ORIGINAL INSTRUCTIONS

CX19C
Mini Excavator

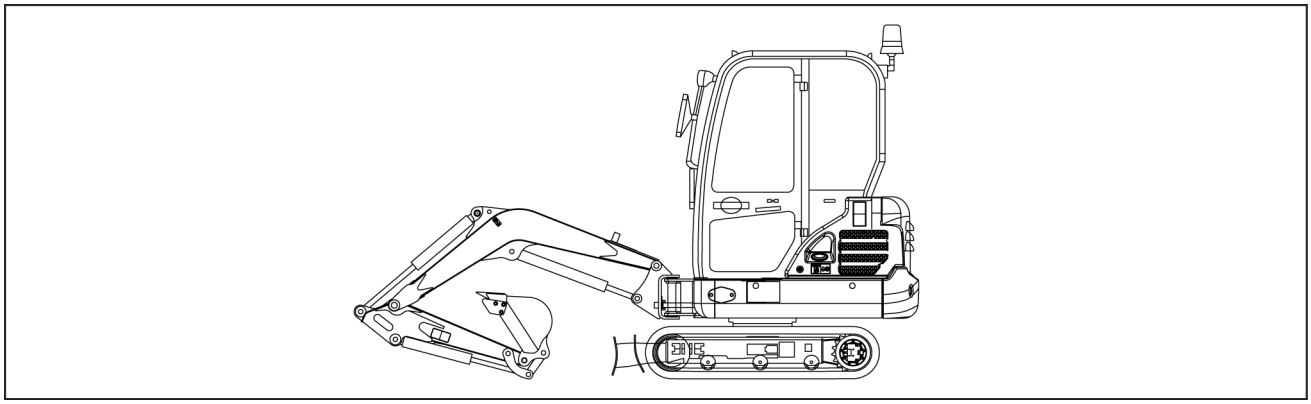
OPERATOR'S MANUAL

Part number 90361798
1st edition English
July 2020

CASE CONSTRUCTION

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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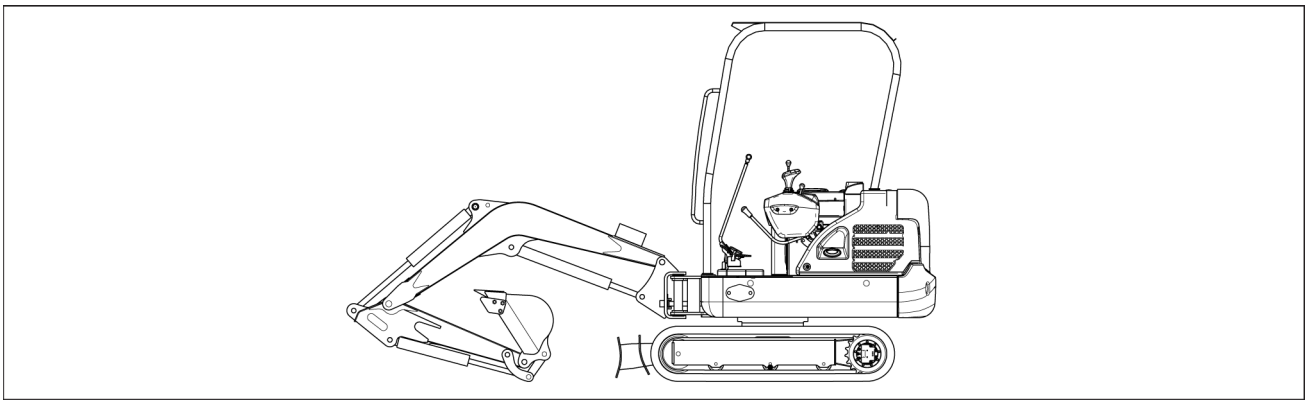
Cab version



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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

1. Designed, built and equipped so as to conform with all applicable regulations adopted by the Air Resources Board pursuant to its authority in Chapters 1 and 2,Part 5,Division 26 of the Health and Safety Code; and.
2. Free from defects in materials and workmanship which cause the failure of a warranted part to be identical in all material respects to the parts as described in Mitsubishi Heavy Industries, Ltd.'s application for certification for a period of 5 years or 3,000 hours of operation, whichever occurs first, for all engines rated at **19 kW** (**26 Hp**) and greater, except as noted below. In the absence of a device to measure hours of use, the engine shall be warranted for a period of 5 years. For all engines rated less than **19 kW** (**26 Hp**), and for constant-speed engines rated under **37 kW** (**50 Hp**) with rated speeds higher than or equal to 3,000 min-1, the period of 2 years or 1,500 hours of operation, whichever occurs first, shall apply. In the absence of a device to measure hours of use, the engine shall be warranted for a period of 2 years.

C. The warranty on emission-related parts shall be interpreted as follows:
1. Any warranted part which is not scheduled for replacement as required maintenance in the written instructions required by Subsection (e) shall be warranted for the warranty period defined in Subsection (b) (2). If any such part fails during the period of warranty coverage, it shall be repaired or replaced by Mitsubishi Heavy Industries, Ltd. according to Subsection (4) below. Any such part repaired or replaced under the warranty shall be warranted for the remaining warranty period.
2. Any warranted part which is scheduled only for regular inspection in the written instructions required by Subsection (e) shall be warranted for the warranty period defined in Subsection (b) (2). A statement in such written instructions to the effect of "repair or replace as necessary" shall not reduce the period of warranty coverage. Any such part repaired or replaced under the warranty shall be warranted for the remaining warranty period.
3. Any warranted part which is scheduled for replacement as required maintenance in the written instructions required in Subsection (e) shall be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part shall be repaired or replaced by Mitsubishi Heavy Industries, Ltd. according to Subsection (4) below. Any such part repaired or replaced under the warranty shall be warranted for the remaining warranty period.
4. Repair or replacement of any warranted part under the warranty provisions of this article shall be performed at no charge to the owner at a warranty station.
5. Notwithstanding the provisions of Subsection (4) above, warranty services or repairs shall be provided at all Mitsubishi Heavy Industries, Ltd. distribution centers that are franchised to service the subject engines.
6. The owner shall not be charged for diagnostic labor that leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at a warranty station.
7. Mitsubishi Heavy Industries, Ltd. shall be liable for damages to other engine components proximately caused by failure under warranty of any warranted part.
8. Throughout the engine's warranty period defined in Subsection (b) (2), Mitsubishi Heavy Industries, Ltd. shall maintain a supply of warranted parts sufficient to meet the expected demand for such parts.
9. Any replacement part, as defined in Section 1900(b) (13), Title 13, may be used in the performance of any maintenance or repairs and must be provided without charge to the owner. It is not necessary for replacement parts to be the same brand or by the same manufacturer as the original part sold with the engine. Such use shall not reduce the warranty obligations of Mitsubishi Heavy Industries, Ltd.
10. Add-on or modified parts, as defined in Section 1900(b)(1) and (b)(10), Title 13, that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts shall be grounds for disallowing a warranty claim made in accordance with this article. Mitsubishi Heavy Industries, Ltd. shall not be liable under this article to warrant failures of warranted parts caused by the use of a non-exempted add-on or modified part.
11. The Executive Officer may request and, in such case, Mitsubishi Heavy Industries, Ltd. shall provide, any documents which describe that Mitsubishi Heavy Industries, Ltd.'s warranty procedures or policies.

