PART NO. EM16J-1-1

Operator's Manual

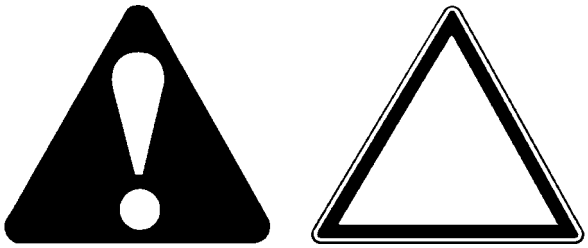
ZAXIS

450
450LC
450H
450LCH
Excavator

HITACHI

RECOGNIZE SAFETY INFORMATION

- These are the **SAFETY ALERT SYMBOLS**.
  - When you see these symbols on your machine or in this manual, be alert to the potential for personal injury.
  - Follow recommended precautions and safe operating practices.



SA-688

001-E01A-0001

UNDERSTAND SIGNAL WORDS

SA-1223

- On machine safety signs, signal words designating the degree or level of hazard - DANGER, WARNING, or CAUTION - are used with the safety alert symbol.
  - **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
  - **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
  - **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
  - **DANGER or WARNING safety signs** are located near specific hazards. General precautions are listed on **CAUTION safety signs**.
  - Some safety signs don't use any of the designated signal words above after the safety alert symbol are occasionally used on this machine.
  -
- **CAUTION** also calls attention to safety messages in this manual.
- To avoid confusing machine protection with personal safety messages, a signal word **IMPORTANT** indicates a situation which, if not avoided, could result in damage to the machine.
- ***NOTE*** indicates an additional explanation for an element of information.

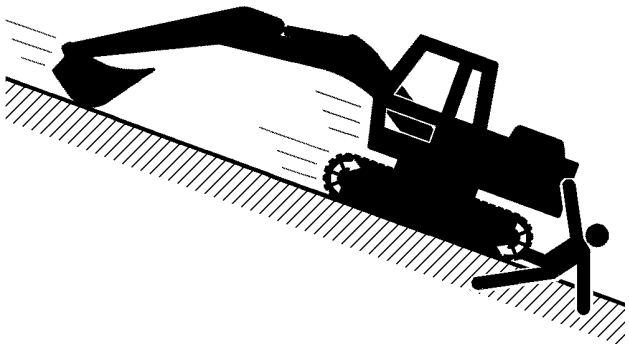
002-E01A-1223

AVOID INJURY FROM ROLLAWAY ACCI-DENTS

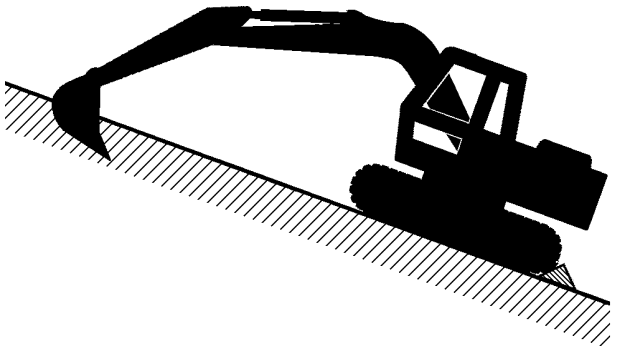
- Death or serious injury may result if you attempt to mount or stop a moving machine.

To avoid rollaways:

- Select level ground when possible to park machine.
- Do not park the machine on a grade.
- Lower the bucket and/or other work tools to the ground.
- Turn the auto-idle/acceleration switch and the H/P mode switch off.
- Run the engine at slow idle speed without load for 5 minutes to cool down the engine.
- Stop the engine and remove the key from the key switch.
- Pull the pilot control shut-off lever to LOCK position.
- Block both tracks and lower the bucket to the ground. Thrust the bucket teeth into the ground if you must park on a grade.
- Position the machine to prevent rolling.
- Park a reasonable distance from other machines.



SA-391



SA-392

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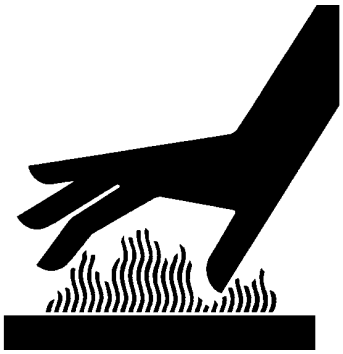
PREVENT BURNS

SA-039



SA-225

Hot spraying fluids:

- After operation, engine coolant is hot and under pressure. Hot water or steam is contained in the engine, radiator and heater lines.
  Skin contact with escaping hot water or steam can cause severe burns.
  - To avoid possible injury from hot spraying water. DO NOT remove the radiator cap until the engine is cool. When opening, turn the cap slowly to the stop. Allow all pressure to be released before removing the cap.
  - The hydraulic oil tank is pressurized. Again, be sure to release all pressure before removing the cap.

Hot fluids and surfaces:

- Engine oil, gear oil and hydraulic oil also become hot during operation.
  The engine, hoses, lines and other parts become hot as well.
  - Wait for the oil and components to cool before starting any maintenance or inspection work.

505-E01B-0498

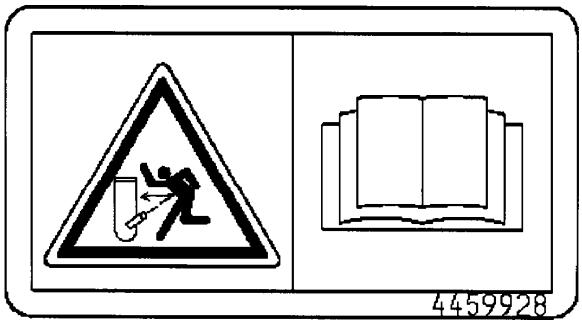
REPLACE RUBBER HOSES PERIODICALLY

SA-019

- Rubber hoses that contain flammable fluids under pressure may break due to aging, fatigue, and abrasion. It is very difficult to gauge the extent of deterioration due to aging, fatigue, and abrasion of rubber hoses by inspection alone.
  - Periodically replace the rubber hoses. (See the page of “Periodic replacement of parts” in the operator’s manual).
- Failure to periodically replace rubber hoses may cause a fire, fluid injection into skin, or the front attachment to fall on a person nearby, which may result in severe burns, gangrene, or otherwise serious injury or death.

S506-E01A-0019

A



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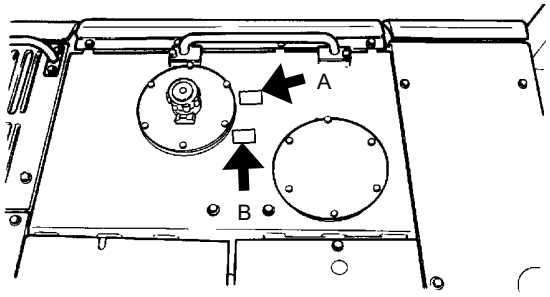
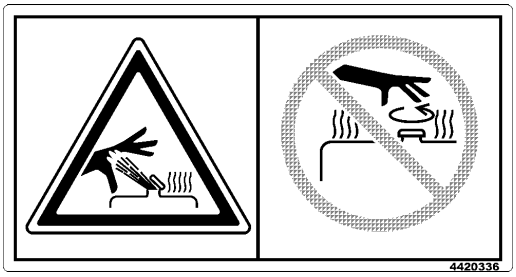


SS-2233

- Sign indicates a burn hazard from compressed air and spurting hot oil if the oil inlet is uncapped during or right after operation.
  Read manual for safe and proper handign.

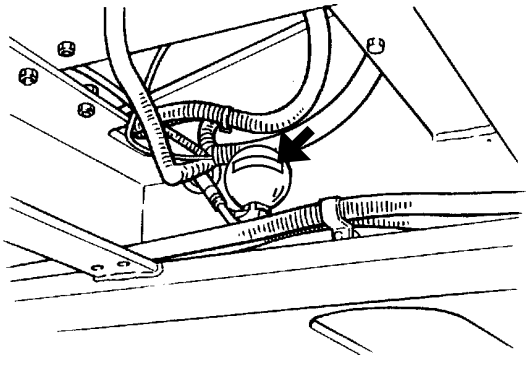
B



SS4420336

- Sign indicates a burn hazard from spurting hot water or oil if radiator or hydraulic tank is uncapped while hot. Allow radiator or hydraulic tank to cool before removing cap.

