



450Z

Compact Excavator

**OPERATOR'S
MANUAL**

PART #50940100

Revision A - 06/12



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Provide adequate ventilation when working in an enclosed area

Engine exhaust fumes are harmful to the human body and their inhalation is extremely hazardous. When starting the engine in an enclosed area, open the windows and doors for ventilation. Also do not idle the engine unnecessarily or leave the engine running while the machine is not in use.



000283-00X

Keep the cabin window clean

- Keep the surface of the cabin windows and the headlights clean for clear view.
- Make sure that your machine is equipped with headlights and all required working lamps, and that they work properly.

Fasten the seatbelt

- For your safety, ROPS (Roll-Over Protective Structure)/FOPS (Falling Objects Protective Structures) with a seatbelt is installed.
- Always fasten the seatbelt across the pelvic region and adjust snugly before you operate the machine.
Never fasten a seatbelt across the abdomen.
- The seatbelt must be replaced after an accident.
- In addition the seat and seat mounting must be checked by your dealer after an accident has occurred.
- If the seat and seat mounting are damaged, they must be replaced.

ROPS/FOPS

- Never modify the structural member of ROPS/FOPS.
- If ROPS/FOPS is damaged, replace it immediately to prevent bodily injury.
Never repair or modify it.

Caution for the protection of plants from hot wind

The hot wind of the high temperature is exhausted from the muffler and the radiator. If this hot wind hits plants directly, they will die.

Give a cover board to protect plants from the hot wind when working near the arranging fence or plant.

9. Precautions for Servicing

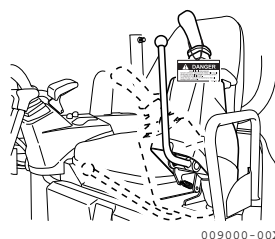
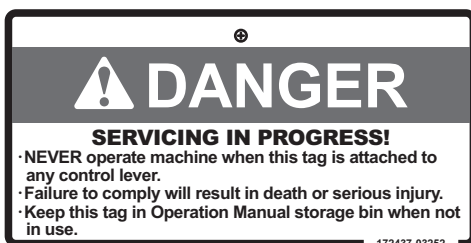
9-1. Precautions before servicing

Attach the "SERVICING IN PROGRESS" tag to an implement control lever

- If another person should start the engine or operate the control levers while service is in progress, the service personnel can sustain serious bodily injury.

Attach the "SERVICING IN PROGRESS" tag indicating "Servicing in Progress" to one of the implement control levers.

The "SERVICING IN PROGRESS" tag is enclosed with the Operation Manual.





Use appropriate tools

- Using damaged or worn tools or using tools inappropriate for the required application is very dangerous, and may also cause damage to the machine. Make sure to use the tools that are appropriate for the specific job.

For information about tools, refer to Section "22-1. Required tools".




(11)

	WARNING SERVER HAZARD! MOVING FAN BLADE AND BELTS! NEVER open engine access panel while engine is running. Stop engine and remove key before servicing. Failure to comply could result in death or serious injury.
	

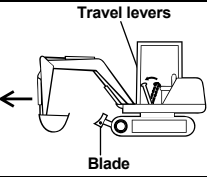
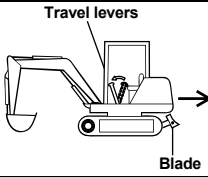
172437-03441

(12)

	WARNING BURN HAZARD! ALWAYS allow exhaust pipe and muffler to cool before servicing. Exhaust system cools slowly. Failure to comply could result in death or serious injury.
---	--

172437-03422

(13)

WARNING	
	
Blade	Blade
CRUSH HAZARD! Machine travels in direction of blade when travel levers are pushed away from operator. NEVER move excavator before confirming location of blade and direction of travel. Failure to comply could result in death or serious injury.	



172437-03443

(14)

WARNING
NEVER repair or modify a ROPS. ALWAYS replace ROPS if damaged. Failure to comply could result in death or serious injury.

