Operation & Maintenance Manual

SEAM007701

PC1000-1
PC1000LC-1
PC1000SE-1

HYDRAULIC EXCAVATOR

SERIAL NUMBERS PC1000-10001
PC1000LC-10001 and up
PC1000SE-10001

⚠ WARNING

Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read this manual before operating or maintaining this machine. This manual should be kept near the machine for reference and periodically reviewed by all personnel who will come into contact with it.

NOTICE

Komatsu has Operation & Maintenance Manuals written in some other languages. If a foreign language manual is necessary, contact your local distributor for availability.

KOMATSU

12. Operation 2-37
12.1 Check before starting engine 2-37
12.2 Starting engine 2-46
12.3 Operations and checks after starting engine 2-50
12.4 Moving machine off 2-52
12.5 Steering machine 2-56
12.6 Stopping machine 2-58
12.7 Swinging 2-60
12.8 Operation of work equipment 2-61
12.9 Working mode selection 2-62
12.10 Prohibitions for operation 2-63
12.11 Precautions for operation 2-66
12.12 Precautions when traveling up or down hills 2-67
12.13 How to escape from mud 2-69
12.14 Work possible using hydraulic excavator 2-70
12.15 Parking machine 2-71
12.16 Check after finishing work 2-72
12.17 Stopping engine 2-73
12.18 Check after stopping engine 2-74
12.19 Locking 2-74

13. Transportation 2-75
13.1 Precaution for transportation 2-75
13.2 Parts for transport 2-76
13.3 Procedure for increasing or reducing track frame gauge 2-79

14. Cold weather operation 2-81
14.1 Precautions for low temperature 2-81
14.2 Precautions after completion of work 2-83
14.3 After cold weather 2-83

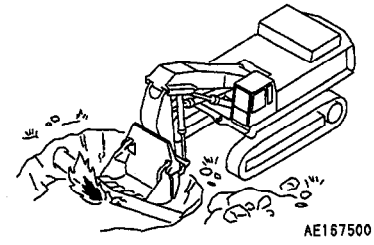
15. Long-term storage 2-84
15.1 Before storage 2-84
15.2 During storage 2-85
15.3 After storage 2-85
15.4 Starting machine after long-term storage 2-85

16. Troubleshooting 2-86
16.1 Phenomena that are not failures 2-86
16.2 Precautions on particular jobsites 2-86
16.3 If battery is discharged 2-87
16.4 Other trouble 2-91

7.1 BEFORE STARTING ENGINE

SAFETY AT WORKSITE

- Before starting the engine, thoroughly check the area for any unusual conditions that could be dangerous.
- Before starting the engine, examine the terrain and soil conditions of the worksite. Determine the best and safest method of operation.
- Make the slope as horizontal as possible before continuing operations.
- If you need to operate on a street, protect pedestrians and cars by designating a person for worksite traffic duty or by installing fences around the worksite.
- If water lines, gas lines, and high-voltage electrical lines may be buried under the worksite, contact each utility and identify their locations. Be careful not to sever or cut any of these lines.
- Check the depth and flow of water before operating in water or crossing a river. NEVER be in water which is in excess of the permissible water depth.
  Permissible water depth → See "12.11 PRECAUTIONS FOR OPERATION".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FIRE PREVENTION

- Thoroughly remove wood chips, leaves, paper and other flammable things accumulated on the engine compartment. They could cause a fire.
- Check fuel, lubrication, and hydraulic systems for leaks. Have any leaks repaired. Wipe up any excess oil, fuel or other flammable fluids.
  Check point → See "12.1.1 WALK-AROUND CHECK".
- Be sure a fire extinguisher is present in and working order.


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IN OPERATOR'S CAB

- Do not leave tools or spare parts lying around in the operator's compartment. They may damage or break the control levers or switches. Always put them in the tool box on the right side of the machine.
- Keep the cab floor, controls, steps and handrails free of oil, grease, snow, and excess dirt.
- Check the seat belt, buckle and hardware for damage or wear. Replace any worn or damaged parts. Always use seat belts when operating your machine.
  Seat belts → See "28. USING SEAT BELT".

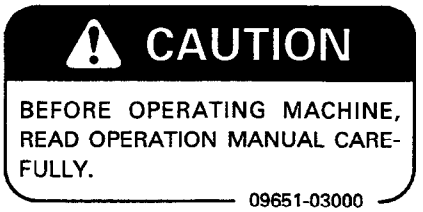
OPERATION SUPERVISOR

- Before performing lifting operation, designate an operation supervisor.
  Always execute operation according to his instructions.
  - o Execute operating methods and procedures under his direction.
  - o Select a person responsible for signaling. Operate only on signals given by such person.

HANDING OF WIRE ROPES ETC.

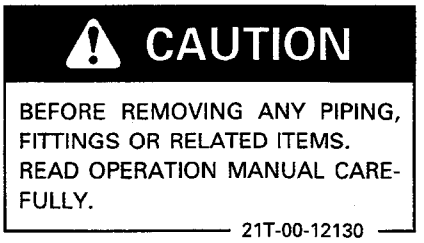
- Wear leather gloves when handling wire ropes.