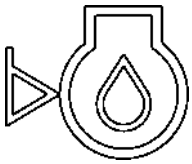
SS-1022



SS-1082

ENGINE OIL LEVEL INDICATOR

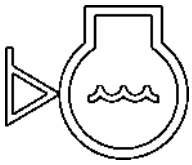
Orange indicator will light when engine oil level is inadequate for operation. Check engine oil level.



M178-01-039

COOLANT LEVEL INDICATOR

Orange indicator will light when coolant level is inadequate for operation. Check coolant level.



M178-01-040

PREHEAT INDICATOR

Orange indicator will light when the key switch is turned to ON position in cold weather. Light will turn off after a few seconds, indicating that the preheat is completed.

M178-01-041

PRECISTON MODE INDICATOR

Orange indicator will light when the precision mode switch is turned to ON position.

M16J-01-006

AUTO-LUBRICATION INDICATOR (Optional)

Red indicator will light when any trouble occurs in the auto-lubrication circuit. Also, red indicator will light when auto-lubrication switch is in the OFF position.
Check the grease cartridge and the grease pipe connections for grease leakage.

M16J-01-005

WIPER/WASHER SWITCH
ZAXIS450H, 450LCH

The wiper and the window washer are operated using the wiper/washer switch.

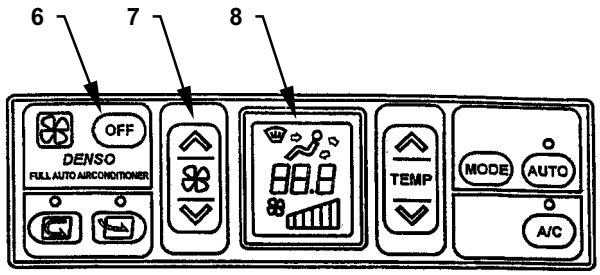
- Wiper
  Turn the wiper/washer switch to the specified position to operate the wiper.

  OFF Position: The wiper stops and is retracted.
  INT Position: The wiper operates intermittently at the interval selected by the switch position as described below.
  INT (Fast): The wiper operates at 3-second interval.
  INT (Mid): The wiper operates at 6-second interval.
  INT (Slow): The wiper operates at 8-second interval.
  ON Position: The wiper operates continuously.

- Washer
  Press and hold the wiper/washer switch to squirt washer fluid onto the front window. When the wiper/washer switch is pressed for more than 2 seconds, the wiper operates until the switch is released. When the wiper/washer switch is released, the wiper automatically retracts. While operating the wiper in the INT mode, when the wiper/washer switch is pressed, the wiper operation mode is changed to the continuous operation mode.

IMPORTANT: Washer motor may be damaged if wiper/washer switch is held for more than 20 seconds, or continually operated with no fluid in the washer tank.

Controller Part Name and Function



M178-01-017

- Blower OFF Switch (6)
  Stops the blower.
  When the switch is pressed, all displays (vent mode, set-temperature, and blower speed) on the LCD (8) panel will disappear and the blower stops in both the auto and manual modes.

- Blower Switch (7)
  Controls the blower speed from Low to High in 6 stages in the manual mode. The blower speed is displayed at the bottom on the LCD (8).
  - Increasing Blower Speed
    Each time the top side mark "∧" on blower switch (7) is pressed, the blower speed is increased by one increment.
  - Decreasing Blower Speed
    Each time the bottom side mark "∨" on blower switch (7) is pressed, the blower speed is decreased by one increment.

NOTE: In the AUTO mode operation, the fan speed will be automatically controlled with the fan speed indicator flashing.

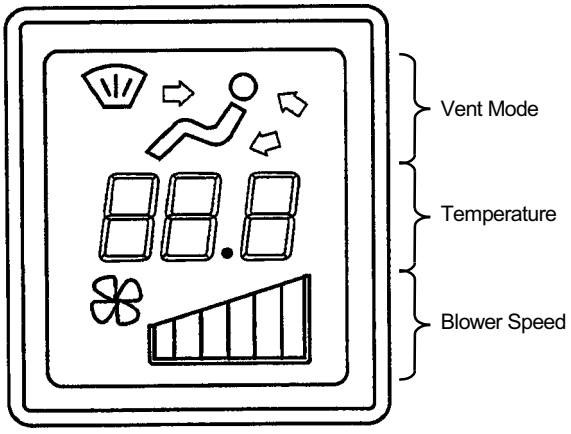
- LCD (8)
  Displays the set-status of the air conditioner operating temperature, fan speed, and vent mode.
  - Temperature Display
    Indicates the set-temperature (18 to 32.0 °C, 65 to 90 °F) by 0.5 °C (0.9 °F) increments at the panel center.
  - Blower Speed Display
    Indicates the blower speed in 6 stages by lighting the segment at the panel bottom.
  - Vent Mode Display
    Indicates the selected vent mode at the panel top.
    The vent modes are as shown below:

 : Front/Defroster Vent Mode

 : Front/Rear/ Defroster Vent Mode

 : Front/Rear/Foot/ Defroster Vent Mode

 : Foot Vent Mode

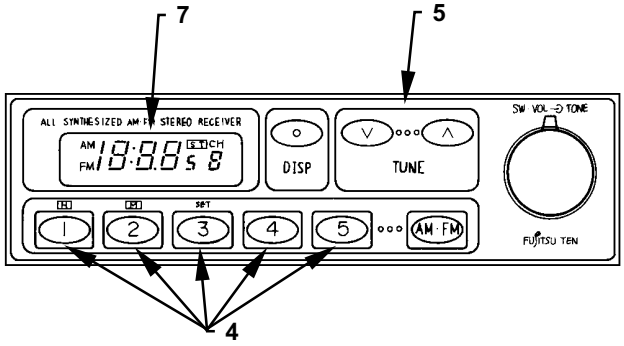


M178-01-020

Station Presetting Procedure

1. Select the desired station using tuning switches (5). (Refer to the “Tuning Procedure” section.)
2. Press and hold one station preset (4) for more than 2 seconds until an electronic tone is heard. Now, the selected station is preset for the selected station preset. The frequency of the preset station will be indicated on digital display (7).

Once the presetting is complete for a station preset (4), the radio will be tuned to the preset station when station preset (4) is pressed (for less than 2 seconds).



M157-01-027

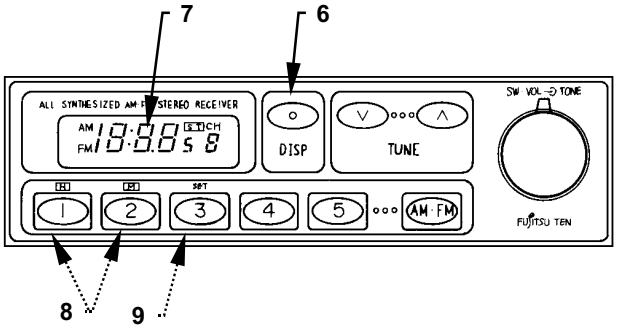
DIGITAL CLOCK SETTING PROCEDURE

NOTE: In order to set the clock, digital display (7) must be in the time display mode.

1. Press and hold display mode change switch (6). While holding display mode change switch (6), use time set switches (8) and/or set switch (9) to set the clock.
   The functions of time set switches (8) and set switch (9) are as follows:
   - Time Set Switch (H): Each time set switch (H) is pressed, the hour display will increase by one.
   - Time Set Switch (M): Each time set switch (M) is pressed, the minute display will increase by one. (The time is displayed in 12 hour standard.)

   If either of the switches (H) or (M) is pressed and held, the hour or minute display will change continuously until the switch is released.
   - Set Switch (SET) (9): If set switch (SET) (9) is pressed, the minute display will be reset to “00.”
   - If the minute display is “29” or smaller when set switch (SET) (9) is pressed, the display will be reset to “00” without changing the hour display.
   - If the minute display is “30” or larger when set switch (SET) (9) is pressed, the hour display will be increased by one and the minute display will be reset to “00.”

   For example, if set switch (SET) (9) is pressed when the clock display is “10:29” and “10:30”, the clock display will change to “10:00” and “11:00” respectively.



