

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

OPERATOR'S MANUAL

E75CSR

Midi Excavator

Part number 47488357

1st edition English
February 2013



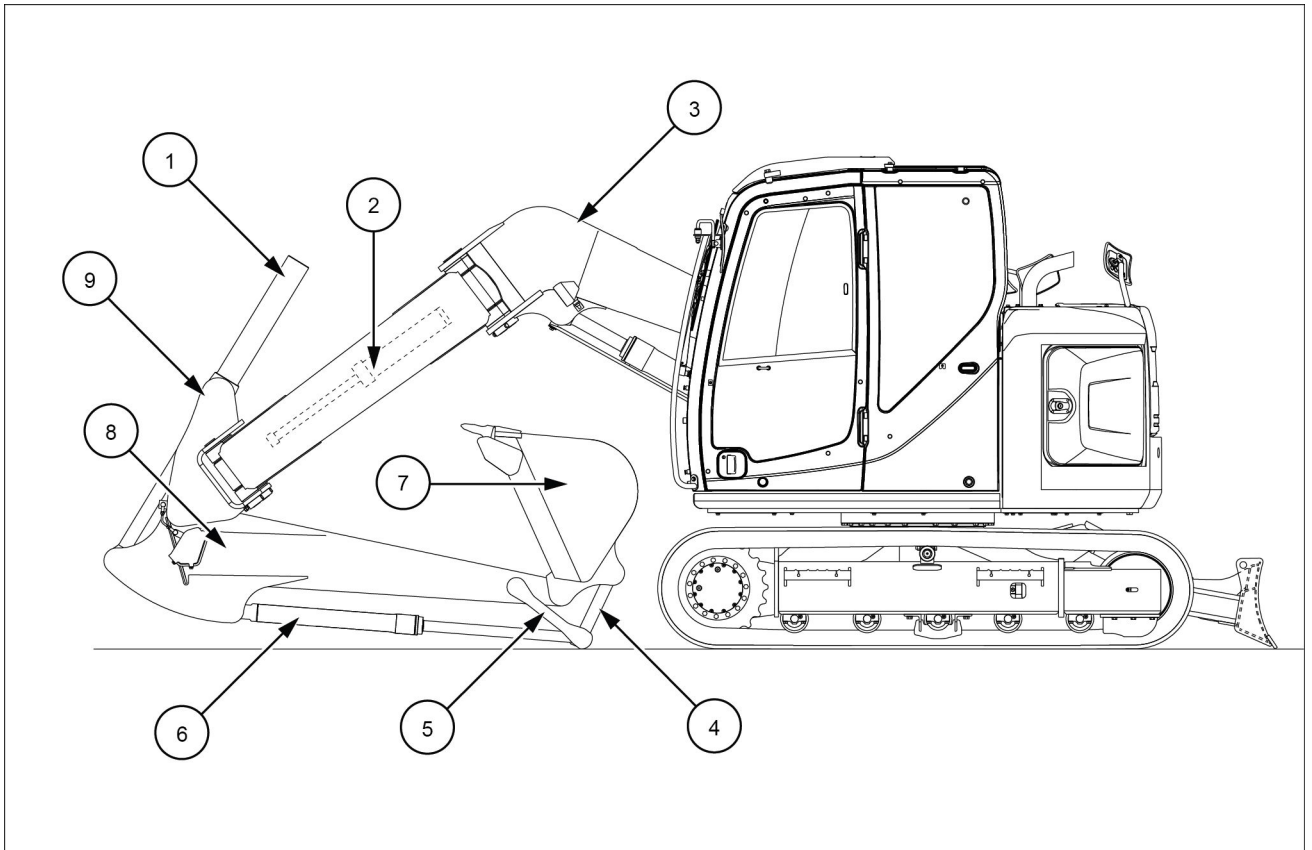
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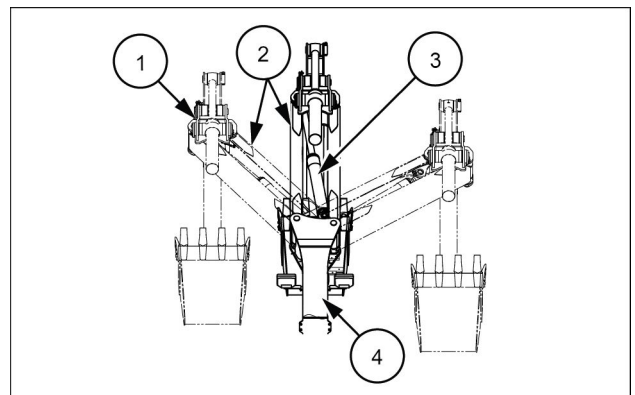
- | | |
|--------------------|--------------------|
| 1. Arm cylinder | 6. Bucket cylinder |
| 2. Offset cylinder | 7. Bucket |
| 3. Rear boom | 8. Arm |
| 4. Bucket link | 9. Upper boom |
| 5. Idler link | |

Summary of functions of offset boom

On this attachment for offset, the boom foot section is connected to the upper structure with pin horizontally similar to the normal hydraulic excavator, and is made up of one upper boom and two front booms which are connected to the top end of rear boom with pin vertically, and arms and arm cylinders are installed on the upper booms.

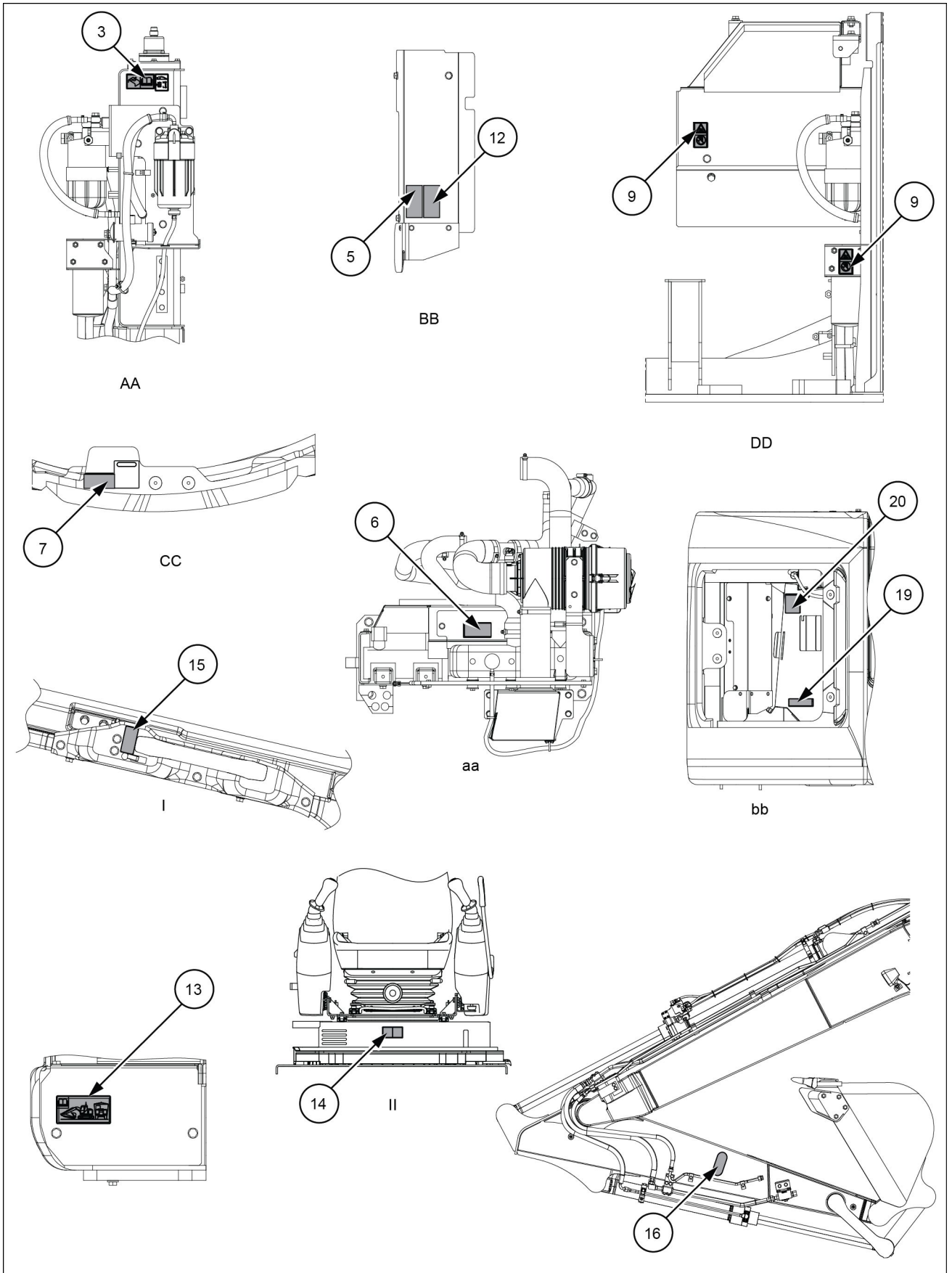
The offset adjustment is performed by extending and retracting the offset cylinder located between front booms while controlling the foot pedal.

1. Upper boom
2. Front boom
3. Offset cylinder
4. Rear boom



SMIL12CEX0443AB 4

2 - SAFETY INFORMATION



SMIL12CEX0206HC 2

Pre-start safety

Follow the rule

- In operating, inspecting and serving the machine, follow the precaution and procedure for the safety described in this manual.
- Never operate machine when being in poor physical condition, having taken medicine (making sleepy), being under the influence of alcohol and being mentally unstable.
- When working in group and with instruction by flagman, make sufficient previous arrangement about the working contents and operate the machine according to the specified signal.

When failure was detected

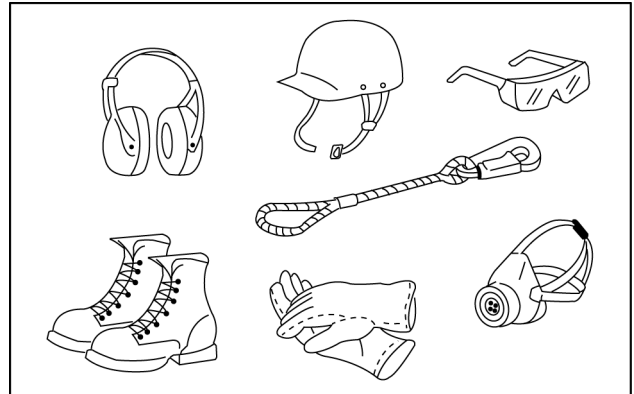
In operating or serving the machine, when the failure of machine (noise, vibration, smell, deviation of instrument, smoke, oil leaking and warning by warning device and multi-display) is detected, contact the person in charge immediately and take a proper measure. Do not operate the machine until the failure is removed.

Wear protective clothing

ATTENTION: work clothing that has come in contact with oil could catch fire. Change clothes immediately.

Wear well fitting safety shoes, hard hat, and working clothes, and put on protective glasses, face shield, ear protection and gloves. When necessary, wear reflective vest.

When operating attachments that produce flying debris, it is strongly recommended to purchase and install protective guards on the machine and close the all window to protect the operator from flying debris. Also the operator and all personnel in the area of the machine should wear protective gear such as safety shoes, hard hat, gloves and face shield or goggles.

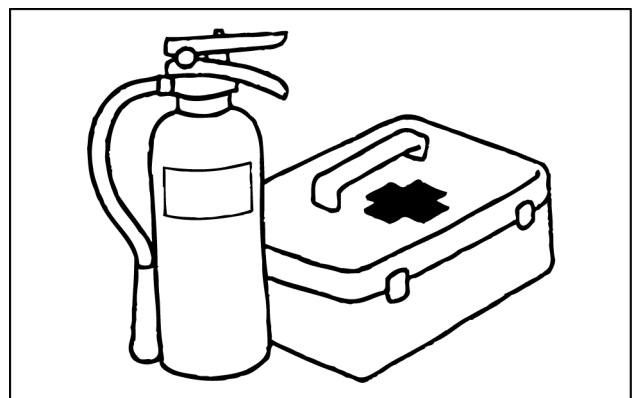


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Prepare for emergencies

Have a fire extinguisher and first aid kit ready for emergencies. Know how to operate the fire extinguisher and know where the first aid kit is located for easy access in case of emergency.

