

ORIGINAL INSTRUCTIONS - according to Directive 2006/42/EC, Annex I 1.7.4.1

OPERATOR'S MANUAL

E16B

E18B

Mini Excavator

Part number 47883508

1st edition English

May 2015

Replaces part number 47530812



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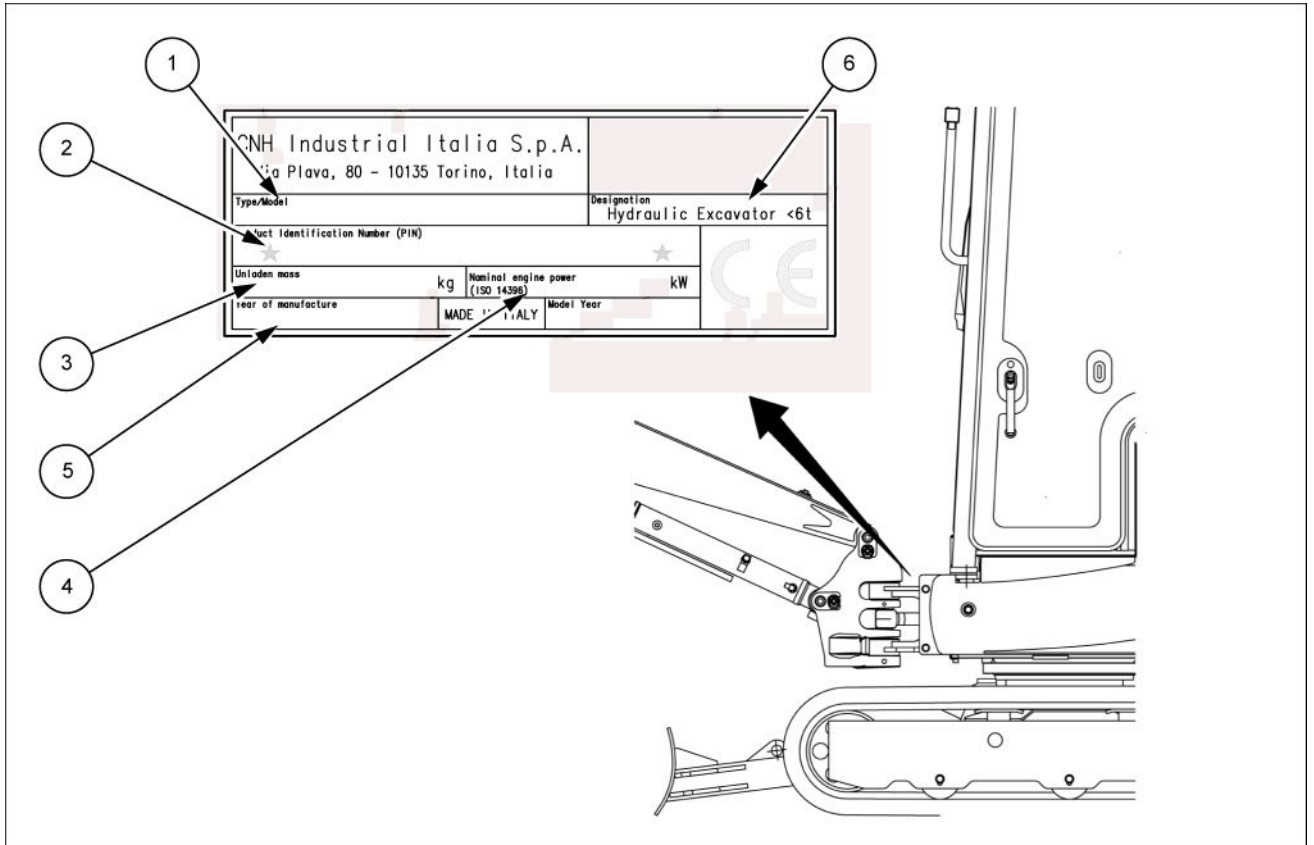
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Product identification

Machine identification plate

1. Commercial name
2. Product identification number
3. Operating mass
4. Engine power (ISO 14396)
5. Year of construction
6. Machine category (Hydraulic excavator <6t)



SMIL15MEX0004FB 1

Before you leave the machine:

1. Park the machine on a firm, level surface.
2. Rest the bucket to the ground.

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.

General transportation safety

Comply with local laws and regulations.

Use appropriate lighting to meet local regulations.

Use safety chains for trailed equipment when safety chains are provided with machine or equipment.

Lift implements and attachments high enough above ground to prevent accidental contact with road.

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

3. Put all controls in neutral position.
4. Place the safety lever in LOCK position.
5. Turn off the engine and remove the key.

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.

When you transport equipment or a machine on a transport trailer, make sure that it is properly secured.

Be aware of overhead structures or power lines and make sure that the machine and/or attachments can pass safely under.

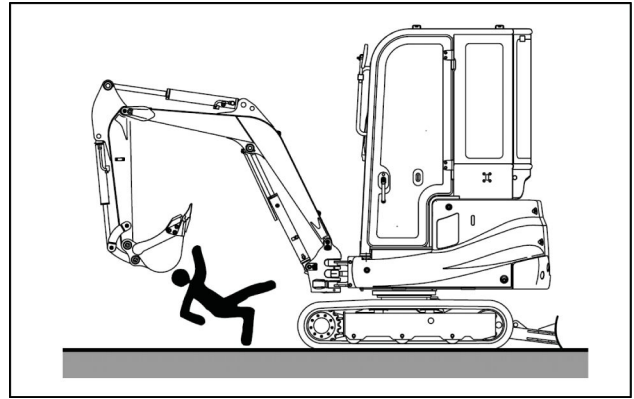
Travel speed should be such that you maintain complete control and machine stability at all times.

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.

⚠ Passengers ⚠

This equipment is not intended or designed for the transportation of persons. Nobody is allowed on the machine except for the driver. Serious injury or death can result from allowing passengers on or in the machine.

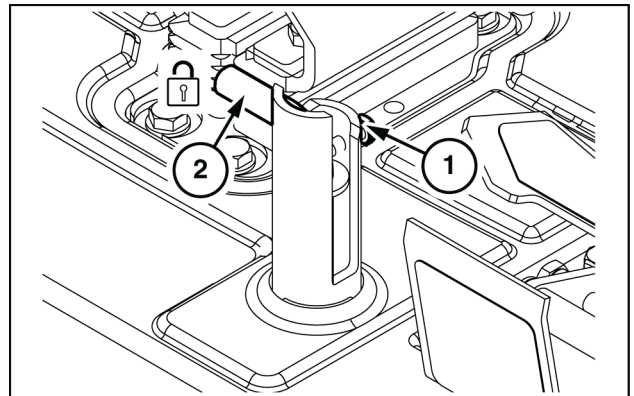


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⚠ Engine start-up ⚠

Start engine from the operator's seat. Do not short circuit the starter with the battery to start. This may cause serious injury or damage to the electrical system.

Make sure to fully tighten the screw (1), in order to prevent unintentionally operating the slewing lock pin (2).

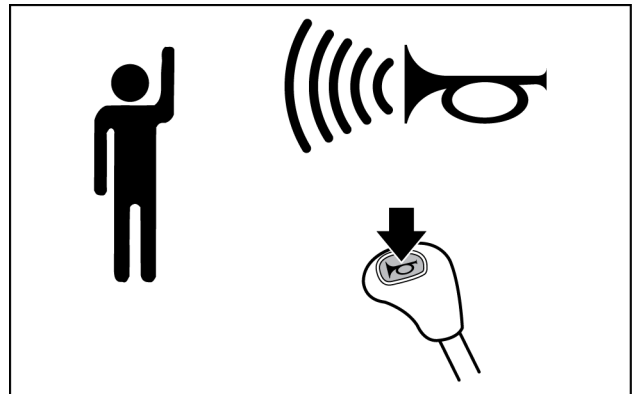


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⚠ Sound the horn when the engine is started ⚠

Sound the horn before starting the engine to alert people the machine is being started. Make sure no one is near the machine.

