PART NO. EM17B-1-1

Operator's Manual

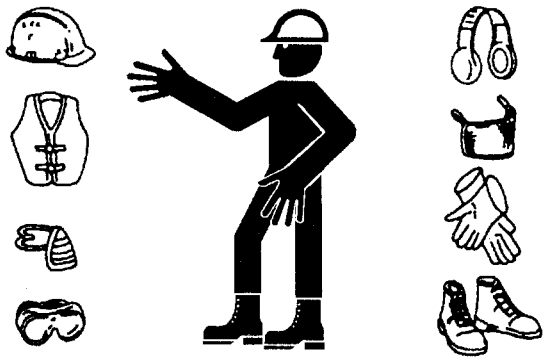
EX550-3
EX550LC-3
EX600H-3
EX600LCH-3

Excavator

Serial No. 06001 and up

HITACHI

WEAR PROTECTIVE CLOTHING



SA-438

- Wear close fitting clothing and safety equipment appropriate to the job.

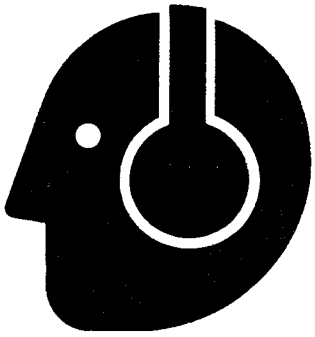
  You may need:
  A hard hat
  Safety shoes
  Safety glasses, goggles, or face shield
  Heavy gloves
  Hearing protection
  Reflective clothing
  Wet weather gear
  Respirator or filter mask.
  Be sure to wear the correct equipment and clothing for the job. Do not take any chances.

  · Avoid wearing loose clothing, jewelry, or other items that can catch on control levers or other parts of the machine.

- Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.

005-E01A-0438-4

PROTECT AGAINST NOISE



SA-434

- Prolonged exposure to loud noise can cause impairment or loss of hearing.

  · Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortably loud noises.

006-E01A-0434-2

INSPECT MACHINE

SA-435

- Inspect your machine carefully each day or shift by walking around it before you start it to avoid personal injury.

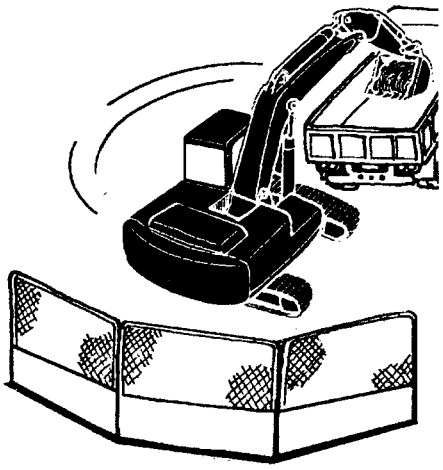
  · In the walk-around inspection be sure to cover all points described in the "PRE-START INSPECTION" chapter.

007-E01A-0435-2

KEEP PERSONNEL CLEAR FROM WORKING AREA

- A person may be hit severely by the swinging front attachment or counterweight and/or may be crushed against an other object, resulting in serious injury or death.

  · Keep all persons clear from the area of operation and machine movement.
  · Before operating the machine, set up barriers to the sides and rear area of the bucket swing radius to prevent anyone from entering the work area.



022-E01A-0386-3 SA-386

NEVER POSITION BUCKET OVER ANYONE

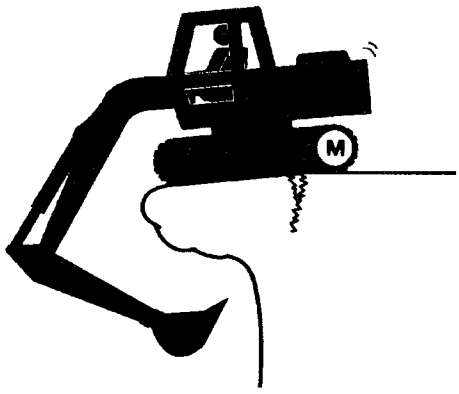
- Never lift, move, or swing bucket above anyone or a truck cab.
  Serious injury or machine damage may result due to bucket load spill or due to collision with the bucket.

023-E01A-0487-2 SA-487

AVOID UNDERCUTTING

- In order to retreat from the edge of an excavation if the footing should collapse, always position the undercarriage perpendicular to the edge of the excavation with the travel motors at the rear.

  · If the footing starts to collapse and if the sufficient retreat is not possible, do not panic. Often, the machine can be secured by lowering the front attachment, in such cases.

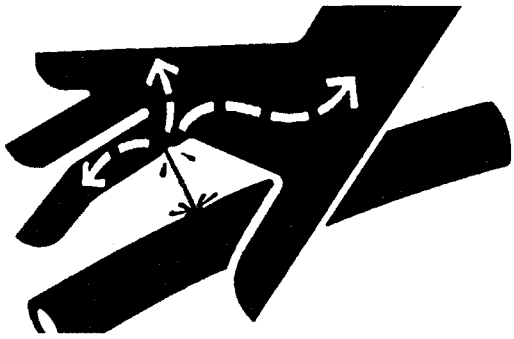


024-E01A-0488-2 SA-488

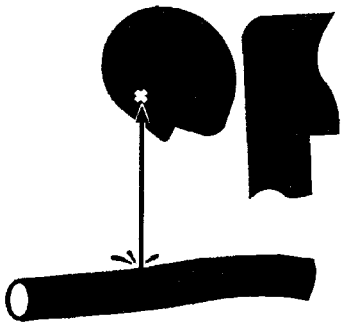
AVOID HIGH-PRESSURE FLUIDS

- Fluids such as diesel fuel or hydraulic oil under pressure can penetrate the skin or eyes causing serious injury, blindness or death.

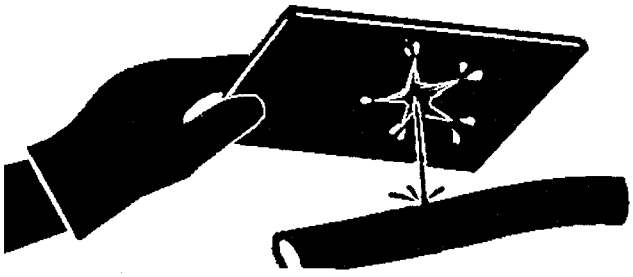
  · Avoid this hazard by relieving pressure before disconnecting hydraulic or other lines.
  · Relieve the pressure by moving the control levers several times.
  Tighten all connections before applying pressure.
  · Search for leaks with a piece of cardboard; take care to protect hands and body from high-pressure fluids. Wear a face shield or goggles for eye protection.
  · If an accident occurs, see a doctor familiar with this type of injury immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.



