressure switch	See your authorized dealer
	Damaged instrument cluster	See your authorized dealer
Battery charging light does not appear when the engine is stationary. (when the starter switch is in ON position)	Damaged instrument cluster	See your authorized dealer
	Damaged wiring	See your authorized dealer

Other systems - Troubleshooting

NOTE: *this chapter describes the easy diagnostic methods for generic problems and the remedies for them. If you cannot find the cause of a problem or solve a problem, consult the CASE CONSTRUCTION dealer.*

Problem	Possible Cause	Correction
Track slip out of place. Excessive wear of the sprocket	Incorrect tension of track	Adjust tension of track
Bucket either rises slowly or not at all	Low oil level	Add oil to specified level
Slow speed of travel, swing, boom, arm and bucket	Low oil level	Add oil to specified level
Unusual noise emitted from pump	Hydraulic tank strainer clogged or dirty	Clean the hydraulic tank strainer
Excessive oil temperature rise of hydraulic oil	Dirty oil cooler	Clean the oil cooler
	Incorrect fan belt tension	Adjust fan belt tension
	Low oil level	Add oil to specified level

8 - SPECIFICATIONS

Machine specifications

Engine

Model	Kubota D1305
Type	4-cycle vertical overhead valve, diesel fuel
Cooling method	Water cooling
Number of cylinders and arrangement	3 cylinders, in-line
Firing order	1 - 2 - 3
Combustion chamber type	Swirl chamber type
Cylinder bore x stroke	**78 mm** (**3.07 in**) x **88 mm** (**3.46 in**)
Piston displacement	**1261 cm³** (**77 in³**)
Compression ratio	24 : 1
Rated gross horse power (SAE J1995)	**18.5 kW** (**25.2 Hp**) at **2400 RPM**
Maximum torque at **1600 RPM**	**81.4 N·m** (**60.0 lb ft**)
Engine oil quantity	**5.7 L** (**1.5 US gal**)
Dry weight	**124 kg** (**273 lb**)
High idling speed	**2350 – 2400 RPM**
Low idling speed	**1400 – 1450 RPM**
Rated fuel consumption	192 g/Hp·hr at **2400 RPM** (257 g/kW·hr at **2400 RPM**)
Starting motor	**12 V**, **1.4 kW**
Alternator	**12 V**, **40 A**
Battery	1 x **12 V** x **58 A·h** (**5 h** rating)

Main pump

Type	Variable displacement tandem axis piston pumps
Capacity	2 x **12 cm³/rev** (**0.7 in³/rev**)
Rated oil flow	2 x **27.6 L/min** (**7.3 US gpm**)
Rated speed	**2300 RPM**

Gear pump

Type	Fixed displacement gear pump single stage
Capacity	**8.5 – 4.5 cm³/rev** (**0.5 – 0.3 in³/rev**)
Rated oil flow	**19.6 – 10.4 L/min** (**5.2 – 2.7 US gpm**)

Main control valve

Type	Sectional, 9 spools (12 blocks)
Operating method	Hydraulic pilot system
Main relief valve pressure : P1, P2 / P3	**21573 – 17161 kPa** (**3129 – 2489 psi**)
Overload relief valve pressure	**23538 kPa** (**3414 psi**)

Swing motor

Type	Fixed displacement axial piston motor
Capacity	**12.5 cm³/rev** (**0.8 in³/rev**)
Relief pressure	**16671 kPa** (**2418 psi**)
Braking system	Automatic, spring applied hydraulic released
Braking torque	**68 N·m** (**50.2 lb ft**)
Brake release pressure	**2454 – 4902 kPa** (**356 – 711 psi**)
Reduction gear type	2 - stage planetary

Travel motor

Type	Variable displacement axial piston motor
Relief pressure	**21573 kPa** (**3129 psi**)
Reduction gear type	2-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	**1861 kPa** (**270 psi**)
Braking torque	**55.9 N·m** (**41.2 lb ft**)

Cylinder

Boom cylinder	Bore diameter x Rod diameter x Stroke	**75 mm** (**3.0 in**) x **45 mm** (**1.8 in**) x **565 mm** (**22.2 in**)
	Cushion	Extend only
Arm cylinder	Bore diameter x Rod diameter x Stroke	Ø **70 mm** (**2.8 in**) x Ø **45 mm** (**1.8 in**) x **500 mm** (**19.7 in**)
	Cushion	Extend and retract
Bucket cylinder	Bore diameter x Rod diameter x Stroke	Ø **60 mm** (**2.4 in**) x Ø **35 mm** (**1.4 in**) x **420 mm** (**16.5 in**)
	Cushion	-
Boom swing cylinder	Bore diameter x Rod diameter x Stroke	Ø **75 mm** (**3.0 in**) x Ø **40 mm** (**1.6 in**) x **400 mm** (**15.7 in**)
	Cushion	-
Dozer cylinder	Bore diameter x Rod diameter x Stroke	Ø **85 mm** (**3.3 in**) x Ø **45 mm** (**1.8 in**) x **140 mm** (**5.5 in**)
	Cushion	-

NOTE: *discoloration of cylinder rod can occur when the friction reduction additive of lubrication oil spreads on the rod surface.*
Discoloration does not cause any harmful effect on the cylinder performance.

Types of shoes – Cab version

Shoe width	**250 mm** (**9.8 in**)
Ground pressure	**31.7 kPa** (**4.6 psi**)
Overall width	**1500 mm** (**59.1 in**)

Types of shoes – Canopy version

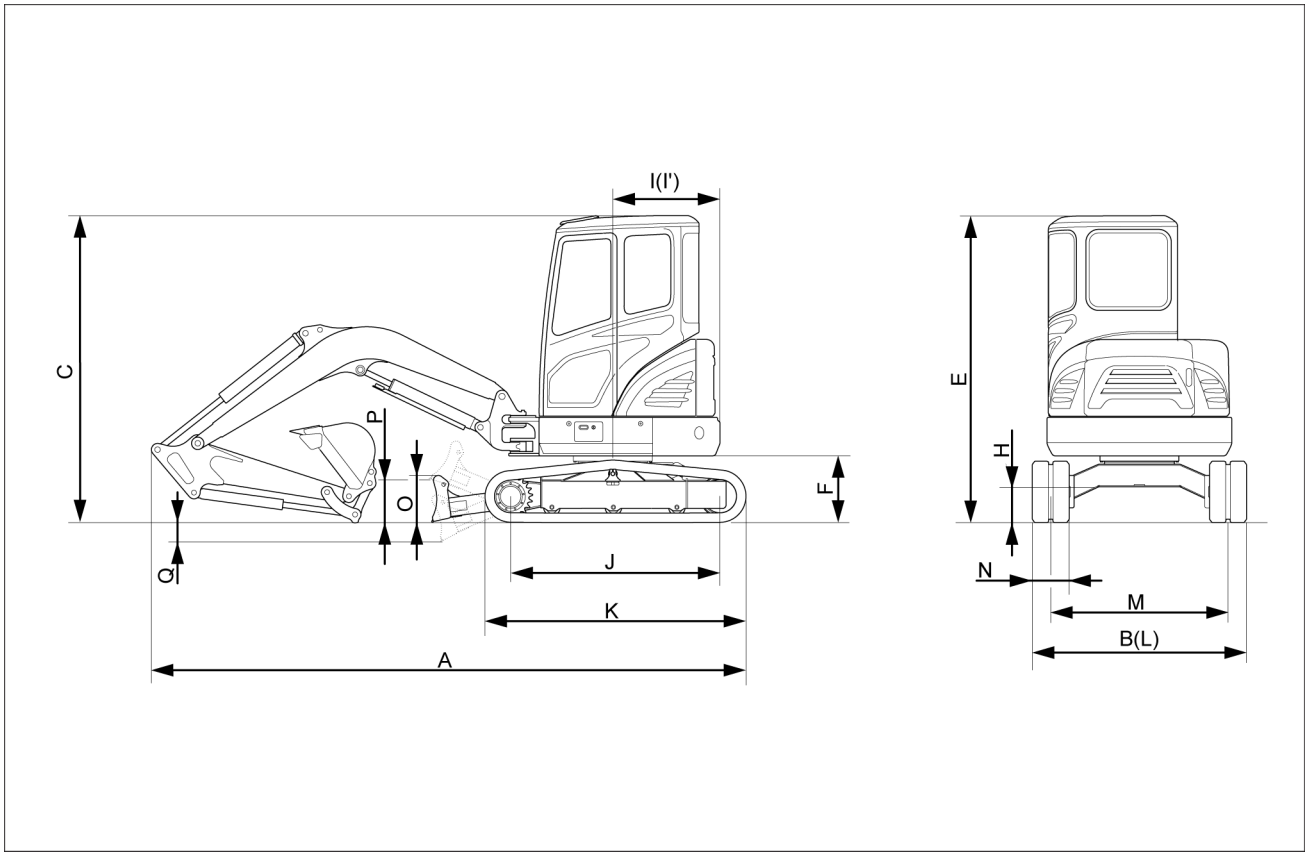
Shoe width	**250 mm** (**9.8 in**)
Ground pressure	**29.6 kPa** (**4.3 psi**)
Overall width	**1500 mm** (**59.1 in**)