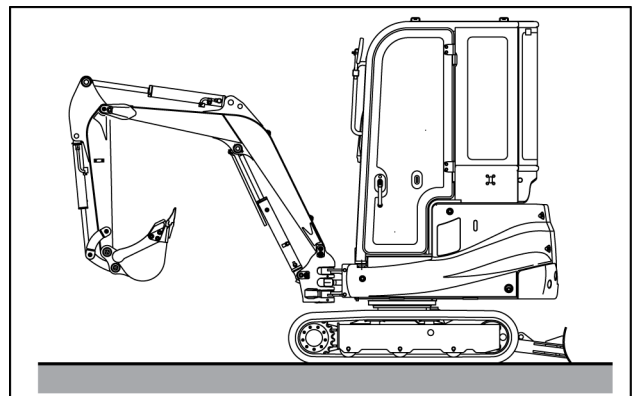
NOTICE: Do not start the engine if a "maintenance in progress" tag has been hung.



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⚠ Check after the engine start ⚠

Be sure to check machine for proper operation after the engine start. Slowly cycle attachments, swing, and travel functions in an area with sufficient space, without obstacles, and personnel. Failure to do so could result in injury or machine damage. Make note of any abnormalities and repair as needed.

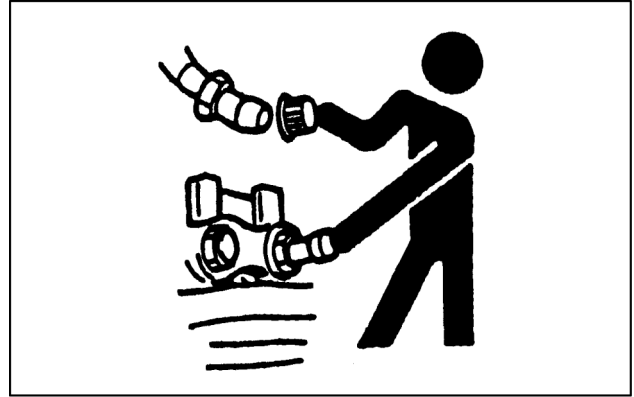


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⚠ Prevent contamination ⚠

Always cap or plug lines when hydraulic components are removed, to help prevent hydraulic system contamination caused by dirt, dust or foreign bodies entering the system.

NOTICE: Never allow an hydraulic line or component to become contaminated by polluting agents. This could cause severe system damages. Contact your dealer to obtain spare parts to be used on this machine.

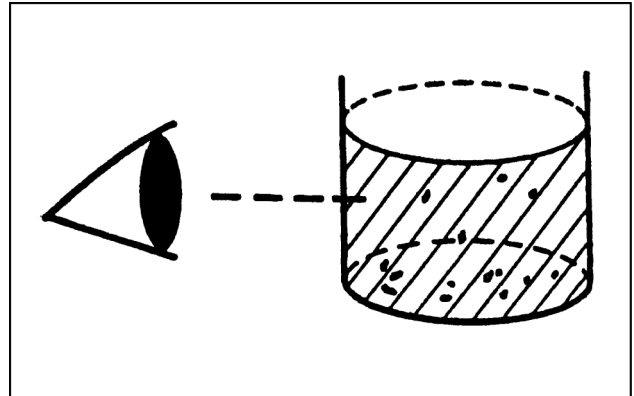


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⚠ Inspect waste oils and filters ⚠

Check all waste oils and filters for debris and foreign matters.

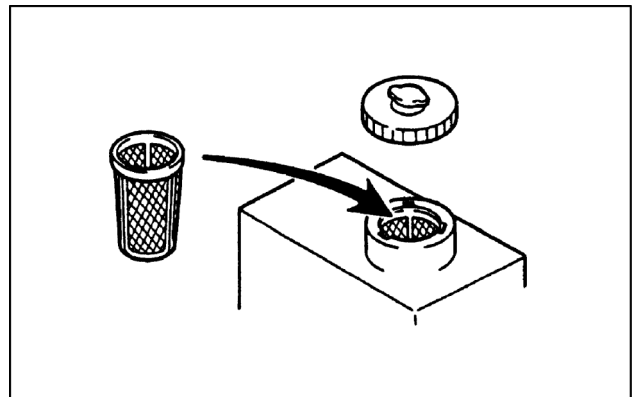
It is recommended to cut the oil filters to detect possible traces.



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⚠ Caution while refuelling ⚠

During the refilling of fuel or oil, avoid to remove possible strainers fitted in the filling ports.



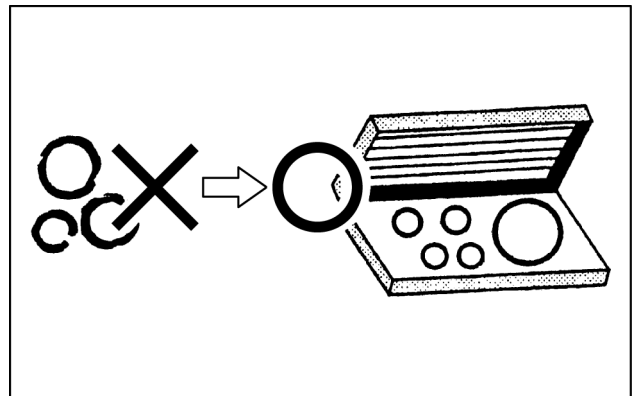
LEL11E0283AB 63

⚠ Seals and O-rings ⚠

After removing the O-ring or gasket, clean the installing face, and replace with a new one.

Always replace O-rings with new ones.

Never reuse a gasket during reassembly of components. Be sure to lubricate all new gaskets with the appropriate oil before installation.

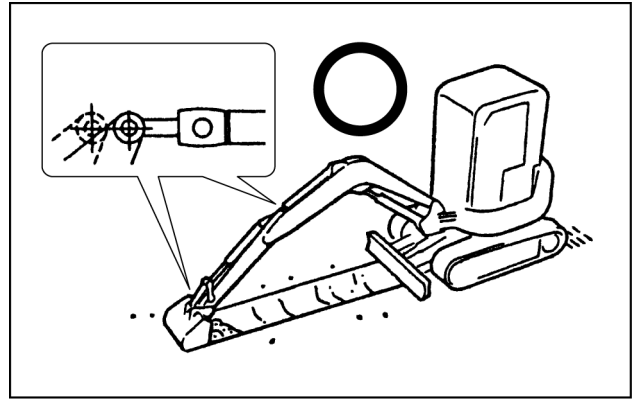


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⚠ Do not operate bucket and arm cylinders to stroke end repeatedly ⚠

If bucket and arm cylinders are forcibly driven to stroke end, to clean debris from the bucket, this will cause the vibration of the bucket cylinders and consequently their damaging.

Use high pressure water or manually remove stuck material from the bucket.



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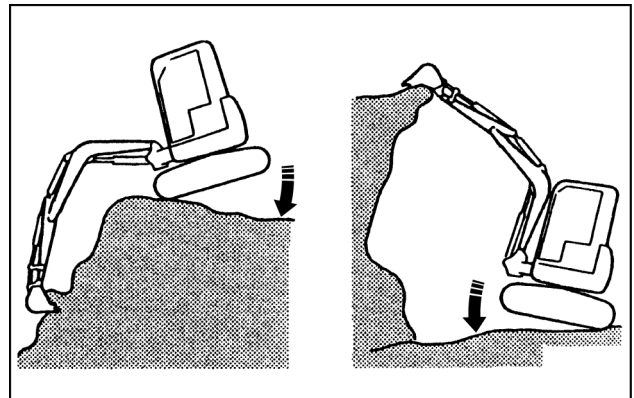
⚠ Do not over exert the machine ⚠

Know the limitations of the machine and its attachments and operate the machine within those specifications.

Do not exceed the values specified in the carrying capacity table.

Never tip or raise the machine to obtain power to move material.

This could cause extensive damage to the machine and its components as well as result in serious bodily injury or death.

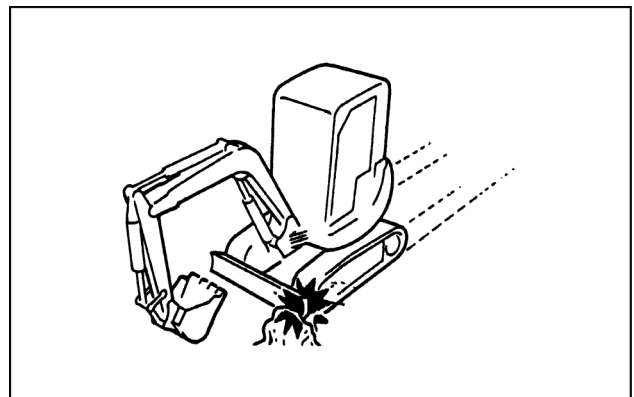


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⚠ Make sure that the dozer does not hit obstacles ⚠

Pay attention that the dozer does not hit any obstacles such as rock lumps.