D. Warranted parts list.
1. Fuel metering system.
   A. Fuel injection system.
   B. Air/fuel ratio feedback and control system.
   C. Cold start enrichment system.
2. Air induction system
   A. Controlled hot air intake system.

⚠ 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.

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

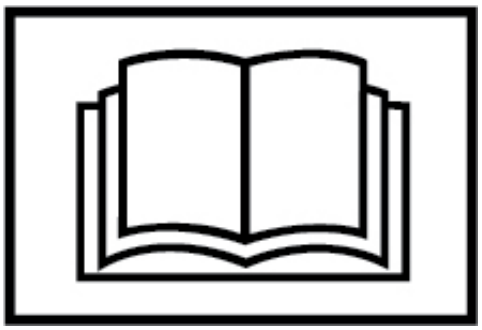
The following safety signs are on your machine as a guide for your safety and for the safety of those working with you. Walk around the machine and note the content and the location of all safety signs before you operate your machine.

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

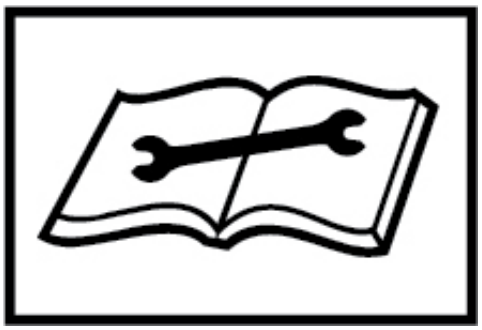
NOTICE: *do not use solvent, gasoline, or other harsh chemicals. Solvents, gasoline, and other harsh chemicals may damage or remove safety signs.*

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.

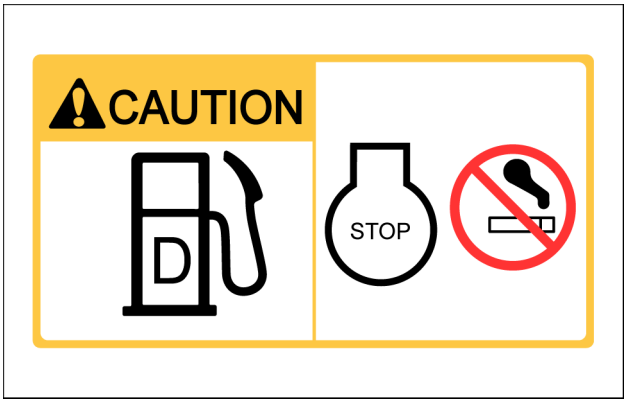


(14) Fuel tank

⚠ 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



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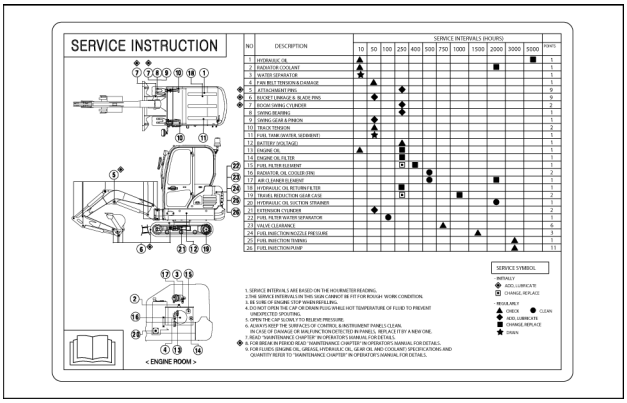
Location: this sign is located on the left-hand side of the machine, below the fuel filler neck.

Quantity: 1

Part number: 91MJ-01140

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.

(15) Service instructions



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Canopy location: this sign is located the behind the operator's seat, on the canopy structure.

Cab location: this sign is located on interior side of the cab door.

Quantity: 1

Part number (for canopy version): 97MJ-10730

Part number (for cab version): 97MJ-10750

This sign describes the service locations and the service intervals.

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

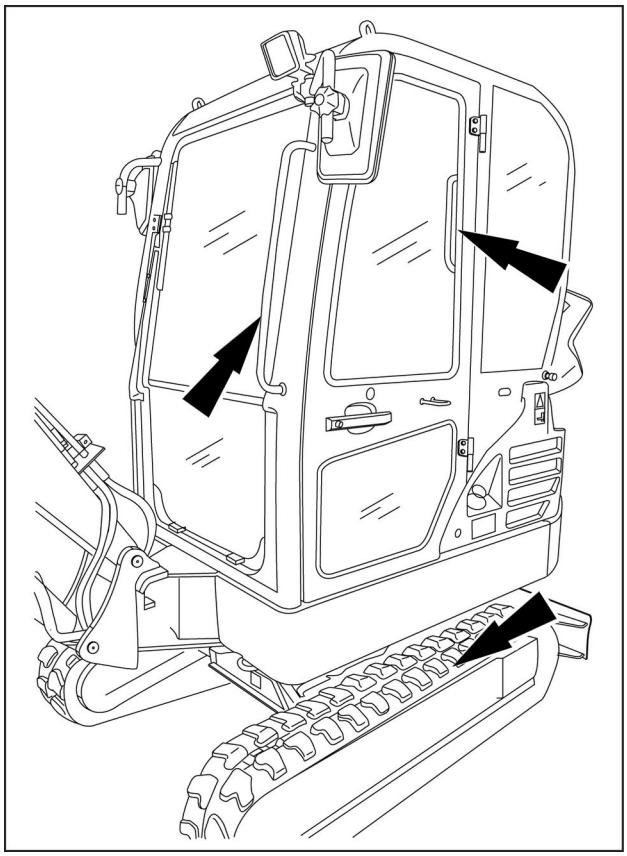
Fall hazard!
When entering or exiting the cab, never use the control levers as handholds. Always mount and dismount the machine in a safe way. Maintain a three-point contact with steps, ladders, and/or handholds.
Failure to comply could result in death or serious injury.