Prepare beforehand the communication means in case of any emergency, and take note of telephone numbers for emergency contact.



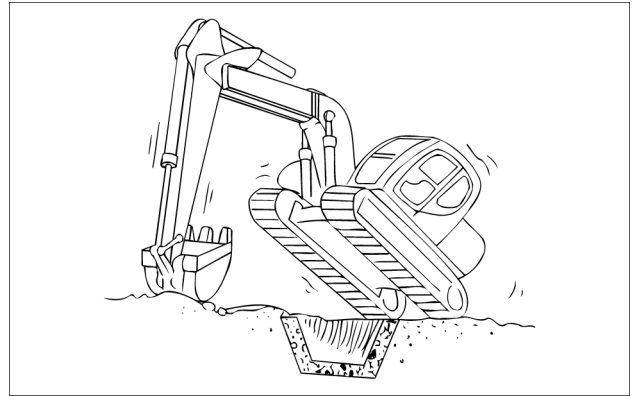
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Precaution to be taken with devices for safe

- Check that all protective guard and cover, and mirror are installed properly. If the failure is found, repair it immediately.
- Well understand how to use the device for safety.
- Never remove the device for safety and control it so that it always functions correctly.

Do not use boom and arm to lift the body

The unnecessary use of boom and arm to lift the body and unnecessary turning of direction are not allowed. They may cause breakage of the offset boom mechanism.

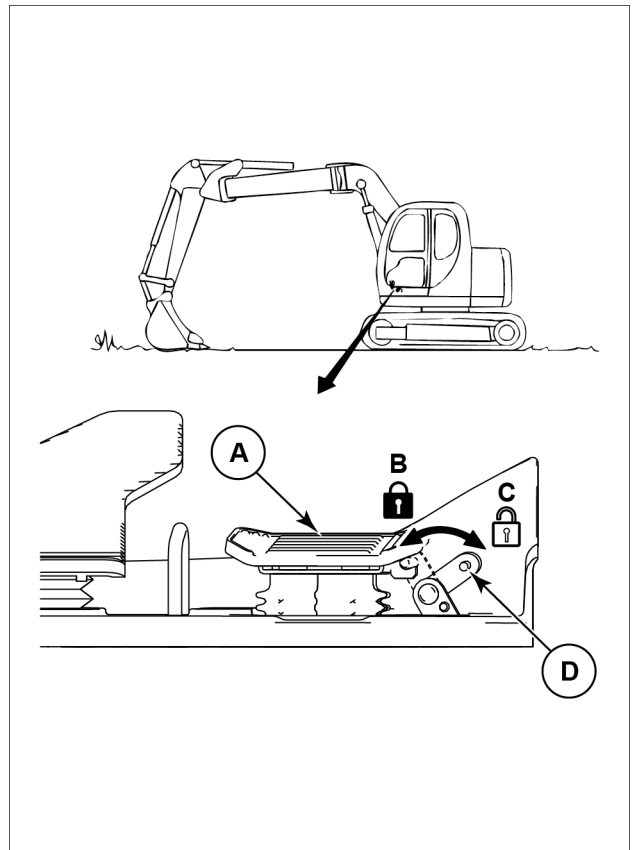


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Do not press foot pedal carelessly

The foot pedal for offset operation is located on the floor plate close to the foot of operator's seat. Learn how to operate it correctly in order not to press the pedal by mistake when operating it or getting on and off, and also be sure to turn the pedal lock to the lock condition when the offsetting, etc. are not required.

- A. Boom offset pedal
- B. Lock position
- C. Unlock position
- D. Pin



TULT12G1400015B 22

“Tag-out” machine

Before performing any inspection or maintenance procedures to the machine, fill out and post to the operator's controls a “DANGER” tag to warn persons not to start the machine. Also inform the supervisor and all operators that the machine is under inspection or maintenance and they will be informed when the machine is ready for normal operation.



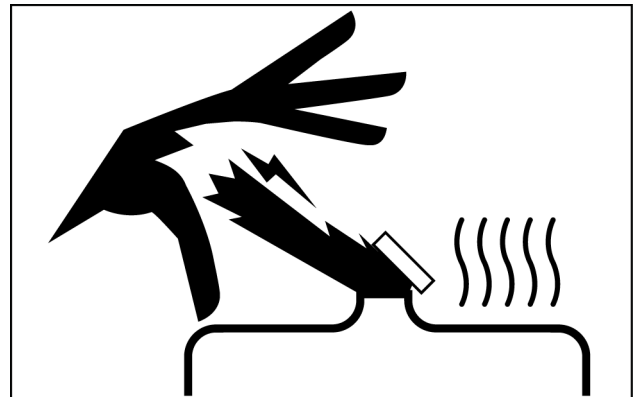
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Tools & equipment

Use the proper tools and equipment for the task at hand. Know the proper use of the tools and equipment before starting any inspection or maintenance procedures.

Pressurized fluids & lubricants

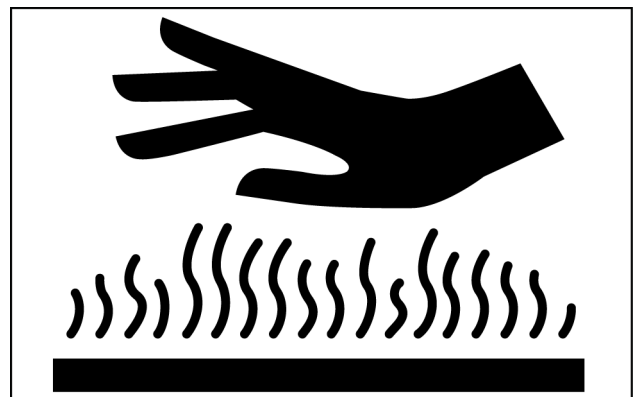
Always release pressure from hydraulic reservoir, engine coolant, fuel system and all systems containing pressure before removing any caps or components. Be cautious of hot fluids and gasses from systems on machines that have just been stopped. Allow sufficient time for systems to cool before performing any inspection or maintenance procedures.



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Avoid hot surfaces & areas

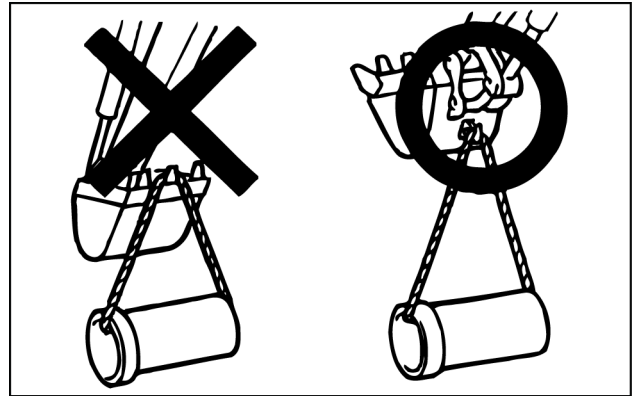
Immediately after the machine is operated, the temperature and pressure of the engine coolant, engine oil and hydraulic oil are very high. Burns may result if caps are removed, or oil, water, or filters are changed under these conditions. Wait until the temperature goes down, before attempting to check fluids or change filters.



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Do not use this machine for anything other than its intended purpose

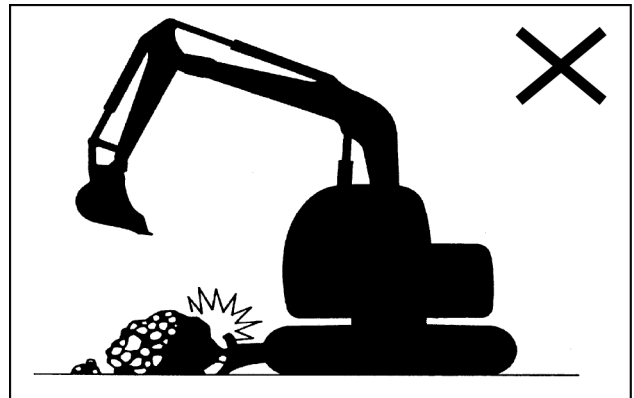
This machine is designed and manufactured for digging, loading and ground leveling operations only. Any other use can exert excessive force to the machine, its components, its systems and result in serious injury or death to the operator and other personnel working in the area of the machine.



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Avoid obstacles with dozer blade.

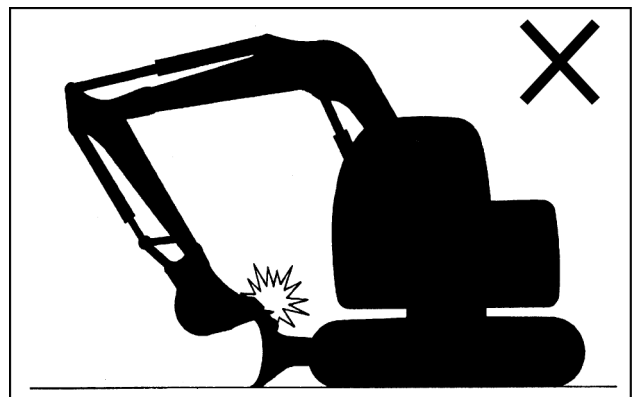
Do not strike any obstacles such as large rocks. The dozer blade may be damaged.



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Attachment travel position

When moving the attachment into the travel position, do not hit the dozer blade with the bucket/attachment.



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Headrest

The headrest can be adjusted in height and can be moved at an angle. Lift the headrest upwards to remove.

AIR SUSPENSION SEAT

NOTE: the adjustment procedures of the air suspension seat are the same of the mechanical seat, except for the suspension adjustment.

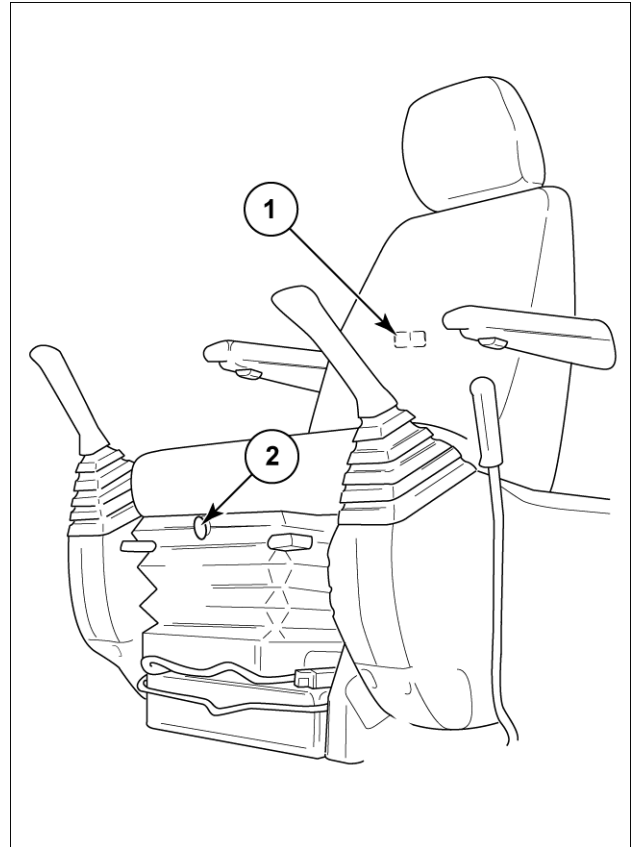
Suspension adjustment

- turn the starter key to **ON** position.
- push the manual air valve **(2)** to increase the suspension.
- pull the manual air valve **(2)** to decrease the suspension.

Cushion heater

- turn the starter key to **ON** position.
- press the switch **(1)**, located on the rear side of the backrest, to **I** position.

ATTENTION: in order to preserve the charging of the batteries, it is recommended that the cushion heater is activated with the engine is running.