Number of rollers and shoes on each side

Upper roller	1
Lower roller	3

Dimensions

Cab version



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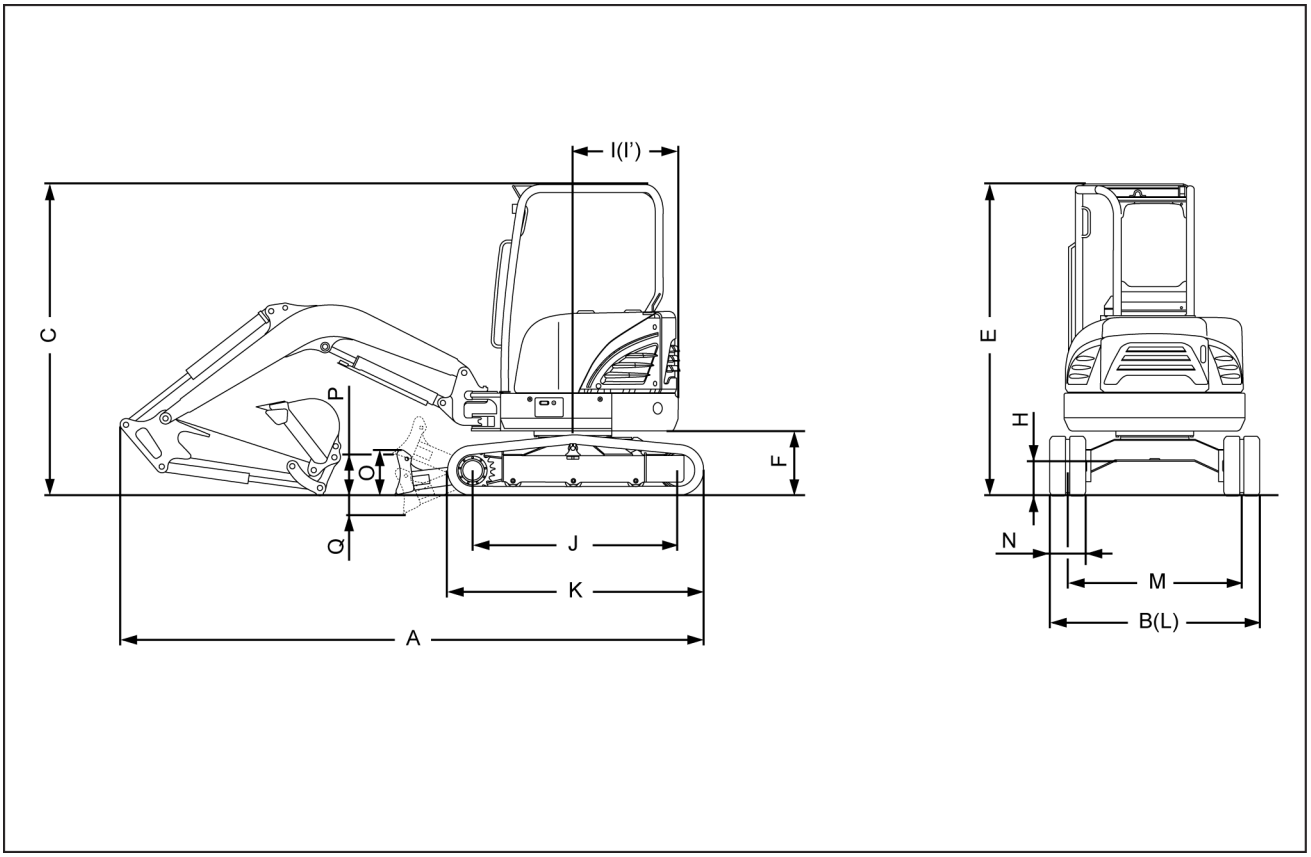
(A) Overall length	**4030 mm** (**158.7 in**)
(B) Overall width, with **250 mm** (**9.8 in**) shoe	**1500 mm** (**59.1 in**)
(C) Overall height	**2500 mm** (**98.4 in**)
(E) Overall height of cab	**2500 mm** (**98.4 in**)
(F) Ground clearance of counterweight	**510 mm** (**20.1 in**)
(H) Minimum ground clearance	**290 mm** (**11.4 in**)
(I) Rear-end distance	**775 mm** (**30.5 in**)
(I') Rear-end swing radius	**775 mm** (**30.5 in**)
(J) Distance between tumblers	**1490 mm** (**58.7 in**)
(K) Undercarriage length	**1910 mm** (**75.2 in**)
(L) Undercarriage width	**1500 mm** (**59.1 in**)
(M) Track gauge	**1250 mm** (**49.2 in**)
(N) Track shoe width, standard	**250 mm** (**9.8 in**)
(O) Height of blade	**300 mm** (**11.8 in**)
(P) Ground clearance of blade up	**330 mm** (**13.0 in**)
(Q) Depth of blade down	**380 mm** (**15.0 in**)

Boom length: **1.945 m** (**76.575 in**)
Arm length: **1.120 m** (**44.094 in**)
With boom swing post