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



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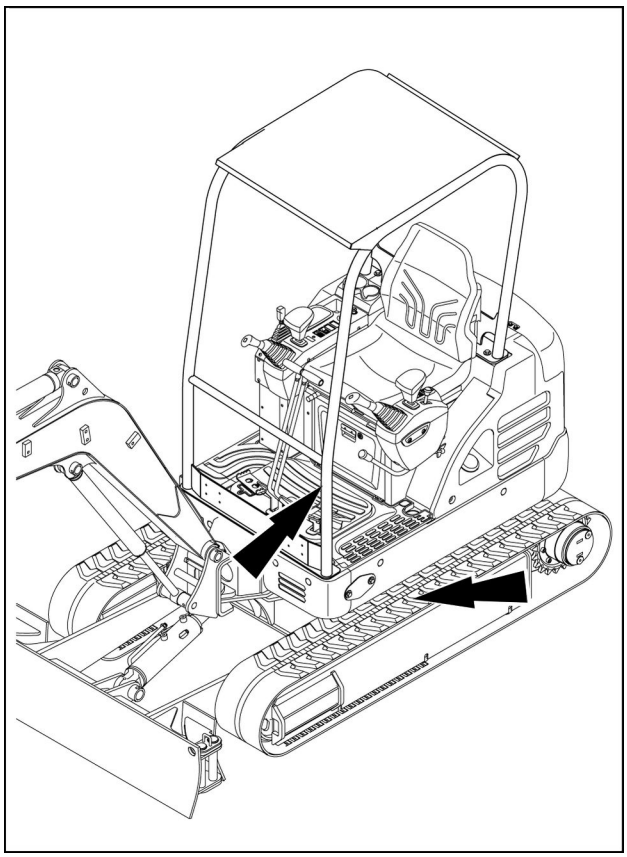

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Windshield

⚠ 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

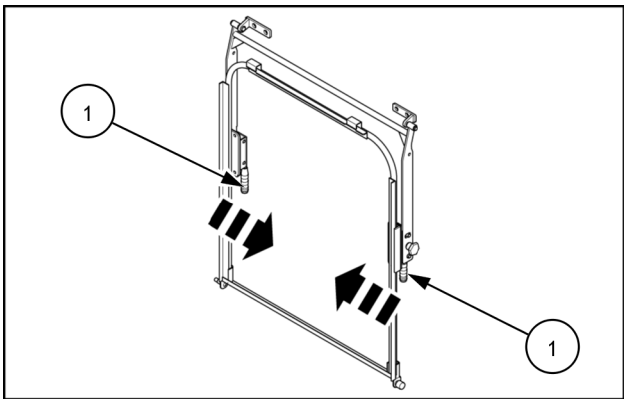
Opening

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.



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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.

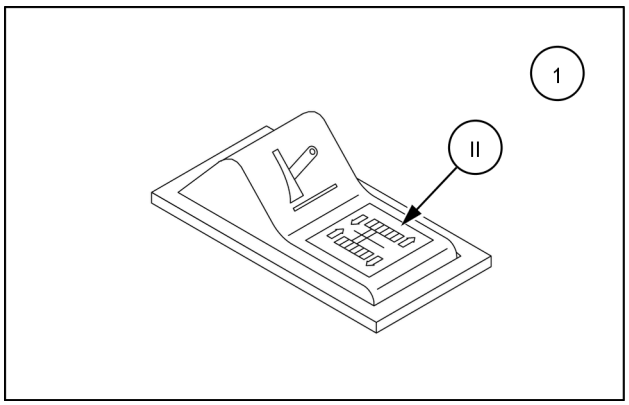
Hold both grips **(1)** and push the windshield downward.

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

To operate the tracks widening frame, the operator must select the position **(II)** of the switch **(1)** and proceed as follows:

- push the dozer blade control lever forward **(A)** to extend the crawler tracks.
- push the dozer blade control lever rearward **(B)** to retract the crawler tracks.

NOTICE: *it is recommended to operate the machine with crawler tracks wide to improve the machine stability during the operation. The narrower crawler tracks width only when the work site space is limited.*



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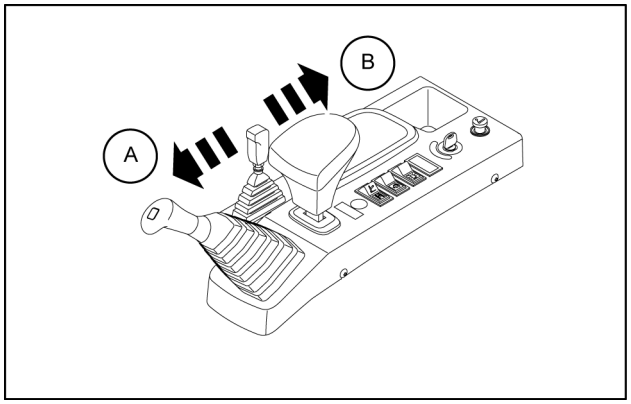

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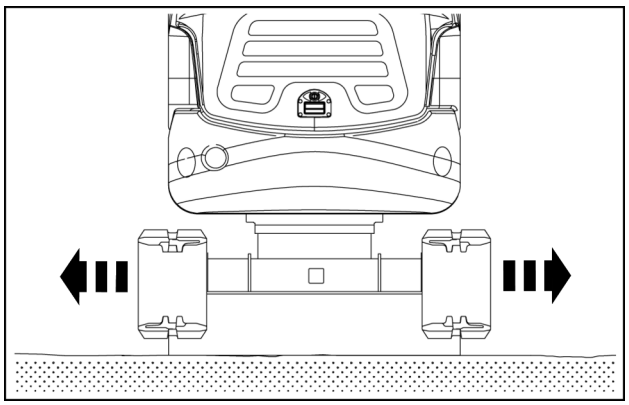