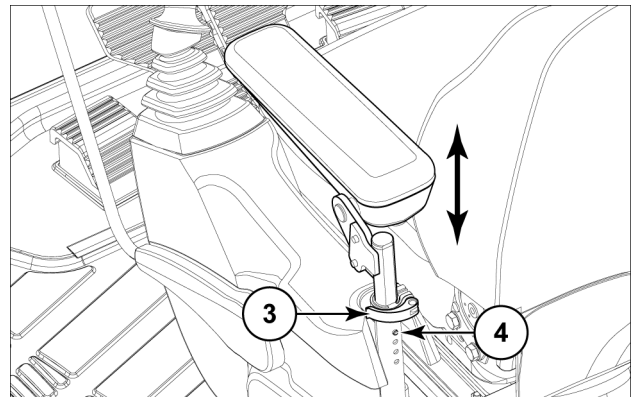


NH0191 2

ARMREST HEIGHT ADJUSTMENT

The height of the right and left armrests is adjustable in four positions:

- Open the clamp **(3)**.
- Push the pin **(4)**.
- Slide the armrest up or down to the desired height until the pin locks.
- Close the clamp **(3)**.

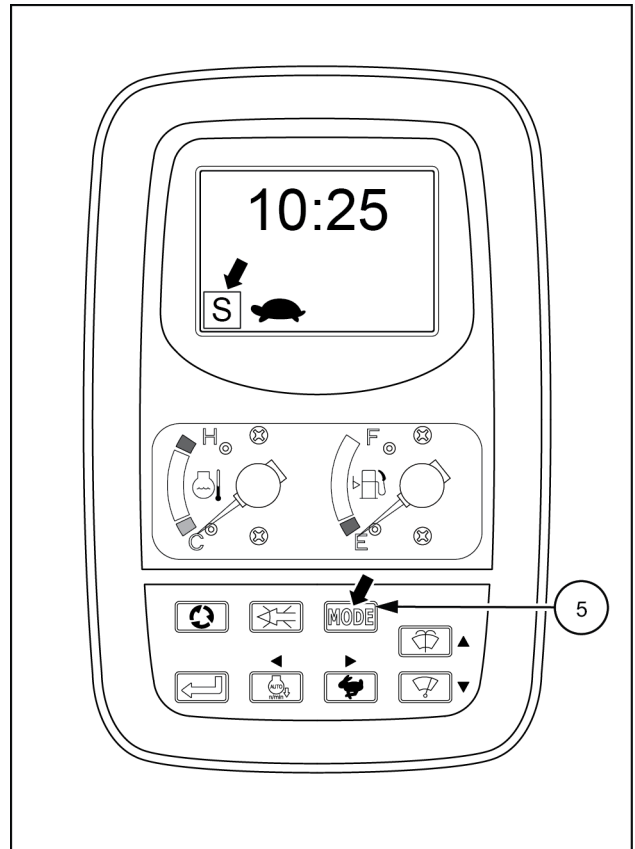


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Work mode select switch

When engine starts, it is set to **S** mode. Select proper work mode from 3 modes shown below according to the work condition and the purpose. The work mode is switched in order of **S** --> **E** --> **H** --> **S** each time the work mode select switch (5) is pressed. The selected work mode is displayed on the left upper corner of multidisplay for confirmation.

S mode: for standard work and loading operations
E mode: for lower fuel consumption digging work
H mode: for heavy duty work

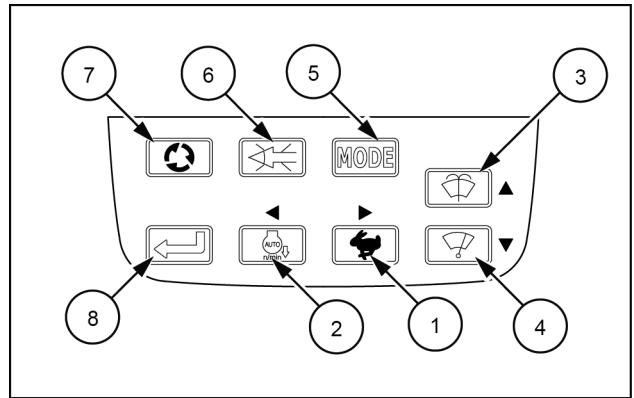


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ATTENTION: the mode after the engine starting is always the start from **H** mode. Before beginning the work, make sure the mode that had been selected is correct.

Set procedure of maintenance schedule

This machine is equipped with multi-display which makes confirmation of remaining time to the coming replacement/change time of engine oil, fuel filter, hydraulic oil filter and hydraulic oil. When the remaining time reaches to Zero (0), replace or change them and perform the initial setting in the following order:



SMIL12CEX0240AB 21

1. Travel speed select switch
2. Auto accel switch
3. Washer switch
4. Wiper switch
5. Work mode select switch
6. Buzzer stop switch
7. Screen change switch
8. Menu switch

NOTICE: interval of replacement of parts is mentioned below.

Engine oil : **500 h**

Fuel filter : **500 h**

Hydraulic filter : **1000 h**

Hydraulic oil : **5000 h**

Pro- ce- dure	Operating procedure	Display on multidisplay	
1	Turn starter key switch on.		After several seconds, display is changed to clock automatically.
2	Press " " switch press once display change switch on the switch panel once. And the clock display changes to the display of remaining time for coming engine oil change.		Press screen change switch once more.
3	Press " " switch press once select switch once and the display for the engine oil change reverses.		Press select switch once more.
4	When required to adjust the interval to the coming change time by 10 hours, press " " switch and the time to the coming engine oil change is added. Press " " switch and the time to the coming engine oil change is reduced.		Replacing interval is changed with each pressing of switch.
5	When desired to return to the initial set time, press " " buzzer stop switch once. Press " " select switch once and the set time is stored.		To set the desired interval, press the select switch

NOTICE:

1. After displaying the display for setting by pressing the display change switch, set the respective main-

tenance time for fuel filter, hydraulic oil filter and hydraulic oil while repeating the procedure 2 to 5.
2. The engine oil change time is displayed on the multi-display by 500 hours as a warning, but the buzzer does not sound.

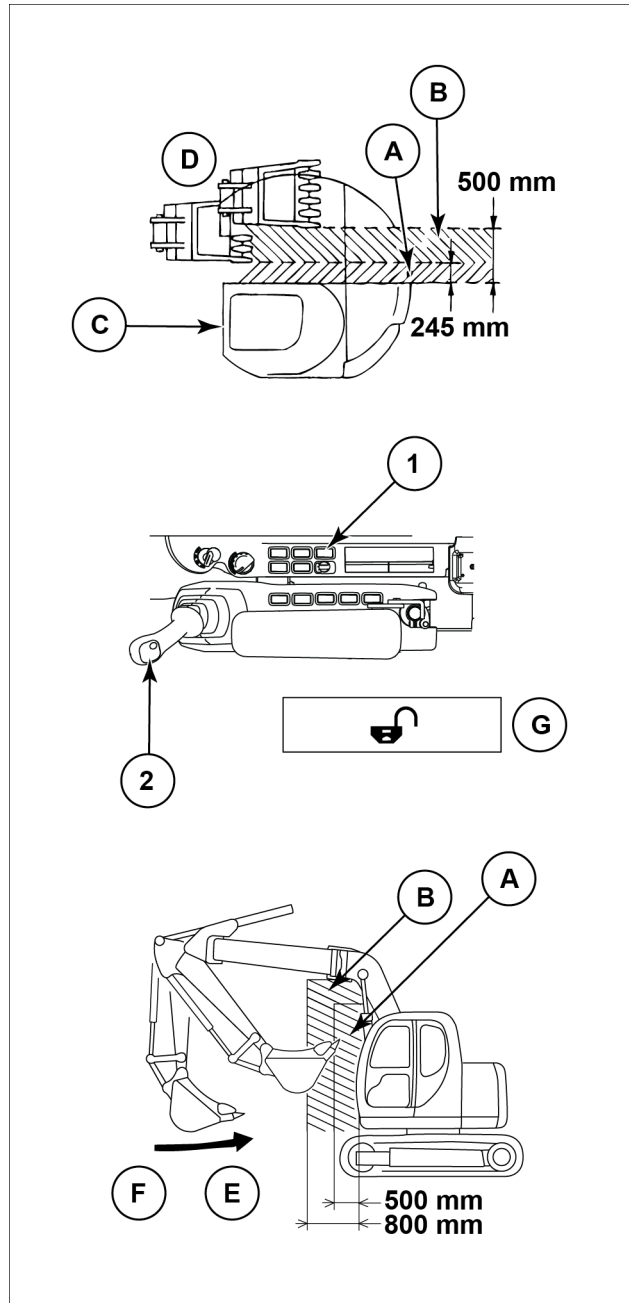
C. Release of automatic stop function

1. During automatic stopping status, if the operator wants to move an attachment close to cab more, press the release switch (1) on the panel, and push the release switch (2) of the right control lever. And the attachment could be moved to desired position.
2. When move the attachment toward safety area, it is not necessary to push the release switch.. In case of returning the attachment to safety area, shift the control lever and move the desired attachment until the warning buzzer sounds intermittently.

- A. Stop area
- B. Warning area
- C. Cab
- D. Interference prevention area (side)
- E. Safety area
- F. Interference prevention area (front)
- G. No interference prevention system

NOTICE: While the interference prevention function is released, the limitation functions of height, depth, and left offset as well as the cab interference prevention function will be released. Pay close attention when operating the lever.

Do not use these cab interference prevention release switches unless it is necessary to move the machine to the safety area in an emergency.



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M. Setting the offset limitation

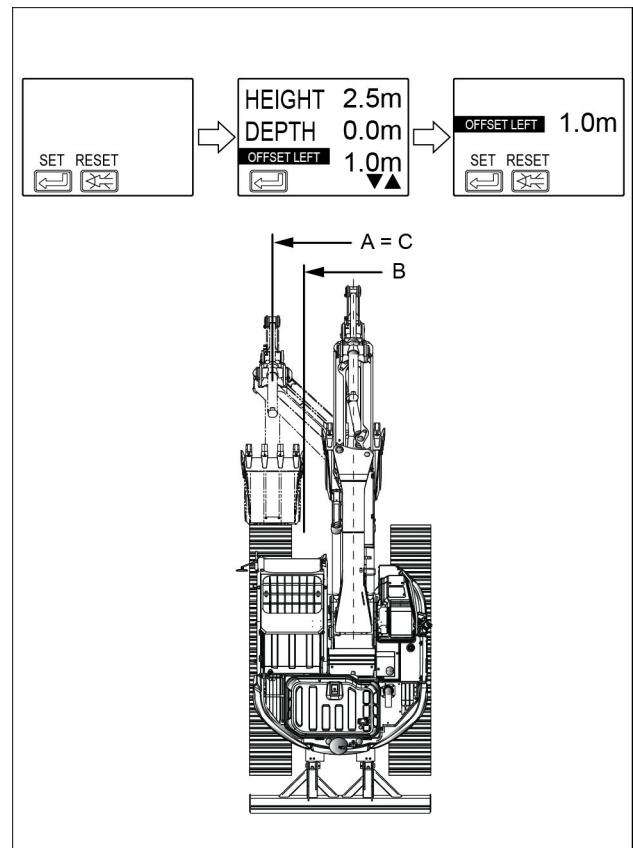
When the offset distance of the attachment is detected and the distance reaches to the preset value, the operation stops.

1. While usual screen is displayed, press the "SELECT SWITCH" to display the set/reset select display.
2. Press the "SELECT SWITCH", and the limitation select screen is displayed. In this time, the each value indicates the preset values. When the limitations were not preset, the present distance of offset is indicated.
3. Using the "UP" or "DOWN" switches, select the "OFFSET LEFT" and press the "SELECT SWITCH". The screen of offset left limitation setting is displayed. This time, the present distance of offset left distance is indicated.
4. Move the attachment to the desired position where you intend to limit the offset distance.
5. Press the "SELECT SWITCH", and the offset left limitation is set. And the screen returns to usual display.
6. This time, the attachment is in the offset left limitation area. Therefore, the offset left operations cannot be operated. But the movement of the attachment to safety area is possible, move the attachment to the safety area.
7. During the operation, the offset distance of attachment reaches the area within **0.3 m** from set position, and the warning buzzer sounds intermittently. And the movement of the attachment slows down.
8. Additionally, if the attachment moves to set position, the warning buzzer sounds for **5 s** continuously, and the movement of the attachment stops. Move the attachment to the safety area.