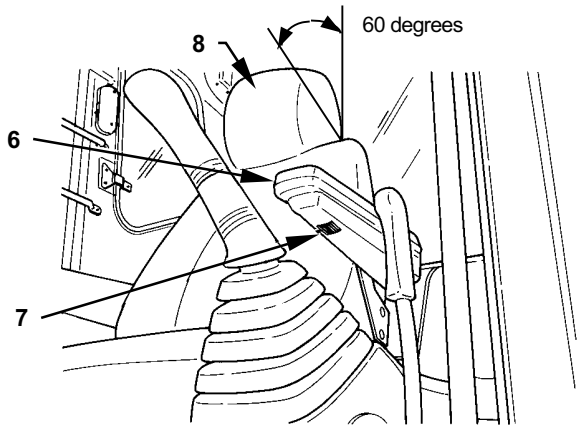
M157-01-027

Armrest Adjustment

Armrest (6) can be pulled upright by hand to get on and off the machine easily.
The angle of armrest (6) can be adjusted to the desired position by turning adjusting dial (7) located on the bottom of armrest (6).

Headrest

Headrest height and angle can be adjusted.
Pull headrest (8) upward or push downward to the desired position. (Height adjustment range: 50 mm (2.0 in))
Headrest (8) can be adjusted 60 degrees forward from the upright position. Move headrest by hands to the desired angle.



M157-01-040

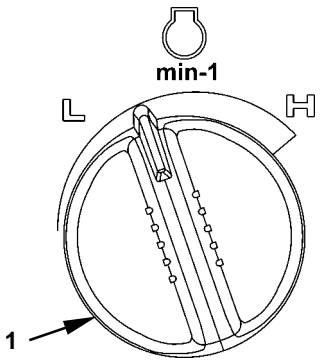
STARTING IN COLD WEATHER

Preheating

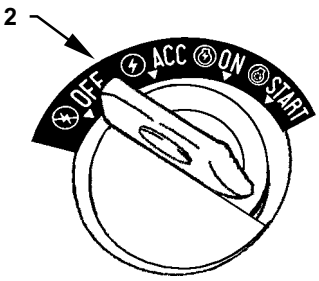
1. Turn engine control dial (1) to around the middle between the L and H positions.
2. Turn key switch (2) ON.
3. The machine will automatically check if preheating is required or not. When preheating is required, preheat indicator (3) is lit for approx. 8 seconds.

NOTE: In case, preheat indicator (3) doesn't come ON, preheating is not required.

4. As soon as preheat indicator (3) goes OFF, turn the key switch (2) to the START position to rotate the starter. Release the key switch (2) immediately after the engine has started.



M178-03-002



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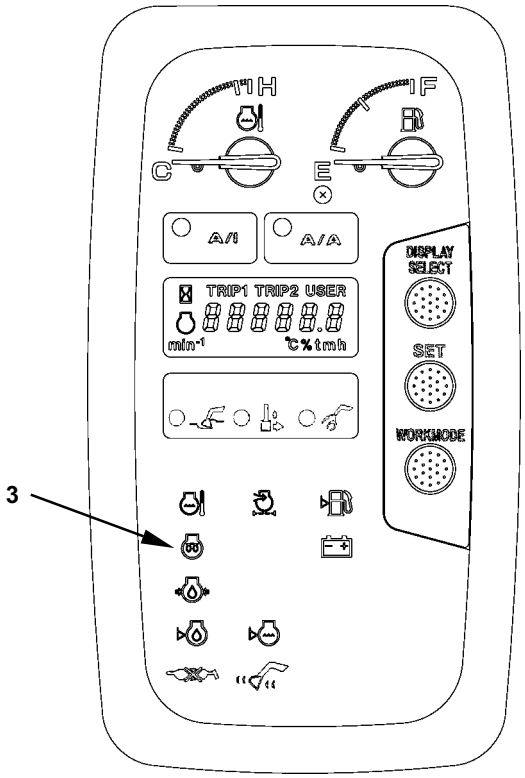
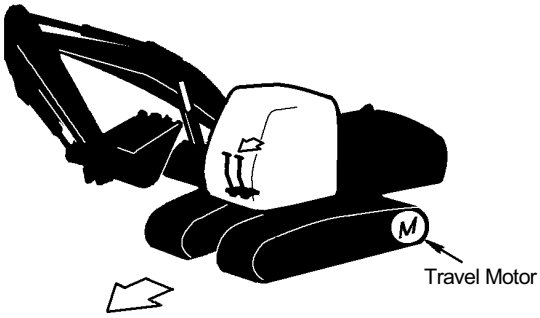


M16J-01-010

TRAVELING

CAUTION: Use a signal person when moving, swinging or operating the machine in congested areas. Coordinate hand signals before starting the machine.

- Before moving machine, determine which way to move travel pedals/levers for the direction you want to go. When the travel motors are in the rear, pushing down on the front of the travel pedals or pushing the levers forward moves the machine forward, towards the idlers.
  An arrow-mark seal is stuck on the inside surface of the side frame to indicate the machine front direction.
- Select a travel route that is as flat as possible. Steer the machine as straight as possible, making small gradual changes in direction.
- Before traveling on them, check the strengths of bridges and road shoulders, and reinforce if necessary.
- Use wood plates in order not to damage the road surface. Be careful of steering when operating on asphalt roads in summer.
- When crossing train tracks, use wood plates in order not to damage them.
- Do not make contact with electric wires or bridges.
- When crossing a river, measure the depth of the river using the bucket, and cross slowly. Do not cross the river when the depth of the river is deeper than the upper edge of the upper roller.
- When traveling on rough terrain, reduce engine speed. Select slow travel speed. Slower speed will reduce possible damage to the machine.
- Avoid operations that may damage the track and undercarriage components.
- During freezing weather, always clean snow and ice from track shoes before loading and unloading machine, to prevent the machine from slipping.



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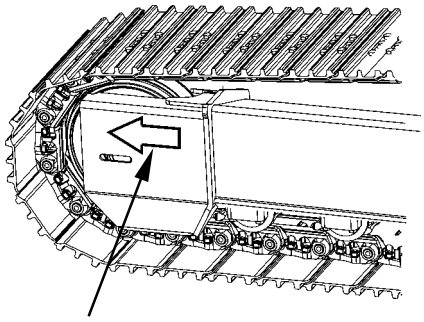

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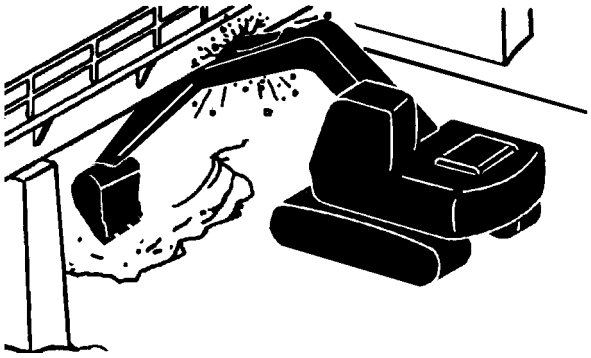
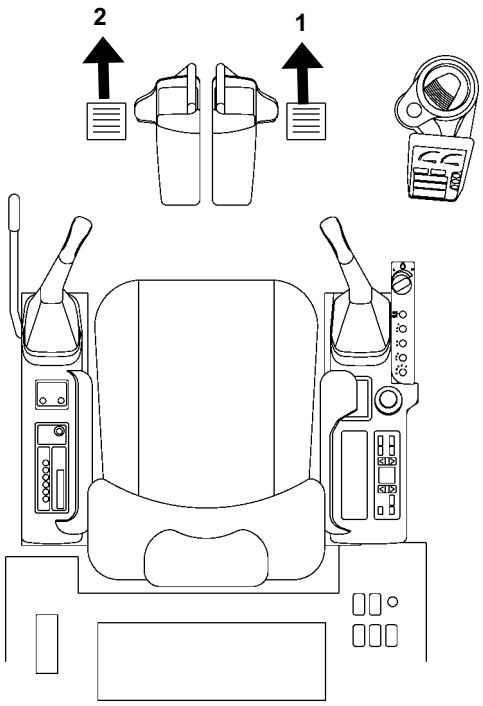


SA-011

BUCKET OPEN-CLOSE PEDALS (LOADING SHOVEL)