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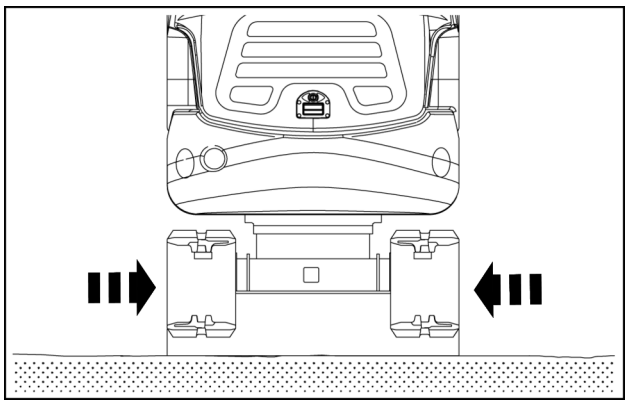

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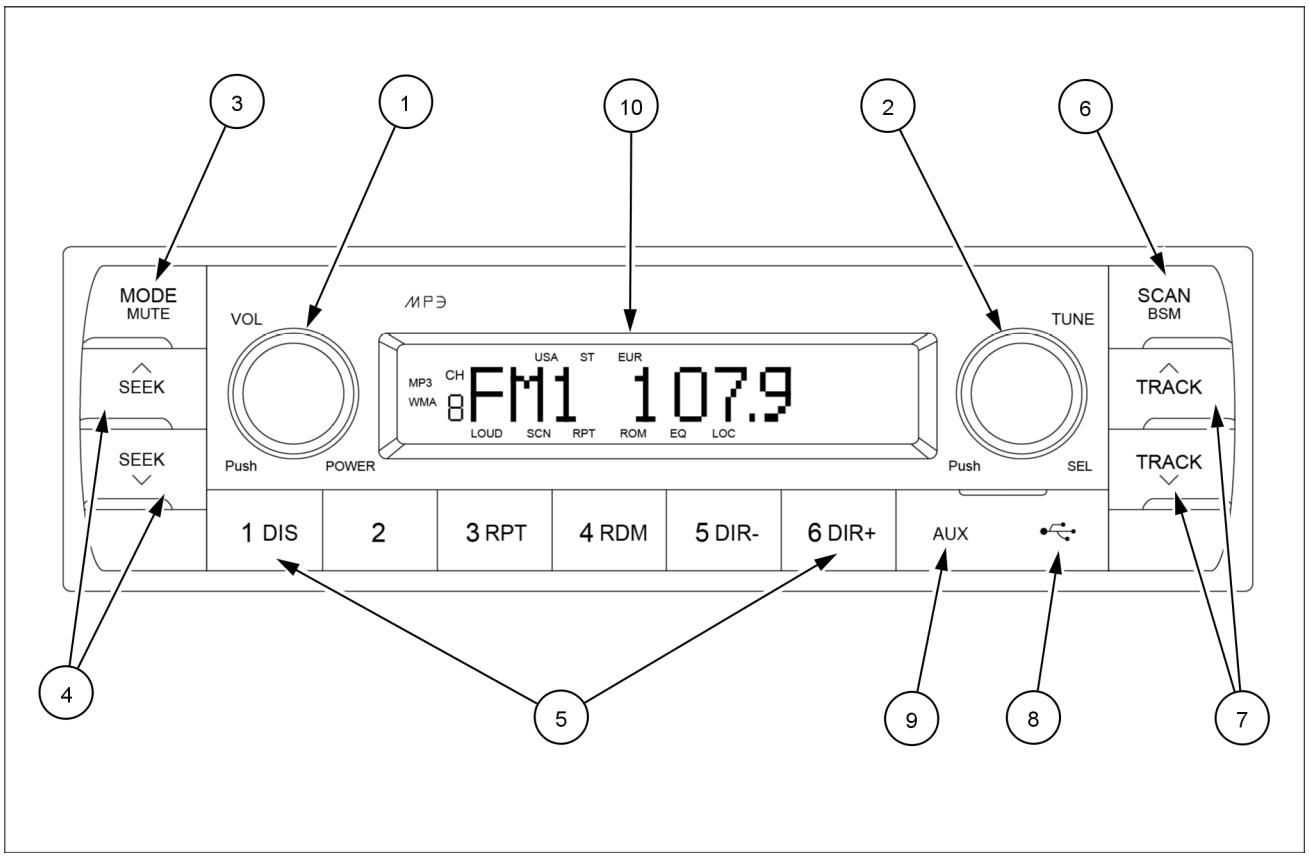
Radio



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(1) Power and volume knob

(2) Audio selection knob, file search and (SEL) button

(3) MODE button / Audio mute / Radio button

(4) UP/DOWN radio seek buttons

(5) Pre-set memory buttons

(6) Pre-set scan (SCAN) / Best Station Memory (BSM) button

(7) UP/DOWN track buttons

(8) USB function

(9) Auxiliary (AUX IN) function

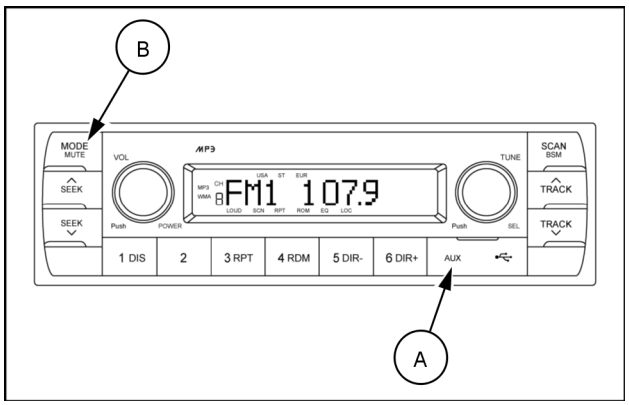
(10) Liquid Crystal Display (LCD) screen

(9) Auxiliary function (AUX IN)

If you want to listen to music from an external audio device, open the cover **(A)** of the AUX IN function, connect the external audio device using the AUX cable **3,5 mm** an push the MODE button **(B)** to switch the AUX IN 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 IN mode.