1. Precaution prior to start operation (09651-03000)

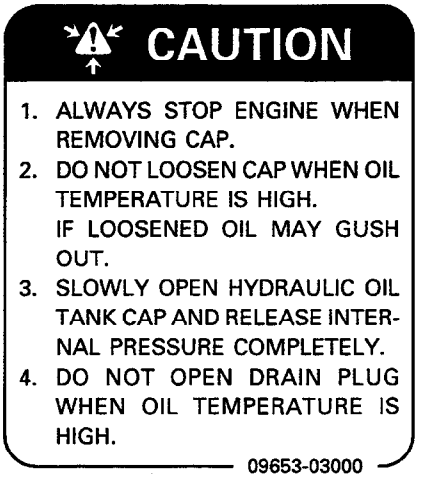


2. Warning, precaution for operation (209-00-52280)

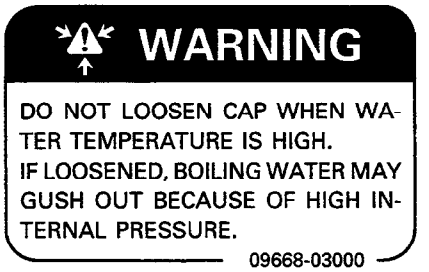
3. Caution for removing general piping (21T-00-12130)



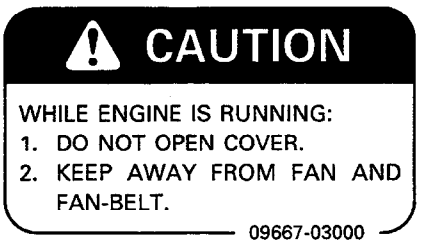
4. Caution for hydraulic tank cap (09653-03000)



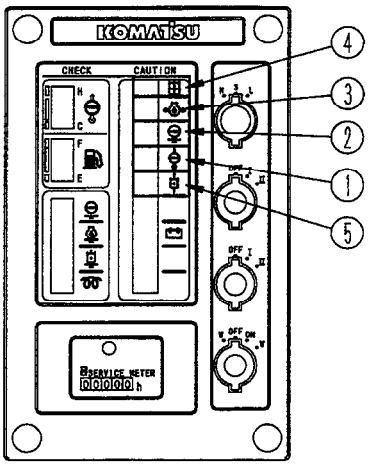
5. Caution for radiator cap (09668-03000)



6. Caution while engine is running (09667-03000)



11.1.3 C: EMERGENCY STOP ITEMS



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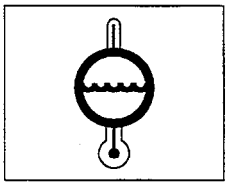
⚠ CAUTION

If any monitor lamp flashes, stop the engine or run it at low idling, and take the following action.

1. ENGINE WATER TEMPERATURE

If the temperature of the engine cooling water becomes abnormally high, the monitor lamp flashes, and the overheat prevention system is automatically actuated to reduce the engine speed.

Stop operations and run the engine at low idling until the engine water temperature gauge enters the green range.



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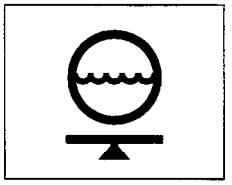
2. RADIATOR WATER LEVEL

If the radiator water level drops, the monitor lamp flashes. Stop the engine, check the radiator water level, and add water if necessary.



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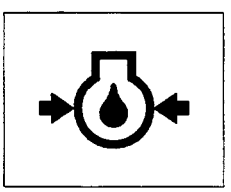
3. ENGINE OIL PRESSURE

If the engine oil pressure drops below the normal pressure, the monitor lamp flashes. At this time, stop the engine and inspect it according to "16.4 OTHER TROUBLE."



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REMARK

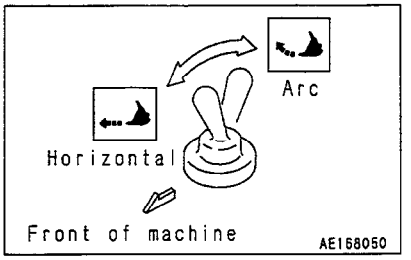
While the starting switch is ON, the lamp remains lit and goes off once the engine is started or stopped. When the engine starts, the buzzer may sound for a short time, however, this does not indicate a fault.

8. BUCKET MOVEMENT SELECTOR SWITCH

This switches between arc digging and automatic horizontal digging.

Horizontal digging: When the arm control lever is operated with the bucket near the ground, the bucket will dig the ground in a horizontal movement.

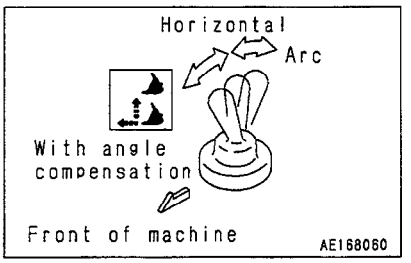
Arc digging: Any operation can be carried out within the working range.



When using bucket with angle compensator

The following positions are provided in addition to those on the standard type.

Horizontal digging with bucket angle compensation: When the arm control lever is operated with the bucket near the ground, the bucket will dig the ground in a horizontal movement.
During BOOM RAISE operations, the angle of the bucket is automatically corrected to prevent the load from spilling.

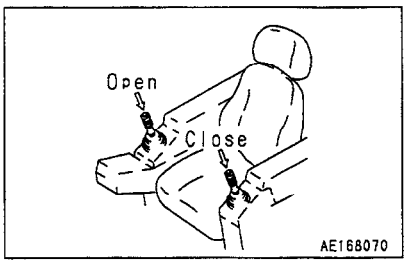


9. BOTTOM DUMP SWITCH

These switches open and close the front bucket.

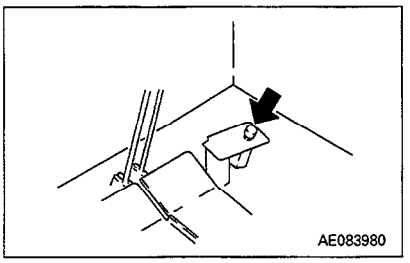
OPEN: Press the button at the tip of the right work equipment control lever.