172437-03441

(15)

WARNING


ROLL-OVER HAZARD! NEVER operate without a seat belt. NEVER jump if excavator rolls.

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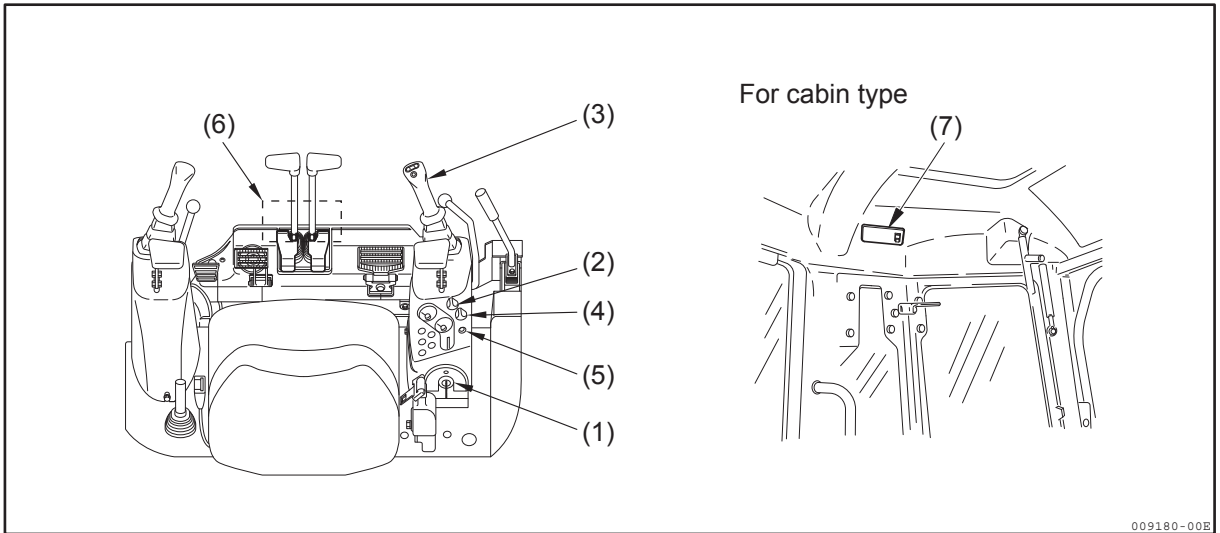
(16)

WARNING

CRUSH HAZARD! STAY CLEAR OF AREA Failure to comply could result in death or serious injury.

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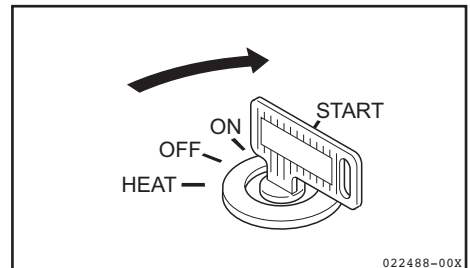
12-2. Switch



(1) Starter switch

Use this switch to start and stop the engine.

- OFF position
Turn the key to "OFF" to stop the engine and disconnect electrical circuit or remove the key.
- ON position
Turn the key to "ON" to connect the electrical fuel solenoid circuit and the electrical charging circuit. (Keep the key in this position while running the engine.)
- START position
Turn the key to "START" to start the engine. Release the key after the engine is started and it will return to the "ON" position.
- HEAT position
Turn the key to activate the preheating circuit and warm up intake air to start the engine easier in cold weather. (Set the key to this position when the outside temperature is low.)
- When the engine is not running and the switch is in the "ON" position, the buzzer keeps sounding.
Turn the switch to the "OFF" position to stop sounding.