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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).

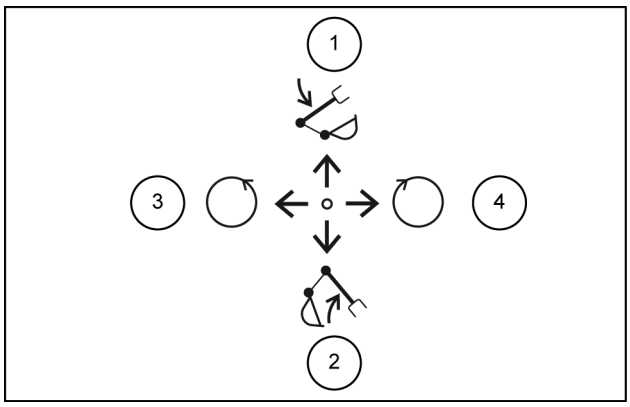
If any of the following occurs during the warm-up procedure, stop the engine immediately.

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

Pattern: SAE type

Left–hand control lever control function

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



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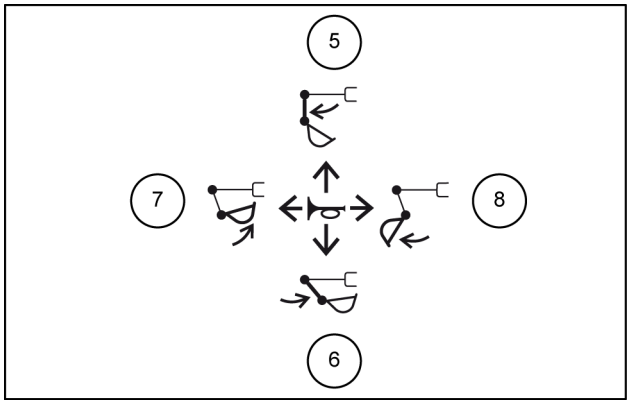
Right–hand control lever control function

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



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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.

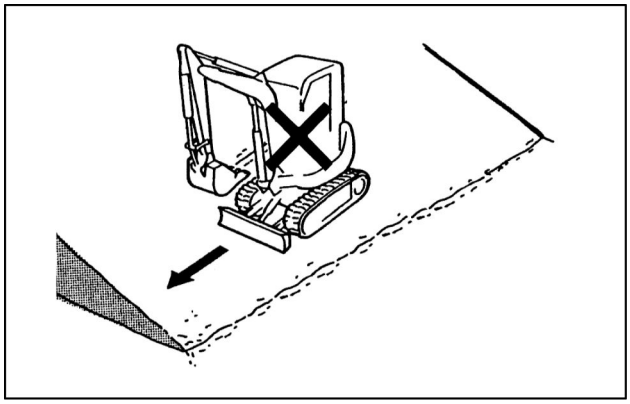
Always travel with the undercarriage oriented along the slope, never across. Never travel along a slope steeper than **10°**.

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.*



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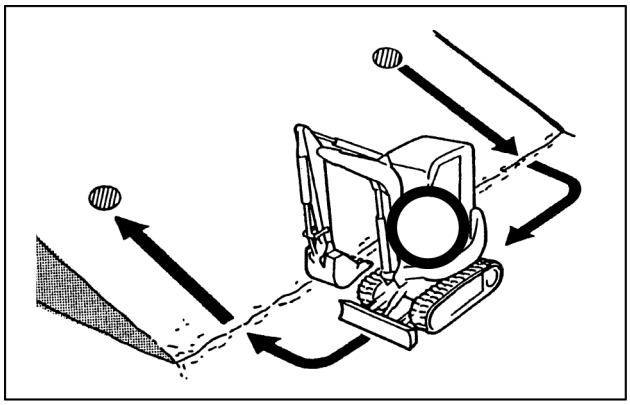

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For uphill and downhill travel, approach the slope as outlined in the pictures.

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.

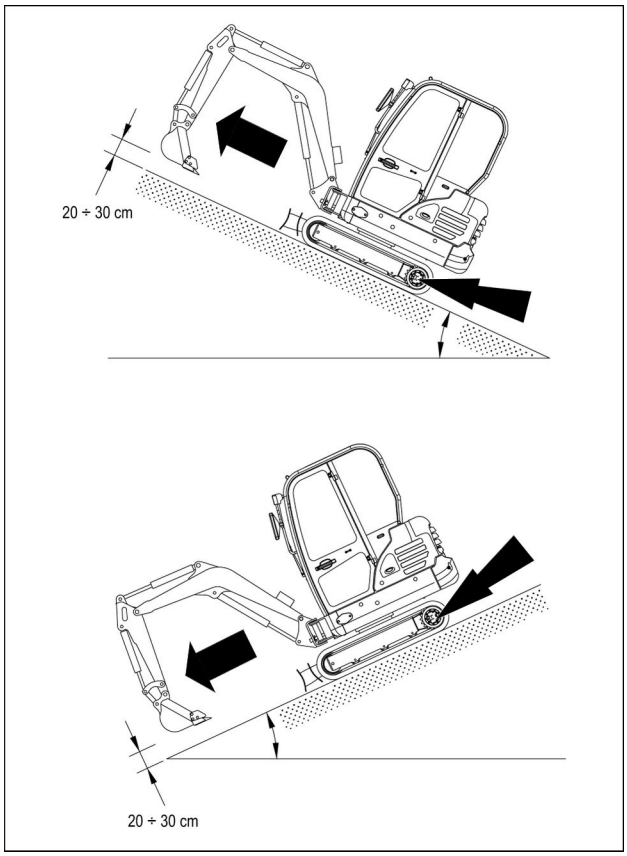
The upper-structure shall be aligned to the undercarriage, and shall be oriented in order to grant straight visibility to the direction of travel.

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.



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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.