A. Set position = Stop position

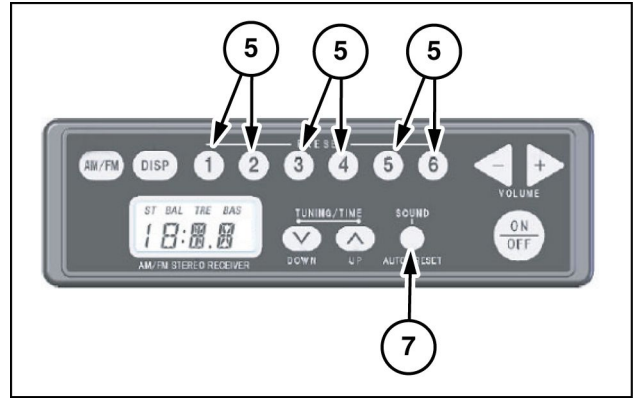
B. Slow down position

NOTICE: the preset standard level is not released even if the starter key switch is **OFF**.



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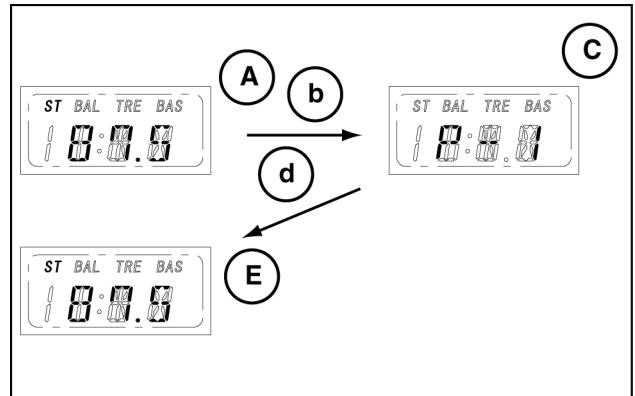
1. Press one of the 6 "PRESET" keys (5) for 1 s or more.
2. After 3 flickering of the memorized preset No. display, the frequency is displayed.



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Example of FM1 is selected:

- A. Frequency display
- b. Press "PRESET" key (No.1) (For 1 s or more)
- C. Preset No. display
- d. (After 3 flickerings of preset No.)
- E. Frequency display



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Preset memory

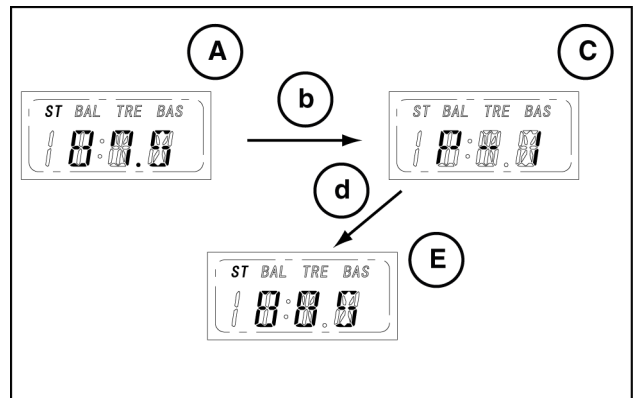
Press one of the 6 "PRESET" keys (5) for 0.5 s or less. And the calling frequency which is memorized in the preset No. and its reception are available by pressing the "PRESET" key.

1. Press one of the 6 "PRESET" keys (5) for 0.5 s or less.

Example of FM1 is selected : The frequency 88.5 MHz is registered in advance:

- A. Frequency display
- b. Press "PRESET" key (No.1) (For 0.5 s or less)
- C. Preset No. display
- d. (After display of preset No. for 0.5 s)
- E. Frequency display

2. After the pressed preset No. is displayed, the display is changed to the frequency which is memorized in the preset No.
3. Receive the required radio station by changed frequency.

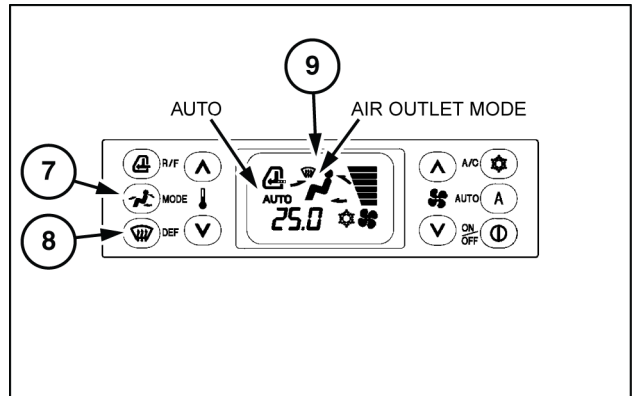


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7. Air outlet mode selector switch and display

To select the air outlet position, this switch is used.

1. Air outlet position is indicated by the arrow on LCD display (9).
2. Press air outlet mode selector switch (7) in the condition where auto display light is On, and the display mode is fixed, "AUTO" indicator lamp on LCD display goes out, and "AUTO" control of air outlet opening is released.



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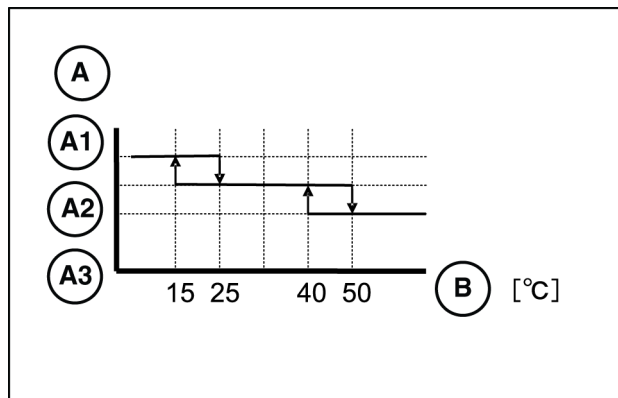
3. Air outlet mode and display

MODE	1	2	3	4	5
AIR OUTLET MODE	FACE	VENT	HIGH-LEVEL	F/D	DEF
DISPLAY					

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Indications of air outlet mode

- Each time when this switch (7) is pressed manually, and air outlet mode is changed from FACE to VENT to BILEVEL to FOOT to FACE.
- To select the defroster mode, press the defroster switch (8).
- When air-conditioner is controlled automatically, airflow of fan is controlled according to this curve.



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Indications of air outlet mode

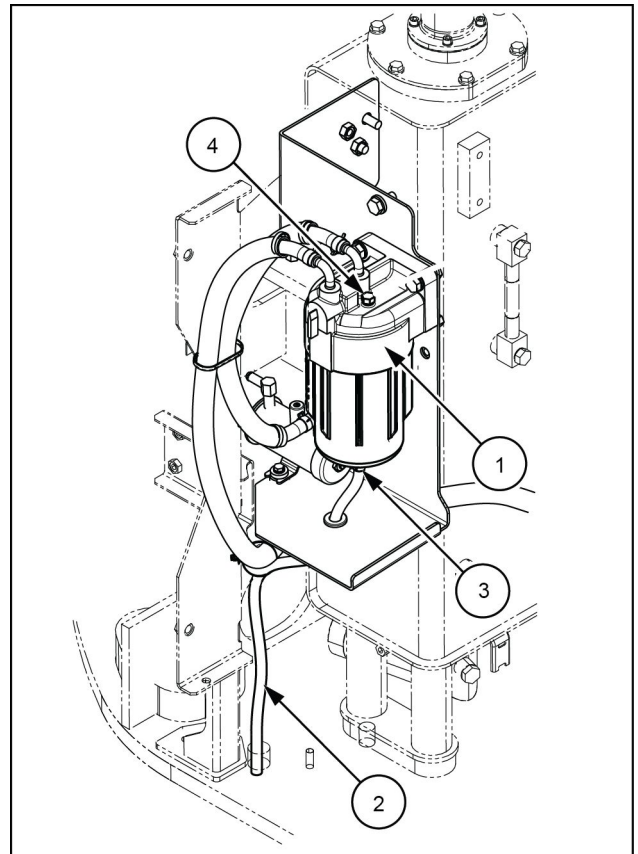
- A. Air outlet mode
 - A1: MODE2
 - A2: MODE3
 - A3: MODE4
- B. Target outlet air temperature

Fuel pre-filter

ATTENTION: to avoid the damage of O-ring, remove foreign matter around the mounting area of drain plug. Damage of O-ring causes leak of fuel, and it causes fire.

Proceed with the draining of the water trapped inside the pre-filter (1), operating as follows:

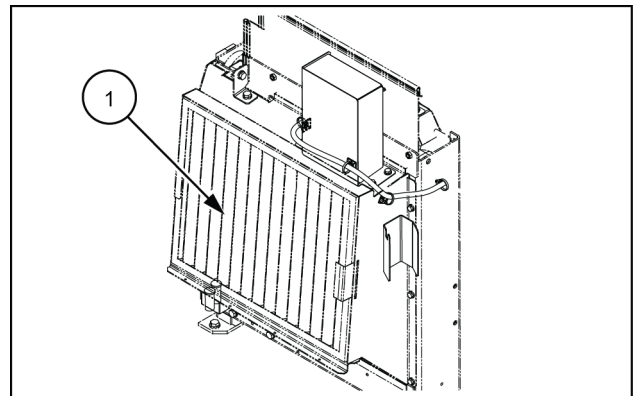
1. The fuel pre-filter (1) is installed in front of counterweight on the right rear side of machine.
2. Open side door on the right side.
3. Place a container of a suitable capacity for drain oil under the drain hose (2).
4. Loosen the drain plug (3) and air bleed plug (4) and drain water collected in fuel pre-filter (1) in the container.
5. After draining, tighten the drain plug (3) and air bleed plug (4) securely.



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Radiator, oil cooler and filter

1. Using starter key, unlock side door on left side of counterweight, and open it.
2. By visual check, check mud, dust and leaves which contaminate filters (1).
3. When filter is contaminated heavily, refer to 7-32 and clean these filters.



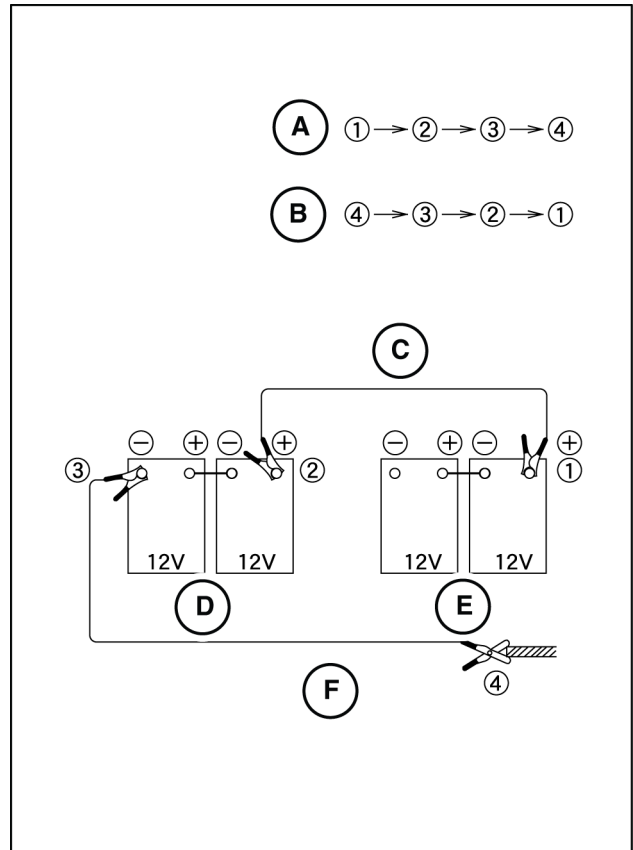
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Connecting/disconnecting booster cables

ATTENTION: Wrong connection of booster cables may cause explosion of the batteries. Pay special attention while connecting and disconnecting the booster cables. The starting system of this machine is **24 V**. Therefore the boost battery voltage in use should be **24 V**. The application of high voltage employed for welding machine, etc. to start the engine may cause damage to the electric system.

Make sure the starter key switch is in the **OFF** position before connecting the booster cables. Proceed as follows to connect and disconnect the booster cables.