Canopy version



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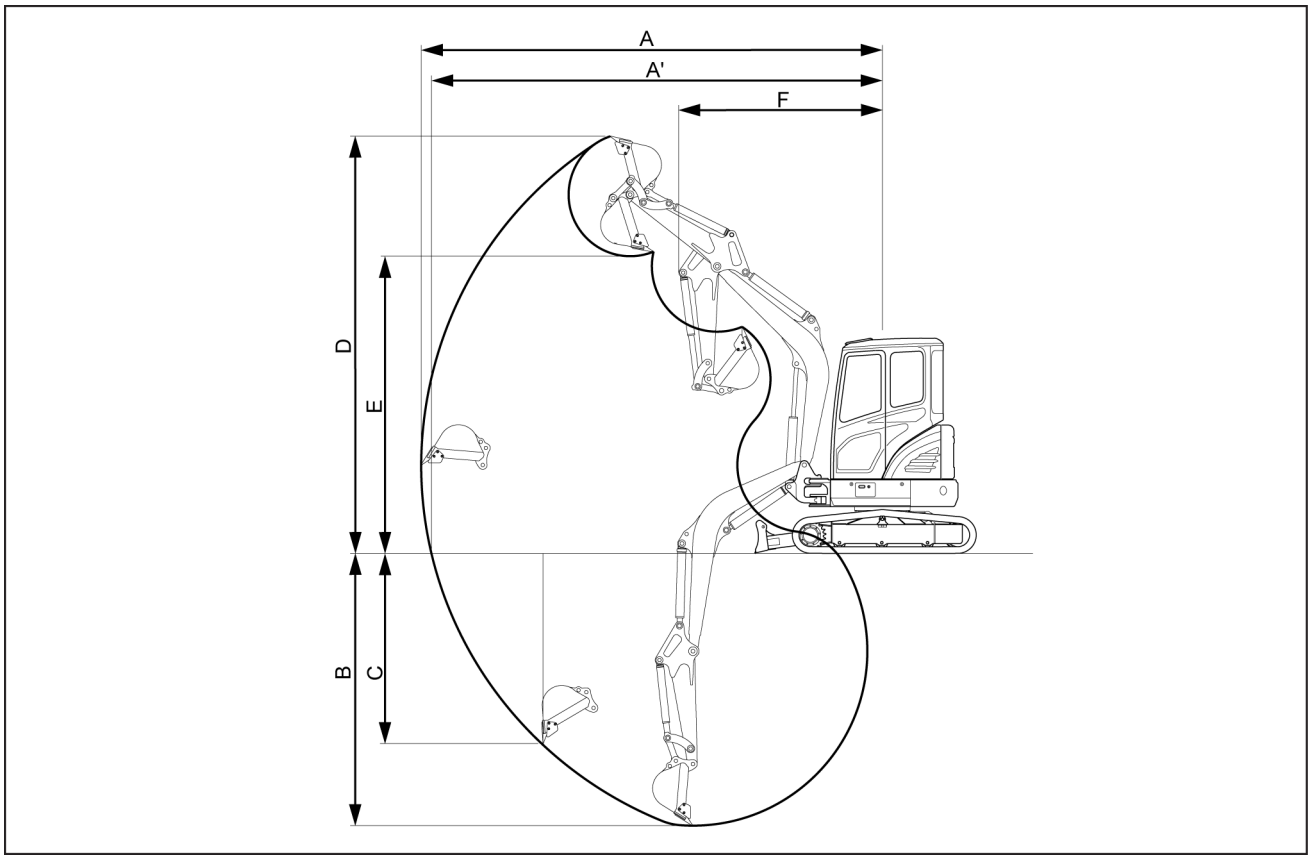
(A) Overall length	**4030 mm** (**158.7 in**)
(B) Overall width, with **250 mm** (**9.8 in**) shoe	**1500 mm** (**59.1 in**)
(C) Overall height	**2500 mm** (**98.4 in**)
(E) Overall height of cab	**2500 mm** (**98.4 in**)
(F) Ground clearance of counterweight	**510 mm** (**20.1 in**)
(H) Minimum ground clearance	**290 mm** (**11.4 in**)
(I) Rear-end distance	**775 mm** (**30.5 in**)
(I') Rear-end swing radius	**775 mm** (**30.5 in**)
(J) Distance between tumblers	**1490 mm** (**58.7 in**)
(K) Undercarriage length	**1910 mm** (**75.2 in**)
(L) Undercarriage width	**1500 mm** (**59.1 in**)
(M) Track gauge	**1250 mm** (**49.2 in**)
(N) Track shoe width, standard	**250 mm** (**9.8 in**)
(O) Height of blade	**300 mm** (**11.8 in**)
(P) Ground clearance of blade up	**330 mm** (**13.0 in**)
(Q) Depth of blade down	**380 mm** (**15.0 in**)

Boom length: **1.945 m** (**76.575 in**)
Arm length: **1.120 m** (**44.094 in**)
With boom swing post

Working range



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(A) Maximum digging reach		**4480 mm** (**176.4 in**)
(A') Maximum digging reach on ground		**4340 mm** (**170.9 in**)
(B) Maximum digging depth		**2420 mm** (**95.3 in**)
(C) Maximum vertical wall digging depth		**1460 mm** (**57.5 in**)
(D) Maximum digging height		**4150 mm** (**163.4 in**)
(E) Maximum dumping height		**2930 mm** (**115.4 in**)
(F) Minimum swing radius		**1980 mm** (**78.0 in**)
Boom swing radius (left-hand/right-hand)		**75 °** / **50 °**
Bucket digging force	SAE	**19.2 kN** (**4316.3 lb**)
	ISO	**21.1 kN** (**4743.5 lb**)
Arm crowd force	SAE	**14.2 kN** (**3192.3 lb**)
	ISO	**14.6 kN** (**3282.2 lb**)

Boom length: **1.945 m** (**76.575 in**)
Arm length: **1.120 m** (**44.094 in**)
With boom swing post

Weights

Machine

Operating weight – Cab version	**2580 kg** (**5688 lb**)
Operating weight – Canopy version	**2430 kg** (**5357 lb**)

Components

Upperstructure assembly	**979 kg** (**2158 lb**)
Main frame weld assembly	**305 kg** (**672 lb**)
Engine assembly	**124 kg** (**273 lb**)
Main pump assembly	**19 kg** (**42 lb**)
Main control valve assembly	**25 kg** (**55 lb**)
Swing motor assembly	**34 kg** (**75 lb**)
Hydraulic oil tank assembly	**50 kg** (**110 lb**)
Fuel tank assembly	**30 kg** (**66 lb**)
Boom swing post	**65 kg** (**143 lb**)
Counterweight	**117 kg** (**258 lb**)
Cab assembly	**210 kg** (**463 lb**)
Lower chassis assembly	**828 kg** (**1825 lb**)
Track frame weld assembly	**220 kg** (**485 lb**)
Swing bearing	**47 kg** (**104 lb**)
Travel motor assembly	**36 kg** (**79 lb**)
Turning joint	**11 kg** (**24 lb**)
Track recoil spring	**16 kg** (**35 lb**)
Idler	**20 kg** (**44 lb**)
Carrier roller	**3 kg** (**7 lb**)
Track roller	**10 kg** (**22 lb**)
Sprocket	**7 kg** (**15 lb**)
Rubber track (**250 mm** (**9.8 in**))	**117 kg** (**258 lb**)
Dozer blade assembly	**92 kg** (**203 lb**)
Front attachment assembly (**1.945 m** (**76.6 in**) boom, **1.12 m** (**44.1 in**) arm, **0.07 m³** (**0.09 yd³**) SAE heaped bucket)	**318 kg** (**701 lb**)
1.945 m (**76.6 in**) boom assembly	**80 kg** (**176 lb**)
1.12 m (**44.1 in**) arm assembly	**45 kg** (**99 lb**)
0.07 m³ (**2.47 ft³**) SAE heaped bucket	**57 kg** (**126 lb**)
Boom cylinder assembly	**26 kg** (**57 lb**)
Arm cylinder assembly	**26 kg** (**57 lb**)
Bucket cylinder assembly	**20 kg** (**44 lb**)
Bucket control link assembly	**20 kg** (**44 lb**)
Dozer cylinder assembly	**21 kg** (**46 lb**)
Boom swing cylinder assembly	**23 kg** (**51 lb**)

9 - ACCESSORIES

Direct fit buckets

The data shown below are referred to working operation with the dozer blade up and the **177 kg** (**390.22 lb**) counterweight.

For cab configuration:

- **1.12 m** (**44.09 in**) arm, minimum lift value: **260 kg** (**573.20 lb**).
- **1.35 m** (**53.15 in**) arm, minimum lift value: **240 kg** (**529.11 lb**).

For canopy configuration:

- **1.12 m** (**44.09 in**) arm, minimum lift value: **230 kg** (**507.06 lb**).
- **1.35 m** (**53.15 in**) arm, minimum lift value: **210 kg** (**462.97 lb**).