SA-031



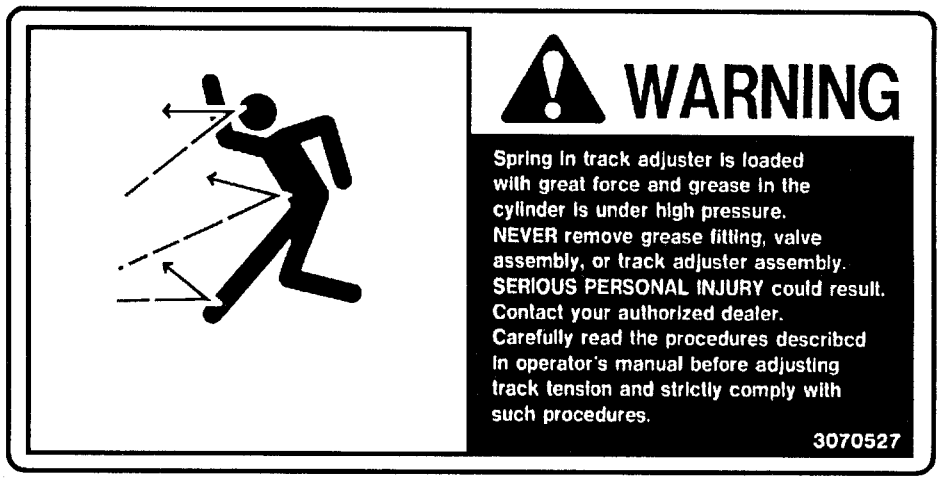
SA-292



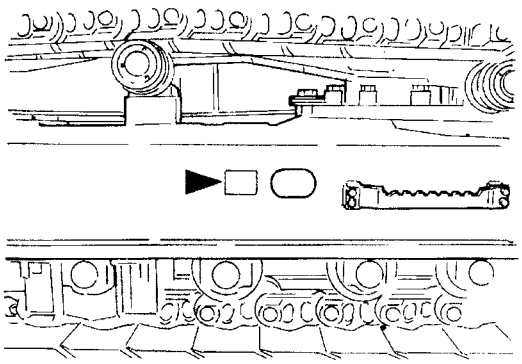
507-E01A-0499-5

SA-044

SAFETY SIGNS

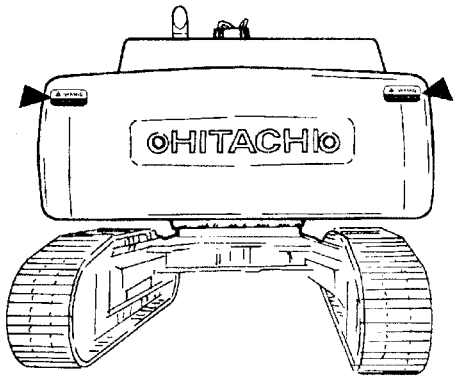


SS-408



SS-520

SS-442



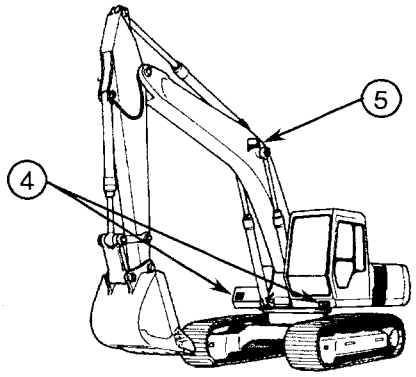
SS-519

LIGHTS

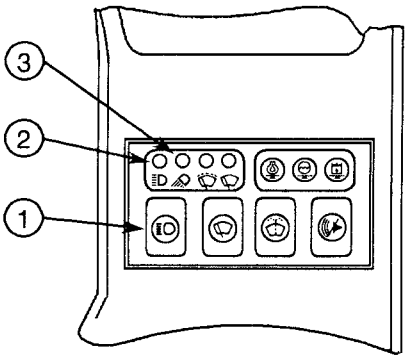
Push switch ① once to turn on head lights ④ and instrument lights. Indicator ② will light.

Push switch ① a second time to turn on work light ⑤ and head lights ④. Indicator ③ will light.

Push switch ① a third time to turn off all lights.



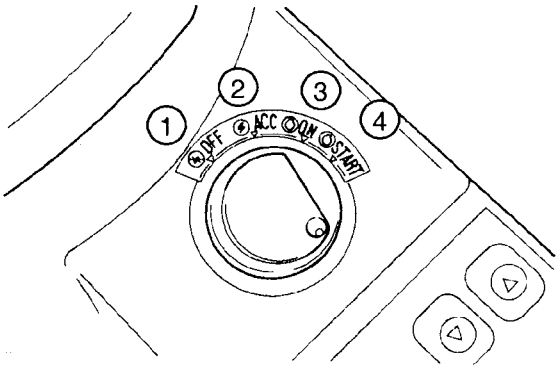
M104-01-018



M104-01-015

KEY SWITCH

1 — OFF (Engine Off)
2 — ACC (Horn, Radio etc.)
3 — ON (Engine On)
4 — START (Engine Start)



M116-01-005

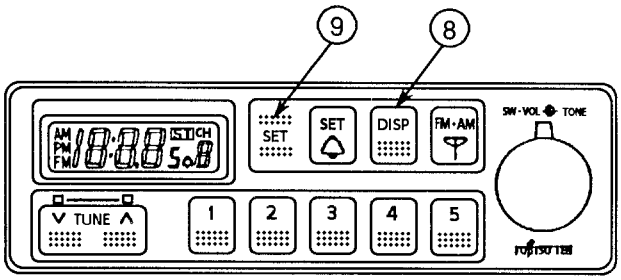
4. Setting the digital clock

IMPORTANT: Clock and preset tuning buttons will need to be reset any time the machine batteries are disconnected.

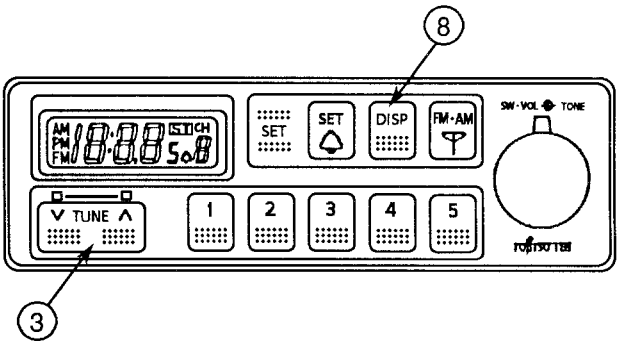
a. Select clock display by depressing display switch ⑧ and hold it.

b. To set the clock to zero minutes press set switch ⑨ while keeping display switch ⑧ depressed. If the current minute display is 29 or less the hour display will not change, and the minute display will read 00. If the current minute display is 30 or more, the hour display will increase one hour and minute display will read 00.

c. Keeping display switch ⑧ depressed, adjust the hour setting by depressing the (V) side of tuning switch ③. When the correct hour is obtained, depress the (Λ) side of tuning switch ③ to adjust the minute display. When the correct time is obtained, release display switch ⑧.



M107-01-027



M107-01-027

ADJUSTING THE SUSPENSION SEAT (FOR NORTH AMERICA)

1. SUSPENSION ADJUSTMENT
   Turn knob ① clockwise to increase suspension stiffness.
   Turn knob counterclockwise to decrease suspension stiffness.

2. SEAT HEIGHT ADJUSTMENT
   Turn knob ② clockwise to raise seat. Turn knob ② counterclockwise to lower seat.

NOTE: Height adjustment from minimum (lowest) to maximum (highest) is 80 mm (3 in).

3. CONSOLE AND SEAT FORE-AFT ADJUSTMENT
   Pull lever ③ to the right to adjust the seat and both right and left consoles to desired distance from the travel pedals and levers. Release lever to lock seat and consoles into position.

NOTE: Seat and console fore-aft adjustment range is 100 mm (3.9 in) with stops every 20 mm (0.8 in).

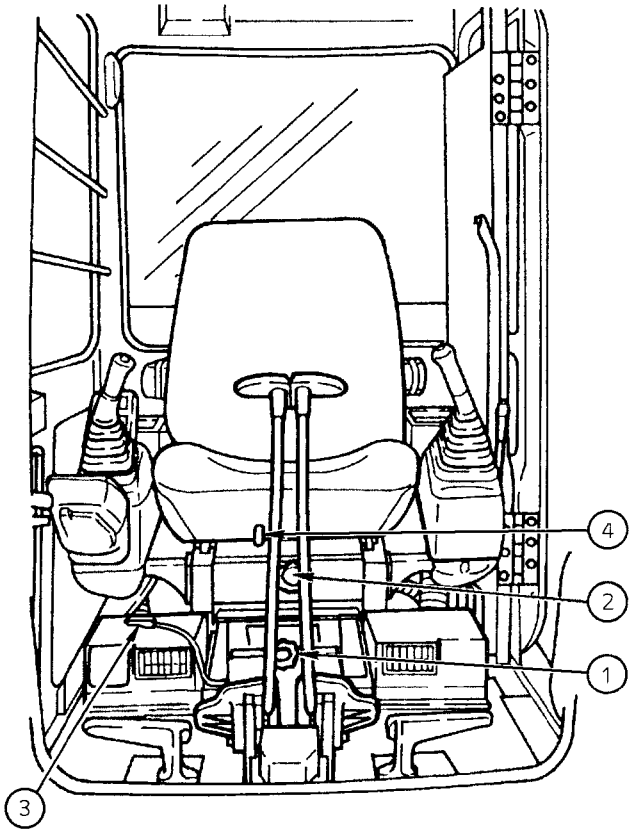
4. SEAT FORE-AFT ADJUSTMENT
   Pull lever ④ to the right to unlock the seat from both consoles. With lever ④ held to the right, slide the seat to the desired distance from control levers. Release lever ④.