- A. Cable connecting order
 - B. Cable disconnecting order
 - C. (Red)
 - D. Booster battery
 - E. Discharged battery
 - F. (Black) To the upper frame of the troubled machine
1. Put attachment on the ground, return all control levers to neutral position and then lock the safety lever.
 2. Set the starter key switch to **OFF** for both boost vehicle and disabled machine.
 3. Connect the booster cable (red) clip to the positive (+) terminal on the battery of disabled machine.
 4. Connect the clip from the other end of the positive (+) booster cable (red) to the positive (+) terminal on the battery of boost vehicle.
 5. Connect the booster cable (black) clip to the negative (-) terminal on the battery of boost vehicle.
 6. Finally, connect the clip from the other end of the negative (-) booster cable (black) to the upper frame of disabled machine, away from the battery.
 7. Start the engine of boost vehicle, and run it for about **10 min** at high idle.
 8. Start the engine of disabled machine.
 9. After starting the engine of disabled machine, remove the booster cables in the reverse order of the above connection order.
 10. Check and repair the cause of the problem of the charging system on the disabled machine.



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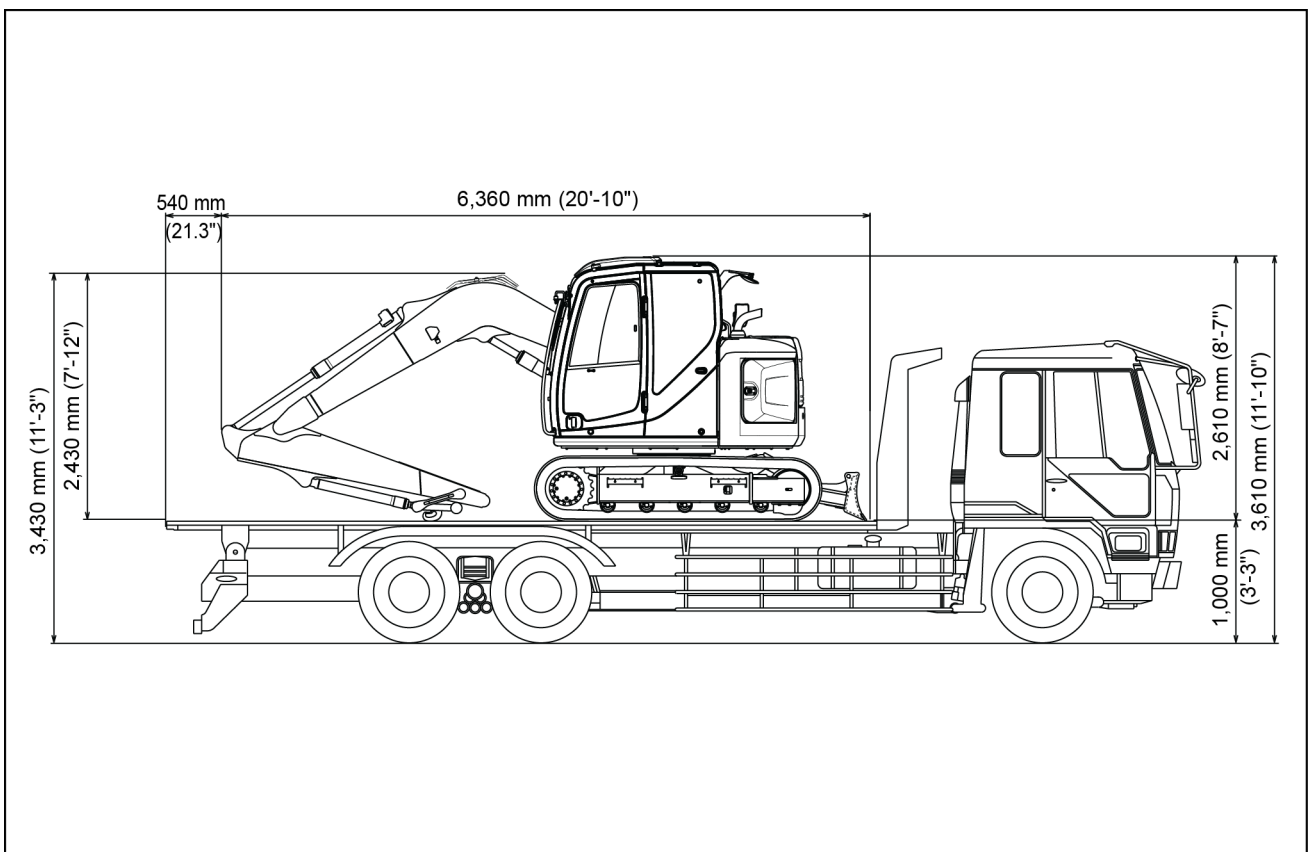
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5 - TRANSPORT OPERATIONS

ROAD TRANSPORT

Machine preparation

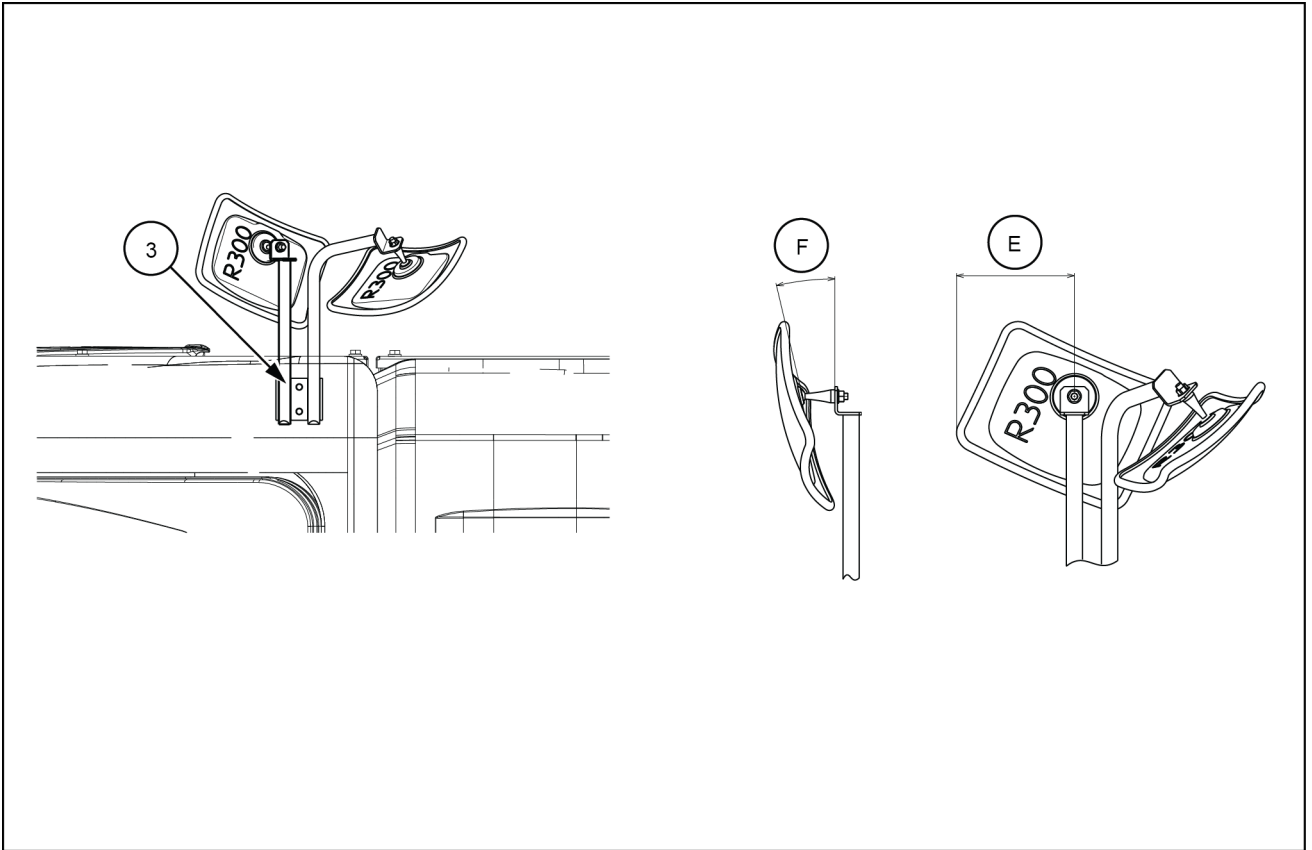
1. Know the total weight, length, width and height of the machine being transported.
2. Know route to be traveled. Investigate bridges, overpasses, height of road signs on route.
3. Obtain any permits required from proper government agencies for machine transportation.
4. Use only a trailer with a rated capacity sufficient to transport the machine.
5. Make certain trailer has ramps or a ramp is available for loading and unloading the machine.
6. When the machine is transported, to prevent an incident, make sure that all doors, guards and access panels were correctly locked.



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Dimensions and weights are **2130 mm (83.9 in)** Arm, **0.22 m³ (0.3 yd³)** Bucket and **3820 mm (150.4 in)** Boom.

Machine Model	Weight	
	E75CSR	450 mm (17.7 in) Shoe
7500 kg (16535 lb)		7720 kg (17020 lb)

Mirror B

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- Adjust the mirror so that person who stands on the right rear ends of machine (or post of **1.5 m (4.9 ft)** high and **30 cm (11.8 in)** in diameter) can be identified from operator.
- Install the mirror to the position shown in the above figure.
E : 145 mm (5.7 in) (Reference value)
F : 14 ° (Reference value)
- Install the mirror so that the mirror (**B**) does not come in contact with the stay (**3**) of the mirror.

Attachment and swing controls

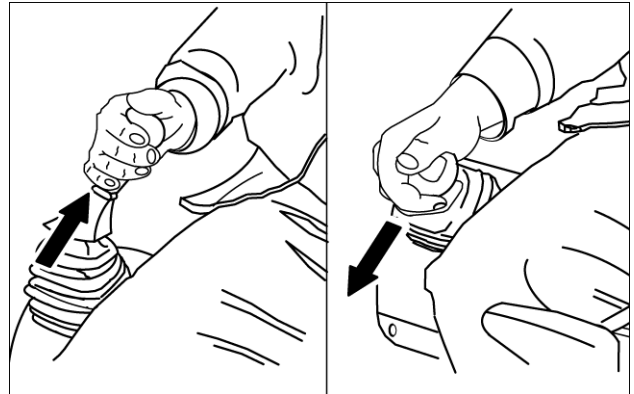
The following instructions are to be used with bucket attachment only. If other attachments are being used, consult the Operator's Manual for the particular attachment.

ATTENTION: *be careful when operating certain attachments close to the cab. Certain attachments can hit and damage cab. Stop attachment a safe distance away from cab to avoid damage or injury.*

Boom operation

The boom is actuated by pushing or pulling the right control lever forward or backward. The speed of the movement is determined by the stroke of the lever.

- When pulling the right control lever BACKWARD the boom is raised.
- When pushing the right control lever FORWARD the boom is lowered.
- When returning the right control lever centrally (neutral position) the boom stops moving.

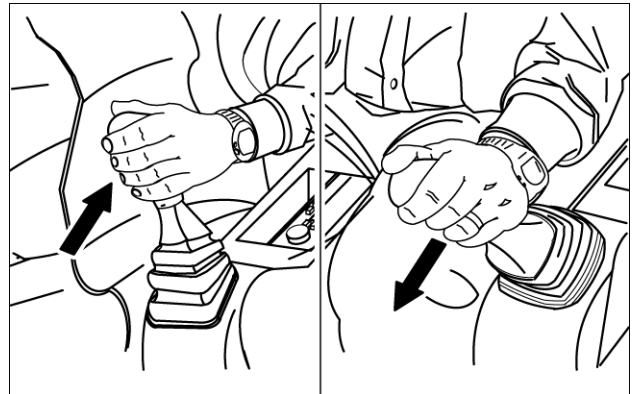


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Arm operation

The arm is actuated by pushing or pulling the left control lever forward or backward. The speed of the movement is determined by the stroke of the lever.

- When pushing the left control lever FORWARD the arm is extended.
- When pulling the left control lever BACKWARD the arm is retracted.
- When returning the left control lever centrally (neutral position) the arm stops moving.