⚠ WARNING

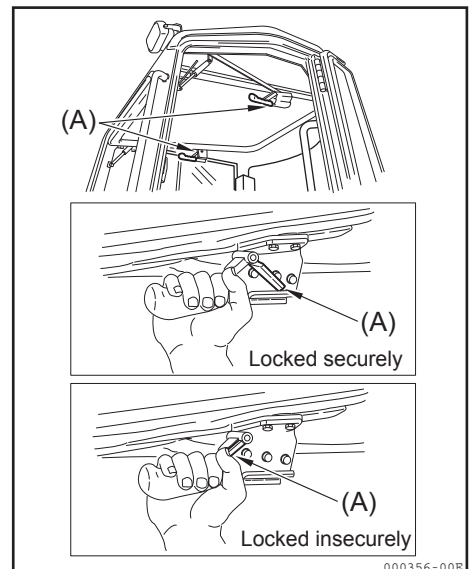
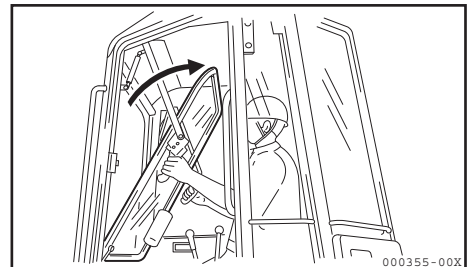
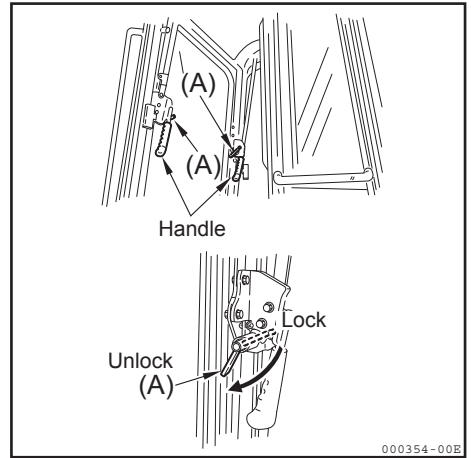
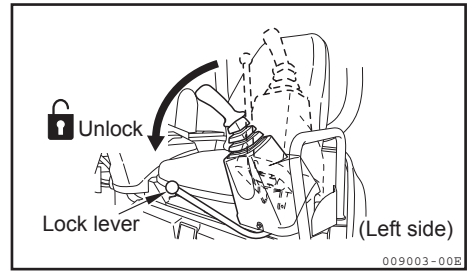
- To avoid bodily injury, securely grasp the handles with both hands when opening and closing the windshield.
- Securely lock the windshield using the lock levers and the window locks when storing or closing the upper and lower front windshields.
- When opening or closing the front windshield, be sure to place the lock levers securely in the lock position.

■ **Opening the upper windshield**

- 1) Hold the handles with your hands and turn the right and left lock levers (A) to the arrowed direction to release the lock.
- 2) Slide the windshield to the upper rear side while pulling it to this side.
- 3) Lock the upper windshield housed under the ceiling securely with the right and left lock levers (A).

■ **Closing the upper windshield**

- 1) Hold the handles with your hands and release the right and left lock levers (A).
- 2) Holding the handles, lower the upper windshield slowly.
- 3) Lock the upper windshield securely with the right and left lock levers (A).



■ Checking the fuel level in the fuel tank and refueling

⚠ WARNING

Be careful not to overfill the fuel tank because it could cause a fire. If the tank is overfilled, completely wipe off the spilled fuel.

⚠ CAUTION

- Do not remove the strainer from the fuel supply port of the fuel tank to refill the tank.
- Be careful not to allow water settled at the bottom of the fuel container or dirt on refueling equipment to enter into the fuel tank.

- 1) Turn the starter switch to the "ON" position, and check the fuel level with the fuel gauge. Open the engine hood B, and supply fuel from the fuel supply port while checking the level gauge.

When the fuel gauge pointer indicates "E", approximately 3 Gals. (12 L) of fuel is left in the tank.