NOTE: Seat fore-aft adjustment range is 160 mm (6.3 in) with stops every 20 mm (0.8 in).

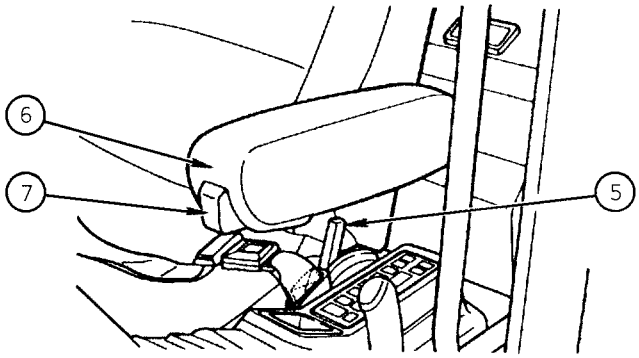
5. BACKREST ADJUSTMENT
   Push lever ⑤ forward to release backrest lock. Move backrest to desired position and release lever. Backrest can be positioned 40° forward for easy access to component behind seat.

NOTE: Seat backrest can be adjusted to 17 positions.

6. ARMRESTS
   Positioning of armrest ⑥ can be made by pulling up adjusting lever ⑦. Position armrest ⑥ to the desired position, then release adjusting lever ⑦ to lock armrest ⑥ in that position. Fully raise armrest ⑥, when getting on or off the machine.



M105-01-020



M104-01-064

DRIVE THE MACHINE CAREFULLY

IMPORTANT: During freezing weather, park machine on a hard surface to prevent tracks from freezing to the ground. Clean debris from tracks and track frame.

If tracks are frozen to the ground, raise tracks using boom, move machine carefully to prevent damage to drive train and tracks.

If engine stops under load, remove load. Start engine immediately. Run engine 30 seconds in light duty (L) mode before you add load.

Select a route that is as flat as possible. Steer machine as straight as possible making small, gradual changes in direction.

When driving over rough terrain, reduce engine speed to lessen possibility of undercarriage damage.

HYDRAULIC WARM-UP SWITCH

The warm-up circuit raises hydraulic oil temperature quickly and automatically without operating controls.

If a power mode select switch (PELI) is pushed during warm-up circuit operation, the warm-up function will be canceled and engine speed will be controlled by the power mode selector.

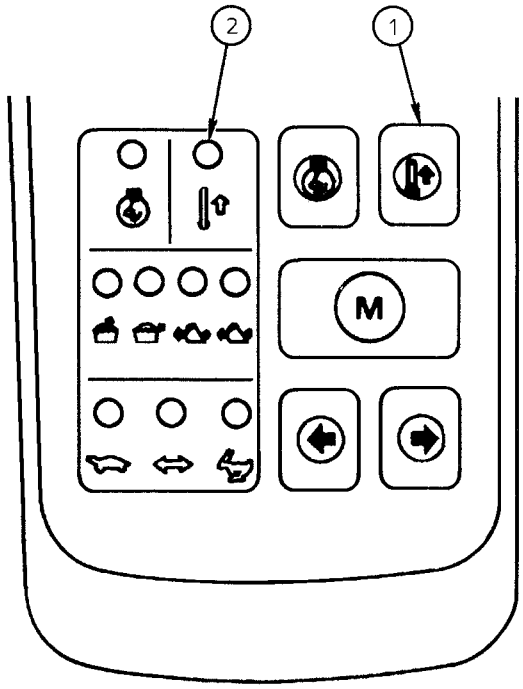
IMPORTANT: Hydraulic components may be seriously damaged if the machine is operated with hydraulic oil temperature below 30°C (86°F). Always warm hydraulic oil to specifications before operating the machine.

1. Start the engine.
2. Press hydraulic warm-up switch ①. Hydraulic warm-up indicator ② will light.

   If the oil temperature is above 30°C (86°F) when the unit is started, the hydraulic warm-up indicator will not come on.

   If the oil temperature is below 30°C (86°F) the hydraulic warm-up indicator will remain on for 16 minutes or until oil reaches 30°C (86°F) whichever comes first. When the oil reaches operating temperature, the light will go off.
3. If necessary, repeat this procedure until hydraulic warm-up indicator ② goes off.
4. After completing warm-up circuit operation, operate boom, arm, and bucket functions by moving the cylinders a short distance to each direction for the first time.

   Operate travel and swing functions slowly, initially moving only short distances. Continue to operate warm-up functions until cycle times are normal.

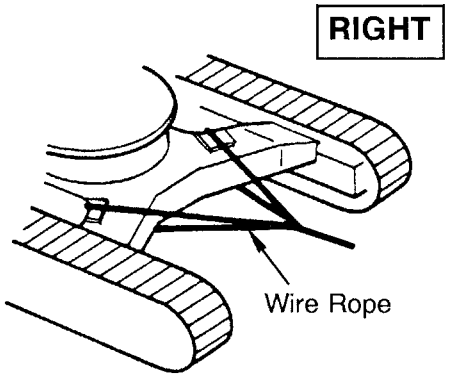


M111-05-003

TOWING MACHINE A SHORT DISTANCE

CAUTION: Cables, straps, or ropes can break causing serious injury. Do not tow machine with damaged chains, frayed cables, slings, straps, or ropes. Always wear gloves when handling cable, straps or ropes.

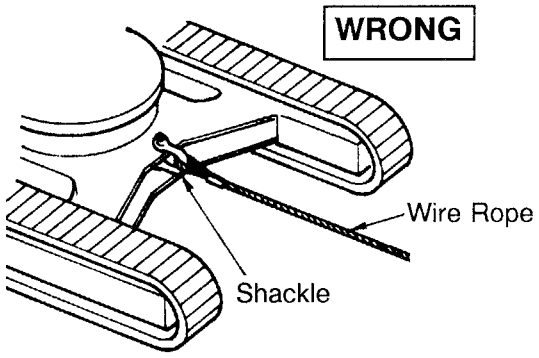
When your machine becomes struck but the engine is still operational, attach wire tow lines as illustrated at right, and slowly tow your machine to firm ground using another machine.
Be sure to attach the wire ropes around the track frames of both machines as illustrated.
To prevent the wire ropes from being damaged, place some protective material between the track frame and the wire ropes.



M104-05-010

IMPORTANT: A shackle hole is provided on the track frame to tow light weights.
Less than 108 000 N (11 000 kgf, 24 250 lbf)
Do not use the shackle hole to tow another machine.

1. **Attach a wire tow line around the machine frame as shown to the frame shackle hole using a suitable clevis.**
2. **Slowly tow, keeping the tow line horizontal and in a straight line with the tracks.**
3. **When the machine is towed, release parking brakes by operating the travel levers.**



M104-05-011

ELECTRONIC CONTROL SYSTEM BYPASS PROCEDURE

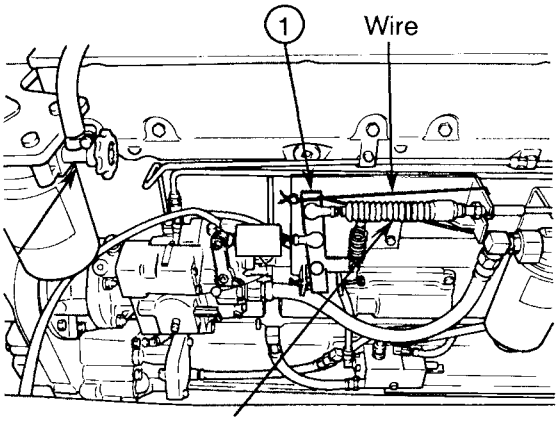
If the electronic control system malfunctions, the machine will not operate.
The following procedure will allow the machine to be moved to a safe area for repair work to be performed.

IMPORTANT: If any electronic control system malfunction occurs, first check fuses for continuity. If no discontinuity is found, see your authorized dealer immediately. If they are not available, perform the following steps.

1. Stop the engine. Remove the key from the key switch.
2. Pull the pilot control shut-off lever to the LOCK position.
3. Attach a "Do Not Operate" tag to right control lever.