CLOSE: Press the button at the tip of the left work equipment control lever.



10. HORN SWITCH

When the button at the right of the footrest is pressed, the horn sounds.



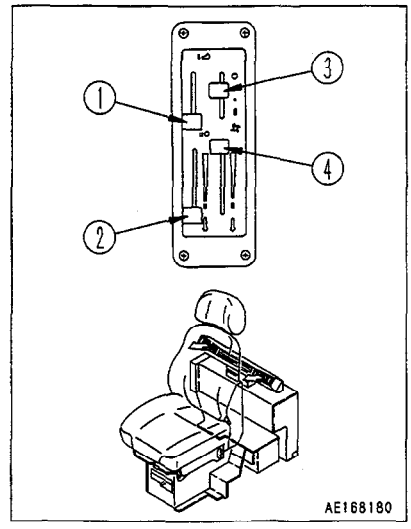
11.9.2 OPERATION

Cooling

Set the knobs to the following positions and a cool breeze will be flowed in from the rear vents.

- Outlet change-over knob ①: FACE
- Heater temperature knob ②: OFF
- Blower switch ③: See table below.
- Cooler temperature knob ④: See table below.

Purpose \ Control knob	Blower switch ③	Cooler temp. knob ④
Quick cooling	HIGH	HIGH
Normal cooling	MEDIUM-LOW	MEDIUM
Gradual cooling	LOW	LOW

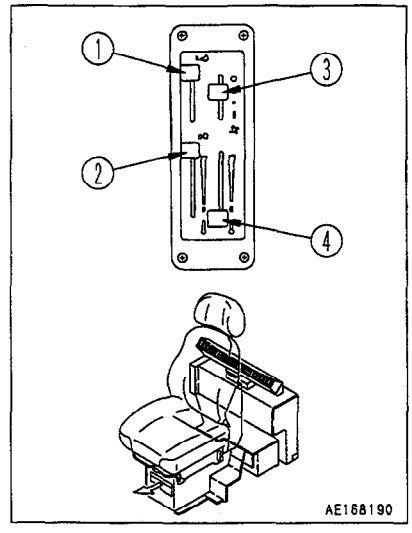


Heating

Set the knobs to the following positions, then warm breeze will be flowed in to the feet.

- Outlet change-over knob ①: FOOT
- Heater temperature knob ②: See table below.
- Blower switch ③: See table below.
- Cooler temperature knob ④: OFF

Purpose \ Control knob	Heater temp. knob ②	Blower switch ③
Quick heating	HIGH	HIGH
Normal heating	MEDIUM	MEDIUM or LOW
Mild heating	LOW	LOW

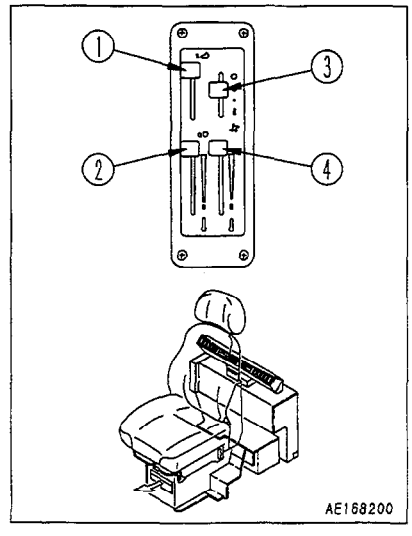


Dehumidity and heating

Set the knobs to the following positions and a dry, fresh, warm breeze will be flowed from the vents at operator's feet.

- Outlet change-over knob ①: FOOT
- Heater temperature knob ②: See table below.
- Blower switch ③: See table below.
- Cooler temperature knob ④: HIGH

Purpose \ Control knob		Heater temp. knob ②	Blower switch ③
Dehumidifying and heating	Winter	HIGH	HIGH
	Normal heating Autumn	MEDIUM or LOW	MEDIUM or LOW



2. **Remove dirt and dust from around engine, battery, radiator**
   Check if there is any dirt or dust accumulated around the engine or radiator. Check also if there is any flammable material (dead leaves, twigs, grass, etc.) accumulated around the battery or high temperature engine parts, such as the engine muffler or turbocharger. Remove all such dirt or flammable material.

3. **Check for leakage of water or oil around engine**
   Check that there is no leakage of oil from the engine or leakage of water from the cooling system. If any abnormality is found, repair it.

4. **Check for oil leakage from hydraulic equipment, hydraulic tank, hoses, joints**
   Check that there is no oil leakage. If any abnormality is found, repair the place where the oil is leaking.

5. **Check the undercarriage (track, sprocket, idler, guard) for damage, wear, loose bolts, or leakage of oil from rollers and final drive case**

6. **Check for leakage of water from radiator**

7. **Check tightness of air cleaner mounting bolts**

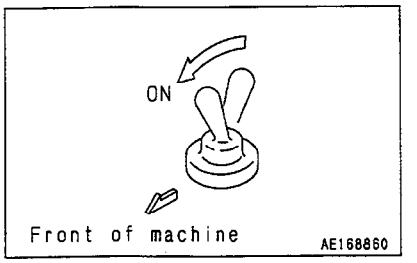
8. **Check oil level in PTO case**
   Check the oil level in PTO case.
   The oil level should be between the L and H marks.

9. **Check oil level in swing machinery case**
   Check the oil level in swing machinery case.
   The oil level should be between the L and H marks.

10. **Drain water and sediment from fuel tank**
    Loosen drain valve and drain the water and sediment at the bottom of the tank together with fuel.

For detail see MAINTENANCE "24.4 CHECK BEFORE STARTING".