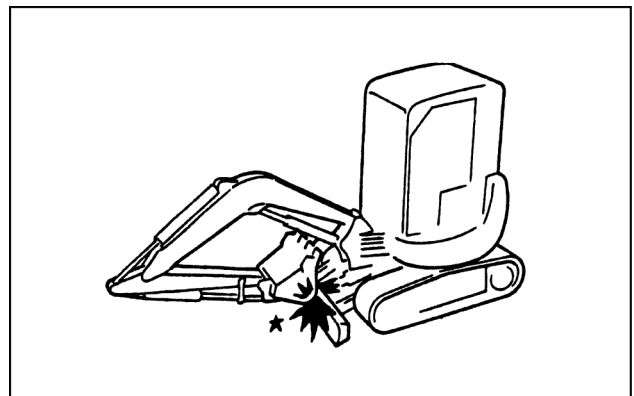
It causes damage to the dozer and cylinder.



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⚠ Be careful when retracting the attachment ⚠

When the attachment is retracted for travel or transport, pay attention that the bucket does not hit the dozer.



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Towing the machine

⚠ WARNING

Avoid injury!

When towing, do not enter the area between the machine and towing vehicle. Do not apply a shock load to the wire rope. Keep the wire rope horizontal and perpendicular to the machine frame. Tow in low speed mode.

Failure to comply could result in death or serious injury.

W1193A

Should the machine become stuck in soft soil, it may be necessary to tow it.

To tow the machine, use towing device as a metal cable or a chain and lay it out on the lower frame as pictured: use a metal cable or chain with sufficient capacity.

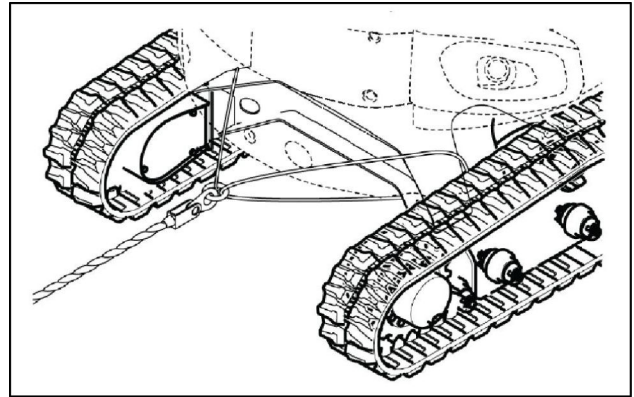
Apply pads at the corners of the lower frame to prevent both the towing device and the lower frame from being damaged.

Attach other end of towing device to the vehicle used for towing.

Operate the machine's travel lever in the proper direction while towing with the other vehicle.

NOTICE: Do not use eyes on machine lower frame to tow machine.

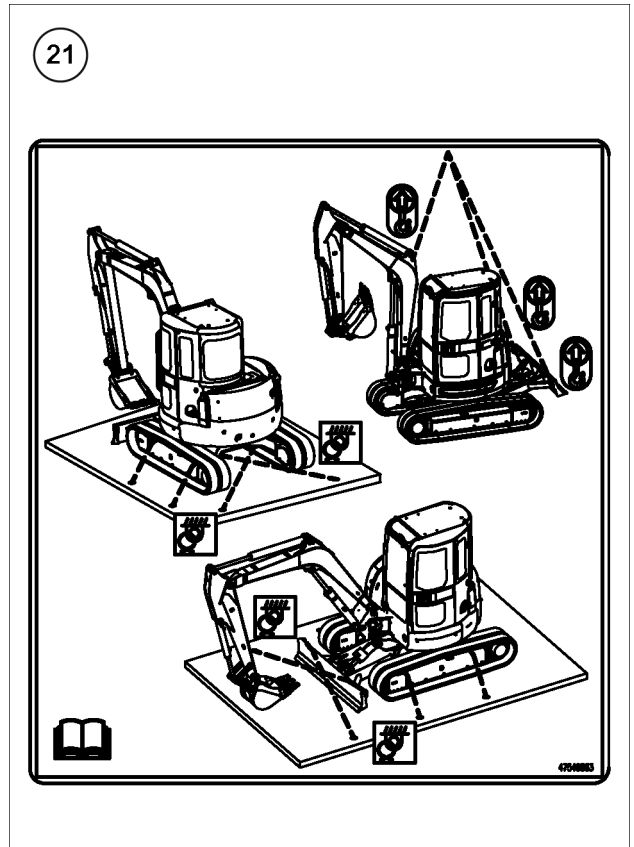
NOTE: Do not tow the machine using the brackets welded to the lower plates of the lower frame.



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Machine overall decal for lifting and lashing points

Summary/overview of fastening points (see section 5 for details).

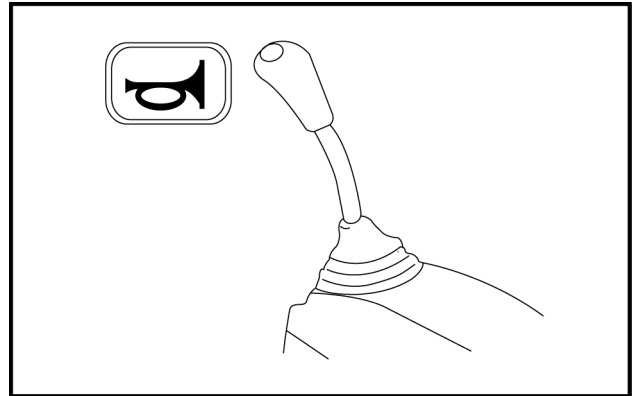


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Horn switch

Depress the symbol of this switch on top of left control lever to sound the horn.

NOTICE: Sound the horn before starting engine, traveling, slewing or operating the attachments.



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Travel control levers and pedals

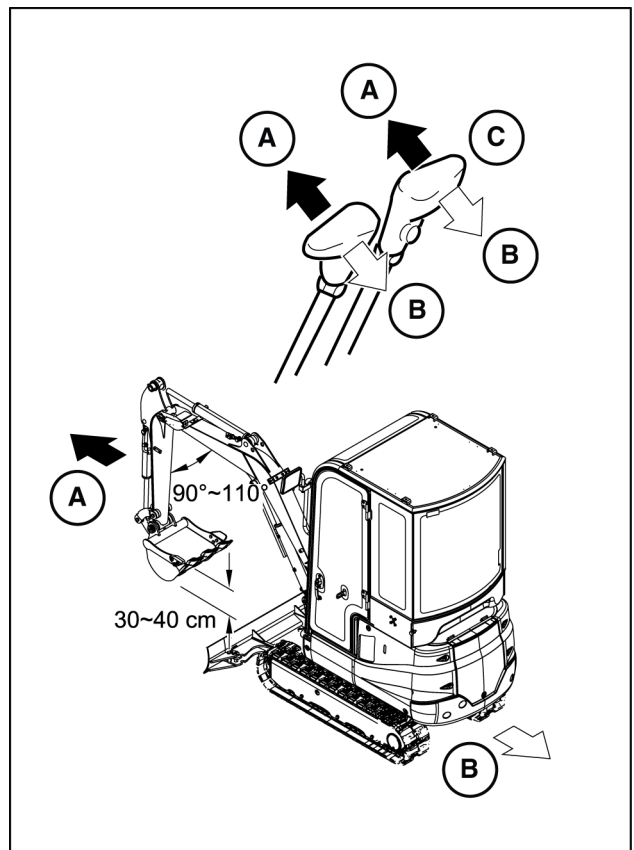
The travel control levers are located in front of the operator's seat. The travel levers are used to move forward and backward the left or right machine crawler.

NOTICE: Use caution to avoid coming in contact with other machines while travelling. Be sure to know the location of the travel motors before operating the travel function.

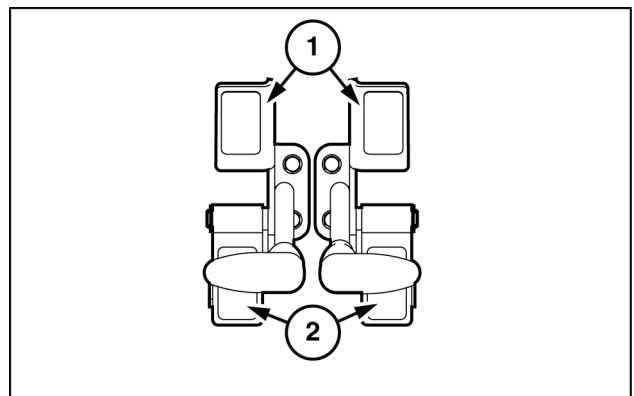
- A. To travel forward (push both control levers forward at the same time).
- B. To travel in reverse (pull both control levers back at the same time).
- C. Neutral position (release the levers to the central position to stop travel).