Perform the following step only when the engine speed cannot be controlled:

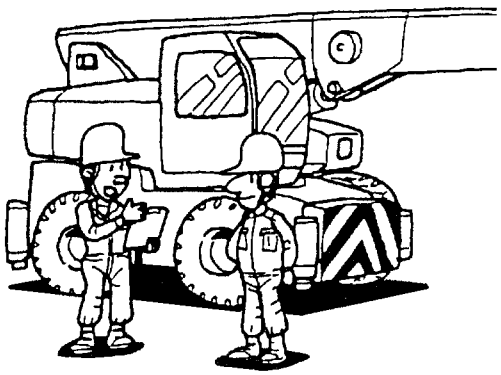
4. Manually move lever ① until the injection pump lever is against the fast idle stop. Use a piece of wire or a tie band to hold lever against the fast idle stop.



M116-05-002

PRECAUTIONS FOR SLINGING WORK

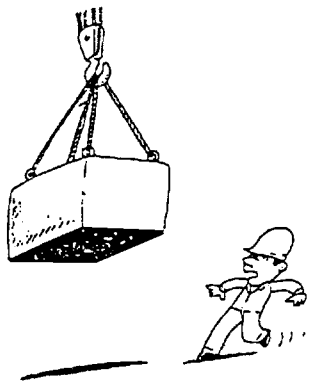
1. Coordinating Signal System, and Appointing Signal Person
   Before starting, be sure to coordinate signal system to be used. Appoint one qualified signal person only (if a multiple number of signal persons are used, different signals may confuse the workers, possibly causing an accident). All workers should obey signals only from one signal person.



M324-07-171

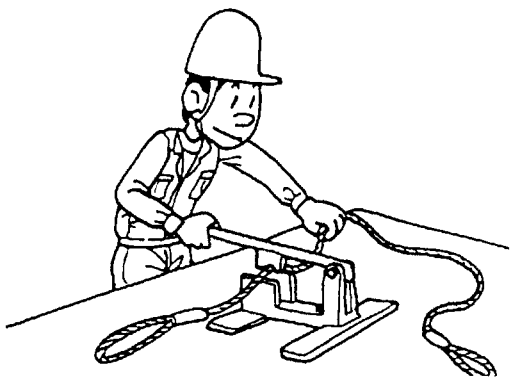
2. When attaching a wire rope to the lifting parts/components, always use slinging protectors between the wire rope and the lifting parts/components to prevent damage.

3. Precautions for Lifting
   (1) Always use a hook with a latch.
   (2) Use only slinging wire ropes and chains that are strong enough.
   (3) Never allow the lifted load to pass over any persons.
   (4) Never allow anyone under the lifted load.



M324-07-173

4. Rectifying Twisted Wire Rope
   Rectify the twist or bend of the wire ropes after the work. Store the wire ropes in a specified place.



M324-07-174

CONNECT BUCKET CYLINDER HOSES

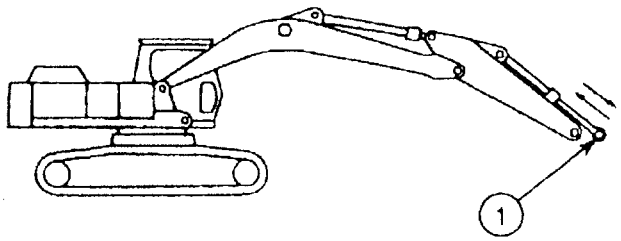
CAUTION:

1. **Stop the engine. Move the control levers back and forth, and right and left several times to release the remaining pressure in the hydraulic line.**
2. **Before connecting the bucket cylinder and the pipes on the boom with the hoses, loosen bolts securing the covers to the pipes on the boom to gradually release the trapped oil pressure in the pipings. Then, remove the covers.**

1. Gradually loosen bolts securing the covers to the ends of the hydraulic pipings on the boom to release the trapped oil pressure in the pipings. Then, remove the covers.

2. Connect two hoses between the hydraulic pipings on the boom and bucket cylinder.

3. To prevent seals from damage, bleed the air from the bucket cylinder according to the following procedures.
   (1) Start the engine and run it at slow speed.
   (2) Slowly extend and retract cylinder rod ①.
   (3) Repeat operation in step (2) until cylinder rod ① moves smoothly.



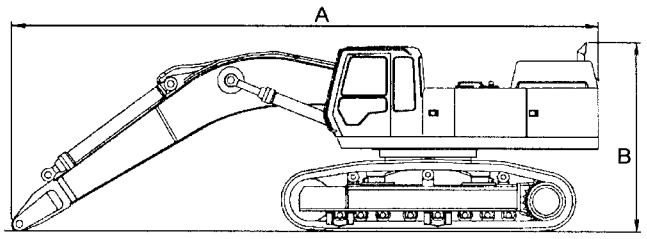
M112-09-009

TYPE 2

Basic Machine

Model	Boom Length m (ft·in)	Shoe Width mm (ft·in)	A mm (ft·in)	B mm (ft·in)	Overall Width mm (ft·in)	Weight kg (lb)
EX550-3	7.6 (24'11")	600 (2'0")	10 630 (34'11")	3 390 (11'1")	3 300 (10'10")	38 100 (84 000)
		750 (2'6")	10 630 (34'11")	3 390 (11'1")	3 450 (11'4")	38 900 (85 800)
	6.6 (21'8") BE-Boom	600 (2'0")	9 570 (31'5")	3 390 (11'1")	3 300 (10'10")	38 100 (84 000)
		750 (2'6")	9 570 (31'5")	3 390 (11'1")	3 450 (11'4")	38 900 (85 800)
EX550LC-3	7.6 (24'11")	600 (2'0")	10 630 (34'11")	3 390 (11'1")	3 300 (10'10")	39 000 (86 000)
		750 (2'6")	10 630 (34'11")	3 390 (11'1")	3 450 (11'4")	39 900 (88 000)
	6.6 (21'8") BE-Boom	600 (2'0")	9 570 (31'5")	3 390 (11'1")	3 300 (10'10")	39 000 (86 000)
		750 (2'6")	9 570 (31'5")	3 390 (11'1")	3 450 (11'4")	39 900 (88 000)
EX600H-3	7.6 (24'11") H-Boom	600 (2'0")	10 630 (34'11")	3 490 (11'5")	3 300 (10'10")	39 000 (86 000)
EX600LCH-3	7.6 (24'11") H-Boom	600 (2'0")	10 630 (34'11")	3 490 (11'5")	3 300 (10'10")	39 800 (87 800)

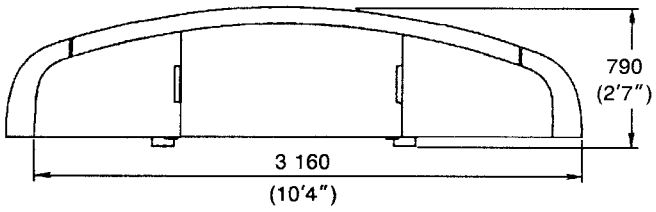
NOTE: When the 600 mm (24 in) wide shoes are installed, steps on the track frame and hand rails on the cab must be removed to comply with the overall width dimensions above.



M116-06-006

Counterweight

Weight : 10 500 kg (23 200 lb)
Maximum Height: 1 250 mm (4 ft 1 in)

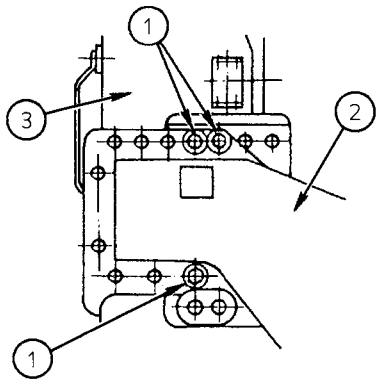


M116-06-003

EXTENDING THE SIDE FRAME

IMPORTANT: 1. Remove and clean mud and gravel from contact areas of track frame ② and side frame ③. Otherwise, mounting bolts may become loose.