5. Set the low temperature starting aid switch ④ to ON position. The low temperature starting aid monitor lamp flashes.

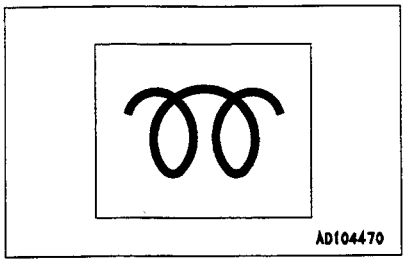


REMARK

Even if the ambient temperature is below 15°C (59°F), if the starting aid switch is set ON when the water temperature is above 13°C (55.4°F), the low temperature starting aid monitor lamp will not flash.

In this case, start the engine by normal starting.

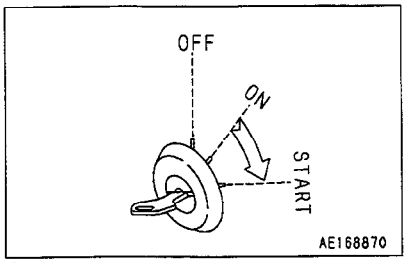
6. Hold the low temperature starting aid switch until the low temperature starting aid monitor lamp light up.



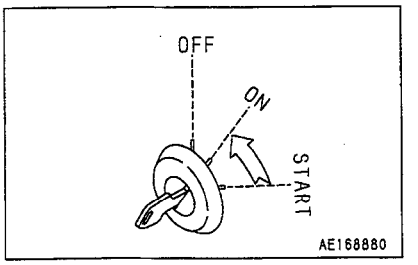
REMARK

Preheating is completed after approx. 80 seconds, and the monitor lamp become flash to light up.

7. When the monitor lamp light up, turn the key of starting switch ③ to the START position and start the engine.

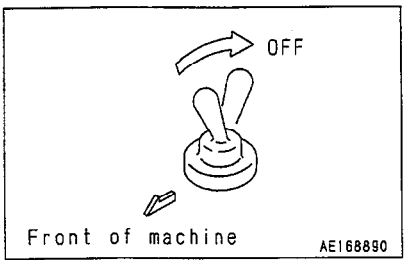


8. When the engine started, release the key of starting switch ③ and the key will return automatically to ON.



9. When the engine runs smoothly and the color of exhaust gas becomes normal, put the low temperature starting aid switch ④ in the OFF position.

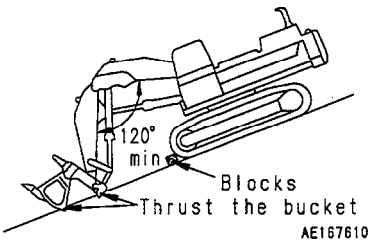
   The low temperature starting aid monitor ⑤ goes off.

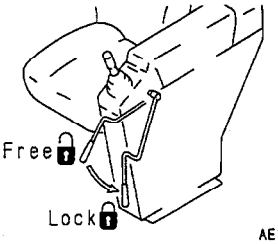


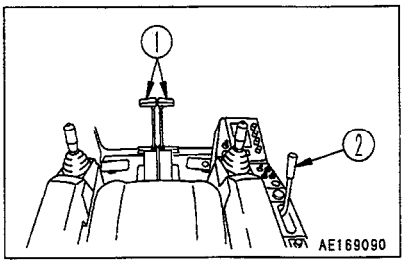
12.6 STOPPING MACHINE

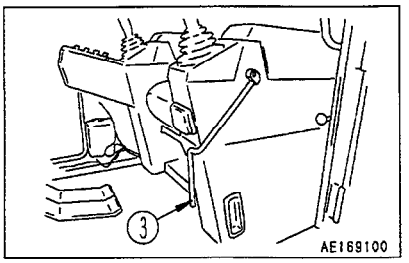
⚠ WARNING

- **Avoid stopping suddenly. Give yourself ample room when stopping.**
- **When stopping the machine, select flat hard ground and avoid dangerous places. If it is unavoidably necessary to park the machine on a slope, insert blocks underneath the track shoes. As an additional safety measure, thrust the bucket into the ground.**
- **If the control lever is touched by accident, the work equipment or the machine may move suddenly, and this may lead to a serious accident. Before leaving the operator's compartment, always set the safety lock lever securely to the LOCK position.**
- **When the machine is not being used after completion of work, first retract the work equipment cylinder to the stroke end, then set the work equipment in the posture shown in the diagram.**

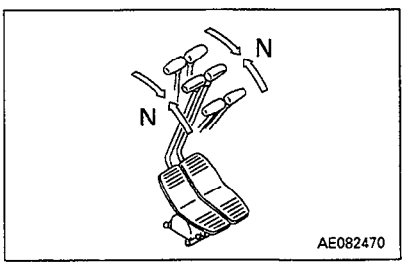








1. Put the left and right travel levers ① in the neutral position, then stop the machine.



Braking when traveling downhill
To brake the machine during downhill runs, put the travel lever in the neutral position. This will cause the brake to be automatically applied.

If shoes slip
When traveling uphill, if the shoes slip or it is impossible to travel uphill using the force of the track only, it is possible to use the pulling force of the arm to help the machine travel uphill.

If engine stops
If the engine stops when traveling uphill, move the travel levers to the neutral position, lower the bucket to the ground, stop the machine, then start the engine again.

When engine trouble causes the engine to stop with the work equipment (boom) raised, place the traveling and steering levers in NEUTRAL and immediately (within 2 or 3 minutes) operate the boom lever fully to the LOWER side and lower the work equipment until it is in contact with the ground.