Direct fit buckets application as function of the arm (for cab version)

General purpose buckets			Arm	
Capacity **ISO 7451** (Heaped)	Width	Mass	**1.12 m** (**44.09 in**)	**1.35 m** (**53.15 in**)
0.04 m³ (**0.05 yd³**)	**305 mm** (**12.01 in**)	**55 kg** (**121.25 lb**)	●	●
0.062 m³ (**0.081 yd³**)	**457 mm** (**17.99 in**)	**70 kg** (**154.32 lb**)	●	●
0.085 m³ (**0.111 yd³**)	**610 mm** (**24.02 in**)	**84 kg** (**185.19 lb**)	●	●

Direct fit buckets application as function of the arm (for canopy version)

General purpose buckets			Arm	
Capacity **ISO 7451** (Heaped)	Width	Mass	**1.12 m** (**44.09 in**)	**1.35 m** (**53.15 in**)
0.04 m³ (**0.05 yd³**)	**305 mm** (**12.01 in**)	**55 kg** (**121.25 lb**)	●	●
0.062 m³ (**0.081 yd³**)	**457 mm** (**17.99 in**)	**70 kg** (**154.32 lb**)	●	●
0.085 m³ (**0.111 yd³**)	**610 mm** (**24.02 in**)	**84 kg** (**185.19 lb**)	●	▲ (*)

● Density of material up to 1.6 t/m^3
▲ Density of material up to 1.4 t/m^3

(*) With this bucket, to improve digging performance and stability it is recommended to use additional counterweight.

NOTICE: *make particular attention when swing the boom to the left-hand side: the attachment may collide with the cab/canopy.*

Auxiliary hydraulic circuits

The machine can provide a single-acting hydraulic circuit or a double-acting hydraulic circuit.

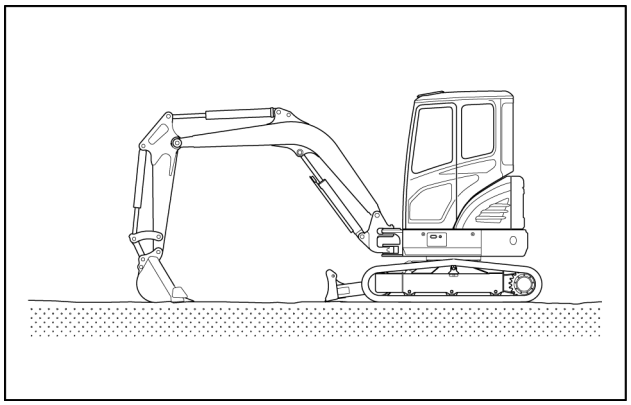
- The single-acting hydraulic circuit is intended for usage of attachments such as a hydraulic breaker.
- The double–acting hydraulic circuit is intended for usage of attachments such as clamshell or shears.

Hydraulic switching

The selection between the single-acting hydraulic circuit and the double-acting hydraulic circuit is done acting on the bolt located on the three-way valve near the hydraulic oil tank.

To select the hydraulic circuit perform the following operations.

Park the machine on a flat and level place. Stop the engine, and remove the starter key.



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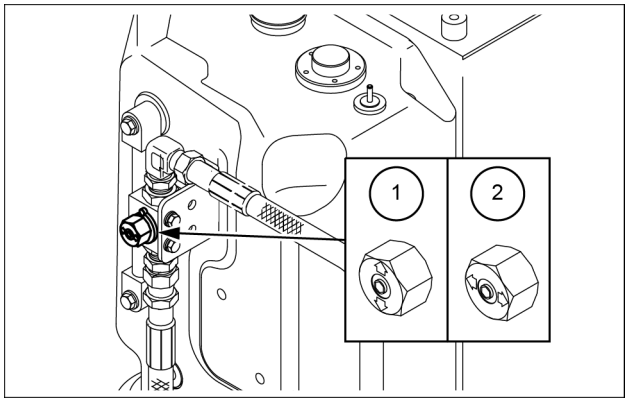
Open the side hood to access to the three-way valve.

Use a spanner to turn the bolt of the three-way valve and select the hydraulic circuit.

- **(1)**: one way flow, single-acting hydraulic circuit
- **(2)**: two way flow, double-acting hydraulic circuit



SMIL16MEX0460AB 2

Circuit configuration

As for breaker oil pressure line, use extra spool of main control valve.

Set proper breaker pressure on load relief valve.

The pressure of the system is **21580 kPa** (**3130 psi**).

The accumulator should be used to the breaker charging and return line. If the accumulator is not used, it will be damage as the input wave is delivered.
Keep the pressure pulsation of pump below **5861 kPa** (**850 psi**) by installing the accumulator.

Do not connect the breaker return line to the main control, but connect to the return line front of the cooler.

Do not connect the breaker return line to drain lines, such as of swing motor, travel motor or pump, otherwise they should be damaged.

One of spool of the main control valve should be connected to the tank.

Select the size of pipe laying considering the back pressure.

Shim-less tube should be used for the piping.

Weld the bracket for pipe clamp to prevent damage caused by vibration.

Operating controls

The flow rate/pressure characteristic of the auxiliary circuit can be set according to the type and to the specifications of the attachment used.

NOTICE: *before operating any hydraulic attachment be sure to set the proper attachment mode (breaker or crusher) and the proper hydraulic flow rate/pressure characteristic. If the attachment mode or the hydraulic flow rate/pressure characteristic are not properly set, malfunction or failure may occur to the machine or damage may occur to the hydraulic attachment.*

To operate the breaker or clamshell, use the auxiliary pedal **(A)**.

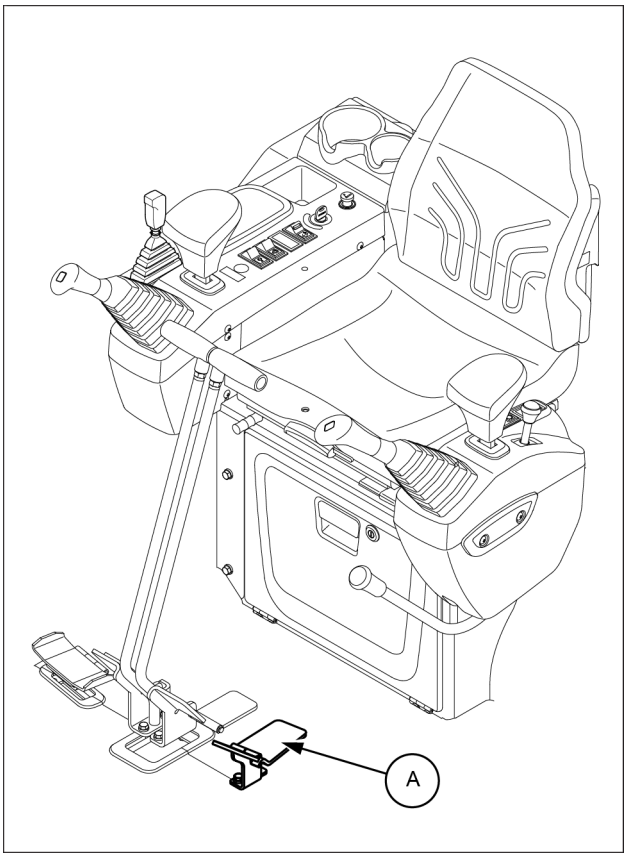
When breaker operating is finished, stop engine and push the auxiliary pedal **(A)** to release pressure in the breaker circuit.

If pressure still remains, the lifetime of the diaphragm in the accumulator will be shortened.

NOTE: *make sure to prevent contamination by dust, sand and etc. Contaminated oil causes wear and damage to the moving parts of the pump.*

NOTE: *when operating the breaker, bolts and nuts of main equipment may be loosened by vibration. So, it must be inspected periodically.*

NOTICE: *If not using any hydraulic attachment, do not operate controls for auxiliary hydraulic circuits.*



SMIL16MEX0370BB 3

2-way selection proportional switch (Optional)

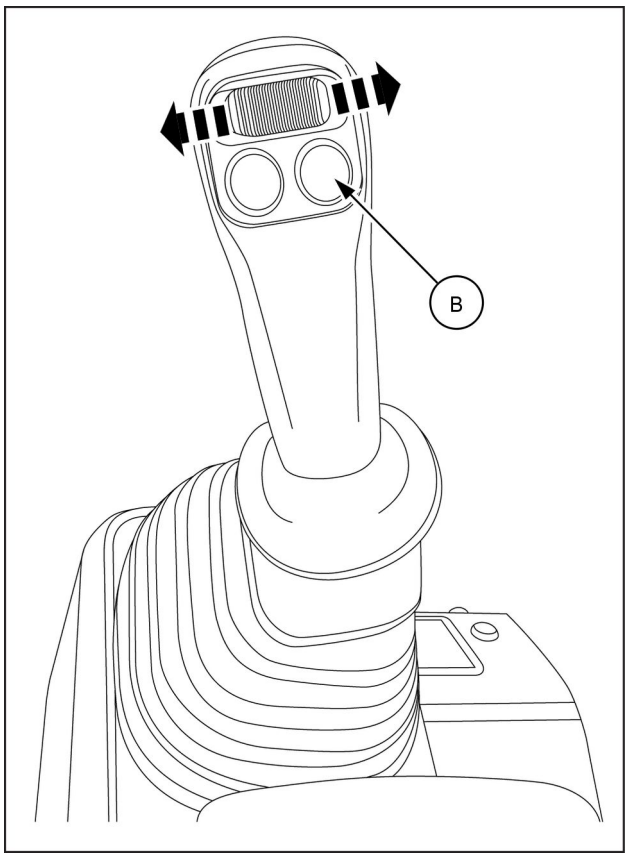
Clamshell or shear can be operated by means of the proportional switch on the right-hand control lever. This function applies to double action hydraulic attachment circuit.