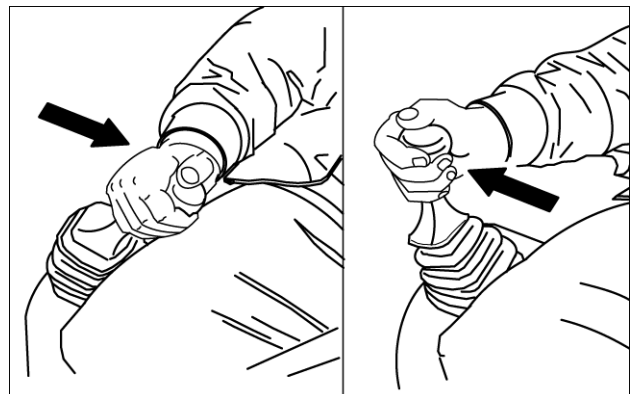


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Bucket operation

The bucket is actuated by moving the right control lever rightward or leftward. The speed of the movement is determined by the stroke of the lever.

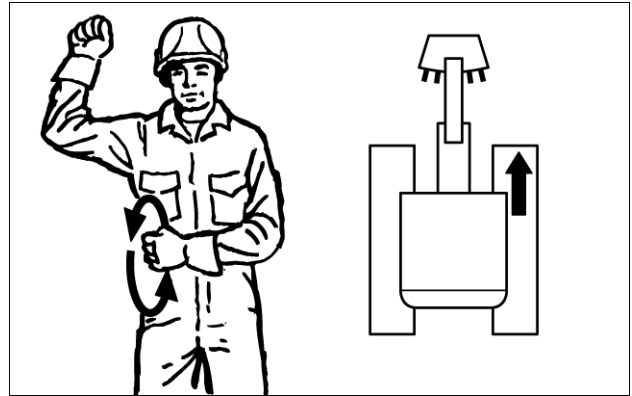
- When moving the right control lever leftward, the bucket is rolled back (digging).
- When moving the right control lever rightward, the bucket is extended (dumping).
- When returning the right control lever centrally (neutral position) the bucket stops moving.



NH0115 12

Turn left

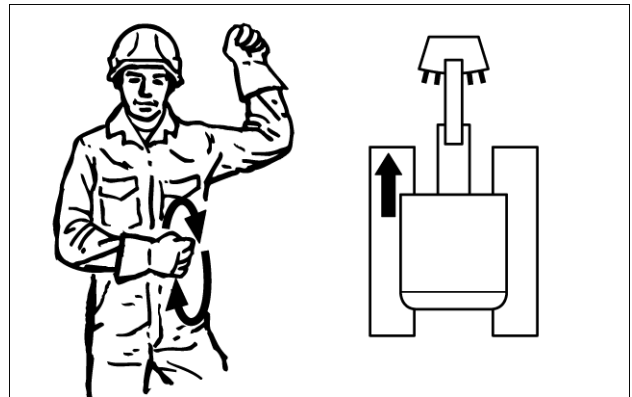
Face machine operator, raise right forearm up, make fist with right hand and hold stationary, bend left arm in, make fist with left hand and rotate left fist in a small reverse circular motion.



NH0097 17

Turn right

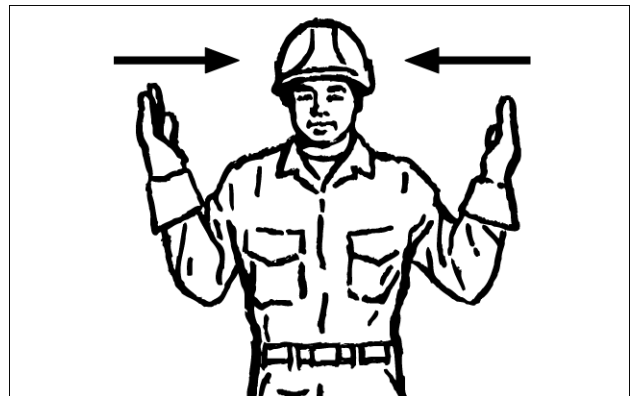
Face machine operator, raise left forearm up, make fist with left hand and hold stationary, bend right arm in, make fist with right hand and rotate right fist in a small forward circular motion.



NH0098 18

Move this much

Face machine operator, raise both forearms up, hands open and facing each other, move hands in laterally indicating how far to go.



NH0099 19

Move slowly

Face machine operator, raise left arm out horizontally toward right shoulder with hand open and facing down, point right index finger up toward open left hand and rotate right hand in a reverse circular motion. (Raise load slowly is illustrated).



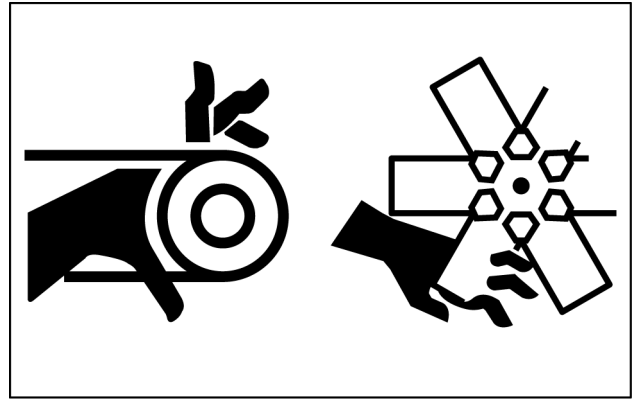
NH0100 20

Stop engine

Do not attempt any MAINTENANCE with engine running. Always stop the engine and allow machine to cool to avoid injury.

Otherwise, there is a possibility of danger that your hand may be caught in the cooling fan or fan belt resulting injury.

If it is unavoidable to operate the engine for inspection or maintenance, carry out the work with two people. The person seated in the operator's seat should be ready to stop the engine at any time while watching for a signal from the other person.



TUIL12C140293AA 4

Tag-out machine

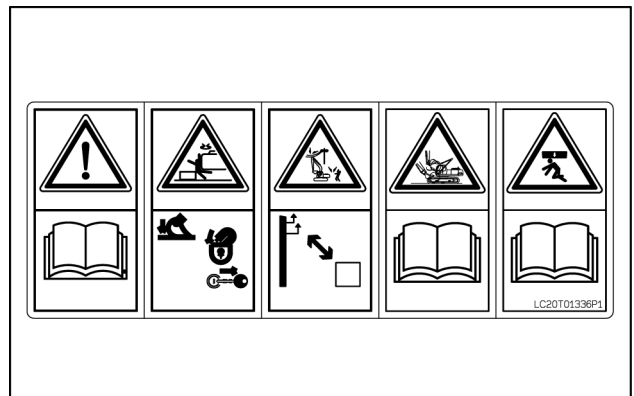
Before beginning any inspection or maintenance procedures, secure a "DANGER" tag (P/N: YN20T01320P2) to the operator's console to inform the operator that the machine will be inoperable for inspection and maintenance. This tag will help prevent accidental starting of the machine.



TUIL12C140294AA 5

Observe precautions

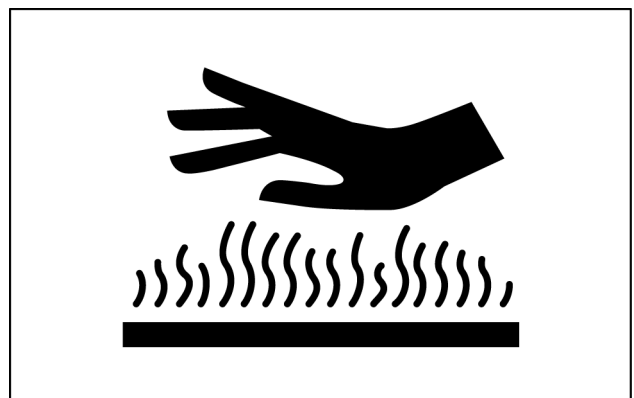
Start the inspection and maintenance work fully understanding the contents of safety precautions indicated on the machine labels.



TUIL12C140295AA 6

Hot surfaces & fluids

Wear the proper safety equipment when working around hot areas. Do not change oils, engine coolant or filters immediately after machine has been stopped. Allow machine to cool down before performing maintenance procedures.



TUIL12C140296AA 7

7 - MAINTENANCE

2. Metric fine thread standard tightening torque values. Tighten all bolts and nuts to proper torque values.

Classification		4.8T		7T		10.9T	
		No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M8	P=1.0	10.2 - 12.4 N·m (7.5 - 9.1 lb ft)	8.5 - 10.5 N·m (6.3 - 7.7 lb ft)	22.5 - 26.5 N·m (16.6 - 19.5 lb ft)	18.6 - 22.6 N·m (13.7 - 16.7 lb ft)	40.2 - 48.0 N·m (29.6 - 35.4 lb ft)	33.4 - 41.2 N·m (24.6 - 30.4 lb ft)
M10	P=1.25	20.6 - 24.6 N·m (15.2 - 18.1 lb ft)	16.8 - 20.6 N·m (12.4 - 15.2 lb ft)	43.2 - 53.0 N·m (31.9 - 39.1 lb ft)	37.3 - 45.1 N·m (27.5 - 33.3 lb ft)	78.5 - 96.1 N·m (57.9 - 70.9 lb ft)	66.6 - 80.4 N·m (49.1 - 59.3 lb ft)
M12	P=1.25	35.3 - 43.1 N·m (26.0 - 31.8 lb ft)	30.4 - 36.2 N·m (22.4 - 26.7 lb ft)	76.5 - 94.1 N·m (56.4 - 69.4 lb ft)	64.7 - 78.5 N·m (47.7 - 57.9 lb ft)	138 - 170 N·m (102 - 125 lb ft)	116 - 142 N·m (85.6 - 105 lb ft)
M16	P=1.5	83.4 - 101.0 N·m (61.5 - 74.5 lb ft)	69.7 - 85.3 N·m (51.4 - 62.9 lb ft)	176 - 216 N·m (130 - 159 lb ft)	152 - 186 N·m (112 - 137 lb ft)	324 - 402 N·m (239 - 296 lb ft)	275 - 333 N·m (202.8 - 246 lb ft)
M20	P=1.5	167 - 205 N·m (123 - 151 lb ft)	139 - 171 N·m (103 - 126 lb ft)	363 - 441 N·m (268 - 325 lb ft)	304 - 362 N·m (224 - 267 lb ft)	657 - 795 N·m (485 - 586 lb ft)	549 - 667 N·m (405 - 492 lb ft)
M24	P=2	285 - 343 N·m (210 - 253 lb ft)	236 - 294 N·m (174 - 217 lb ft)	617 - 755 N·m (455 - 557 lb ft)	510 - 628 N·m (376 - 463 lb ft)	1122 - 1358 N·m (828 - 1002 lb ft)	932 - 1128 N·m (687 - 832 lb ft)
M30	P=2	578 - 696 N·m (426 - 513 lb ft)	481 - 579 N·m (355 - 427 lb ft)	1253 - 1527 N·m (924 - 1126 lb ft)	1039 - 1275 N·m (766 - 940 lb ft)	2245 - 2755 N·m (1656 - 2032 lb ft)	1874 - 2286 N·m (1382 - 1686 lb ft)
M33	P=2	765 - 941 N·m (564 - 694 lb ft)	636 - 776 N·m (469 - 572 lb ft)	1674 - 2046 N·m (1235 - 1509 lb ft)	1395 - 1705 N·m (1029 - 1258 lb ft)	3016 - 3684 N·m (2224 - 2717 lb ft)	2515 - 343 N·m (1855 - 253 lb ft)
M36	P=3	962 - 1178 N·m (710 - 869 lb ft)	804 - 980 N·m (593 - 723 lb ft)	2104 - 2556 N·m (1552 - 1885 lb ft)	1744 - 2136 N·m (1286 - 1575 lb ft)	3778 - 4622 N·m (2787 - 3409 lb ft)	3147 - 3853 N·m (2321 - 2842 lb ft)

Fuel tank drain

Loosen the drain valve (1) to drain the water and deposits in an empty container.

Since the water is deposited during the night, it is effective to drain before starting up the engine in the morning.