Travel control pedals:

1. Forward travel
2. Reverse travel



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EXTERIOR CONTROLS

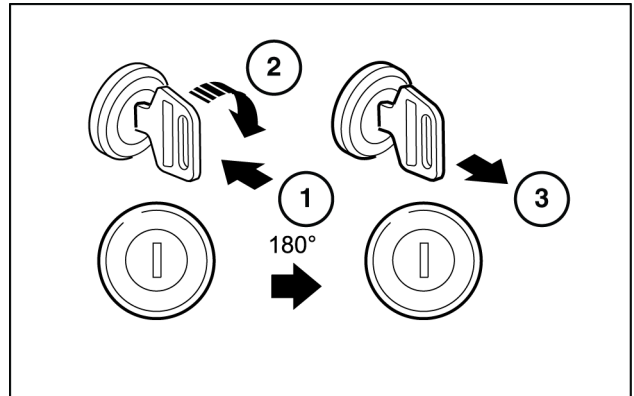
Hoods

NOTICE: Stop the engine when hood or radiator cover are open.

Locking devices are provided for the engine guards. Use the starter key to open and close engine guards.

Opening

1. Insert key in the lock.
2. After unlocking the lock, remove the key and open the engine guard (guard hinges guarantee its automatic opening).
3. Secure the engine guard in the opened position by means of the gas spring.



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Locking

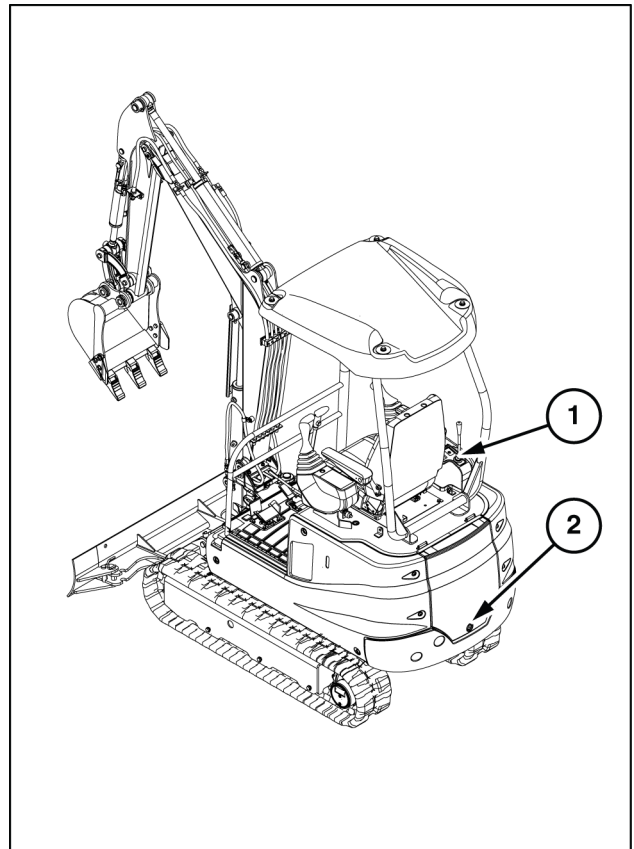
1. Set the gas spring in the rest position.
2. Close the engine guard.
3. Insert the key and turn it counterclockwise to lock the engine guard. Then remove the key.

(1): Starter key

(2): Engine guard lock

NOTE: Be sure to insert the key completely, otherwise it could get damaged.

NOTICE: While opening, make sure you are not in the opening area of the guard.

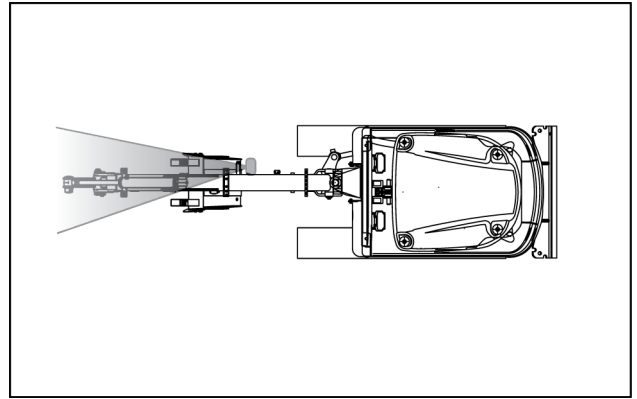


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Work lights

With the starter key in ON position, turn on the work light switch so as to check if it operates correctly.

If light does not turn on, presumably the bulb is burnt out or an electric fault is occurred.



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PARKING THE UNIT

Parking the machine

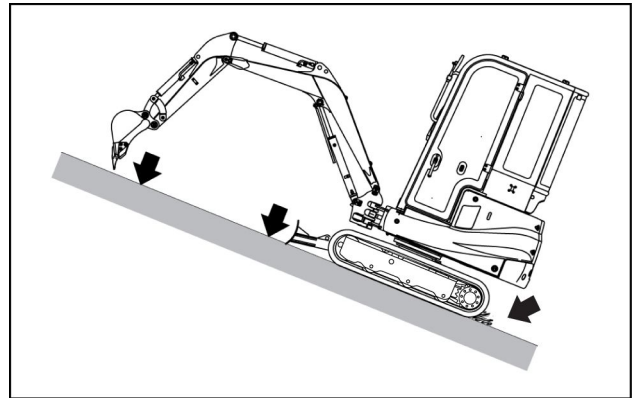
- Always park the machine on a level and firm ground, with the attachment and the dozer positioned on the front side of the machine.
- Avoid parking on a slope. When parking on a slope is unavoidable, make sure the bucket teeth are stuck in the ground, lower the dozer to the ground and properly block the crawlers with wedges.
- Stopping the engine.
- Turn the starter key to off and remove it.
- Make sure that the safety lever is in locked position to prevent any unexpected machine movement.

NOTICE: Do not shut off the engine when running at full speed, but let it run idle for some minutes to cool it down.

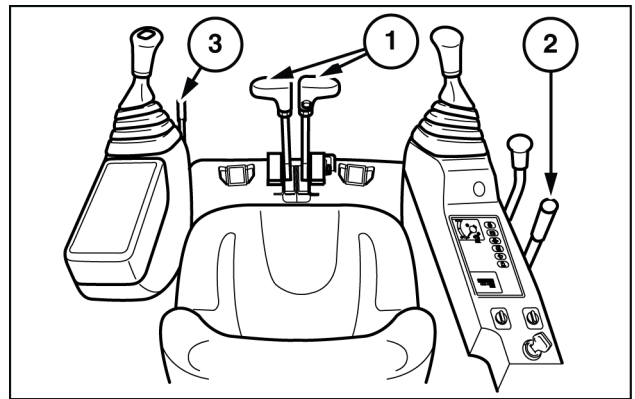
- Move both travel control levers (1) to the neutral position.
- Set the throttle lever (2) to LOW IDLING.
- Lower the bucket to the ground.
- Place the dozer on the ground.
- Block both crawlers by means of chocks.
- Stop the engine by turning the starter key to OFF.

NOTICE: Do not shut off the engine when running at full speed, but let it run idle for some minutes to cool it down.

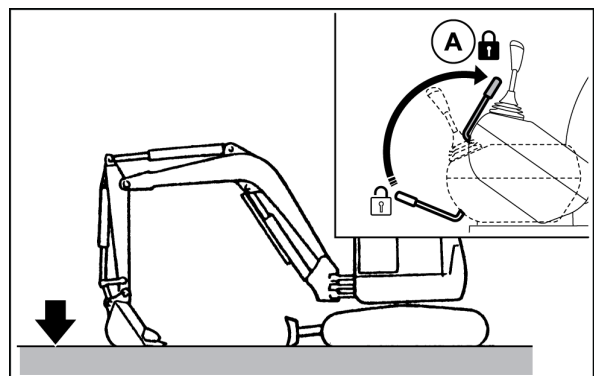
- Set the safety lever (3) to the LOCK position (A).