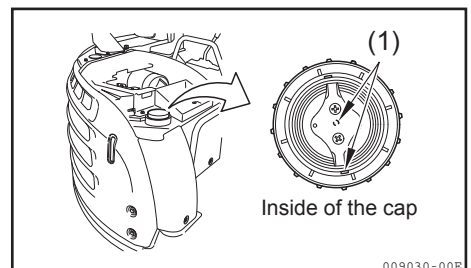
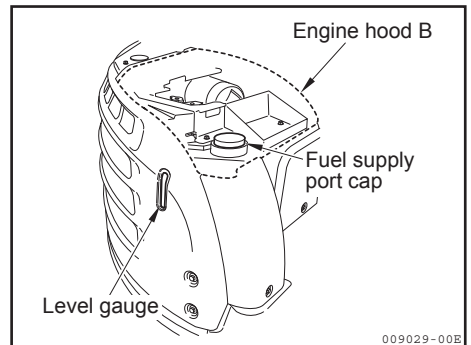
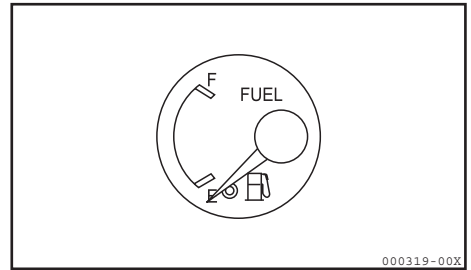
Capacity : 16.9 Gals. (64 L)

For the quality of the fuel to be used, refer to Section "21. Fueling, Oiling and Greasing Based on Temperature Range".

- 2) After refueling, securely retighten the fuel supply port cap, and close the engine hood B.

Note :

If the breather hole (1) in the cap is clogged, the pressure in the tank may decrease and the fuel may not be supplied adequately to the engine. Clean the engine breather hole from time to time.



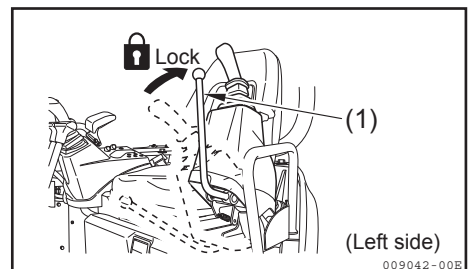
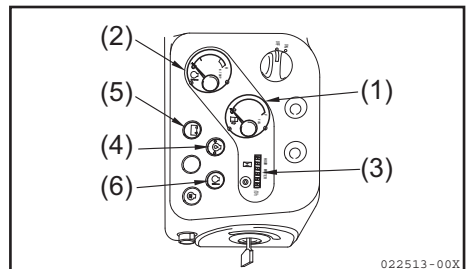
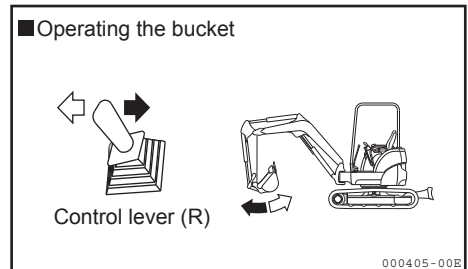
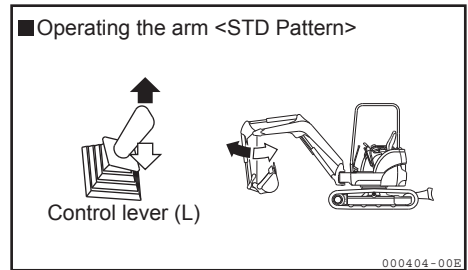
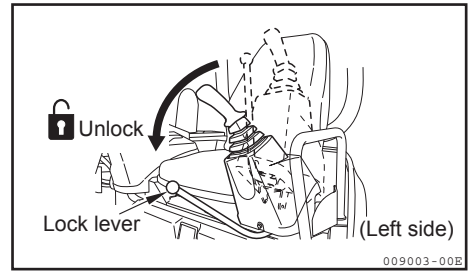
- 3) Unlock the lock levers, and lift the bucket from the ground.
- 4) Operate the bucket and arm control levers slowly to move the bucket and arm cylinders to their stroke ends. Operate the bucket for thirty seconds and the arm for thirty seconds alternately for approximately five minutes to increase the hydraulic oil temperature to 68°F (20°C).