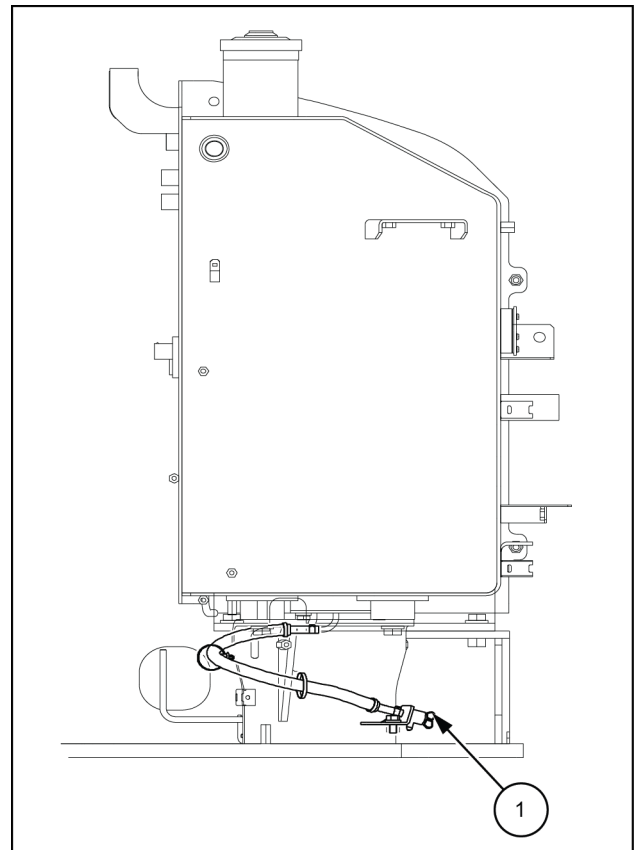
⚠ WARNING

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 death or serious injury.

W0904A

1. Swing the upper structure of the machine so that the drain valve (1) under the fuel tank comes to midway between the Crawler shoes of left and right. Place bucket to the ground and stop the engine.
2. Place an empty container under the drain valve (1) to catch the fuel discharged.
3. Open drain valve (1) and discharge water and sediment deposited on the bottom. In this time, be careful not to be showered by flushed fuel.
4. Close drain valve (1) when clean fuel was discharged.



SMIL12CEX0309BB 1

Fan, Alternator, A/C Belt Wear and tension

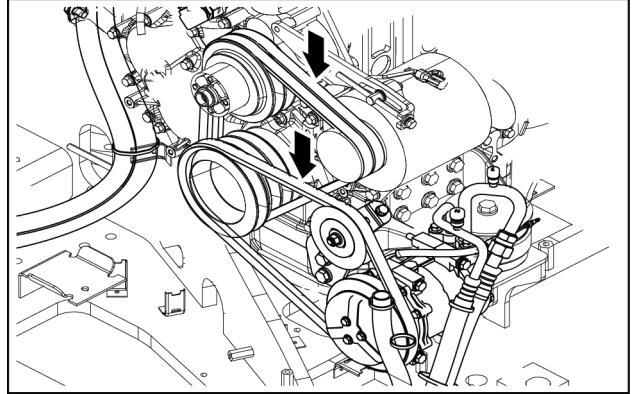
ATTENTION: rotating parts can cause injury. Keep away from fan and belt when engine is running. Stop engine before servicing.

ATTENTION: if defects such as cuts or surface separations are found during inspection, replace the belt. Keep oil and grease away from the belt, since they may cause the belt to slip and shorten the service life.

This machine is equipped with belts for alternator, fan and air-con.

Check these belts for wear and damage and check the belt tension for slack, and adjust it properly in order to maintain the engine in high performance and the specified service life.

Check the tension of belt by pressing on the center of belt by thumb. If the deflection is within the range shown in the table, it is in normal tension.



SMIL12CEX0324AB 1

Belt	When new belt replaced	When inspected	Force
Alternator, Fan	4 - 6 mm (0.2 - 0.2 in)	7 - 9 mm (0.3 - 0.4 in)	98 N (22 lb)
Air-conditioner	3 - 4 mm (0.12 - 0.16 in)	5 - 6 mm (0.2 - 0.24 in)	24 N (5.4 lb)

NOTICE:

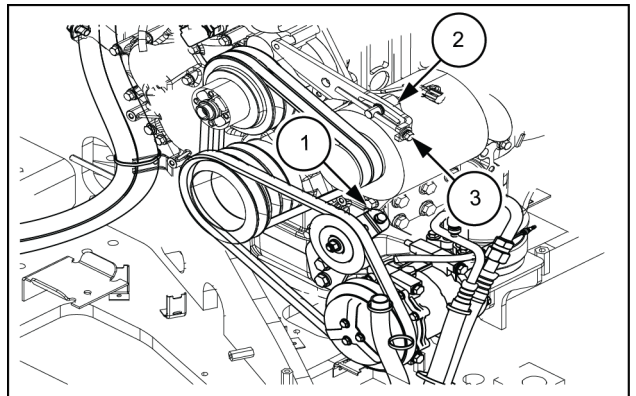
- when replace with new belt, there is a lack of initial adaptability of the belt. Run the engine at idling speed for about three or five minutes. After that, adjust the belt tension again.

- New belts get complete initial elongation after being run about 2 h.

Adjustment for alternator and fan belt

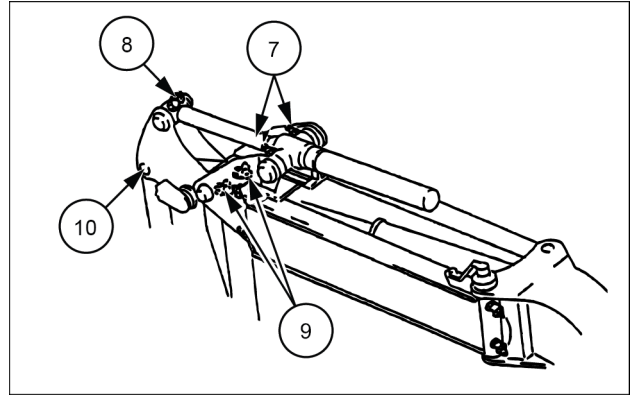
NOTICE: be careful of the alternator and fan belts so that grease and oil are not adhered. The service life may be shortened due to slipping with oil.

1. Open engine hood and support it with stay.
2. Loosen attaching bolt (1) and adjusting nut (2) slightly and adjust the belt tension.
3. Loosen adjusting bolt (3), adjust the alternator and fan belts to the specified tension, and tighten attaching bolt (1) and adjusting nut (2).
4. After adjustment, start engine and run it at low speed for about 5 min.
5. Stop engine and check tension of fan belt.
6. Release the stay which is supporting hood, close engine hood and lock engine hood.



SMIL12CEX0325AB 2

4. Apply grease to 2 nipples **(7)** on the arm cylinder support section, arm cylinder rod **(8)**, grease to 2 nipples **(9)** on the connection of arm and upper boom, and grease nipple **(10)** of the bucket cylinder head.



SMIL12CEX0440AB 7

Checking the air-conditioner refrigerant

A. Sight glass

ATTENTION:

- do not loosen parts in the refrigerant circuit because there is a hazard of losing sight by getting coolant in eyes and being frostbitten hands by touching it.

- The inhaling of refrigerant gas has serious influence on human body.

And do not bring fire near the area where refrigerant gas is produced.

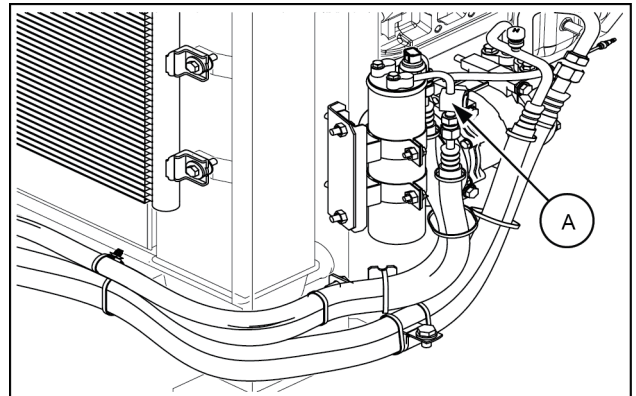
NOTICE:

when filling or changing refrigerant, confirm the type of refrigerant and use refrigerant in the specified type.

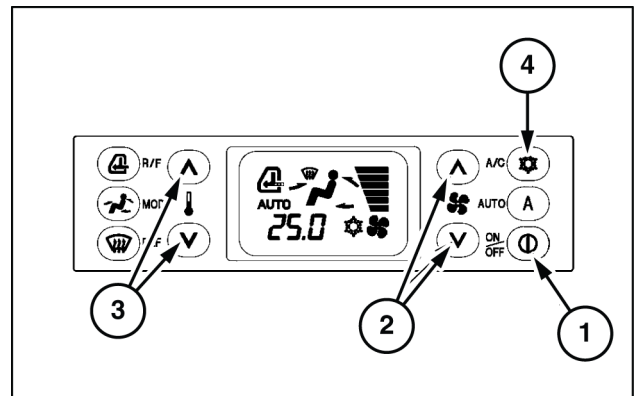
- Refrigerant type and quantity:

R134A: 0.85 - 0.95 kg (1.9 - 2.1 lb)

The use of unspecified refrigerant may cause damage of equipment.



SML12CEX0345AB 1



TUIL12C140384AB 2

Checking

1. Start the engine. Set the engine speed to the middle speed position.
2. Set the machine to the conditions shown below when checking the refrigerant.
 - (1) Air conditioner switch (1): ON
 - (2) Fan switch (2): HI position (maximum)
 - (3) Temp. adjustment switch (3)
Lower temp position
 - Door / window: Close
 - Compressor switch (4)
ON (the lamp lit up)

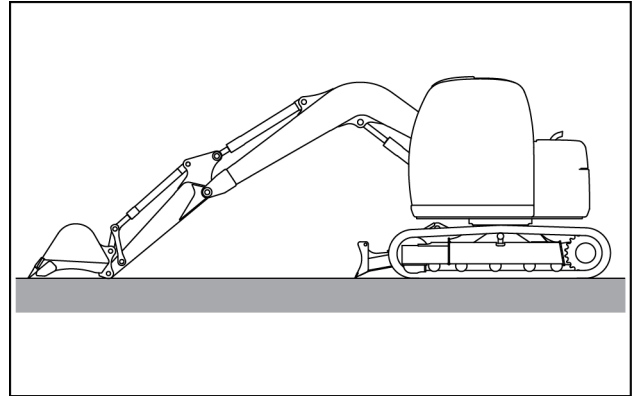
Cleaning suction strainer

ATTENTION: use extreme caution when removing the cover.

The oil is under high pressure when hot. Stop engine first, remove breather cap, press valve, release the pressure from tank, and then remove cover.

Immediately after operation, there is a hazard of getting burn because oil is hot. The service should be done after being cooled.

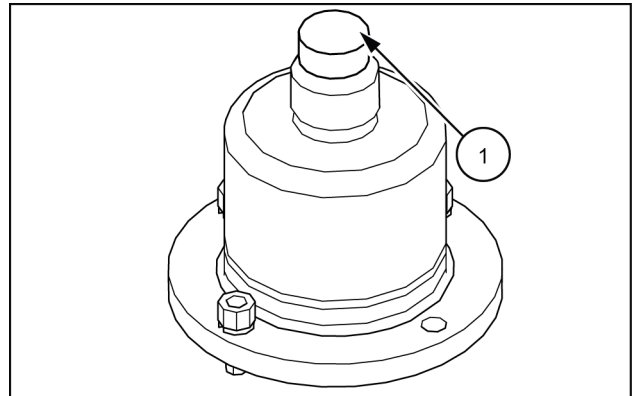
1. Park machine on firm level ground in the hydraulic level checking position, stop engine.
2. Move safety lever to **LOCK** position.
3. Clean the surface around hydraulic tank to prevent intrusion of foreign matter.



SMIL12CEX0359AB 1

4. To release the inner pressure of hydraulic oil tank, push several times (5 to 7 times) the valve (1) located on the tank.
5. Loosen 6 mounting bolts (2) of tank upper cover, remove cover (3).

NOTICE: do not drop bolt or others into the tank during the work.