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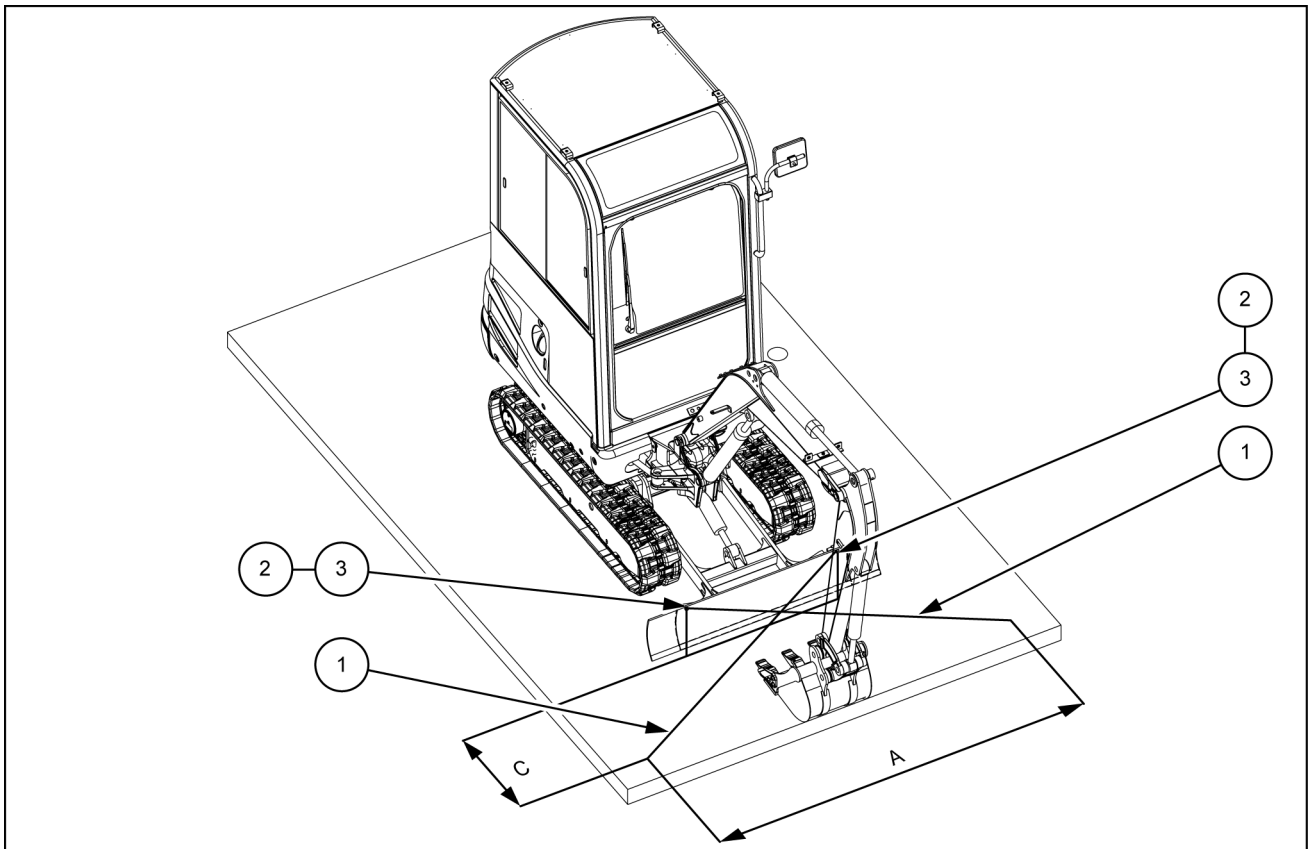


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2 — Front and rear fastening (E18B models)

1. Install two securing tools (1) to the installation holes at the top ends of blade (3). See lashing points decals on the blade.
2. Protect the securing tools (1) against edges with pads (2).
3. Use securing tools (1) having a Lashing Capacity of at least **300 daN (674 lbf)**.

Fastening distance A		Fastening distance C	
MIN	MAX	MIN	MAX
2100 mm (83 in)	2200 mm (87 in)	670 mm (26 in)	1070 mm (42 in)



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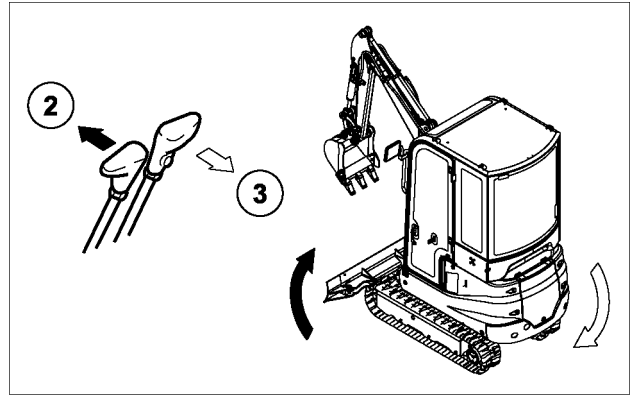


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Clockwise rotation

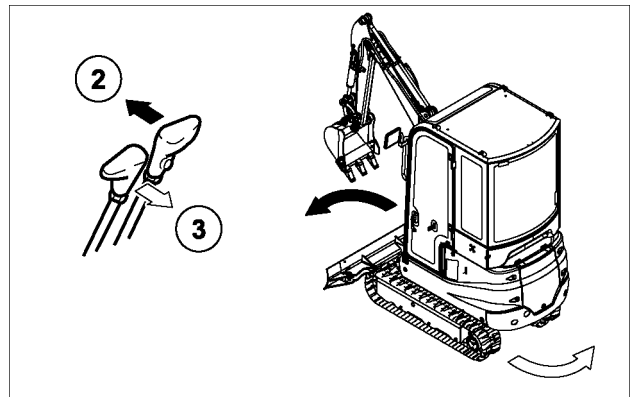
- Push the left travel lever forward (2) and at the same time the right travel lever backward (3).



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Anti-clockwise rotation

- Push the right travel lever forward (2) and at the same time pull the left travel lever backward (3).

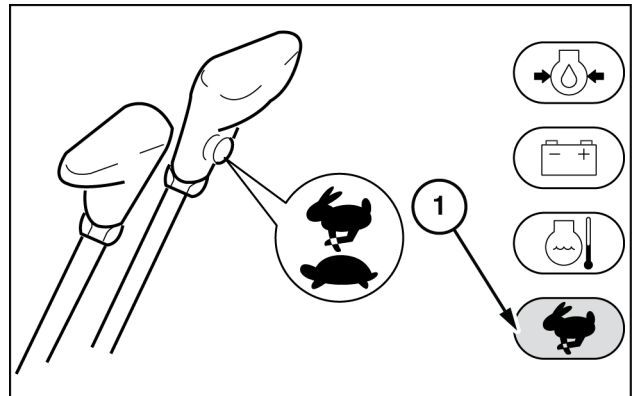


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Shifting from one travel speed to the other

- For a HIGH  travel speed (2nd gear), press and release the relevant switch on the grip of the right travel lever. The hare indicator (1) on the instrument panel turns on.
- Start the machine by operating the travel levers.
- To return to SLOW  travel speed (1st gear), stop travelling, press and release the relevant switch.

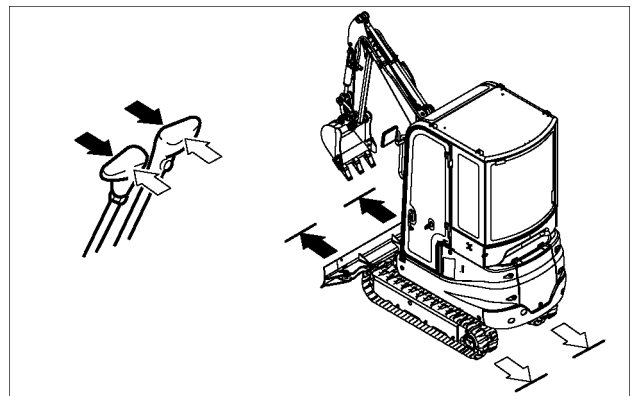
NOTE: The travel speed is always reset to SLOW each time the starter key is turned to OFF .



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Stop travelling

- Move the left and right travel control levers to the NEUTRAL position to stop machine travel.
- Avoid stopping the machine travel suddenly. Stop the machine travel as slowly as possible.



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Practices to improve efficiency

- Slewing the upper structure on a slope may cause the machine's overturning. On a slope, it is very dangerous to slew the upper structure downhill with full bucket. Prepare a level area for the machine to operate safely.
- Make sure the rotation area is clear of persons and obstacles before operating the engine.