The basic operation of the 2-way selection proportional switch are the following:

- Operate the proportional switch to the left to open the clamshell or shear.
- Operate the proportional switch to the right to close the clamshell or shear.

Consult your CASE CONSTRUCTION dealer to select the optional accessory compatible with your machine and to correctly adjust the flow required for its use.

(B) Horn switch.



SMIL16MEX1265BA 4

Breaker trigger switch (Optional)

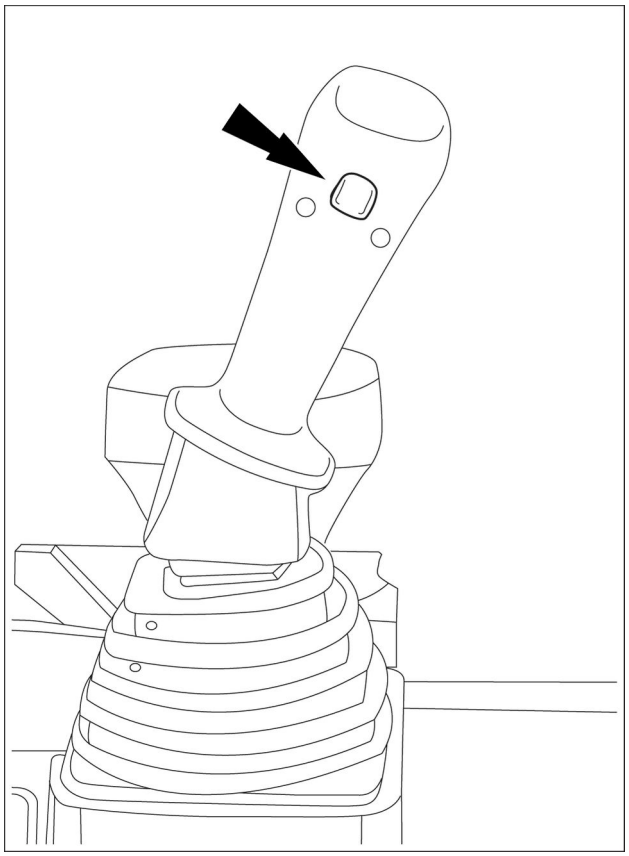
The breaker can be operated by means of the trigger switch located on the right-hand control lever.

NOTE: *the breaker operates only when the breaker selection switch on the switch panel is selected.*

This function applies to single action hydraulic attachment circuit.

When breaker operating is finished, stop engine and push the trigger switch to release pressure in the breaker circuit.

Consult your CASE CONSTRUCTION dealer to select the optional accessory compatible with your machine and to correctly adjust the flow required for its use.



SMIL16MEX1502BA 5

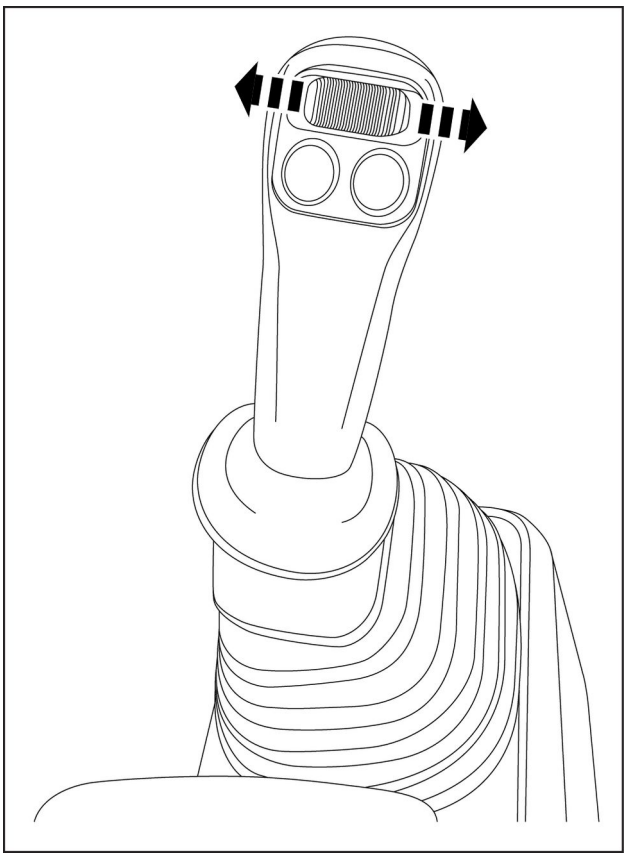
4-way selection proportional switch (Optional)

The attachment can be rotated by means of the proportional switch on the left-hand control lever. This function applies to double action hydraulic attachment circuit.

The basic operation of the 4-way selection proportional switch are the following:

- Operate the proportional switch to the left-hand to rotate counterclockwise the attachment.
- Operate the proportional switch to the right-hand to rotate clockwise the attachment.

Consult your CASE CONSTRUCTION dealer to select the optional accessory compatible with your machine and to correctly adjust the flow required for its use.



SMIL16MEX1498BA 6

Operating guidelines for usage of hydraulic attachments

Always select an hydraulic attachment which is suitable for installation on the machine, in order to avoid severe damages to the machine frames and to the machine systems. Make sure to select an hydraulic attachment which does not compromise the overall machine stability. Make sure to select an hydraulic attachment which properly matches the capacity of the auxiliary hydraulic circuit of the machine.

NOTICE: *make sure to know the maximum working pressure allowed by the attachment.*

Make sure to read and understand the Operator's Manual of the hydraulic attachment.

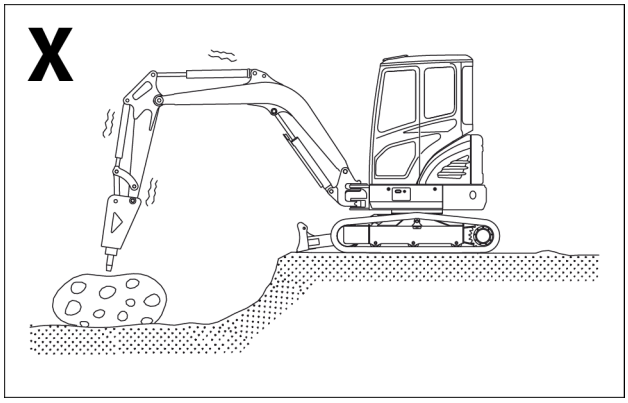
Always refer to the Operator's Manual of the hydraulic attachment for proper and safe installation of the attachment to the machine.

Always refer to the Operator's Manual of the hydraulic attachment and to the following instructions in this manual for proper and safe usage of the attachment.

Always refer to the Operator's Manual of the hydraulic attachment for proper maintenance of the attachment. Always refer to the Operator's Manual of the machine for specific maintenance schedule related to the usage of specific attachments (e.g. replacement of the hydraulic filters and of the hydraulic fluid, greasing of the pins of the bucket linkage).