Precautions on slopes
- If the engine stops when the machine is on a slope, never use the left work equipment control lever to carry out swing operations. The upper structure will swing under its own weight.
- Do not open or close the door on the cab if the machine is on a slope. This may cause a sudden change in the operating force. Always keep the door locked.

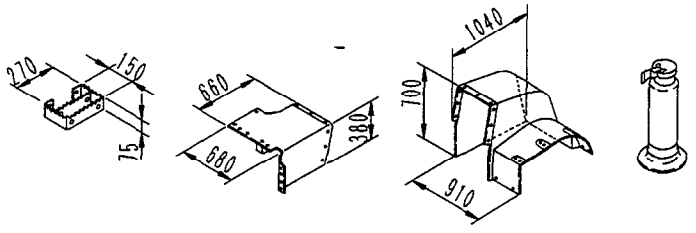
Total weight: 410 kg (904 lb)

Weight 2 kg x 3
(4.4 lb x 3)

Weight 30 kg x 2
(66 lb x 2)

Weight 120 kg x 2
(265 lb x 2)

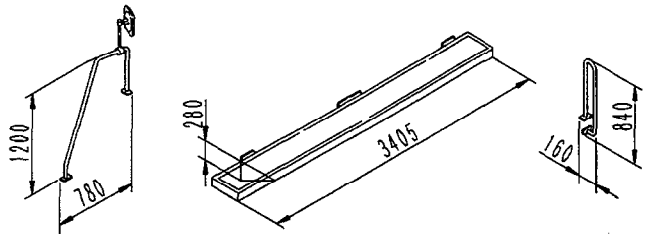
Weight 25 kg
(904 lb)



Weight 5 kg (11 lb)

Weight 60 kg (132 lb)

Weight 7 kg x 2 (15 lb x 2)



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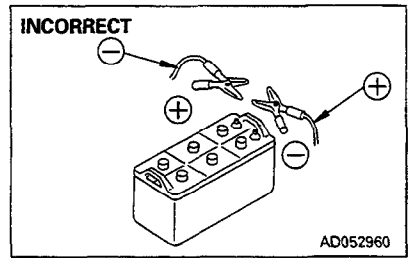
16.3.1 STARTING ENGINE WITH BOOSTER CABLE

When starting the engine with a booster cable, do as follows:

Precautions when connecting and disconnecting booster cable

⚠ WARNING

- **When connecting the cables, never contact the positive ⊕ and negative ⊖ terminals.**
- **When starting the engine with a booster cable, always wear safety glasses.**
- **Be careful not to let the normal machine and problem machine contact each other. This prevents sparks from generating near the battery which could ignite the hydrogen gas given off by the battery. If hydrogen gas explodes, it could cause serious injury.**
- **Make sure that there is no mistake in the booster cable connections. The final connection is to the revolving frame, but sparks will be generated when this is done, so connect to a place as far as possible from the battery. (However, avoid connecting the cable to the work equipment, as conduction is poor.)**
- **Use care when removing the cables from the machine that has been started. Do not allow the cable ends to contact each other or the machine, to avoid hydrogen explosion.**



NOTICE

- **The size of the booster cable and clip should be suitable for the battery size.**
- **The battery of the normal machine must be the same capacity as that of the engine to be started.**
- **Check the cables and clips for damage or corrosion.**
- **Make sure that the cables and clips are firmly connected.**

MEMO

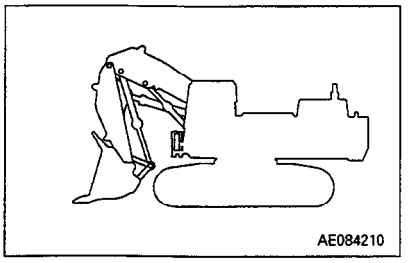
18.4 RELEASING PRESSURE

When disassembling the machine or removing the piping during inspection or maintenance, always release the pressure as follows.

RELEASING PRESSURE FROM WORK EQUIPMENT CIRCUIT, SWING CIRCUIT, TRAVEL CIRCUIT

⚠ WARNING

When removing the oil filler cap of the hydraulic tank, turn it slowly to release the internal pressure before taking off the cap.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1. Lower the work equipment to the ground in a stable flat place as shown in the diagram, then stop the engine.

- Set the lock lever to the FREE position.

2. After stopping the engine, move each work equipment control lever to the end of its travel within 5 to 6 seconds.

- Leave the starting switch ON.

3. Remove the cap of the hydraulic tank.

4. Start the engine, run it for approx. 10 seconds, then stop the engine again.
- When running the engine, do not raise the speed above 1000 rpm.
- Set the work equipment control levers to neutral.

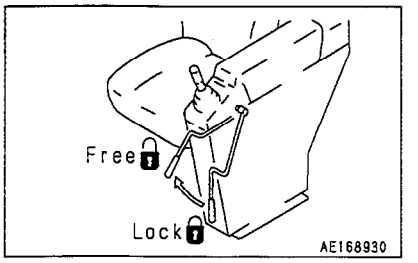
5. After stopping the engine, move each work equipment control lever to the end of its travel within 5 to 6 seconds.
- Repeat Steps 4 to 5 three times.

RELEASING PRESSURE IN ACCUMULATOR CIRCUIT

Pilot circuit

Stop the engine, set lock lever to the FREE position, then move each work equipment control lever 3 to 4 times to the end of its travel. After 1 minute passes, the pressure is relieved.

- Do not loosen the piping less than 1 minute after releasing pressure.



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REMARK

- When fuel sulphur content is less than 0.5%, change oil in the oil pan at every periodic maintenance interval given in this manual.
  Change oil according to the following table if fuel sulphur content is above 0.5%.