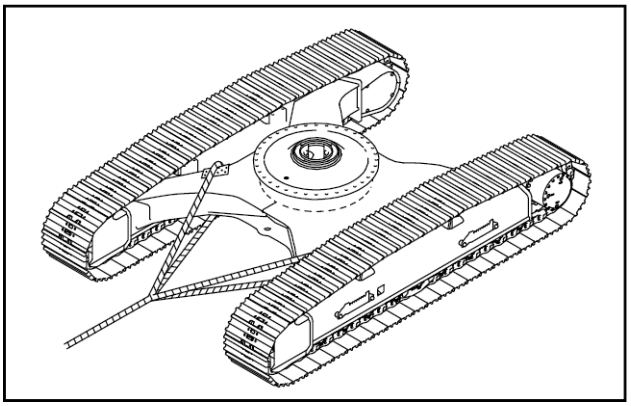
W0259A

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

Fuel

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

For North America only: use only No. 2-D Ultra-Low Sulfur 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 sulfur 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.

Break-in period

Fuel filter

Replace the fuel filter after the first **250 h** of service.

To replace the fuel filter perform the operations described on page **6-50**.

Travel reduction gears

Replace the travel reduction gears oil after the first **250 h**.

To replace the travel reduction gears oil perform the operations described on page **6-56**.

Grease points (Bucket)

Lubricate the bucket linkage (arm-bucket connection and arm-bucket link connection) and the bucket cylinder pin (rod side) every **10 h** within the first **50 h**, then lubricate every **50 h**.

Lubricate the bucket cylinder pin (head side) every **10 h** within the first **100 h**, then lubricate every **250 h**.

To lubricate the bucket linkage and the bucket cylinder pin (rod side) refer to page **6-26**.

To lubricate the bucket cylinder pin (head side) refer to page **6-44**.

Grease points (Boom and arm)

Lubricate the boom connection pin, the boom cylinder pins, the arm cylinder pins, the arm connection pin, and the boom swing post every **10 h** within the first **100 h**.

To lubricate the boom connection pin, the boom cylinder pins, the arm cylinder pins, the arm connection pin, and the boom swing post refer to page **6-44**.

Grease points (Blade)

Grease the dozer blade cylinder (head and rod) and the lower frame connecting points with the dozer blade every **10 h** within the first **50 h**.

To grease the dozer blade cylinder (head and rod) and the lower frame connecting points with the dozer blade refer to page **6-27**.

Grease points (Boom swing cylinder)

Grease the boom swing cylinder every **10 h** within the first **50 h**.

To grease the boom swing cylinder, refer to page **6-46**.

Track tension

⚠ WARNING

Tip-over hazard!
Only raise the track as little as necessary.
Failure to comply could result in death or serious injury.

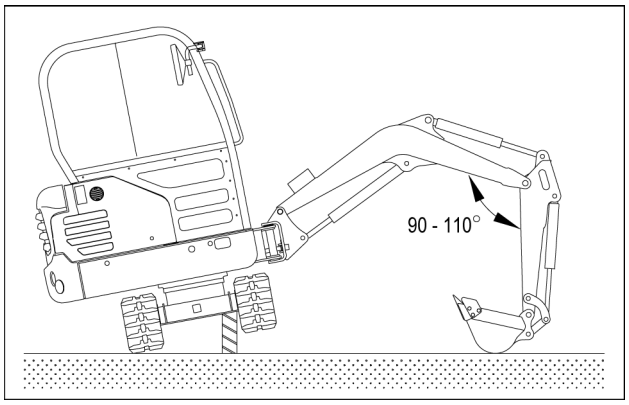
W0276A

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 they 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:

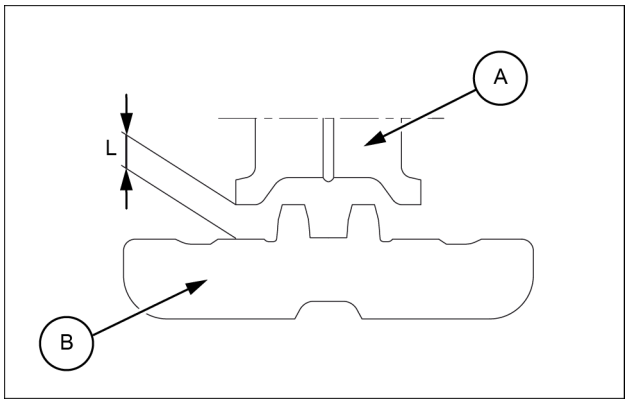
1. Swing the upper structure perpendicular to the undercarriage. Lower the attachment to the ground, then lower the boom until the track is raised off the ground. Place a block under the undercarriage and raise the attachment off the ground.
2. Set the engine speed lever to the maximum speed position.
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.



SMIL20MEX0394AA 1

Checking the tension

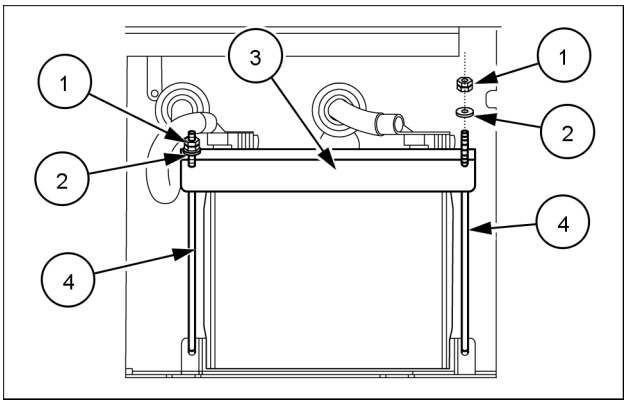
1. Stop the engine, then remove the key from the starter switch.
2. At the center of the track, measure the slack **(L)** between the bottom of the lower roller **(A)** and the rubber track shoe **(B)**.



SMIL16MEX0423AB 2

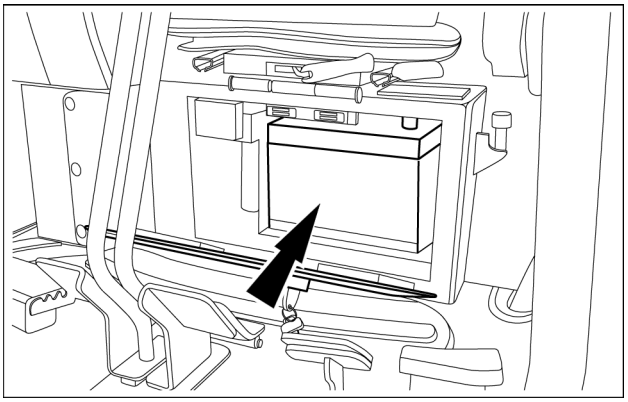
3. the value of the slack must be within **5 – 10 mm** (**0.2 – 0.4 in**).
4. Adjust the tension as necessary, then lower the track to the ground.
5. Repeat the same operations for the other track.