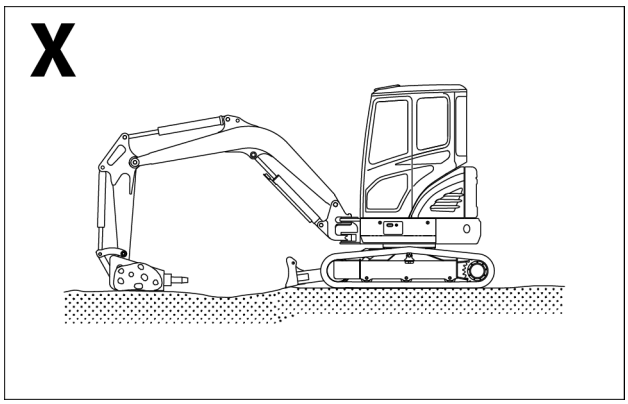
Precautions while operating the hydraulic breaker

Avoid hitting objects with breaker. The breaker is heavier than the bucket and lowers faster. This may cause damages to the breaker, attachment, and upperstructure. Always lower the breaker slowly until the chisel point touches the object to be broken before starting breaker operation.



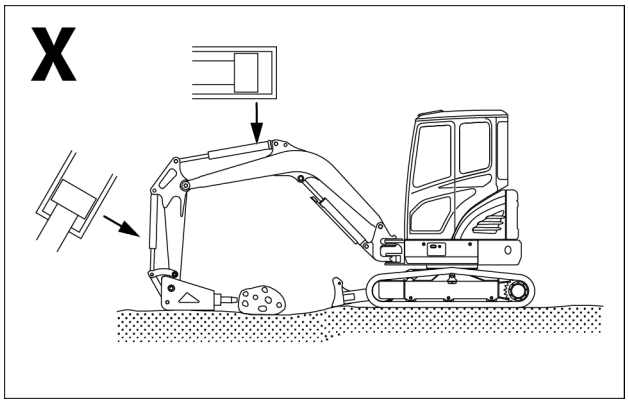
SMIL16MEX0461AA 7

Do not use the hydraulic breaker and/or swing function to push objects as damage to the attachment may result.



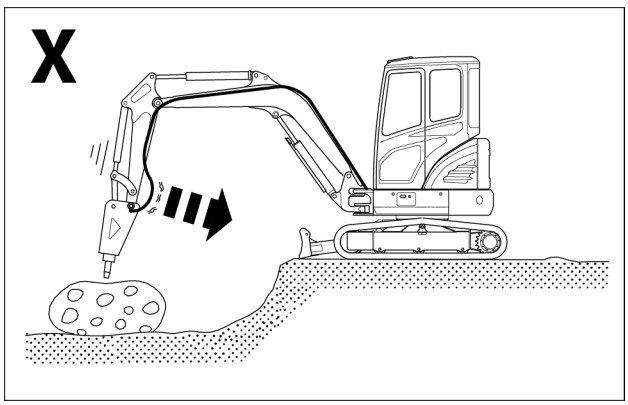
SMIL16MEX0462AA 8

Do not operate the breaker with the excavator cylinders fully extended or retracted to avoid attachment and/or cylinder damage.



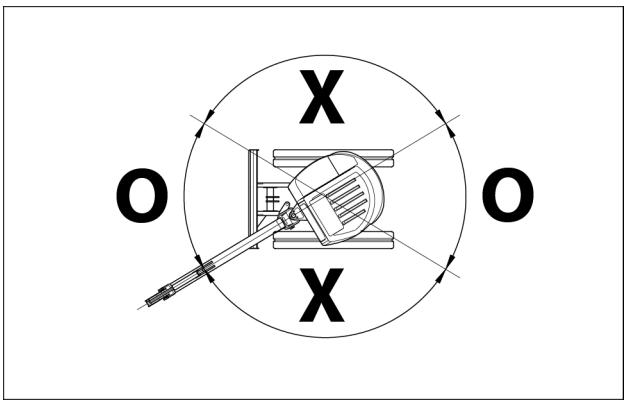
SMIL16MEX0463AA 9

Stop working if hydraulic hoses look abnormally bent. Contact your authorized Dealer.



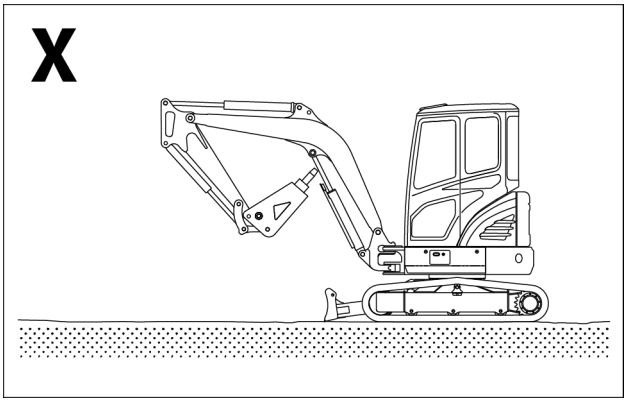
SMIL16MEX0464AA 10

Do not operate the breaker to the side of the machine. The machine may become unstable and undercarriage components life may be reduced.



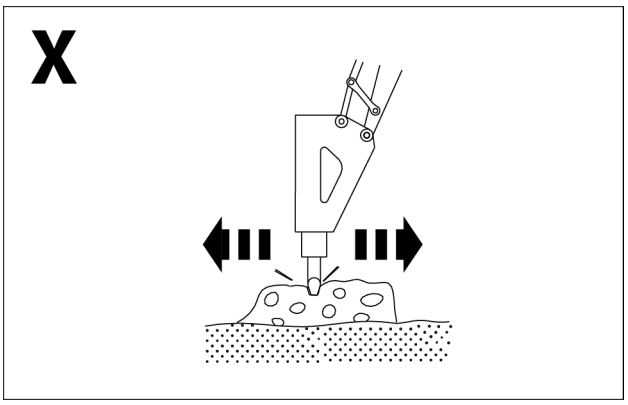
SMIL16MEX0465AA 11

Operate the excavator carefully to avoid hitting the boom with the hydraulic breaker.



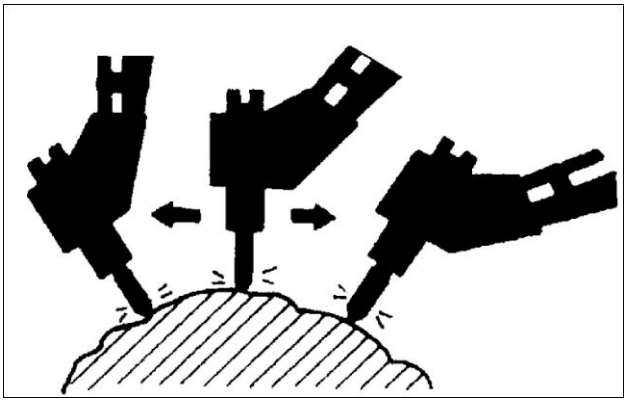
SMIL16MEX0466AA 12

Do not operate the breaker while striking. This can cause damage to the working device and to the swing system.



SMIL16MEX0467AA 13

Do not operate the hydraulic breaker continuously longer than **60 s**. Excessive chisel wear will result. If an object could not be broken within **60 s**, apply chisel to other locations, less than **60 s** for each location.



NH0205 14

Hydraulic oil - breaker/nibbler

When using the hydraulic breaker, hydraulic fluid deteriorates more quickly than during ordinary digging. Check the hydraulic fluid level more frequently. In addition, when changing the filters, also check the condition of the hydraulic fluid.

Use the following table to determine the interval for changing the hydraulic fluid and filters when using the hydraulic breaker.

Maintenance action	Operating the breaker (rate 100%)	Normal use
Hydraulic oil replacement	Every **600 h**	Every **5000 h**
Hydraulic oil return filter replacement	Every **100 h**	Every **250 h**
Pilot line filter replacement	Every **100 h**	Every **250 h**

Load handling

⚠ WARNING

Crushing hazard!
During load handling operations, it is very important to adhere strictly to the instructions given in this manual and local legislation.
Failure to comply could result in death or serious injury.