Fuel sulphur content	Change interval of oil in engine oil pan
0.5 to 1.0%	1/2 of regular interval
Above 1.0%	1/4 of regular interval

- When starting the engine in an atmospheric temperature of under 0°C (32°F), be sure to use engine oil of SAE10W, SAE10W-30 and SAE15W-40, even though atmospheric temperature goes up to 10°C more or less in the day time.

- Use API classification CD as engine oil and if API classification CC, reduce the engine oil change interval to half.

- There is no problem if single grade oil is mixed with multigrade oil (SAE10W-30, 15W-40), but be sure to add single grade oil that matches the temperature in the table.

- We recommend Komatsu genuine oil which has been specifically formulated and approved for use in engine and hydraulic work equipment applications.

Specified capacity: Total amount of oil including oil for components and oil in piping.
Refill capacity: Amount of oil needed to refill system during normal inspection and maintenance.

ASTM: American Society of Testing and Material
SAE: Society of Automotive Engineers
API: American Petroleum Institute

SERVICE ITEM	PAGE
Change oil in final drive case	3-62
Check level of battery electrolyte	3-63
Change oil in engine oil pan, replace engine oil filter cartridge	3-64
Replace hydraulic filter element	3-65
Check alternator drive belt tension, adjust	3-66
Check airconditioner compressor belt tension, adjust	3-67
Check, clean fuel strainer	3-68
Check and tighten track shoe bolts	3-68
Check and tighten track frame and axle connecting bolts	3-68
EVERY 500 HOURS SERVICE	
Clean hydraulic tank strainer	3-69
Check and clean radiator fins	3-70
Clean pilot filter strainer	3-70
Clean strainer of PTO lubrication oil filter	3-70
Change fuel filter	3-71
Check fan belt	3-71
Check inspection of weldings structure (color check)	3-72
EVERY 1000 HOURS SERVICE	
Change oil in swing machinery case	3-76
Check turbocharger clamping joint	3-76
Lubricating of tension pulley (2 points)	3-76
Change oil in PTO case	3-77
Replace corrosion resistor cartridge	3-77
Replace hydraulic tank breather element	3-78
EVERY 2000 HOURS SERVICE	
Change oil in final drive case	3-79
Change oil in hydraulic tank, clean strainer	3-80
Clean, check turbocharger	3-80
Check turbocharger rotor play	3-80
Check swing pinion grease level, add grease	3-81
Clean engine breather	3-82

24.3.4 CHECK AND ADJUST TRACK TENSION

⚠WARNING

Carry out this operation with two workers. The operator must move the machine in accordance with the signals from the other worker. The track tension is checked with the chassis raised, so it is extremely dangerous if the machine is lowered by mistake during the inspection. Never move the machine while anyone is carrying out measurements.

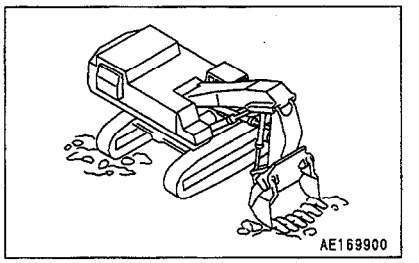
The wear of pins and bushings on the undercarriage will vary with the working conditions and soil properties. It is thus necessary to continually inspect the track tension so as to maintain the standard tension.

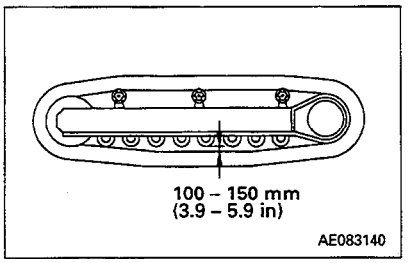
Carry out the check and adjustment under the same conditions as when operating (on jobsites where the track becomes clogged with mud, measure with the track clogged with mud).

Inspection

1. Raise the chassis with the boom and arm.
   When doing this, operate the levers slowly.
2. Measure the clearance between the sprocket and the top of the track shoe at a position that is safe even if the chassis should come down.

Standard clearance: 100 to 150 mm (3.9 to 5.9 in)





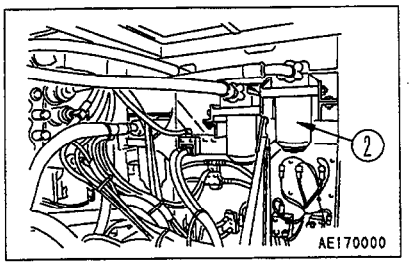
24.3.10 CLEAN LINE FILTER

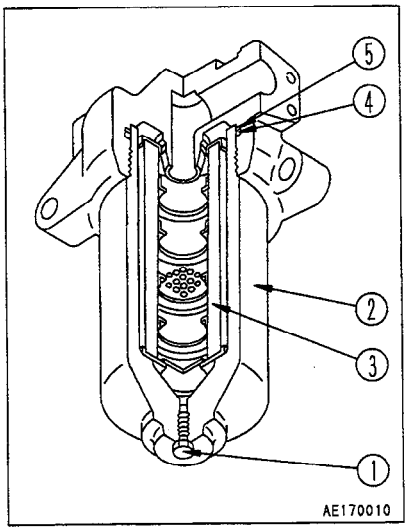
If there is any abnormality in the pump or other hydraulic equipment, remove the dirt from inside the line filter as follows.

Before removing the line filter, release the pressure inside the hydraulic circuit. For details, see "18. OUTLINES OF SERVICE".

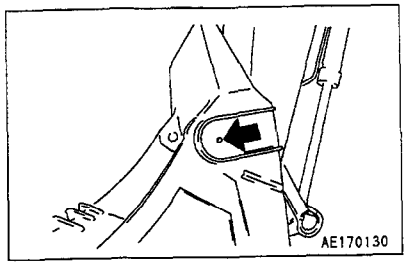
1. Loosen drain plug ①.