NOTE: The optional attachments offer a wider range of application other than the showed ones.

Digging instructions

Use mainly the mere arm force for digging. Use the full bucket rotation travel to fill it completely. Setting the bucket too deep will decrease the machine's efficiency.

Maximum digging force position

The attachment will provide maximum digging force when arm and boom are positioned at **90° - 110°** from each other. Operate slowly to get maximum digging force.

Bucket teeth direction

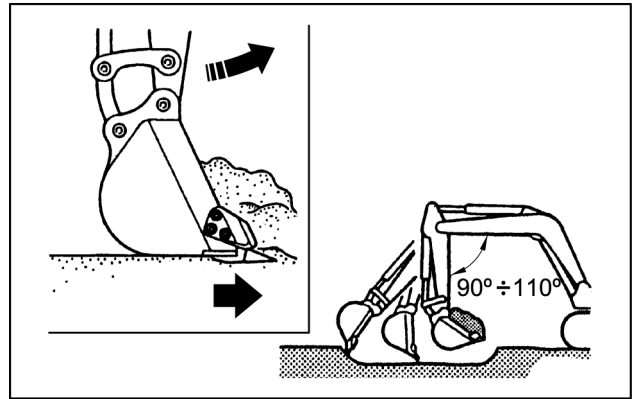
Direct bucket teeth parallel to digging direction. The bucket must be used for shallow diggings, so as to reduce the resistance and avoid damaging the teeth.

Operate boom carefully

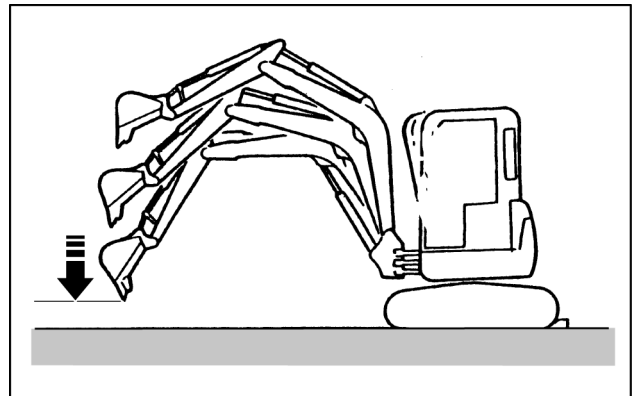
Activate boom operation by moving the control levers carefully. Do not perform sudden starts and stops of the boom as this creates unnecessary stress on the machine and its components.

Clean sand and soil from bucket

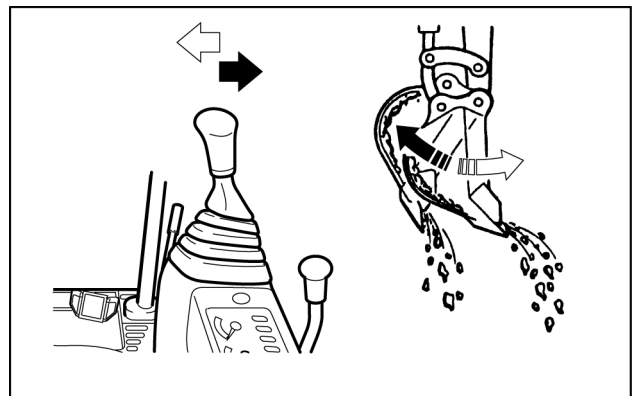
Place the arm in horizontal position and bring the bucket to the dumping position. If sand and soil do not fall out, move the bucket lever right and left a few times to remove soil stuck to the bucket.



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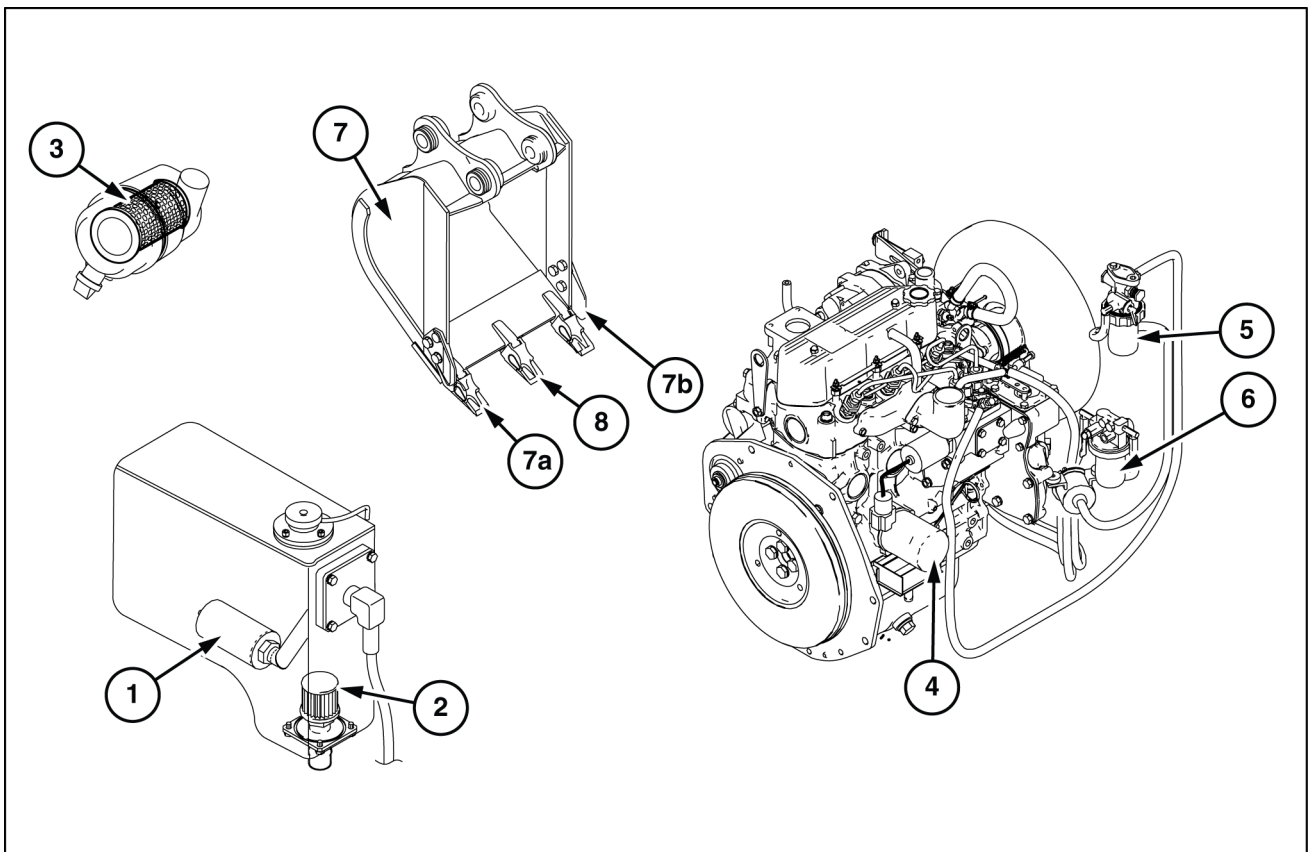
- Frequently check all mounting hardware for proper tightness. Torque to proper value to aid in preventing salt from entering the machine systems.

Operation in Humid Climate

- In climates with high humidity, thoroughly wash the machine daily and coat all bare surfaces with an oil based lubricant to help prevent corrosion.

Maintenance parts

During maintenance, replace parts subjected to wear before expiry, as filters and cartridges. The machine operates more efficiently if worn parts are replaced with new parts.