2. Before tightening the mounting bolts, clean the bolt holes. If tightening the bolts is difficult, re-tap the bolt holes.
Tap Size: M33, Pitch 3 mm



M111-06-011

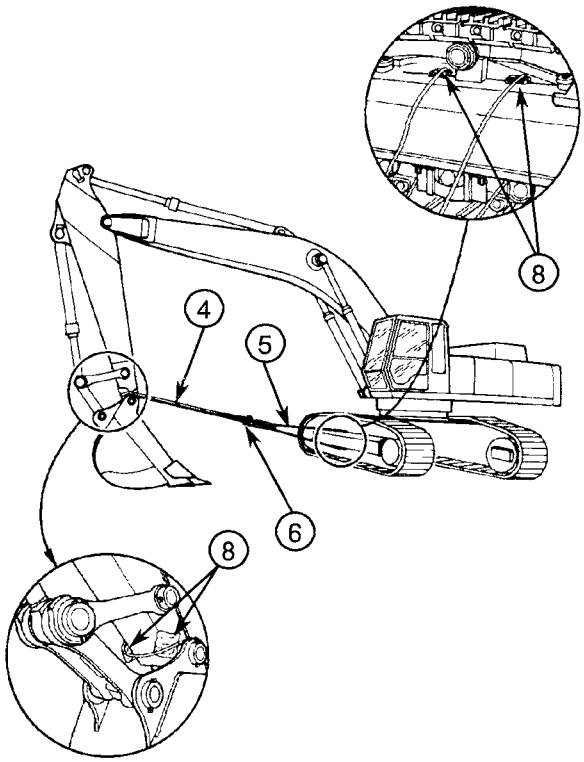
1. Remove six track frame mounting bolts ① (3 used in two places) from the extending side frames.

   Tool: Ratchet offset wrench
   Socket (Wrench Size 50 mm)
   Pipe (Approximately two meters)

2. Swing the upperstructure 90° towards the side frame to be extended.

3. Install one wire rope ④ around the arm and another one ⑤ around the side frame. Connect the wire ropes with chain block ⑥, as illustrated.
   Use wire ropes equivalent to 6 × 19 Z lay stranded, A-class with a rope dia. of 14 to 16 mm (0.55 to 0.63 in). When attaching a wire rope to the arm and side frame, always use protectors ⑧ between the wire rope and the components (arm and side frame) to prevent damage.

NOTE: Do not attach the wire rope to the steps bolted on the side frame.

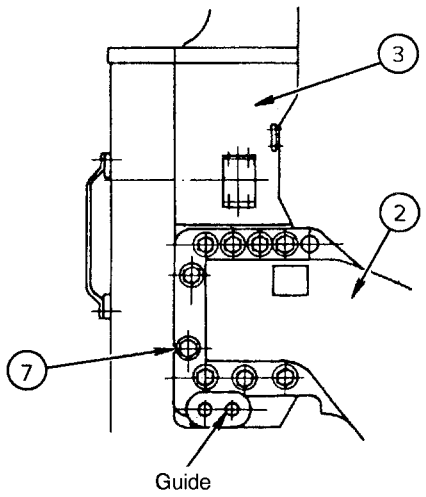


M116-06-018

4. Lower the bucket to raise the side frame off the ground slightly, then extend the arm gradually to pull out side frame ③ until the guides on the side frame come in contact with track frame ②.

5. After side frame ③ is fully extended, lower the side frame slowly to the ground and tighten the eighteen mounting bolts ⑦ (9 used in two places) to 2 160 N·m (220 kgf·m, 1 590 lbf·ft)

6. After extending one side frame, repeat steps 1 to 5 as described above, to extend the opposite side frame.



M116-06-041

24. Make sure the counterweight lift arms are below the top surface of the counterweight and are not touching the counterweight plate from inside.
    Make sure yoke connected to the counterweight pin brackets are not tight.
    (If necessary, lower or raise cylinder slightly to meet above requirements and check again torques.)

25. Install lock pins ⑰ into nuts ⑩.

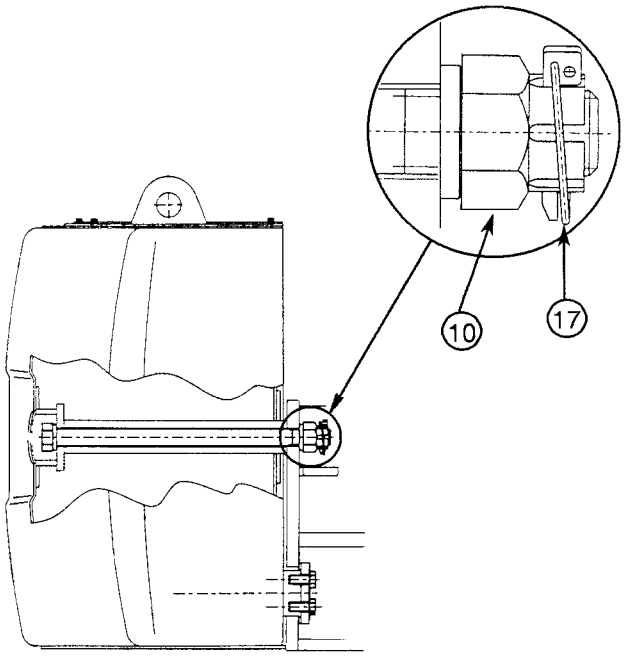
26. Bend one top and bottom corner of lock plate ⑯ against the head of each bolt ⑮.

    NOTE: It may be necessary to replace the lock strap if damaged.

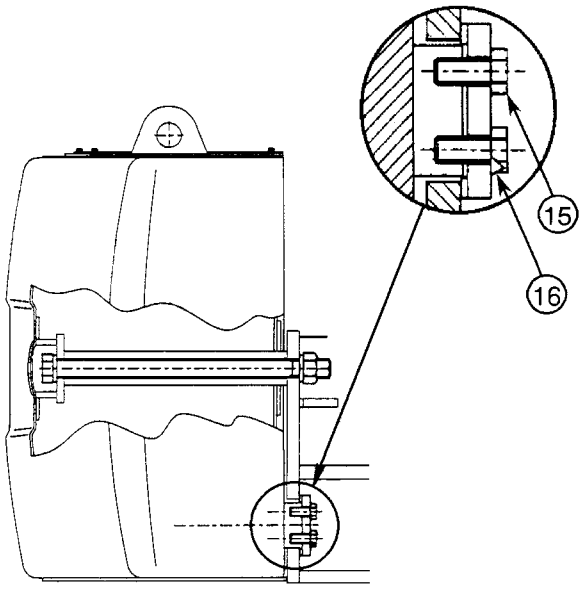
27. Close shut off valve ⑱.

28. Install the both machine mainframe bottom access covers and counterweight top cover.

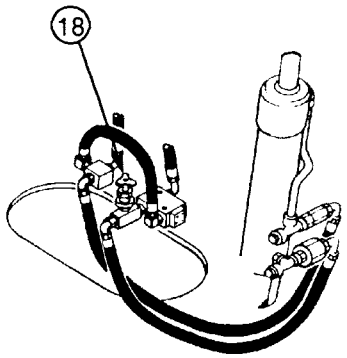
29. Install the lift cylinder guard.



M116-06-024

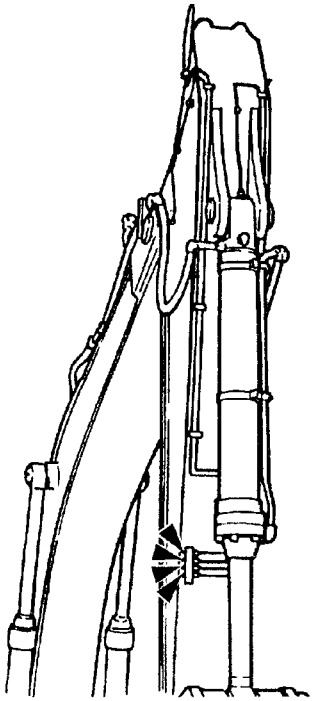


M116-06-027



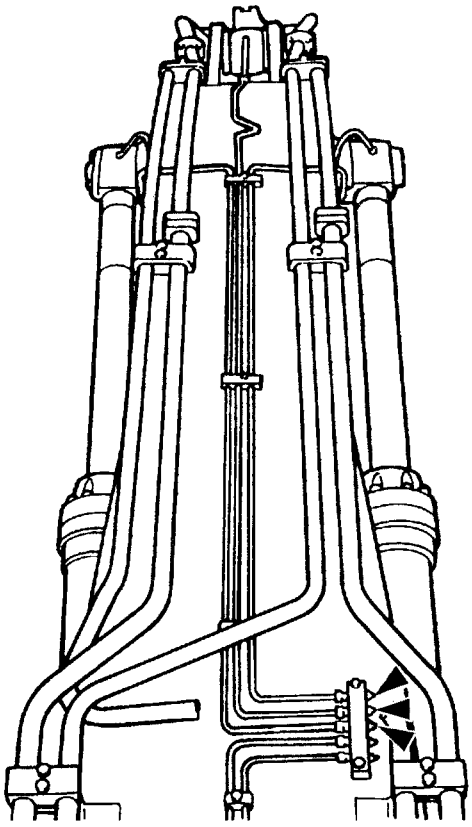
M116-06-022

- Boom and Arm Joint Pin, Arm Cylinder Rod Pin and Bucket Cylinder Bottom Pin.