2. Remove case ②, and clean filter ③.
   (1) When cleaning the filter, also clean off the dirt and dust stuck to the side face of the case.
   (2) When assembling the case again, replace O-ring ④ and backup ring ⑤ together.
   (3) After assembling the line filter again, bleed the air from the system. (For details, see "18.5 BLEEDING AIR FROM CIRCUIT".)

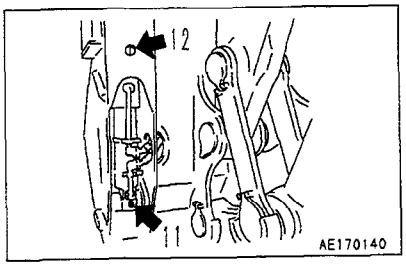




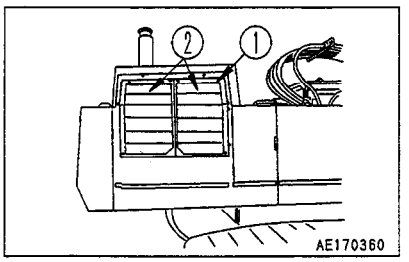
10. Bucket hinge pin (2 points)



11. Bottom dump cylinder foot pin (2 points)
12. Bottom dump cylinder rod end pin (2 points)



24.8.2 CHECK AND CLEAN RADIATOR FINS

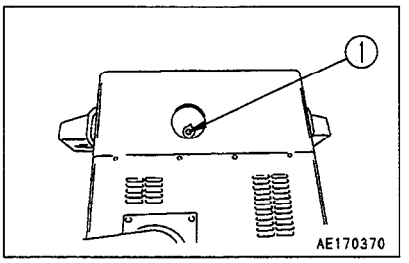


1. Remove bolts ① and cover ②.
2. Remove the mounting bolts of the air conditioner condenser, and rotate the condenser towards the front of the machine. Carry out the cleaning from the rear face of the condenser.
3. Clean the radiator fins clogged with mud, dust and leaves with compressed air.
   Stream or water may be used instead of compressed air.
   The rubber hose should be checked at the same time. If the hose is found to have cracks or to be hardened by ageing, such hose should be replaced by new one. Further, looseness of hose clamps should also be checked.

24.8.3 CLEAN PILOT FILTER STRAINER

⚠WARNING

The oil is at high temperature after engine has been operated. Wait for the oil to cool down before carrying out maintenance.

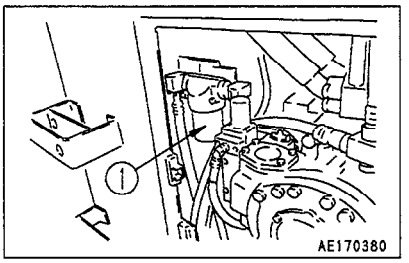


1. Remove filter case ①.
2. Take out the strainer and wash the strainer in the fuel. Replace the strainer if finding some defects.
3. Install the strainer and filter case ①.

24.8.4 CLEAN STRAINER OF PTO LUBRICATING OIL FILTER

⚠WARNING

The oil is at high temperature after engine has been operated. Wait for the oil to cool down before carrying out maintenance.



1. Remove filter case ①.
2. Take out the strainer and wash the strainer in the fuel. Replace the strainer if finding some defects.
3. Install the strainer and filter case ①.

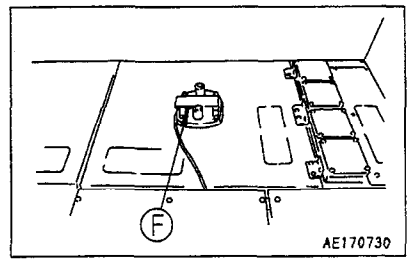
24.10.2 CHANGE OIL IN HYDRAULIC TANK, CLEAN STRAINER

⚠WARNING

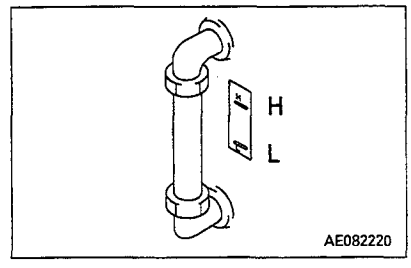
The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before changing it. When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it carefully.

Prepare the following.
- Container to catch drained oil: min. 650 ℓ capacity
- Refill, capacity: 650 ℓ (172 US gal, 143 UK gal)
- Prepare a handle for the socket wrench set.

1. Retract the arm and bucket cylinder, lower the boom, put the tips of the teeth in contact with the ground, then stop the engine.
2. Remove the cap of oil filler Ⓕ.



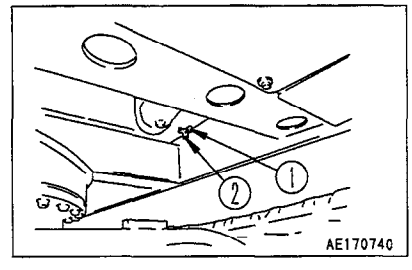
3. Remove drain plug ② and loosen valve ① at the bottom of the machine body to drain off the oil. After draining off the oil, tighten up the drain valve and plug.
4. Pour in the specified amount of engine oil through oil filler Ⓕ.



For details of engine oil filling, see "24.4.2 CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL".

For details of releasing the air inside the hydraulic tank and the pressure inside the hydraulic circuit, see "18.5 BLEEDING AIR FROM CIRCUIT".

For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".