1- Bucket Opening

2- Bucket Closing



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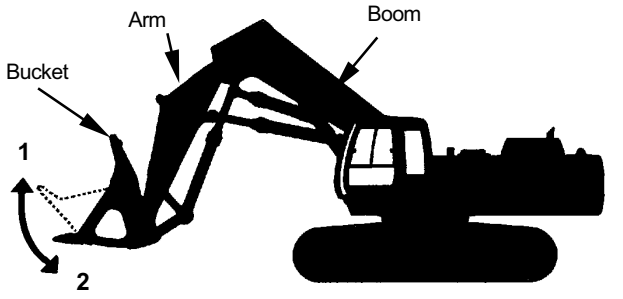


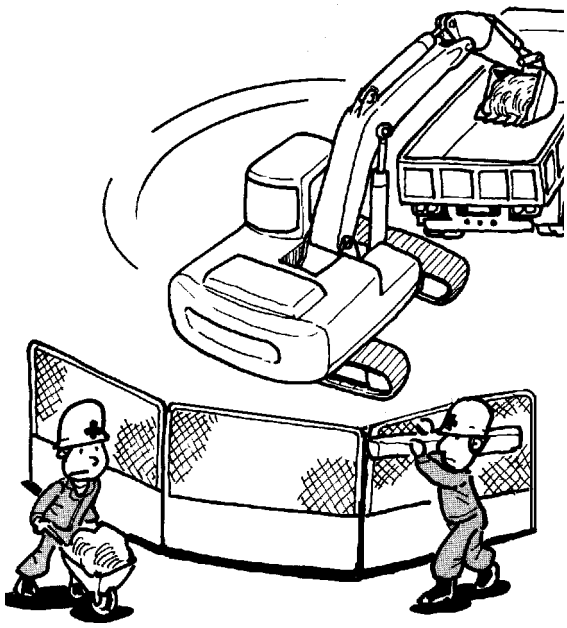
M166-01-053

PRECAUTIONS FOR OPERATIONS

CAUTION: Investigate the work site before starting operations.

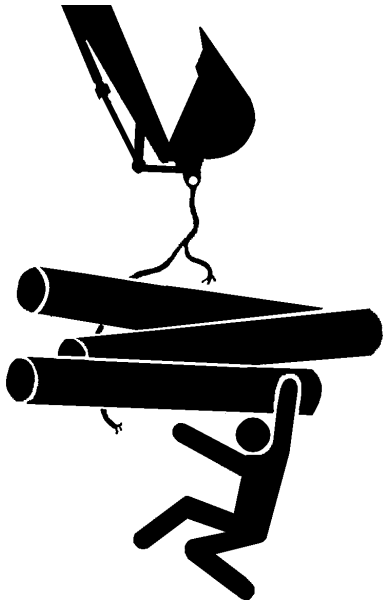
1. **Be sure to install an overhead cab guard when operating in a work site which has a possibility of falling objects.**
2. **If operation on soft ground is required, sufficiently reinforce the ground beforehand.**

- Be sure to wear close fitting clothing and safety equipment appropriate for the job, such as a hard hat, etc. when operating the machine.
- Clear all persons and obstacles from area of operation and machine movement.
  Always beware of the surroundings while operating. When working in a small area surrounded by obstacles, take care not to hit the upperstructure against obstacles.
- When loading onto trucks, bring the bucket over the truck beds from the rear side. Take care not to swing the bucket over the cab or over any person.



M104-05-015

OBJECT HANDLING --- IF EQUIPPED



SA-014

CAUTION: When you use machine for object handling, be sure to comply with all local regulations.
Cables, straps, or ropes can break, causing serious injury. Do not use damaged chains, frayed cables, slings, straps, or ropes to crane.

When required to swing the machine with a load lifted, pay attention not to allow the lifted load to come in contact with the surroundings or to not tip over the machine due to centrifugal force. Slowly swing the machine after turning the precise control mode switch ON or by reducing the engine speed. Always turn the power mode switch to the P or E position with the auto idle/acceleration switch OFF to ensure safe operation.

Never move the load quickly. Never move load over a person's head. Do not allow any persons near load.

Keep all persons away from wire-rope-attached load, lifted or sitting on the ground unless it is securely sitting on blocks or on the ground.

Position upperstructure so that the travel motors are at the rear.

Do not attach sling/chain to the bucket teeth.

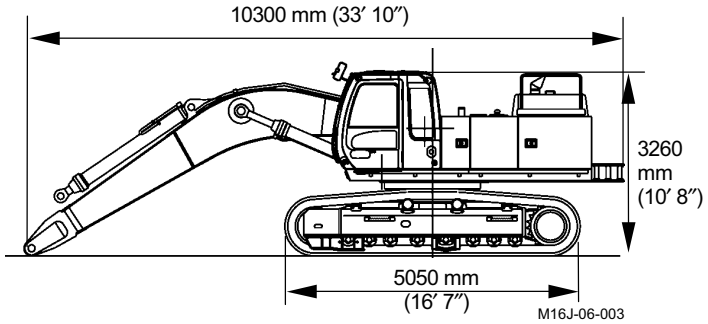
- Secure sling/chain tightly to the load to be lifted. Wear gloves when securing sling/chain.
- Fasten sling/chain to bucket loop, with the bucket curled and arm retracted.
- Coordinate hand signals with your signal man before starting.
- Be aware of the location of all persons in the working area.
- Attach a hand line to load and make sure person holding it is well away from load.
- Before lifting, test your load.
  1. Park your machine close to load.
  2. Attach load to the machine.
  3. Raise load 50 mm (2 in) above the ground.
  4. Swing the load all the way to one side.
  5. While keeping load close to the ground, move it away from machine.
  6. If there is any indication of reduced stability of your machine, lower load to the ground.
- Lift load only as high as necessary.

Packing Dimensions and Weights for Transportation - 3

Basic Machine

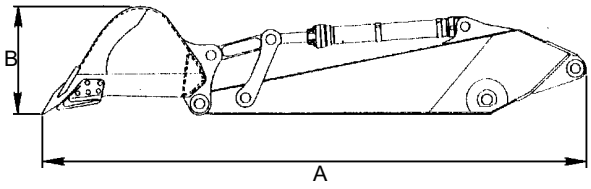
Weight : 29300 kg (64600 lb)

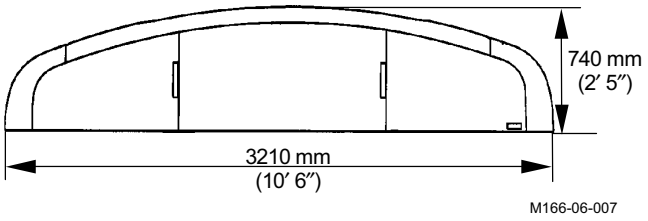
Shoe Width mm (ft·in)	Overall Width mm (ft·in)	Weight kg (lb)
600 (2′ 0″)	3340 (11′ 0″)	29300 (64600)
750 (2′ 6″)	3490 (11′ 5″)	30100 (66400)



Arm and Bucket

Arm Length mm (ft·in)	Bucket Capacity (PCSA heaped) m^3 (yd^3)	A mm (ft·in)	B mm (ft·in)	Overall Width mm (ft·in)	Weight kg (lb)
2900 (9′ 6″)	2.07 (2.71)	6010 (19′ 9″)	1270 (4′ 2″)	1630 (5′ 4″)	3900 (8600)
3400 (11′ 2″)	1.89 (2.47)	6430 (21′ 1″)	1270 (4′ 2″)	1540 (5′ 1″)	3900 (8600)
3900 (12′ 10″)	1.60 (2.09)	6930 (22′ 9″)	1270 (4′ 2″)	1360 (4′ 6″)	3900 (8600)
4900 (16′ 1″)	1.36 (1.78)	7760 (25′ 6″)	1170 (3′ 10″)	1410 (4′ 8″)	3500 (7720)



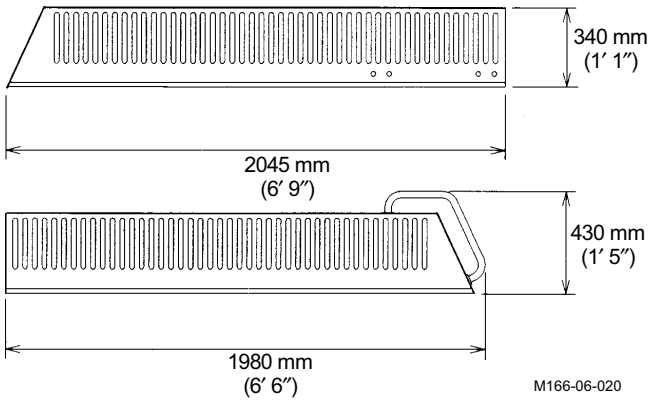


Counterweight

Weight : 9150 kg (20200 lb)
Height : 1250 mm (4 ft 1 in)