W0257A

⚠ WARNING

Improper operation or service of this machine can result in an accident.
When lifting a load the machine must be equipped with:
- safety valves,
- an overload indicator,
- a load fixing point,
- a load handling chart corresponding to the type of machine and to its attachment.
Failure to comply could result in death or serious injury.

W1168A

NOTICE: *the machine has been specifically designed to perform digging/loading works. If you handle suspended loads with this machine, you must equip the machine with the appropriate optional equipment including safety valves, load handling eye, load lifting table, and an overhead warning alarm. Make sure to handle suspended loads following strictly all current Regulations regarding this application, as well as the rules described in the SAFETY INFORMATION chapter.*

NOTICE: *make provision for lifting devices that comply with current Regulations for lifting applications. Make sure that the lifting devices (hooks, chains etc.) are in perfect conditions without any sign of excessive wear. Make sure to use self-locking hooks in order to avoid unintended opening during lift operation. The lifting devices can be used exclusively for the lifting of parts not anchored to the ground. Never use them for towing operations, uprooting or tearing apart.*

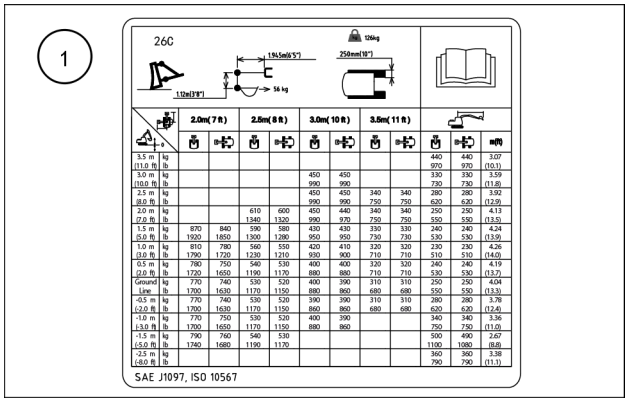
NOTICE: *a suspended load can swing freely, and it can thus hit persons or the cab of the machine. Make sure that all bystanders are moved away from the field of action of the machine, and make sure to handle the load slowly. If the load starts to swing during the handling, lower it slowly to the ground and sling it in a way that avoid unintended swinging as much as possible.*

NOTICE: *load handling eye rated lifting load RLL:* ***1500 kg*** *(****3307 lb****).*

To handle suspended loads proceed as described below:

- Evaluate (if not known) the mass of the object to be handled and compare it with the data listed in the liftable loads chart **(1)** located in the cab/canopy. Do not lift loads exceeding the maximum values prescribed by the table.
- Press the ON side of the overload switch **(2)** to activate the overload warning alarm. The overload warning alarm is intended to avoid lifting of excessive loads.

  NOTICE: *if an overload condition is detected during the handling of the load, When the machine is overloaded, a buzzer sounds and the red warning lamp in the instrument cluster is ON. Place the load onto the ground and check the load conditions making reference to the chart located inside the cab/canopy.*
- Secure the load with the load handling eye **(3)** located on the bucket linkage rod, using slinging devices and chains adequate for the load to be lifted. In order to limit the swinging of the load, avoid slinging it with cables and/or chains too long.
- Extend the bucket cylinder to end stroke.
- Check the surrounding working area and make sure that the path to be travelled with the load is free from obstacles.
- Lift slowly the load, avoiding sharp movements which could cause swinging of the load. Keep the load near the machine, to improve the stability and operate, preferably, along its longitudinal axis, rather than crossways. Lift the load from the ground the minimum height required.
- Position and place the load where desired, making sure that it is resting on a solid base appropriate for its mass.
- Remove the chains.



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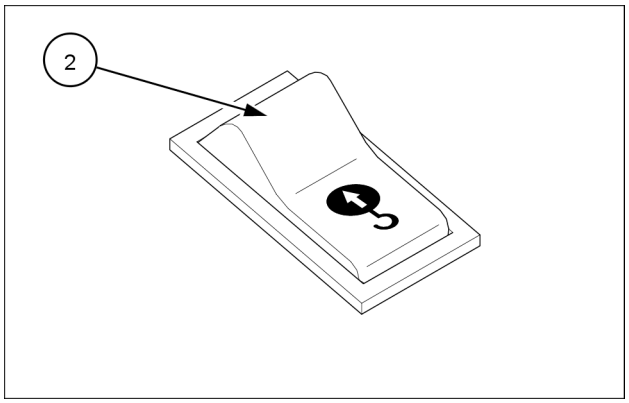

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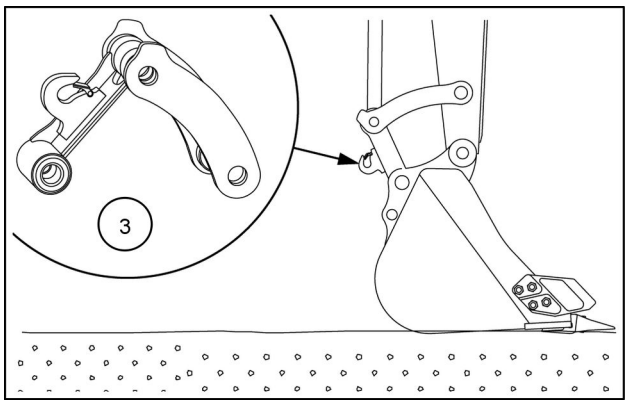
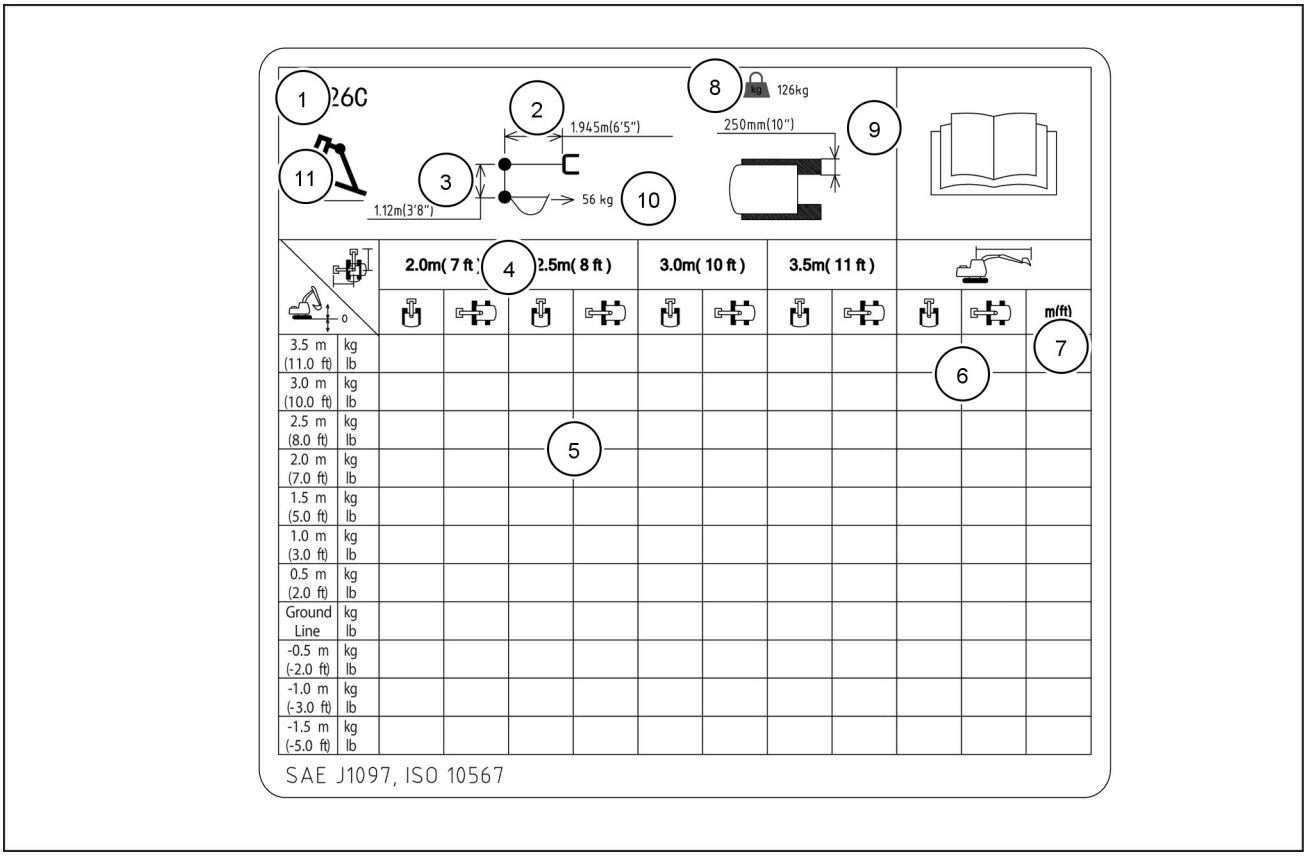