M111-07-008

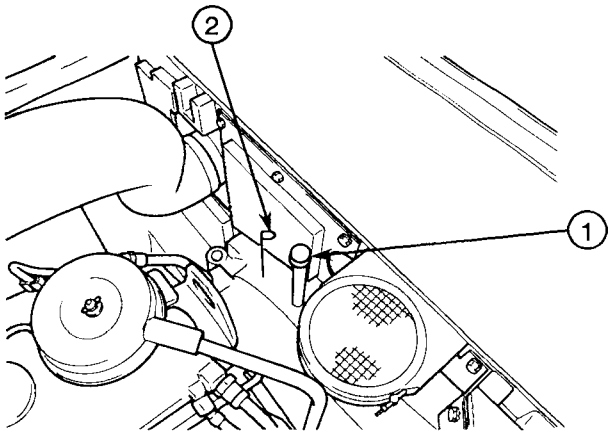
- Boom Cylinder Rod Pins and Arm Cylinder Bottom Pin. (A centralized greasing system)



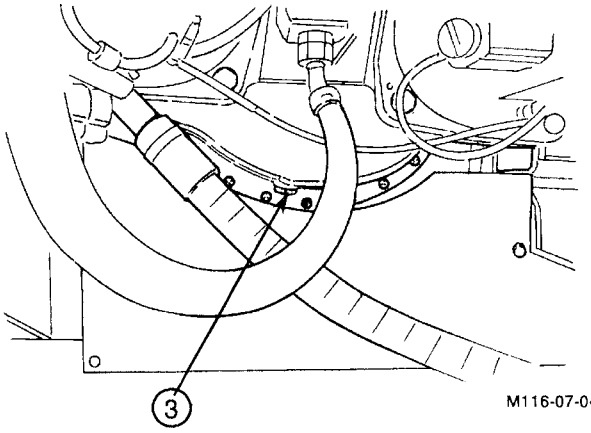
M111-07-009

CAUTION: Gear oil may be hot. Wait for gear oil to cool before starting work.

7. Remove drain plug ③ to drain oil.
8. Reinstall the drain plug.
9. Remove oil supply cap ① and add oil until it is between marks on dipstick ②.
10. Reinstall oil supply cap ①.



M116-07-132

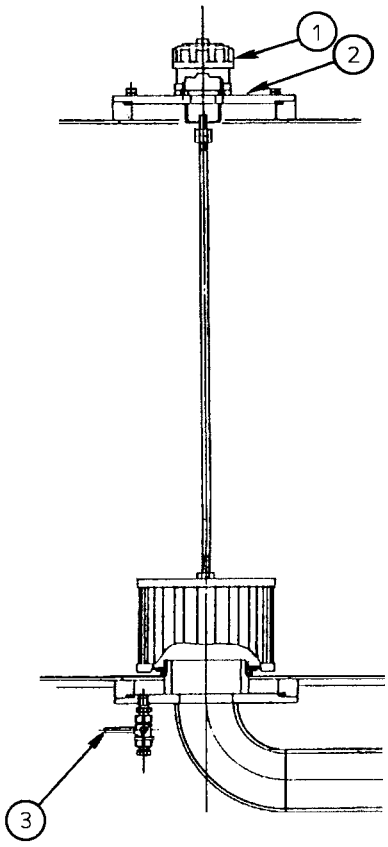


M116-07-047

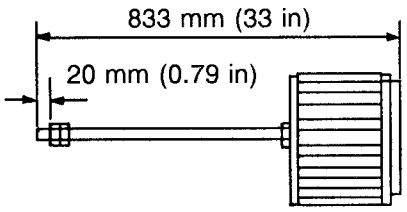
16. Remove the suction filter and rod assembly.
17. Clean the filter and tank interior. If the filter is to be replaced, install new filter on the rod as shown. Tighten nut to 14.5 to 19.5 N·m (1.5 to 2.0 kgf·m, 10.5 to 14.5 lbf·ft).
18. Install the filter and rod assembly. Make sure the filter is positioned correctly on the outlet.
19. Clean, install and tighten drain plug and drain cock ③.
20. Install cover ②. Make sure the filter and rod assembly are in correct position. Tighten the bolts to 49 N·m (5 kgf·m, 36 lbf·ft).
21. Add oil until it is between the marks on the sight gauge.

IMPORTANT: If the hydraulic pump is not filled with oil, it will be damaged when the engine is started.

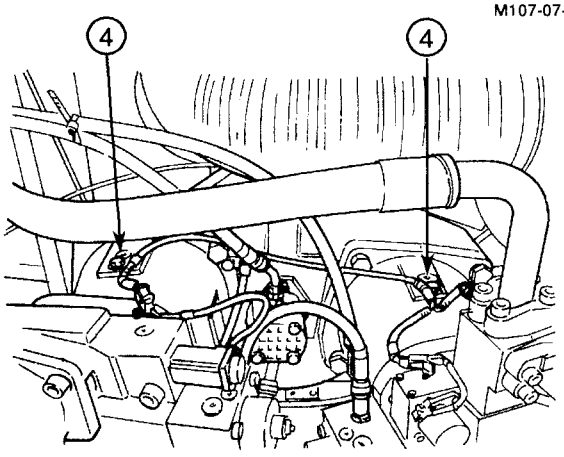
22. Remove air bleed plug ④ from the top of the pump.
23. Fill the pump with oil through air bleed plug ④ port.
24. Reinstall the air bleed plug ④.
25. Start the engine and run at slow idle. Put a "Do Not Operate" tag on the pilot control shut-off lever. Make sure the pilot control shut-off lever is in the LOCK position.
26. Slowly loosen air bleed plug ④ to release trapped air. Retighten the plug when air stops and oil flows from the plug port.
27. Purge air from the hydraulic system by running the engine at slow idle and operating the control levers slowly and smoothly for 15 minutes.
28. Position the machine with the arm cylinder fully retracted and the bucket cylinder fully extended.
29. Lower the bucket to the ground.
30. Turn the auto-idle switch off.
31. Stop the engine. Remove the key from the key switch.
32. Pull the pilot control shut-off lever to the LOCK position.
33. Check the hydraulic oil tank gauge. Add oil if necessary.



M116-07-004



M107-07-097



M116-07-052

3 Check Fuel Hoses
--- daily
--- every 250 hours

CAUTION : Fuel leaks can lead to fires that may result in serious injury.
To avoid this hazard :

1. Park the machine on a solid, level surface. Lower the bucket to the ground. Stop the engine. Remove key from the key switch. Pull the pilot control shut-off lever to the LOCK position.

2. Check for kinked hoses, and hoses that rub against each other parts for leaks.

   Check hoses at the check points indicated below for leaks and other damage that may result in future leaks. If any abnormalities are found, replace or retighten them, as shown in Table 4.

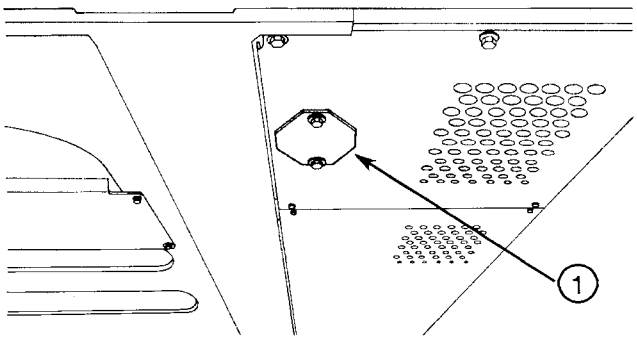
3. Repair or replace any loose or damaged hoses. Never install bent or damaged hoses.