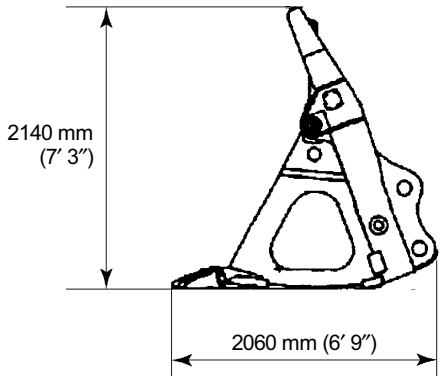
Side Step

Weight : 30 kg (66 lb)



Bucket

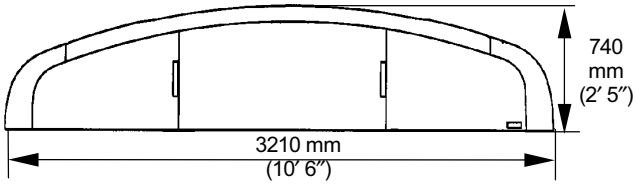
Bucket Capacity	Weight	Max. Width
2.3 m^3	3380 kg (7450 lb)	1860 mm (6 ft 1in)
2.6 m^3	3050 kg (6730 lb)	2030 mm (6 ft 8in)



PEM166-PD1-1-028

Counterweight

Weight : 9150 kg (lb)
Max. Width : 1250 mm (4 ft 1 in)



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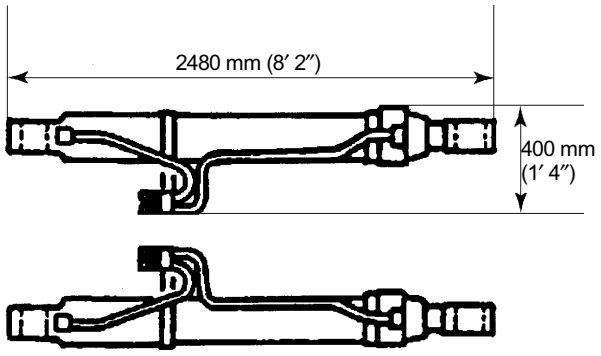
Boom Cylinders

Total Weight : 870 kg (1920 lb)



PEM166-LD1-1-024

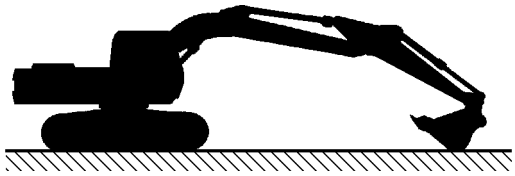
PREPARE MACHINE FOR MAINTENANCE

Before performing the maintenance procedures given in the following chapters, park the machine as described below, unless otherwise specified.

1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle/accelerator switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Turn the key switch OFF. Remove the key from the key switch. (If maintenance must be performed with engine running, do not leave machine unattended.)
6. Pull the pilot control shut-off lever (1) to the LOCK position.
7. Before performing any work on the machine, attach a “Do Not Operate” tag on the right control lever.



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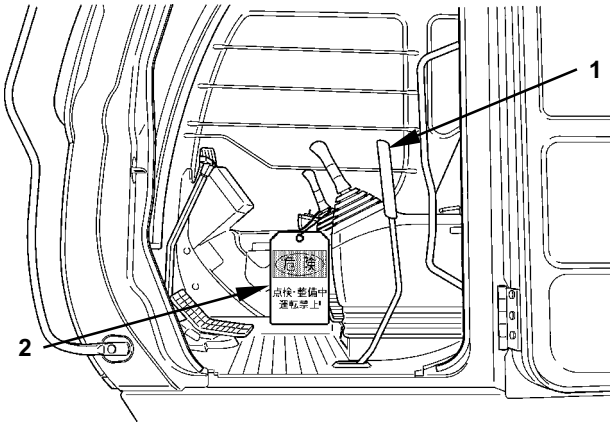


M178-07-017

SS2045102

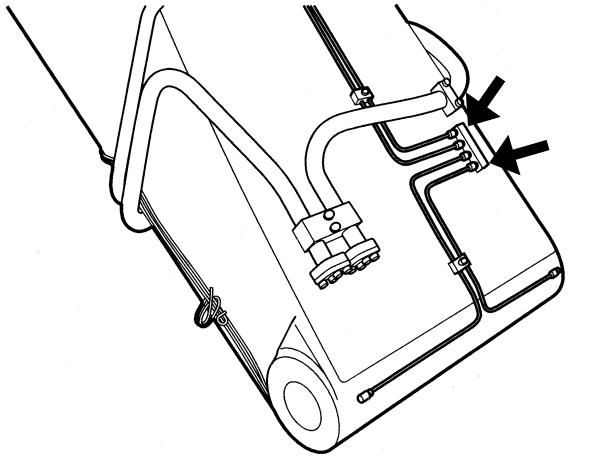
Front Joint Pins (LOADING SHOVEL)

1. Others every 50 hours
   (every 10 hours for the first 100 hours)

Add grease to all grease fittings shown.

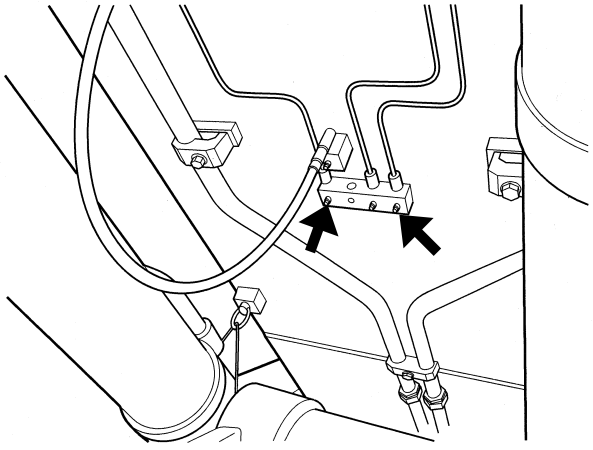
This machine employs a block greasing system so that pins located in high places are greased safely.

- Boom Pirot and Boom cylinder grouped Grease fittings.



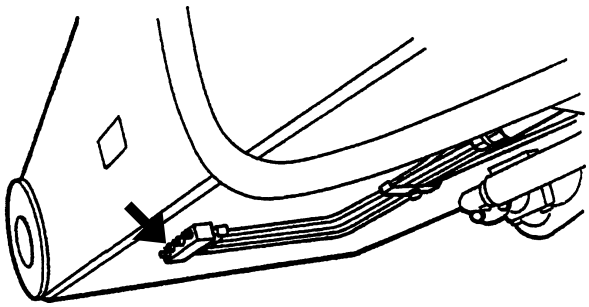
PEM166-LD1-1-033

- Arm and Arm cylinder grouped Grease fillings.



PEM166-LD1-1-034

- Bucket cylinder and Level cylinder grouped Grease fittings.



M166-07-055

B. ENGINE OIL

Parts		Quantity	Interval (hours)						
			10	50	100	250	500	1000	2000
1. Engine Oil	Oil Level Check	-	■						
2. Engine Oil	Change	55 L (14.5 US gal)					■		
3. Engine Oil Filter	Replacement	2					■		

Recommended Engine Oil
Depending upon the expected air temperature range between oil changes, use the oil viscosity shown on the temperature chart below.

API CD Class
SAE 30 or equivalent (both summer and winter)
High temperature areas, SAE 40 or equivalent
Low temperature areas, SAE 10W or equivalent

Brand Names of Recommended Engine Oil

Kind of Oil	Engine Oil		
Application / Air Temp. / Manufacturer	Engine Crank Case, Fuel Injection Pump and Governor		
	–20 to 0 °C (–4 to 32 °F)	–10 to 35 °C (14 to 95 °F)	25 to 40 °C (77 to 104 °F)
British Petroleum	BP Vanellus C3		
	10W	30	40
Caltex Oil	RPM DELO 300 Oil		
	10W	30	40
Esso	Essolube D-3		
	10W	30	40
Idemitsu Kosan	Apolloil diesel motive		
	S-310	S-330	S-340
	–15 to 40 °C (5 to 104 °F) Apolloil custom wide 15W-40		
	Apolloil super wide 15W-40		
Mobil Oil	Mobil Delvac		
	1310	1330	1340
Nippon Oil	Hidiesel S 3		
	–20 to 35 °C (–4 to 95 °F) 10W-30	–10 to 40 °C (14 to 104 °F) 15W-40	
Shell Oil	Rymla zoil white pilot super		
	10W	30	40

NOTE: The machine shipped from the factory is filled with lubricants marked with ■ .