3. Remove the two nuts **(1)**, the two washers **(2)** and then slide out the battery cover **(3)** from the two rods **(4)**.



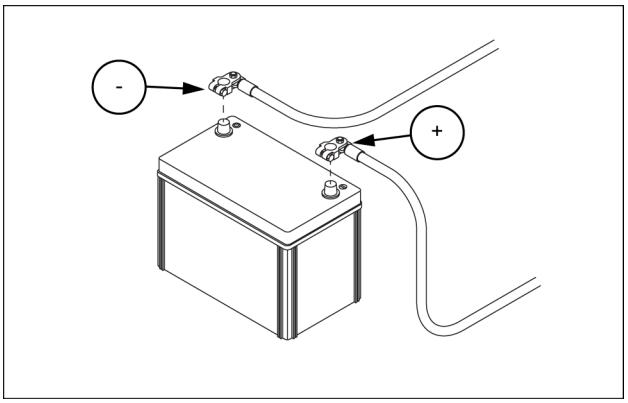
SMIL20MEX0129AA 2

4. Take out the battery from the battery compartment.
5. Disconnect the negative-terminal cable **(-)**. Next, disconnect the positive-terminal cable **(+)**.



SMIL20MEX0128AA 3

6. Wash the terminal with hot water, and apply grease to the terminals after washing.
7. Connect the positive **(+)** and the negative **(-)** cable to the positive and the negative terminal of the battery respectively.



SMIL16MEX2595AB 4

Tightening torques

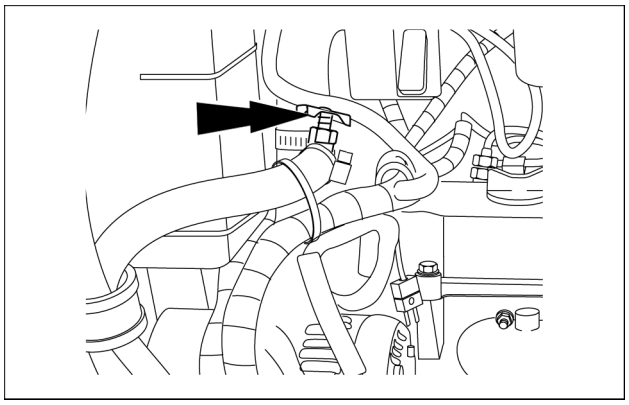
Check the tightening torques every **250 h** (after the break-in period).

Component	Bolt size	Tightening torque
Engine mounting bolt (engine bracket)	M10 × 1.25	**54.4 – 81.6 N·m** (**40.1 – 60.2 lb ft**)
Engine mounting bolt (bracket frame)	M12 × 1.75	**96.8 – 145.2 N·m** (**71.4 – 107.1 lb ft**)
Main pump	M12 × 1.75	**122.4 – 165.6 N·m** (**90.3 – 122.1 lb ft**)
Hydraulic swivel	M10 × 1.5	**54.4 – 81.6 N·m** (**40.1 – 60.2 lb ft**)
Swing motor	M12 × 1.75	**96.8 – 145.2 N·m** (**71.4 – 107.1 lb ft**)
Swing bearing (upper)	M12 × 1.75	**96.1 – 155.0 N·m** (**70.9 – 114.3 lb ft**)
Swing bearing (lower)	M12 × 1.75	**96.1 – 155.0 N·m** (**70.9 – 114.3 lb ft**)
Travel motor	M10 × 1.5	**64.8 – 97.2 N·m** (**47.8 – 71.7 lb ft**)
Sprocket	M10 × 1.5	**60.8 – 74.5 N·m** (**44.8 – 54.9 lb ft**)
Counterweight	M16 × 2.0	**247.3 – 334.7 N·m** (**182.4 – 246.9 lb ft**)
Operator’s seat	M8 × 1.25	**20 – 30 N·m** (**14.8 – 22.1 lb ft**)

5. Open the valve heater.
6. Drain the engine coolant by opening the drain plug. Use a wrench **17 mm**.
7. Tighten the drain plug to **18 – 22 N·m** (**13 – 16 lb ft**)

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.*

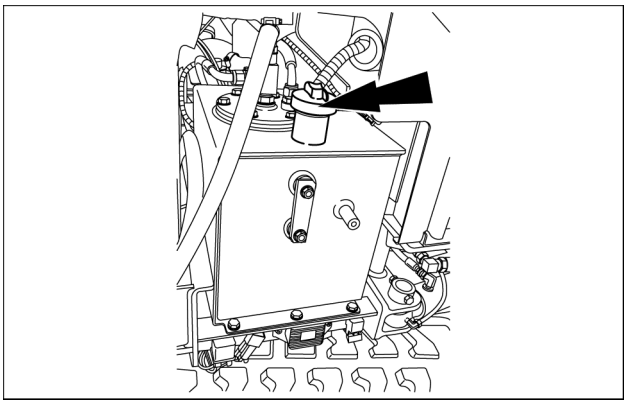
NOTE: *drained coolant should be disposed of by the specified method.*



SMIL20MEX0117AA 3

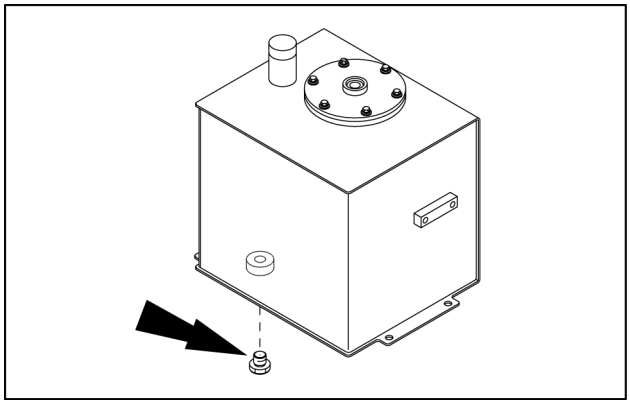
8. Before refill proceed to flushing the system.