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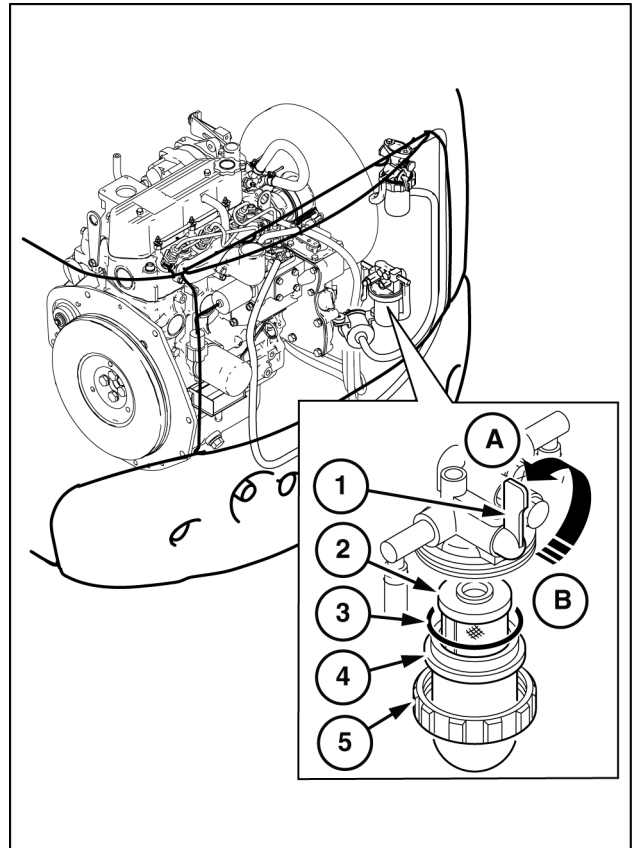
No.	Device	Parts name	Qty.	Replacement interval
1	Hydraulic oil tank	Return filter (O-ring)	1	After 50 h (first change) Every 500 h (from 2 nd change) (Breaker specification: Every 200 h)
2	Hydraulic oil tank	Suction strainer (O-ring)	1	Every 2000 h
3	Air filter	Filter element	1	Every 500 h
4	Engine oil filter	Cartridge	1	After 50 h (first change) Every 250 h
5	Fuel filter	Cartridge (O-ring)	1	Every 250 h
6	Water separator	Cartridge (O-ring)	1	Every 500 h
7	Bucket	Side cutter (right) (7a)	1	When required
		Side cutter (left) (7b)	1	
		Screw	6	
		Nut	6	
8	Bucket	Tooth	3	When required
		Safety pin	3	
		Rubber locking pin	3	

Separator filter draining

NOTICE: Wipe off fuel on any parts of machine. Do not use gasoline to clean filter elements. Dispose of waste fuel promptly in accordance with government environmental regulation.

To drain the water separator filter, proceed as follows:

1. Clean around the water separator filter.
2. Place a drip pan under the water separator filter.
3. Place the cock (1) to the (A) (closed) position to stop fuel flow.
4. Remove the ring nut (5) and the body (4).
5. Drain the cup (4) and clean the element (2) with fuel.
6. Paying attention to the O-ring (3), install the body (4) with the filter element (2) and secure it with the ring nut (5).
7. Bleed the water separator filter.
8. Place the cock (1) in the (B) (open) position, and operate the engine at idling speed for several minutes.
9. Check water separator filter for leakage. If leakage is found, loosen ring nut (5) and check O-ring (3) for damage.



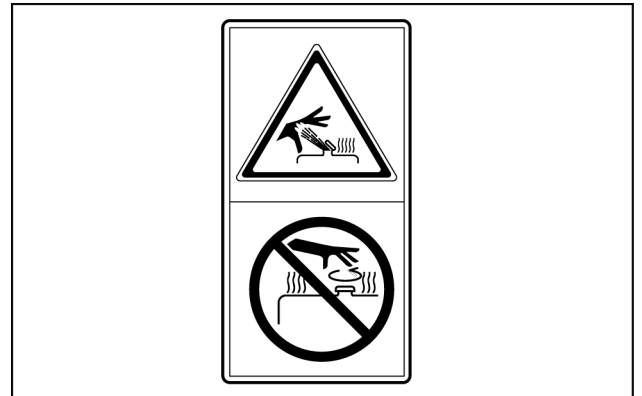
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7 - MAINTENANCE

No.	Greasing points	Qty.
1	Dozer cylinder rod pin	1
2	Dozer cylinder bottom pin	1
3	Dozer fastening pins	1
4	Boom foot pin	1
5	Boom cylinder foot pin	1
6	Boom cylinder rod pin	1
7	Arm cylinder foot pin	1
8	Arm cylinder rod pin	1
9	Boom/arm connecting pin	2
10	Bucket cylinder foot pin	1
11	Bucket cylinder rod pin	1
12	Slewing cylinder foot pin	1
13	Slewing cylinder rod pin	1
14	Support slewing pin	2

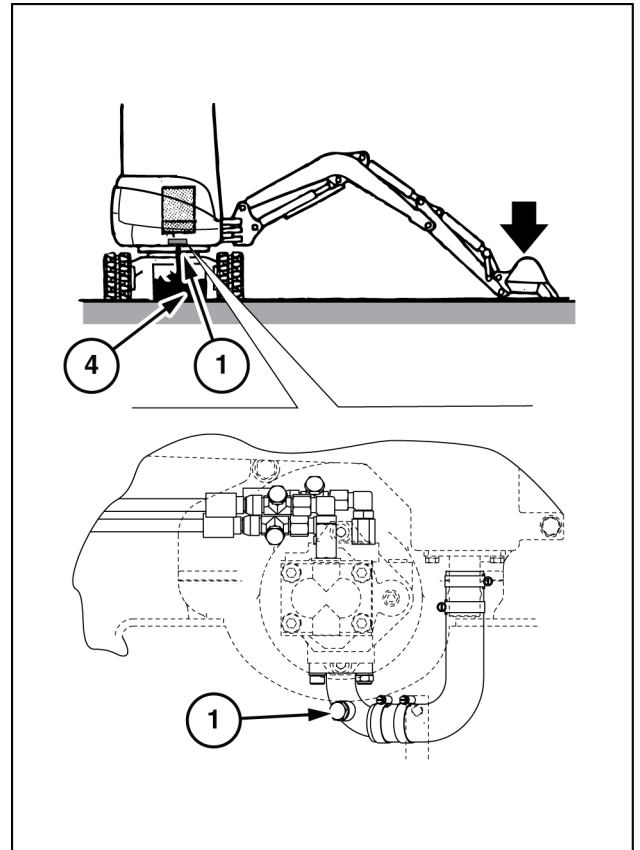
Radiator hoses

Replacing the hoses before any problems occur is both economical and good maintenance practice. This will reduce costs and minimize unexpected interruption of working. Replace an old and damaged hose immediately. In this way troubles are avoided. Carefully inspect the sleeves for integrity and sealing (replace if necessary) and tighten possibly loose straps. Check there are no leakages from the radiator, damages or accumulation of dirt.

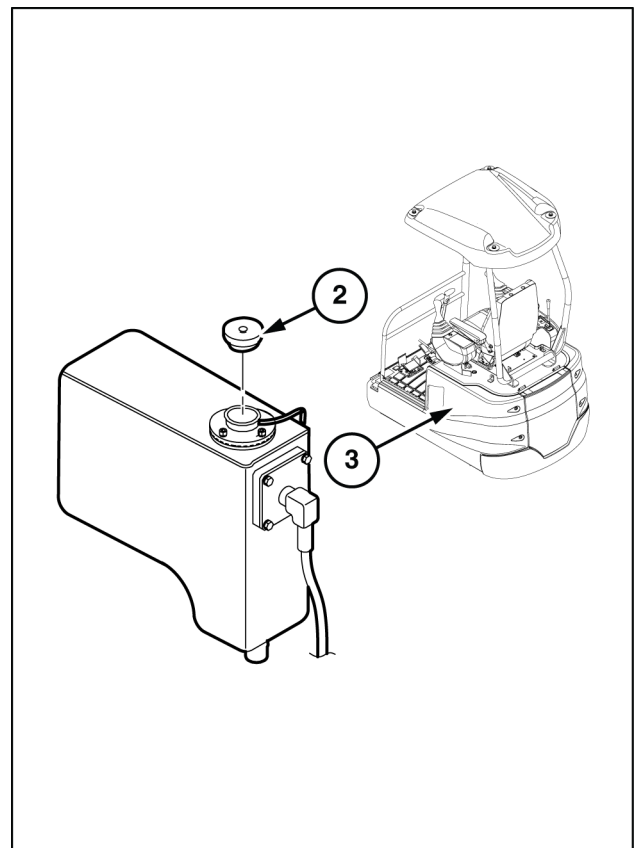


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5. Place an oil collection container (4) under the machine beneath the oil tank.
6. Remove the side guard (3).
7. Release the residual pressure from the hydraulic tank, remove the filler plug (2).
8. Loosen and remove the plug (1) and drain all oil from the tank.
9. Once the tank has been drained, reinstall the plug (1).