INSPECTION AND MAINTENANCE OF HYDRAULIC EQUIPMENT

IMPORTANT: Do not adjust the engine governor and/or hydraulic components.

CAUTION: During operation, the parts of the hydraulic system become very hot.
Allow the machine to cool down before beginning inspection or maintenance.

1. Be sure that the machine is parked on a level, firm surface before servicing hydraulic equipment.
2. Lower the bucket to the ground and stop the engine.
3. Begin servicing hydraulic components only after components, hydraulic oil and lubricants are completely cooled, and after releasing residual pressure.

3.1 Bleed air from the hydraulic oil tank to release internal pressure.

3.2 Allow the machine to cool down.
Note that servicing heated and pressurized hydraulic components may cause hot parts and/or oil to fly off or escape suddenly, possibly resulting in personal injury.

3.3 Keep body parts and face away from plugs or screws when removing them.
Hydraulic components may be pressurized even when cooled.

3.4 Never attempt to service or inspect the travel and swing motor circuits on slopes. They are highly pressurized due to self-weight.

3.5 Even after bleeding the air from the hydraulic oil tank, pressure remains in the various circuits of the hydraulic system. Be sure to operate each control lever a few times to release residual pressure from the system.

4. When connecting hydraulic hoses and pipes, take special care to keep seal surfaces free from dirt and to avoid damaging them. Keep these precautions in mind:

4.1 Wash hoses, pipes, and the tank interior with a washing liquid and thoroughly wipe it out before reconnecting them.

4.2 Only use O-rings that are free of damage or defects. Be careful not to damage them during reassembly.

4.3 Do not allow high pressure hoses to twist when connecting them. The life of twisted hoses will be shortened considerably.

4.4 Carefully tighten low pressure hose clamps.
Do not overtighten them.

7 **Replace Pilot Oil Filter**
--- every 1000 hours

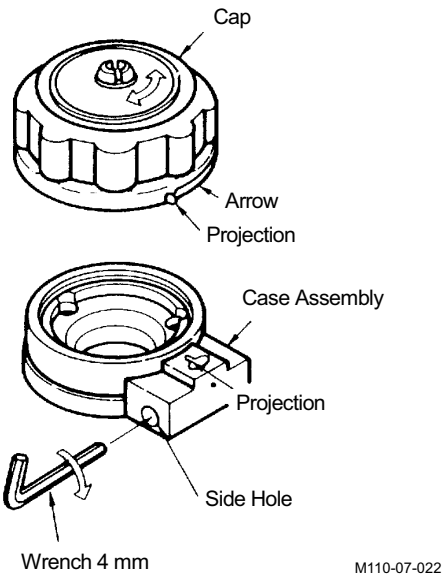
1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.

IMPORTANT: The turbocharger may be damaged if the engine is not properly shut down.

4. Run the engine at slow idle speed without load for five minutes.
5. Stop the engine. Remove the key from the key switch.
6. Operate the right and left control levers to release pressure from the pilot accumulator.
7. Pull the pilot control shut-off lever to the LOCK position.

CAUTION: Keep body and face away from cap. Turn cap slowly and remove the cap only after releasing the internal pressure completely.

8. Insert the wrench as shown and turn the wrench clockwise and hold the wrench.
9. Turn the cap counter-clockwise about 30°, at which point stop cap to release the air.
10. Turn the cap further and remove cap.
11. Align the projected part of cap with the projected part of the case and install cap.
12. Remove filter case (5).
13. Remove element (4) by moving it back and forth while pulling down on it.
14. Remove and discard O-ring (3) and element (4).
15. Clean filter head (1) of O-ring (3) and element (4) area.
16. Apply a thin film of clean oil to new O-ring (3) and install it in filter head (1). Be sure O-ring is in correct position.
17. Apply a thin film of clean oil to ring of new element (4), that fits into filter head. Slowly install element (4) by moving it back and forth while pushing it upward.
18. Clean filter case (5).
19. Install filter case (5) onto filter head (1) by turning it clockwise. Tighten case to 19.5 to 29.5 N·m (2 to 3 kgf·m, 14.5 to 21.5 lbf·ft).
20. After replacing the filter element, bleed air from the pump and check the oil level in the hydraulic oil tank. (Refer to the Bleed Air from Hydraulic System in Step 3.) If the machine is operated with air remaining in the hydraulic system, damage to the hydraulic pump may result.
21. Replace the element at the regular interval to keep hydraulic oil clean and to extend the life of the hydraulic components.



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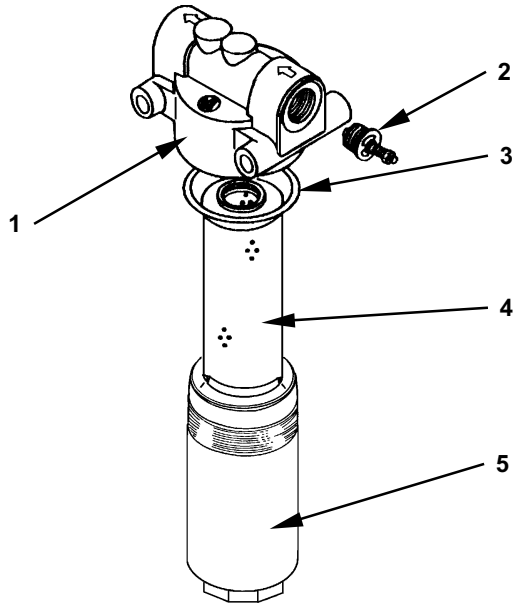

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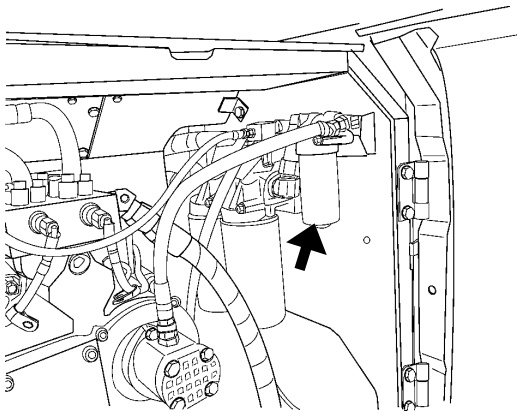
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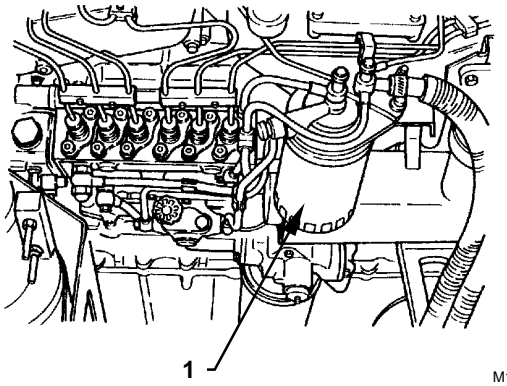
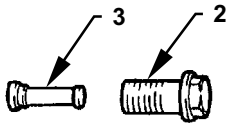
3 **Replace Fuel Filter**
--- every 500 hours



M111-07-090

1. For safety and to protect the environment, always use proper containers when draining fuel. Do not pour fuel onto the ground, down a drain or into a stream, pond or lake. Dispose of waste fuel properly.
2. Remove cartridge filter (1) using the filter wrench.
3. Apply a thin film of clean fuel to the gasket of new cartridge filter (1).
4. Tighten cartridge filter (1) by hand until the gasket makes contact with the sealing surface.
5. Using the filter wrench, tighten cartridge filter (1) about 1/2 to 3/4 turn more. Do not overtighten cartridge filter (1).
6. After replacing cartridge filter (1), bleed air from the fuel system.