SMIL16MEX1105AA 3

Load handling chart

The load handling chart indicates the rated lift capacities that you must consider at different distances from the swing axis.

The rated lift capacity is defined according to SAE J1097 and ISO 10567 as the smaller value of either the rated tipping load (**75 %** of the tipping load) or the rated hydraulic lift capacity (**87 %** of the hydraulic lift capacity).

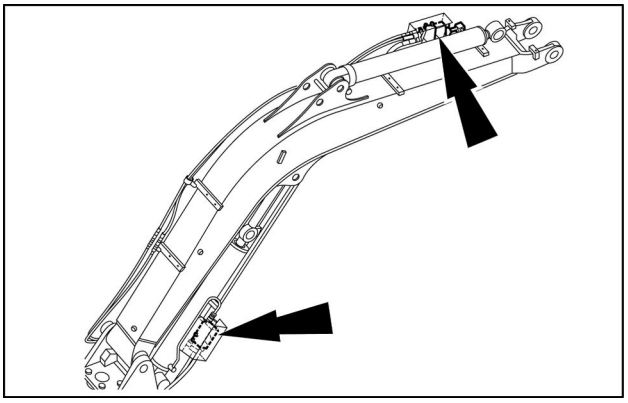


SMIL16MEX3174FA 4

1. Model name
2. Boom length
3. Arm length
4. Load radius
5. Rated lift capacity
6. Rated lift capacity at maximum reach.
7. Maximum reach
8. Counterweight mass (in case of an additional counterweight, two weight icons are shown).
9. Track shoe width
10. Bucket weight
11. Dozer blade position

Safety valves

The safety valves are intended to prevent the front equipment from dropping down in the event of a breakage or burst of a hose in the hydraulic lines of boom and arm. The safety valves keep the front equipment in the position at the time of breakage, and thus allow the operator to slowly lower the attachment to the ground using the left and right control levers.



SMIL16MEX1125AA 5

Moreover, the safety valves allow an operator to keep the front equipment in the selected operating position, reducing the leakages that occur in the neutral position of the boom spool and the arm spool in the main control valve.

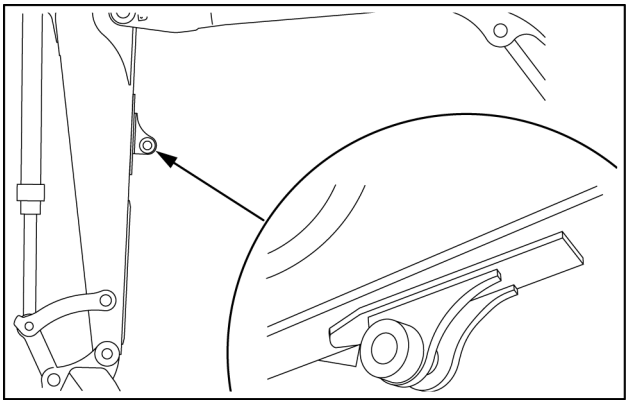
NOTICE: *prior to starting any handling of suspended loads check that the valves do not show clear evidence of damages or abnormal noises. In the event abnormal conditions are found, contact the CASE CONSTRUCTION. dealer.*

NOTICE: *the pressure setting of the safety valves must be checked every 6 months. Consult the CASE CONSTRUCTION dealer.*

Thumb bracket

The arm can be equipped with the bracket in order to install a hydraulic thumb.

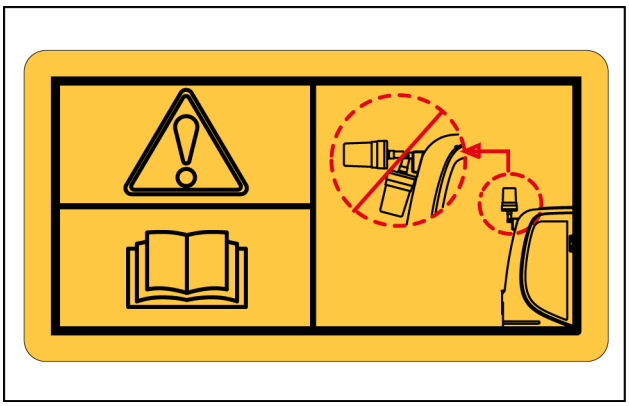
NOTE: *consult your CASE CONSTRUCTION dealer to select the hydraulic thumb compatible with your machine and to install it correctly.*



SMIL16MEX1106AA 1

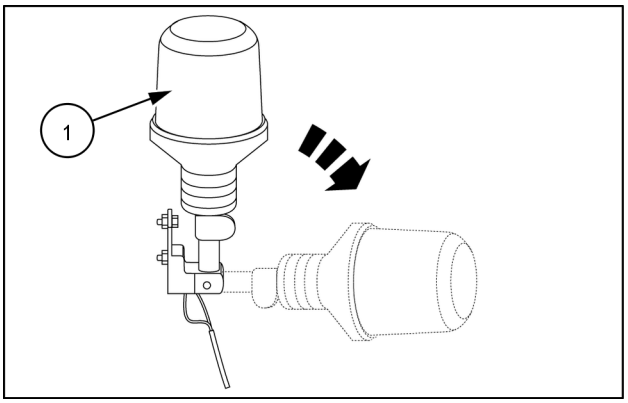
Rotating beacon

When you operate a machine on a road or beside a road, a rotating beacon is required to avoid any traffic accident. Please contact your CASE CONSTRUCTION dealer to install it.



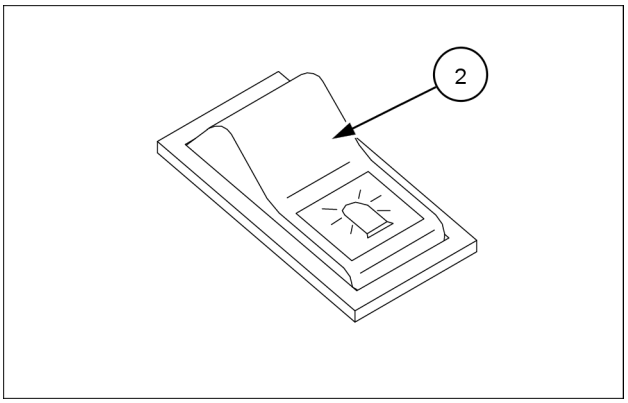
SMIL16MEX0021AA 1

During the machine transfer, change the position of the lamp to the horizontal position.
Before starting the machine operations, make sure that the rotating beacon **(1)** maintains a vertical position.
A horizontal position can result in a decrease in life time of the lamp due to the infiltration of foreign substances such as dust or water.



SMIL16MEX1108AA 2

Press the beacon switch **(2)** located on the right–hand console to activate the beacon light on the cab and the indicator light on the switch.



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Dealer's stamp

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Availability of some models and equipment builds varies according to the country in which the equipment is being used. For exact information about any particular product, please consult your Case dealer.

CASE CONSTRUCTION