Table 4. Hoses

Interval(hours)	Check Points	Abnormalities	Remedies
Daily	Hose covers and fittings	Leak	Retighten or replace
Every 250 hours	Hose	Bend	Replace
	Hose	Collapse	Replace (Use proper bend radius)
	Hose fittings	Deformation	Replace

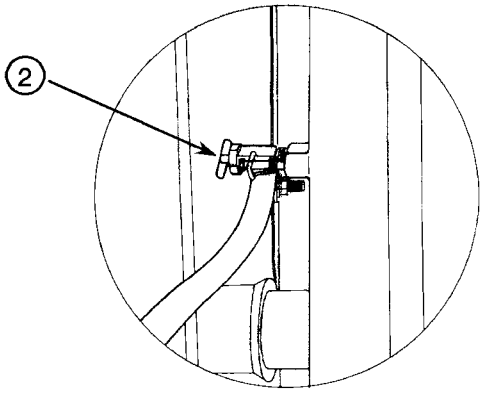
4	**Change Coolant**
	--- twice a year (in spring and autumn)
5	**Clean Radiator Interior**
	--- when changing coolant

NOTE: Before leaving the Hitachi Factory, the cooling system is filled with a mixture of water, antifreeze and anticorrosive agent DCA 4.



M116-07-066

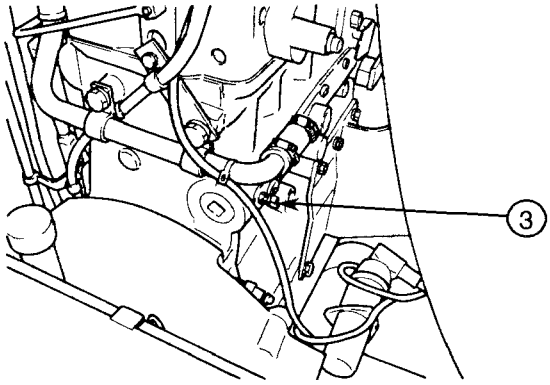
CAUTION: Do not loosen the radiator cap until the engine is cool. Loosen the radiator cap slowly to the stop. Release all pressure before removing the radiator cap.



M116-07-067

1. Remove the radiator cap and cover ① on the bottom cover of the lower radiator. Open drain cocks ②, ③ and ④ on the radiator and engine block to allow the coolant to drain completely.

2. Close drain cocks ②, ③ and ④. Fill the radiator with tap water and a radiator cleaner agent. Start the engine and run it at a speed slightly higher than slow idle; when the needle of the temperature gauge reaches the white zone, run the engine for about ten more minutes.



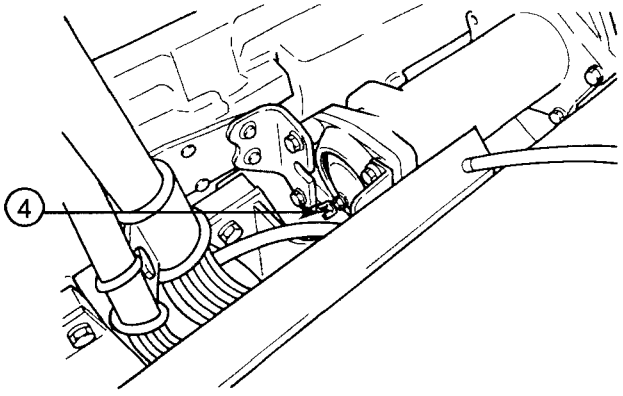
M116-07-105

3. Stop the engine and open the radiator drain cock ②. Flush out the cooling system with tap water, until draining water is clear. This helps remove rust and sediment.

4. Close radiator drain cock ②. Fill the radiator with tap water and anti-rust agent or antifreeze at the specified mixing ratio. When adding coolant, do so slowly to avoid mixing air bubbles in the system.
   Replace the water filter with new WF-2074 for initial charge, and add 5 bottles of DCA 60L to the cooling water.

5. Run the engine to sufficiently bleed the air from the cooling system.

6. After adding coolant, operate the engine for several minutes. Check the coolant level again, and add coolant if necessary.

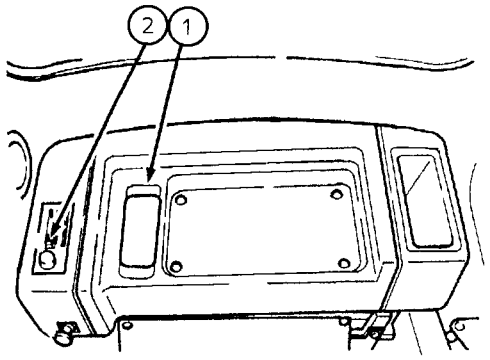


M116-07-110

REPLACING FUSES

If any electrical equipment fails to operate, first check the fuses. Fuse box ① is located behind the right control console, next to heater / air conditioner control panel ②. A fuse location / specification decal is attached to the fuse box cover.

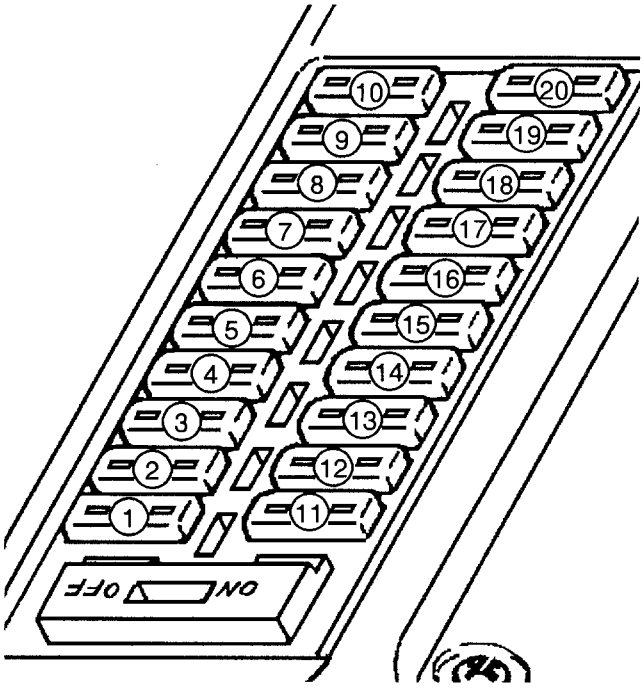
Remove the fuse box cover by lifting it upward. Spare fuses are located on the underside of the cover.



M104-01-051

IMPORTANT: Be sure to install fuses with correct amperage ratings to prevent electrical system damage from due to overload.

1	SW. B. U.	1A
2	ENG. C/U	1A
3	EC MOTOR	5A
4	VAL. B. U.	1A
5	POW. ON	5A
6	SW. BOX	5A
7	VAL. C/U	1A
8	SOL	10A
9	ETER. RY	5A
10	LUB.	10A
11	LAMP	20A
12	WIPER	5A
13	AIRCON.	20A
14	FUEL. SOL	5A
15	HORN	10A
16	RADIO	5A
17	LIGHTER	10A
18	ROOM LAMP	5A
19	OPTION	20A
20	MOT. ALARM	5A



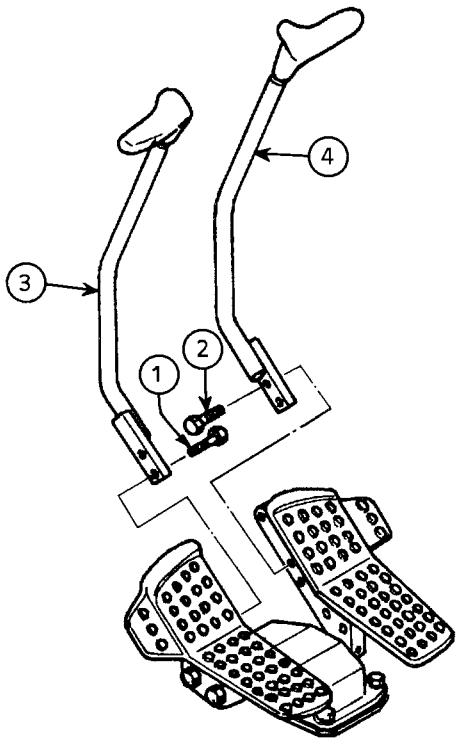
M104-07-055

5 Remove Travel Levers

The travel levers may be removed if desired.