24.10.3 CLEAN, CHECK TURBOCHARGER

Excessive carbon or oil sludge adhering to turbocharger blower impeller may deteriorate normal performance of turbocharger and may sometimes damage it.

Ask your Komatsu distributor to clean the turbocharger and check rotation of the rotor impeller.

24.10.4 CHECK TURBOCHARGER ROTOR PLAY

Contact your Komatsu distributor for checking.

26. GENERAL PRECAUTIONS

26.1 PRECAUTIONS RELATED TO SAFETY

If attachments or options other than those authorized by Komatsu are installed, this will not only affect the life of the machine, but will also cause problems with safety.
When installing attachments not listed in this Operation and Maintenance Manual, please contact your Komatsu distributor first.

If you do not contact Komatsu, we cannot accept any responsibility for any accident or failure.

⚠ WARNING

Precautions for removal and installation operations
When removing or installing attachments, obey the following precautions and take care to ensure safety during the operation.

- **Carry out the removal and installation operations on a flat, firm ground surface.**
- **When the operation is carried out by two or more workers, determine signals and follow these during the operation.**
- **When carrying heavy objects (more than 25 kg (55 lb)), use a crane.**
- **When removing heavy parts, always support the part before removing it.**
  When lifting such heavy parts with a crane, always pay careful attention to the position of the center of gravity.
- **It is dangerous to carry out operations with the load kept suspended. Always set the load on a stand, and check that it is safe.**
- **When removing or installing attachments, make sure that they are in a stable condition and will not fall over.**
- **Never go under a load suspended from a crane.**
  Always stand in a position that is safe even if the load should fall.

NOTICE

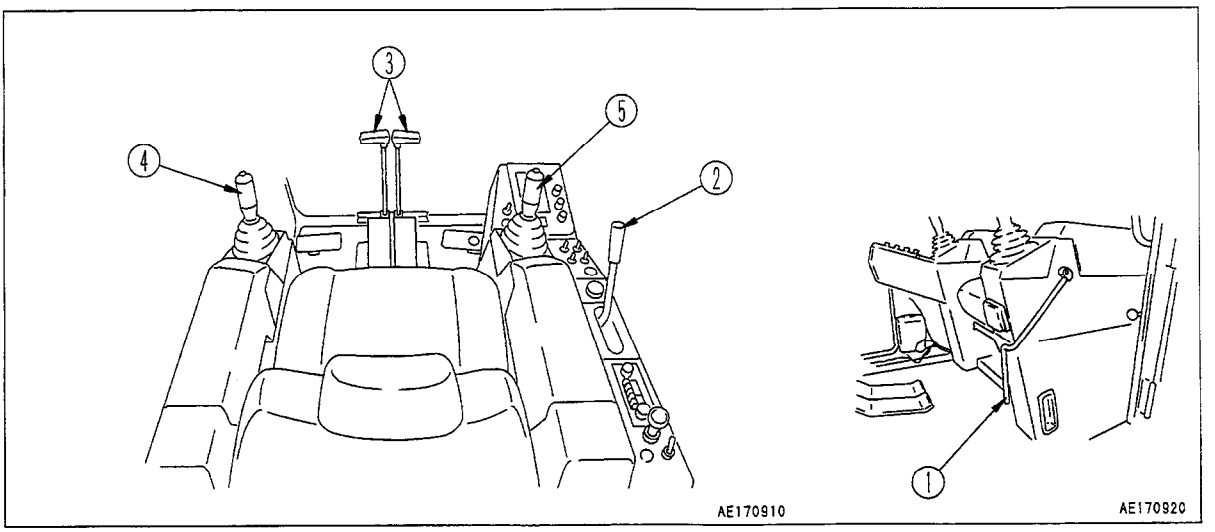
Qualifications are required to operate a crane. Never allow the crane to be operated by an unqualified person.

For details of the removal and installation operations, please contact your Komatsu distributor.

31.2 CONTROL LEVERS

⚠ WARNING

For machine with auto-deceleration device, careful operation of levers ② through ⑤ is necessary in the deceleration range because the engine speed rises quickly.

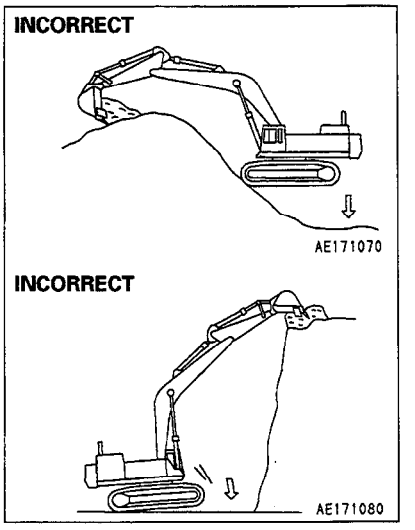


1. **LOCK LEVER**
2. **FUEL CONTROL LEVER**
   (with auto-deceleration device)
3. **TRAVELING AND STEERING LEVERS**
   (AND PEDALS)
   (with auto-deceleration device)

Details of the above equipment 1, 2, 3 are given in CONTROL LEVERS, PEDAL on the previous pages.

Scraping-down operations are prohibited.

Never use the front bucket of a bottom-dump bucket to scrap down rocks or soil.



Digging rocky ground

It is better to excavate hard rocky ground after breaking it up by some other means.
This will not only reduce damage to the machine but make for better economy.

Phenomena that do not indicate failure

Note that the following phenomena are not faults:

- The arm may sometimes stop when the bucket teeth become more or less horizontal.
- At the beginning and end of a swinging, a noise may sometimes be emitted from the brake valve.
- When descending a steep slope at low speed, a noise may sometimes be emitted from the travel motor.