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TULI12E1B0178BB 4

Replacement of rubber crawler

This work must be done carefully by two people. The operator must operate the machine as instructed by the signals of the partner.

Having to carry out visual controls with the crawler in motion, remain always at an emergency distance and outside from the moving range of the machine. Whatever service to the crawlers must be carried out with the machine set up in the following way:

- Throttle lever at idle run.
- Engine shut down.
- Starter key removed.
- Safety lever in LOCKED position.

⚠ WARNING

Pressurized fluid can penetrate the skin and cause severe injuries.

The grease in the track tensioning mechanism is under high pressure. Keep face and body away from grease nipple. Never loosen the grease nipple more than one complete turn. Failure to comply could result in death or serious injury.

W0959A

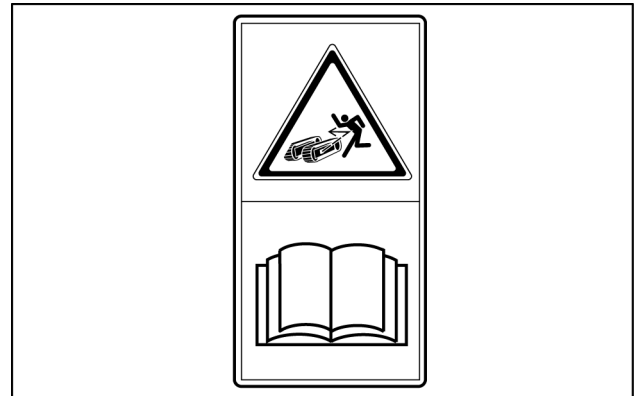
Before removing the rubber crawler, check that the grease pressure has been completely released.

Personnel must observe the instructions given in paragraph "Replacement of rubber crawler", otherwise there is a risk of injury.

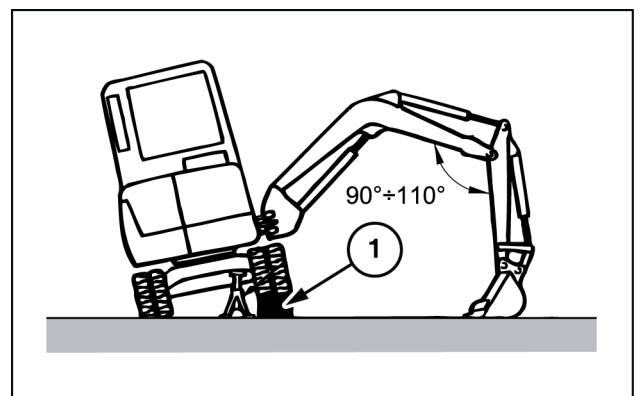
Removing of rubber crawler

Turn the upper structure by 90° and lower the bucket to lift the crawler as shown.

Keep the angle between the boom and the arm to 90° and 110° and position the round part of the bucket on the ground. Place some supports (1) under the frame to support the machine.



LEL11E0303AA 1



LEL11E0304AB 2

Side cutter replacement

⚠ WARNING

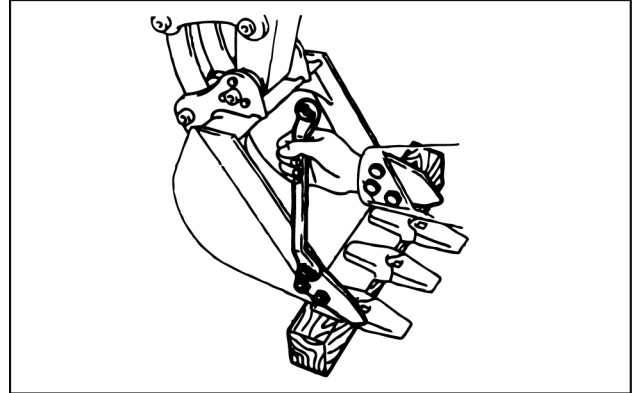
Avoid injury!

Handle all parts carefully. Do not place your hands or fingers between parts. Use Personal Protective Equipment (PPE) as indicated in this manual, including protective goggles, gloves, and safety footwear.

Failure to comply could result in death or serious injury.

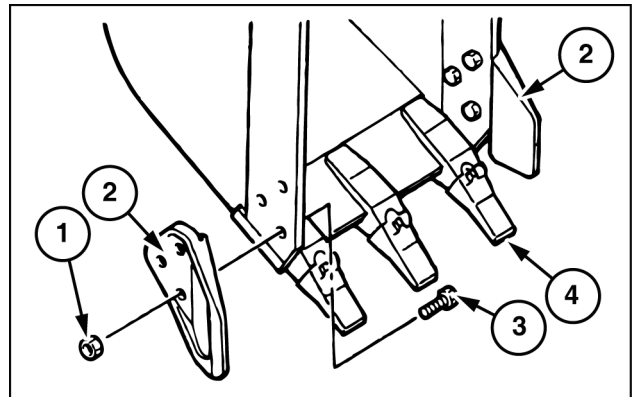
W0208A

Remove completely all sand and soil stuck on the cap screws. Use an acetylene torch to cut off the cap screws, then remove the side cutters (2). Clean the mounting face and install a new side cutter (2). When replacing the side cutter, also replace the cap screws (3) and nuts (1).



LEL11E0329AA 1

Tightening torque: **103 - 127 N·m (75.97 - 93.67 lb ft)**. After tightening the nuts (1), spot-weld them.



LEL11E0330AB 2

Hydraulic systems - Troubleshooting

Problem	Possible Cause	Correction
Temperature rise of the hydraulic oil	Oil cooler core clogged	Cleaning
	Engine fan belt slipping	Adjust or replace
	Low hydraulic oil level	Fill oil to specified level
	Wrong type hydraulic oil used	Replace with correct oil
	Hydraulic pump is not working	Repair or replace

Operating mass

Models	Versions	Operating mass ISO 6016*
E16B	Canopy	1580 kg (3483 lb)
E16B	Cab	1700 kg (3748 lb)
E18B	Canopy	1660 kg (3660 lb)
E18B	Cab	1780 kg (3924 lb)

Rubber belt	* The operating mass is measured with this configuration
Long arm	
Standard counterweight	
Big bucket (33 kg (73 lb))	
Fuel (22 kg (49 lb))	
Operator (75 kg (165 lb))	

Models	Versions	Additional mass
		Differential of long-short arm
E16B	Canopy	-10 kg (-22 lb)
E16B	Cab	-10 kg (-22 lb)
E18B	Canopy	-10 kg (-22 lb)
E18B	Cab	-10 kg (-22 lb)

Before operating hydraulic breaker

Contact your Dealer for pipings, for the installation of the hydraulic breaker and for the replacement of the hydraulic oil return filter, according to the maintenance schedule enclosed. Thoroughly read the hydraulic breaker operation manual and the safety instructions described in this manual to prevent damaging the machine or the hydraulic breaker during operation. When the hydraulic breaker is used, the excavator is subjected to working conditions more critical than usual, that speed up hydraulic oil deterioration and contamination. To avoid damaging the hydraulic system of the excavator and of the hydraulic breaker, follow maintenance procedures observing the time schedule indicated in this manual.

Prevention of hydraulic oil contamination

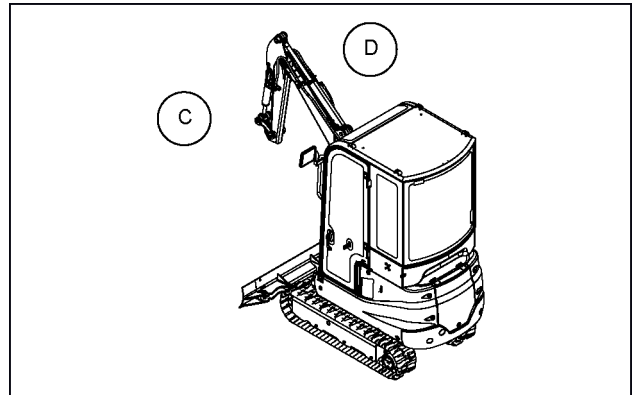
When the hydraulic breaker is not installed on the machine, apply blanking plugs on the tube ends of arm and breaker, to prevent the penetration of foreign bodies.

Before starting operation, check the fixing clamps for looseness, and the tubes and hoses fittings for leakage.

Hydraulic lines

Left side AUX hydraulic line **(C)** has to be used to supply hydraulic flow to breaker.

Right side AUX hydraulic line **(D)** has to be used for breaker free return.



SMIL13MEX0335AB 11

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