4. Loosen the filling cap of the hydraulic oil tank.



SMIL20MEX0123AA 2

5. Place a container with a capacity of **25 L** (**6.6 US gal**) under the drain plug. Loosen the drain plug located on the bottom of the hydraulic oil tank.
6. When the hydraulic oil is drained, clean the hydraulic oil suction filter, refer to page **6-61**.
7. Install the drain plug.
8. Add new hydraulic oil to the tank.
9. Tighten the filling cap on the hydraulic oil tank.
10. 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.
11. Tighten the air bleed plug on the hydraulic pump.
12. Start the engine, and run it with no load for about **5 min**.
13. Move each control several times to remove all air from the system.
14. Park the machine at the specified position, and then stop the engine.
15. Check the oil level of the hydraulic tank, refill it with oil as necessary. Check that there are no bubbles in the hydraulic tank.
16. Loosen the air bleed plug on the pump, and check that air free fluid comes out from the bleed port.
17. Install the right-hand side panel **(C)** by tightening the three bolts **(A)**,the nut **(B)** then unlock and close the engine access door.



SMIL17MEX0028AA 3

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

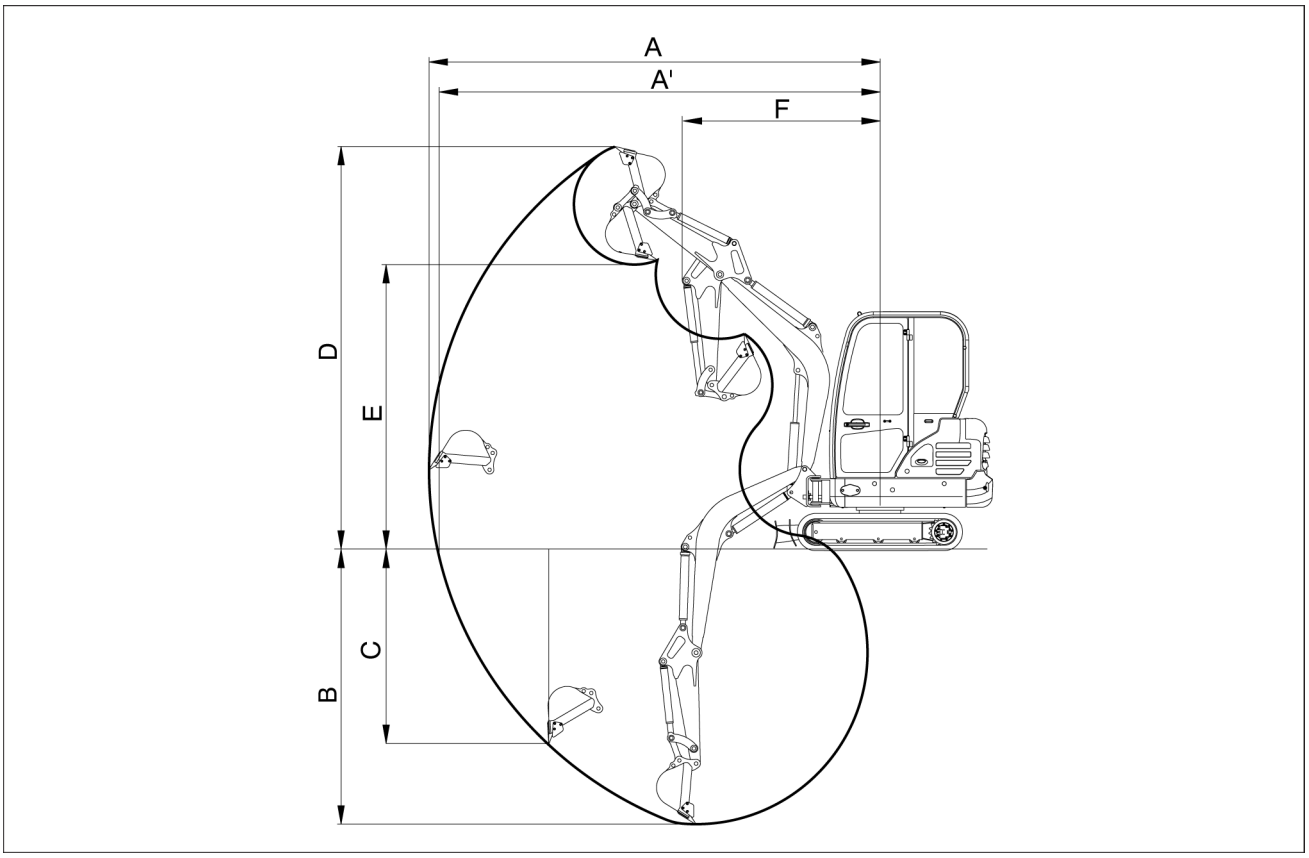
Inhalation hazard! Risk to operators and bystanders.
Avoid running the engine in confined areas. Make sure there is adequate ventilation at all times.
Failure to comply could result in death or serious injury.

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. Remove the "Do not operate" label, and start the engine following the engine starting procedure.
13. 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.*

Working range



SMIL20MEX0042FA 3

(A) Maximum digging reach		**3960 mm** (**156 in**)
(A') Maximum digging reach on ground		**3870 mm** (**152 in**)
(B) Maximum digging depth		**2245 mm** (**88 in**)
(C) Maximum vertical wall digging depth		**1775 mm** (**70.3 in**)
(D) Maximum digging height		**3675 mm** (**145 in**)
(E) Maximum dumping height		**2575 mm** (**101 in**)
(F) Minimum swing radius		**1660 mm** (**65 in**)
Boom swing radius (left-hand/right-hand)		**60°** / **60°**
Bucket digging force	SAE	**13.1 kN** (**2945.0 lb**)
	ISO	**15.1 kN** (**3394.6 lb**)
Arm crowd force	SAE	**9 kN** (**2023.3 lb**)
	ISO	**9.4 kN** (**2113.2 lb**)

Boom length: **1.8 m** (**70.9 in**)
Arm length: **0.96 m** (**37.8 in**)
With boom swing post