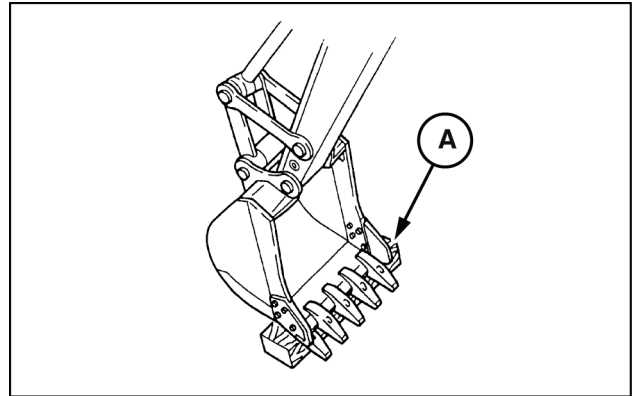


SMIL12CEX0360AB 2

Check for abrasion/damages on tooth point and side cutter

NOTICE: When replacing the tooth point and side cutter, apply a safety block to the bottom face of the bucket.

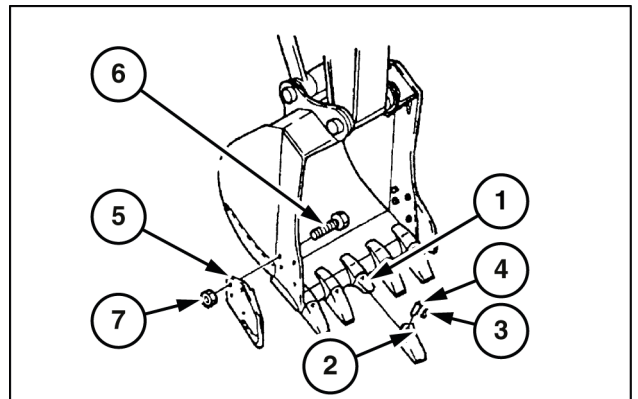
Check for wear and looseness of the bucket tooth points. Tooth point life cannot be determined only by the number of operating hour, operating conditions must also be considered.



TUIL12C140324AB 1

A: Safety block

1. Adapter nose
2. Tooth point
3. Rubber lock
4. Locking pin
5. Side cutter
6. Bolt
7. Nut



TUIL12C140325AB 2

Replacing the tooth points

⚠ WARNING

Personal Protective Equipment (PPE) required.

When assembling, operating, or servicing the machine, wear protective clothing and PPE necessary for the particular procedure. Some PPE that may be necessary includes protective shoes, eye and/or face protection, hard hat, heavy gloves, filter mask, and hearing protection.

Failure to comply could result in death or serious injury.

W0353A

Replace the bucket tooth in the following cases:

- When little holes appear on the tooth point.
- When the edge lines of the tooth point are worn.

8 - SPECIFICATIONS

General specifications

ENGINE	
Make	ISUZU Motors, Ltd.
Model	AP-4LE2X
Type	Water-cooled, 4cycle, direct injection type. Diesel engine with intercooler turbo-charger
Rated output power at 1850 RPM (ISO 14396)	42 kW (57.1 Hp)
Number of cylinders	4
Total displacement	2179 cm³ (133.0 in³)
Bore x Stroke	85 mm (3.3 in) x 96 mm (3.8 in)

ELECTRICAL SYSTEM	
Voltage	24 V
Battery	2 x 12 V
Battery capacity	74 A·h
Alternator	50 A
Starter motor	3.2 kW (4.4 Hp)

HYDRAULIC SYSTEM	
PUMP	
Maximum displacement	2 x 33 cm³ (2.0 in³)
Maximum flow rate	2 x 66 l/min (17.4 US gpm)
MAXIMUM OPERATING PRESSURE	
Attachment	29.4 MPa (4264.5 psi)
Travel	29.4 MPa (4264.5 psi)
Swing	32.9 MPa (4772.1 psi)
Dozer	20 MPa (2901.0 psi)
CYLINDERS (Bore x Stroke)	
Boom	110 mm (4.3 in) x 916 mm (36.1 in)
Arm	95 mm (3.7 in) x 839 mm (33.0 in)
Bucket	80 mm (3.1 in) x 762 mm (30.0 in)
Dozer	135 mm (5.3 in) x 129 mm (5.1 in)

TRAVEL	
Hydraulic motors	Axial piston type
Parking brake	Oil disk brake
Reduction unit	2 stage planetary gear unit
Maximum climbable gradient	70 %
TRAVEL SPEED	
Slow	2.6 km/h (1.6 mph)
Fast	5.3 km/h (3.3 mph)

SWING	
Hydraulic motor	Axial piston type
Parking brake	Oil disk brake
Reduction unit	2 stage planetary gear unit
Bullgear	Grease-bath
SWING SPEED	11.5 RPM

9 - ACCESSORIES

Operation of hydraulic breaker and nibbler (for 1 pedal type)

Selection of hydraulic breaker and nibbler

When installing a hydraulic breaker or nibbler to the machine, select the optimal breaker or nibbler taking the matters into consideration such as stability, hydraulic system pressure, required hydraulic oil volume.

Before operating breaker or nibbler

- Consult with your Dealer for the additional piping work and reinforcement for the arm to install the breaker or nibbler to the machine.
- When using the breaker or nibbler, fully understand and peruse the Operation Manual of its manufacturer and the refer to paragraph headed "Prohibited work in use of breaker" for the work mentioned in this MANUAL, in order to get full performance of them paying attention to damages on the machine and hydraulic breaker or nibbler.

Precautions for impurity and hydraulic oil

When the hydraulic breaker or nibbler is removed after its installation, apply a blinding plug to the stop valves attached on the tip of arm and openings on the hydraulic pipings for the hydraulic breaker or nibbler to prevent them from invasion of dust, water, etc.

Before the operation, check the looseness on the clamps which are fixing the piping for attachment, and the leakage on connections of tubes and hoses.

Selection of attachment mode

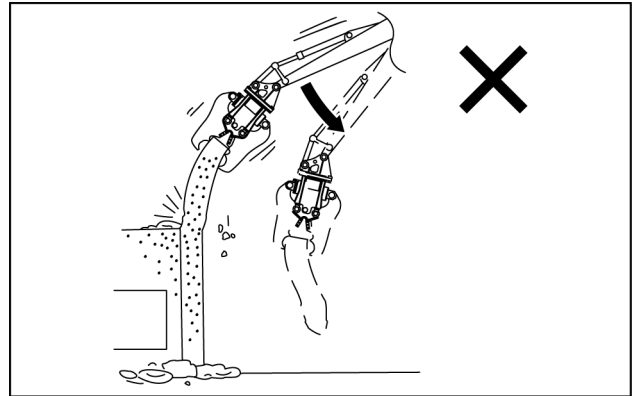
In accordance with the attachment which is equipped, it is necessary to change the attachment mode.

ATTENTION:

- *select the attachment mode appropriately when you use the breaker or nibbler. Confirm the position of attachment mode switch and the screen of multi display closely.*
- *Press the attachment mode switch to a correct position when the switch position is improper. Match the attachment mode to the attachment that is used from now.*
- *Select the breaker mode absolutely when you work with breaker. If the machine is operated with mode other than breaker mode, hydraulic component and breaker are damaged.*
- *If the selection of attachment mode is not correct, it causes defective operation and the breakdown of the machine.*
- *When "S", "E" or "H" of the fuel consumption mode is flickering, this shows that the selection of attachment mode is improper.*

Do not pry and pull nibbler during holding object

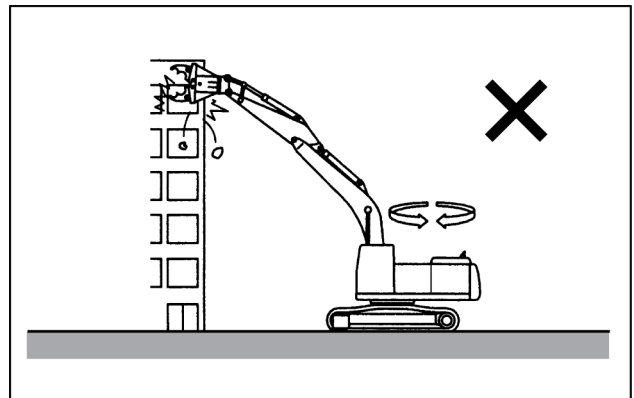
Do not pry and pull objects with nibbler.



TUIL12C140459AA 21

Do not swing the machine during holding object

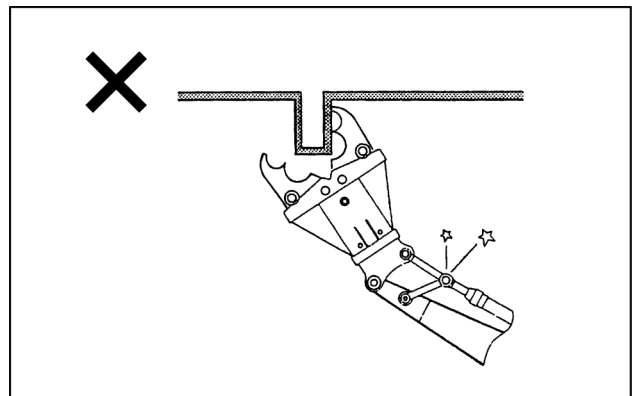
Do not pull down buildings and structures by the swing force.



TUIL12C140460AA 22

Do not hold object obliquely

Select machine position and holding position so that nibbler opening does not hold breaking object obliquely.



TUIL12C140461AA 23

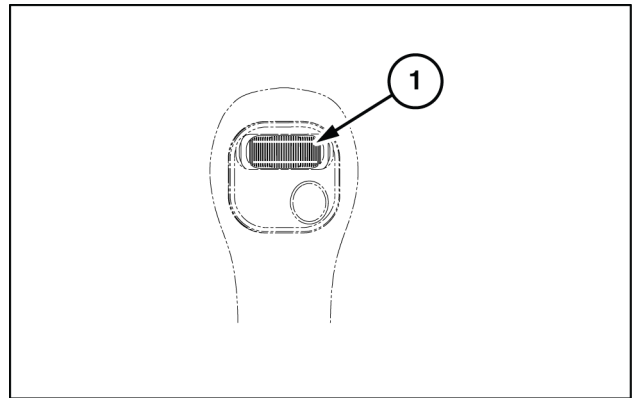
Extra hand control

Slide the switch (1) that is located on left control lever to actuate the “extra operation”.

Switch operation

Operation procedure of option switch (1)	Oil flow
Slide to the left	Extra (LH)
Slide to the right	Extra (RH)

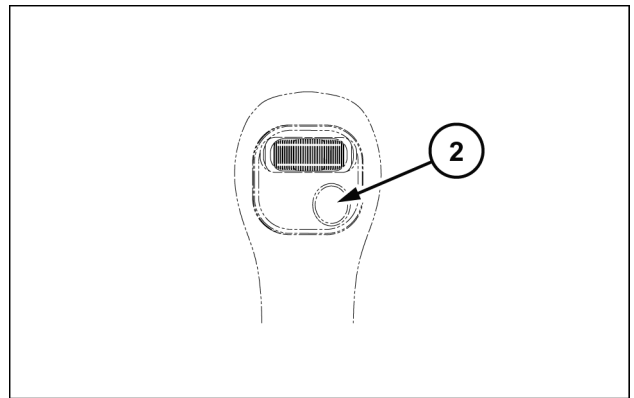
NOTICE: according to the slide distance of option switch, hydraulic flow rate increases.



TUIL12C140476AB 8

Horn switch

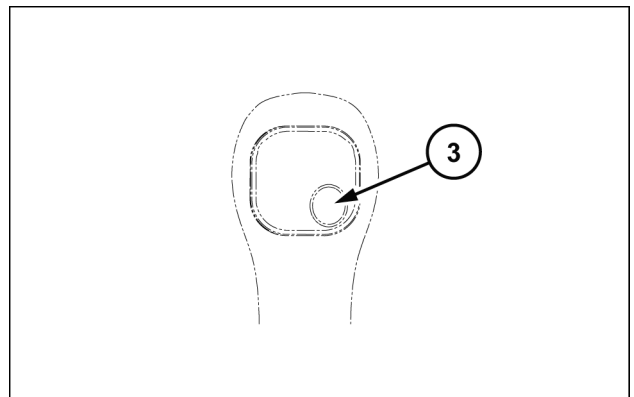
For horn switch (2), see 3-7.



TUSP12F1400023A 9

Reserve switch

When the machine is equipped with the option specification, this switch is used as a reserve switch (3).



TUSP12F1400024A 10

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