1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.
4. Turn the key switch OFF. Remove the key.
5. Pull the pilot control shut-off lever to the LOCK position.
6. Remove bolts ① and ② to remove levers ③ and ④ from brackets.

NOTE: Wrench size 17 mm
Tightening torque 49 N·m (5 kgf·m, 36 lbf·ft)



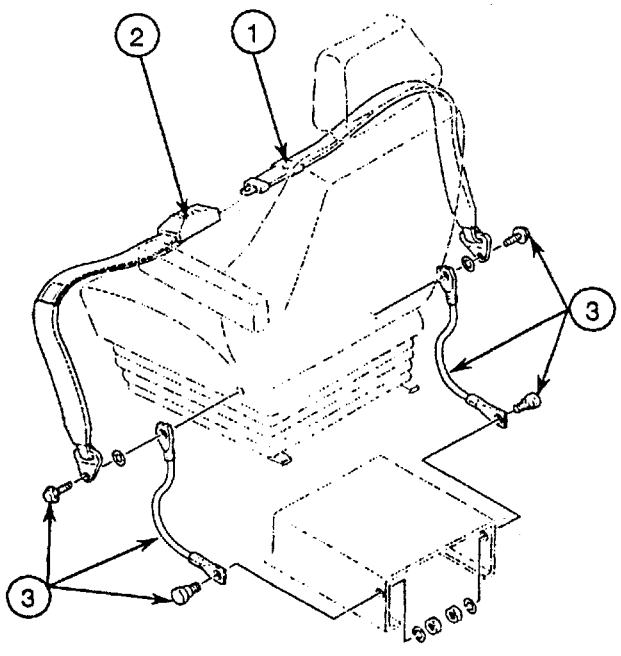
M107-04-001

6 Check and Replace Seat Belt
Check --- daily
Replace --- every 3 years

Always maintain the seat belt in a functional condition and replace when necessary to ensure proper performance.

Prior to operating the machine, thoroughly examine belt ①, buckle ② and attaching hardware ③. If any item is damaged or materially worn, replace the seat belt or component before operating the machine.

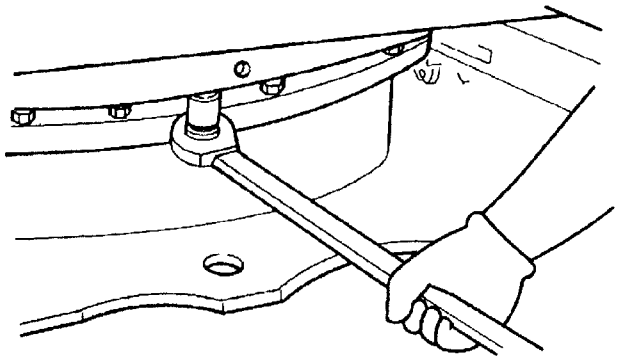
We recommend that the seat belt be replaced every three years regardless of its apparent condition.



M116-07-130

13. Retighten swing bearing mounting bolts to upperstructure.

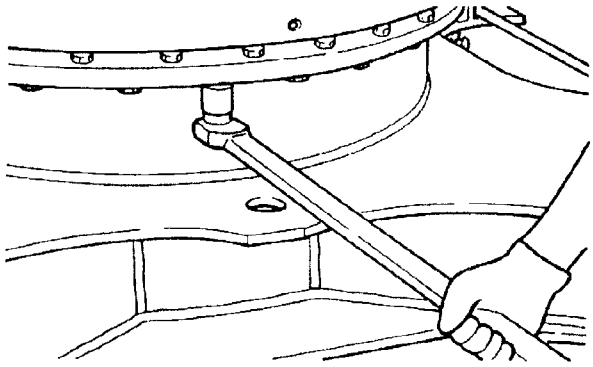
    Tool : 46 mm
    Torque : 1 910 N·m (195 kgf·m, 1 410 lbf·ft)



M107-07-088

    Retighten swing bearing mounting bolts to undercarriage.

    Tool : 46 mm
    Torque : 1 720 N·m (175 kgf·m, 1 270 lbf·ft)



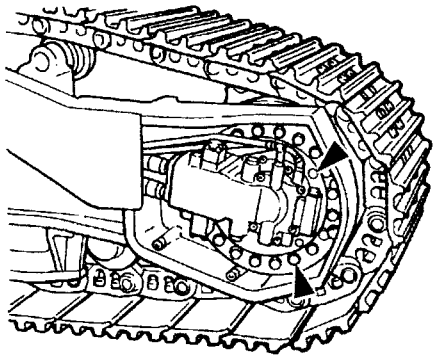
M107-07-089

14. Retighten travel device mounting bolts.

    Tool : 32 mm
    Torque : 740 N·m (75 kgf·m, 540 lbf·ft)

    Retighten travel motor mounting bolts.

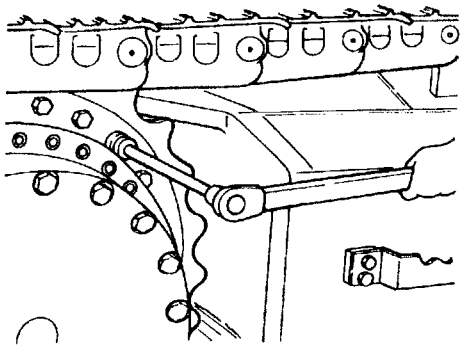
    Tool : 27 mm
    Torque : 295 N·m (30 kgf·m, 215 lbf·ft)



M111-07-077

    Retighten sprocket mounting bolts.

    Tool : 32 mm
    Torque : 740 N·m (75 kgf·m, 540 lbf·ft)



M111-07-078

ENGINE

Problem	Cause	Solution
	Injection nozzles dirty or faulty	See your authorized dealer.
	Fuel shut-off linkage	Adjust or repair linkage.
Engine Not Developing Full Power	Air filters plugged	Replace filter elements.
	Fuel line restricted	Repair or replace fuel line.
	Contaminated fuel	Drain fuel tank and clean outlet screen. Refill.
	Fuel filters plugged	Change filters.
	Plugged vent in fuel tank cap	Clean or install new cap.
	Injection nozzles dirty or malfunctioning	See your authorized dealer.
	Injection pump linkage adjustment	See your authorized dealer.
	Wrong fuel	Use correct fuel.
	Wrong oil	Use correct oil.
	Turbocharger failure	See your authorized dealer.
	Injection pump out of time	See your authorized dealer.
	Exhaust restriction	Remove muffler and run engine.
	Engine is too hot or cold	See below.
	Engine failure	See your authorized dealer.
	Valve clearance	Check and adjust valves.
	Intake or exhaust system leakage	See your authorized dealer.
Engine Overheats	Low coolant level	Add coolant.
	Thermostat	See your authorized dealer.
	Engine overloaded	Check hydraulic relief valves.
	Radiator cap faulty	Install new cap.
	Radiator core or oil cooler core plugged	Clean radiator and oil cooler.
	Radiator screen plugged	Clean screen.
	Injection pump out of time	See your authorized dealer.
	Fan damaged	Replace fan.
	Air cleaner plugged	Clean air cleaner.
	Alternator and fan belt loose	Tighten or install new belt.

HYDRAULIC SYSTEM

Problem	Cause	Solution
Travel is Not Smooth	Rocks or mud "Jammed" in track frame	Remove and repair.
	Park brake not releasing	See your authorized dealer.
Swing Does Not Work	Swing motor	See your authorized dealer.
	Pilot valve	See your authorized dealer.
Swing Is Not Smooth	Swing gear	See your authorized dealer.
	Swing bearing	See your authorized dealer.
	Lack of grease	Apply grease.
Engine Stops When Travel or/and Control Lever Moved	Failed EPC controller	See your authorized dealer.
	Pump	See your authorized dealer.