4 **Clean Feed Pump Strainer**
--- every 1000 hours,



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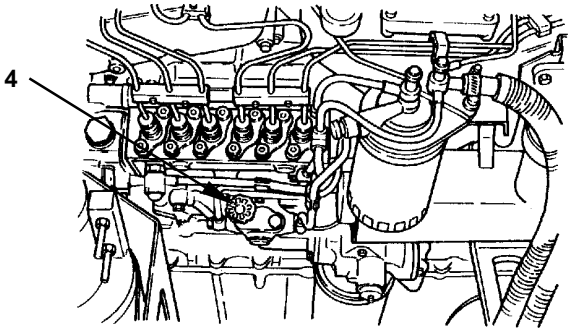


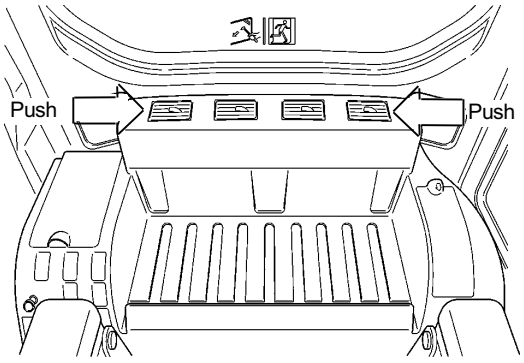
M111-07-091

1. Remove the feed pump (4) inlet hose joint bolt (2), located at the water separator inlet.
2. Remove strainer (3) from joint bolt (2) using a screw driver.
3. Clean strainer (3) using diesel fuel.
4. Install and tighten strainer (3) in joint bolt (2).
5. Install and tighten joint bolt (2).
6. After replacing for filter, bleed air from the fuel system.

1

Clean and Replace Air Conditioner Filter
Clean Filter
Circulating Air Filter --- every 500 hours
Fresh Air Filter --- every 500 hours

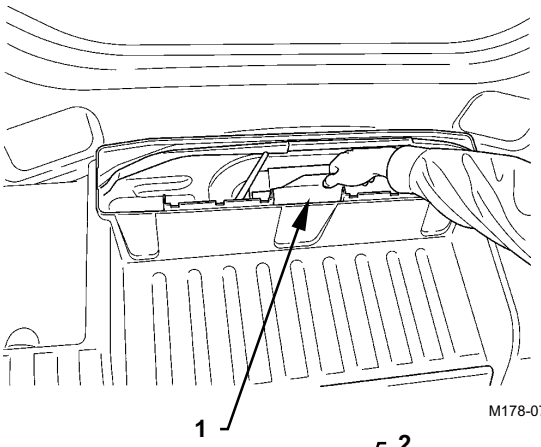
Replace Filter
Circulating Air Filter --- After cleaning 6 times or so
Fresh Air Filter --- After cleaning 6 times or so



M178-07-037

Removing Fresh Air Filter

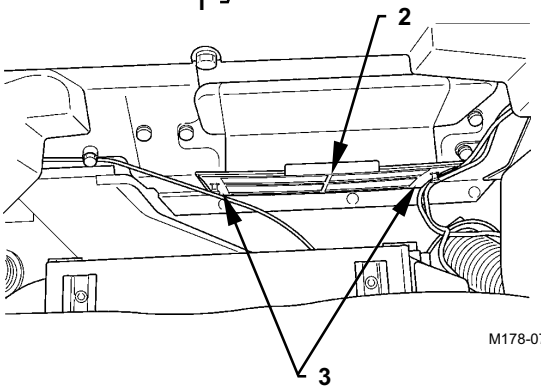
1. While pushing the cover side above the rear deck, raise the upper cover to remove.
2. After removing the upper cover, hold the grip of fresh air filter (1) and pull it out in the vertical direction.



M178-07-070

Removing Recirculation Filter

1. Recirculation filter (2) is located under the rear deck.
2. Holding grips (3), pull them toward you to remove.



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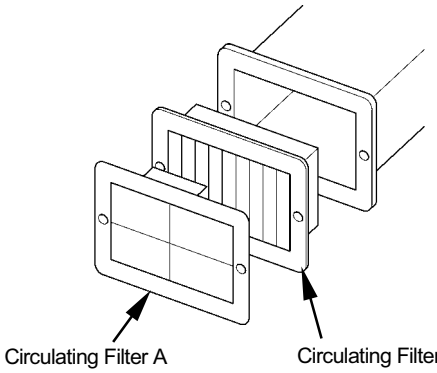
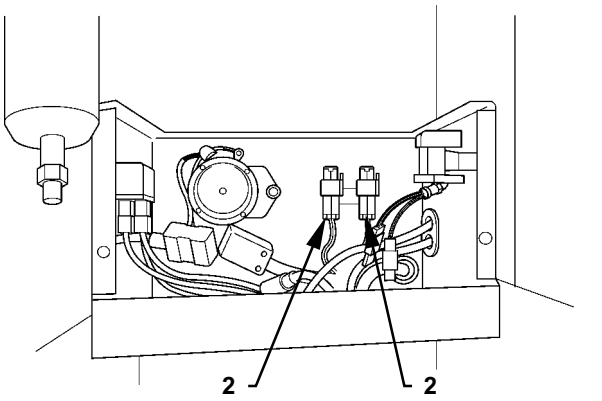


M16J-07-057

- Fusible Link (Main Fuse)
  In case the starter won't rotate even if the key switch is turned to the START position, fusible link may the cause of the trouble. Remove the cover under the air cleaner to check the fuse. Replace it if blown.
  21- + Side (Red) 45A
  22- – Side (Black) 75A



M16-07-062

CONNECTING BATTERIES

After batteries are disconnected, engine speeds must be recalibrated.

1. Turn the key switch to the ON position.

2. Press the max. power (S/P) mode switch and turn engine control dial to the highest position to automatically recalibrate engine speeds.

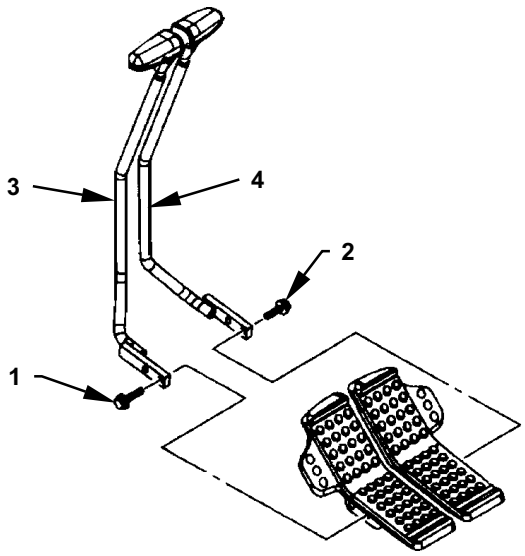
3. Turn the key switch OFF.

The machine can now be started and operated as usual.

5 Remove the 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.

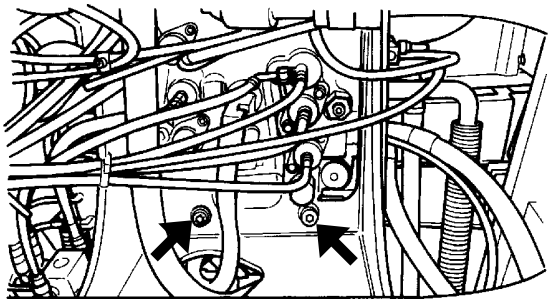


M178-07-077

NOTE: Wrench size 17 mm
Tightening torque 50 N·m
(5.1 kgf·m, 37 lbf·ft)

8. Retighten control valve mounting bolts.

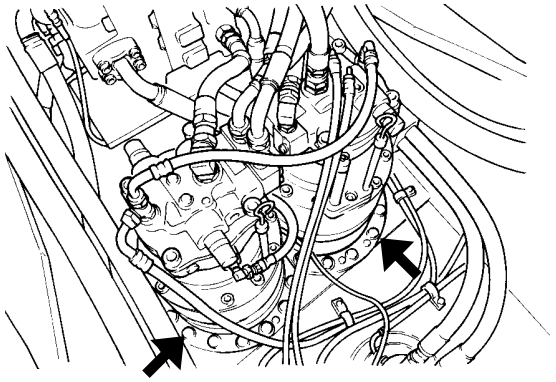
Tool: 17 mm
Torque: 400 N·m (41.0 kgf·m, 295 lbf·ft)



M111-07-099

9. Retighten swing device mounting bolts.

Tool: 32 mm
Torque: 750 N·m (76.5 kgf·m, 550 lbf·ft)



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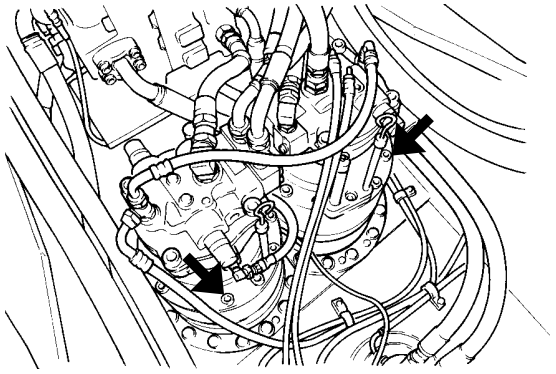
10. Retighten swing motor mounting bolts.

Tool: 14 mm
Torque: 300 N·m (30.5 kgf·m, 220 lbf·ft)



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STORAGE

STORING THE MACHINE

1. Inspect the machine. Repair worn or damaged parts. Install new parts if necessary.
2. Clean the primary air cleaner element.
3. Retract all hydraulic cylinders, if possible. If not, coat exposed cylinder rods with grease.
4. Lubricate all grease points.
5. Park the tracks on long stable blocks.
6. Wash the machine.
7. Remove the batteries and store them in a dry protected place after charging fully. If not removed, disconnect the negative battery cable from the (−) terminal.
8. Add an antirust agent to the coolant. In cold weather, add an antifreeze, or drain the coolant completely. Be sure to attach a “No Water in Radiator” tag on a clearly visible location if the system is drained.
9. Loosen the alternator belt and fan belt.
10. Paint necessary areas to prevent rust.
11. Store the machine in a dry, protected place. If stored outside, cover with a waterproof cover.
12. If the machine is stored for a long time, operate hydraulic functions for travel, swing and digging two to three times for lubrication, at least once a month. Be sure to check the coolant level and lubrication conditions before operating.

ELECTRICAL SYSTEM

Problem	Cause	Solution
Nothing Works	Battery	Recharge or replace.
Nothing Works (Except clock)	Battery relay	Replace relay.
Batteries Undercharged	Loose or corroded connections	Clean and tighten or replace batteries.
	Alternator belt loose	Tighten or install new belt.
	Alternator not charging	See your authorized dealer.
	Fuse	Replace fuse.
	Key switch failure	Replace key switch.
Starting Motor Will Not Turn	Battery undercharged or dead	Recharge or replace battery.
	Battery cables making poor connections	Clean connections.
	Fusible link	Replace fusible link.
	Key switch	See your authorized dealer.
	Start relay	See your authorized dealer.
	Starter solenoid	See your authorized dealer.
	Starter	Repair or replace start motor.
	Starter pinion jammed in flywheel gear	Repair or replace starter.
	Major engine failure	See your authorized dealer.
Starter Solenoid Chatters	Poor connections at batteries or starter	Clean connections.
	Low battery charge	Recharge or replace batteries.
	Starter solenoid “hold-in” windings open	See your authorized dealer.
Starter Motor Turns but Will Not Crank Engine	Starter pinion gear not engaging flywheel ring gear	See your authorized dealer.
	Pinion shift mechanism jammed or malfunctioning	See your authorized dealer.
	Pinion gear teeth broken	See your authorized dealer.
	Flywheel gear teeth broken	See your authorized dealer.
Engine Cranks Slowly	Battery cables damaged or broken internally	Inspect and replace cables.
	Battery or starter cable connections loose or corroded	Clean and tighten connections.

SHOE TYPES AND APPLICATIONS

ZAXIS450

Shoe Width mm (in)		600 mm (24″) Grouser Shoe	750 mm (30″) Grouser Shoe
Application		For Ordinary Ground (Standard)	For Weak Footing (Option)
Operating Weight	kg	42500	43200
	(lb)	(93700)	(95200)
Basic Machine Weight	kg	32700	33400
	(lb)	(72100)	(73600)
Cab Height	mm	3260	3260
	(ft·in)	(10′ 8″)	(10′ 8″)
Minimum Ground Clearance	mm	*496	*496
	(ft·in)	(20″)	(20″)
Undercarriage Length	mm	5050	5050
	(ft·in)	(16′ 7″)	(16′ 7″)
Undercarriage Width	mm	3340	3490
	(ft·in)	(11′ 0″)	(11′ 5″)
Ground Pressure		79 kPa (0.81 kgf/cm^2, 11.5 psi)	64 kPa (0.65 kgf/cm^2, 9.2 psi)

ZAXIS450LC

Shoe Width mm (in)		600 mm (24″) Grouser Shoe	750 mm (30″) Grouser Shoe
Application		For Ordinary Ground (Standard)	For Weak Footing (Option)
Operating Weight	kg	44800	45500
	(lb)	(98800)	(100300)
Basic Machine Weight	kg	34800	35600
	(lb)	(76700)	(78500)
Cab Height	mm	3380	3380
	(ft·in)	(11′ 1″)	(11′ 1″)
Minimum Ground Clearance	mm	*738	*735
	(ft·in)	(2′ 5″)	(29″)
Undercarriage Length	mm	5470	5470
	(ft·in)	(17′ 11″)	(17′ 11″)
Undercarriage Width (Extended/Retracted)	mm	3490/2990	3640/3140
	(ft·in)	(11′ 5″)/(9′ 10″)	(11′ 11″)/(10′ 4″)
Ground Pressure		76 kPa (0.77 kgf/cm^2, 10.9 psi)	62 kPa (0.63 kgf/cm^2, 9.0 psi)

NOTE:
- *The specifications for the front-end attachment are for 3.4 m (11 ft 2 in) arm with PCSA 1.89 m^3 (2.47 yd^3) bucket for ZAXIS450 or PCSA 2.1 m^3 (2.7 yd^3) for ZAXIS450LC.*
- *750 mm (30 in) grouser shoe should not be used on gravel or rocky ground.*
- ** The dimensions do not include the height of the shoe lug.*

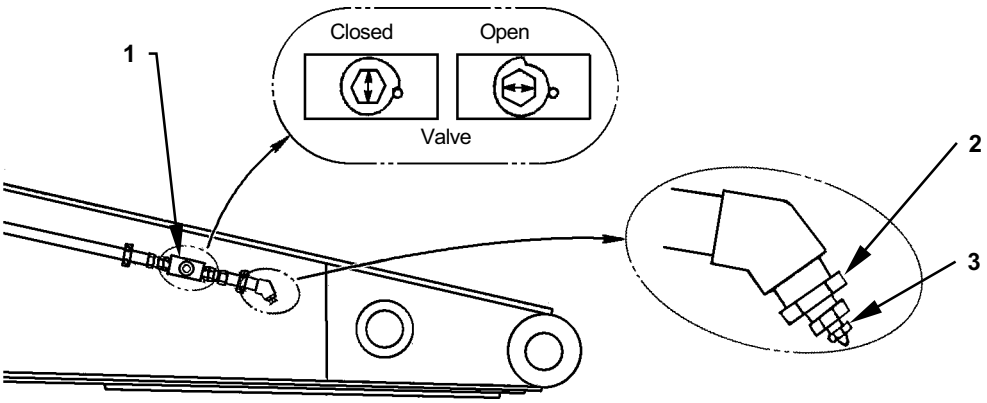
HYDRAULIC BREAKER

Select a breaker that is the correct size and weight for your machine. See your authorized dealer for correct breaker information.

Carefully study the operation manuals of the machine and breaker, and perform the required checks and/or inspection before connecting the breaker to the arm.

IMPORTANT: Precautions for connecting breaker piping.

- **Do not allow impurities to enter into the system when switching the breaker with the bucket.**
- **Before attaching the hydraulic breaker, be sure to loosen air breather plug (3), located on the top of cap assembly (2), to release internal pressure and to drain the trapped hydraulic oil.**
  Then, remove cap assembly (2).
  Install the breather fitting and the breaker rubber hose before opening valve (1).
- **When the breaker is not used, apply the cover to the pipe opening on the arm top and install the plug into the hose end of the breaker to prevent impurities from entering the system.**
  Be sure to provide spare covers and plugs in the tool box so that they will be available when needed.
- **After connecting, check the connecting seal fitting for oil leakage, and pipe clamp bolts for looseness.**



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