IMPORTANT

When moving the implement, be careful not to bump it against the machine or the ground.

- 5) After warming up the engine, check that the gauges and the monitor are in the following status. If there is anything abnormal, take corrective action.
 - Fuel gauge (1)..... Normal
 - Water temp. meter (2)..... Normal
 - Hourmeter (3)..... Normal
 - Engine oil pressure alarm lamp (4) Off
 - Battery charge alarm lamp (5)..... Off
 - Water temperature alarm lamp (6)..... Off
- 6) Check the exhaust gas color, the machine noise, and the vibration level for abnormality. If something is abnormal, take corrective action.
- 7) Set the lock levers to the "LOCK" position to check that the implement cannot be operated and the upperstructure cannot be swung with the left and right control levers.
- 8) Unlock the lock levers and operate the control levers to check that the implement can be operated and the upperstructure can be swung normally with the control levers. If something is abnormal, take corrective action.
- 9) Check to see that the swing brake valve operates normally. If something is abnormal, take corrective action.
- 10) Check that no abnormal noise is heard from the hydraulic system. If any abnormal noise is heard, take corrective action.

Ask your dealer to resolve the problems described in the steps 1) to 10) above.



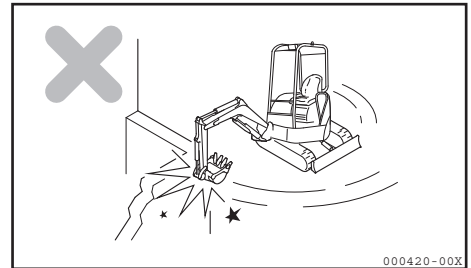
13-9. Precautions for operating the implement

WARNING

- Do not operate the implement control levers while traveling. Stop traveling first and then operate the implement.
- Do not operate the implement on a rocky surface (on hard and soft rocks).

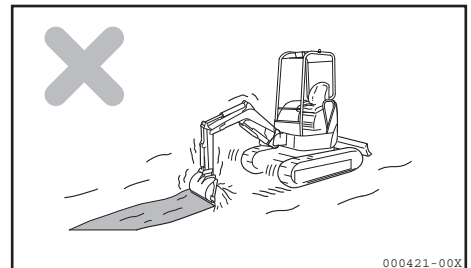
■ Do not use the implement's swing force

Do not level the ground or break down a wall by the use of swing force, and do not dig the bucket teeth into the ground while swinging. Doing these may cause the implement to be damaged.



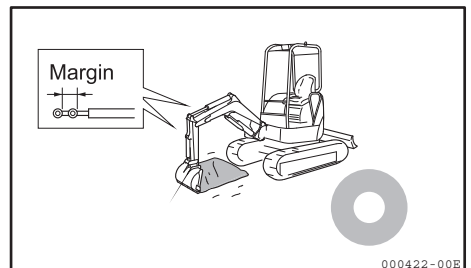
■ Do not use the implement's travel force

Do not excavate the ground by the use of travel force with the bucket teeth in contact with the ground. Doing this may cause excessive force to be imposed on the rear of the machine, shortening the machine life.



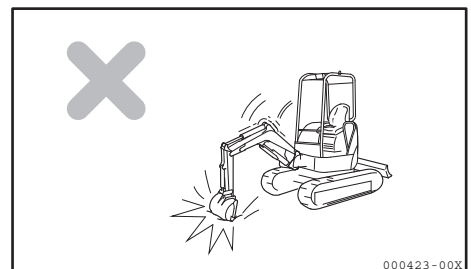
■ Take care not to operate the hydraulic cylinder to the stroke end.

Operating the hydraulic cylinder to the stroke end may impose an undue force on the stopper in the hydraulic cylinder, shortening the implement life. Operate with a small safety margin.



■ Do not operate the implement by the using the dropping force of the bucket

Do not excavate the ground by using the dropping force of the bucket as a pickaxe or pile driver. Doing this may cause excessive force to be imposed on the rear of the machine, shortening the machine life and possibly causing a serious accident.



13-14-4. Attachment types

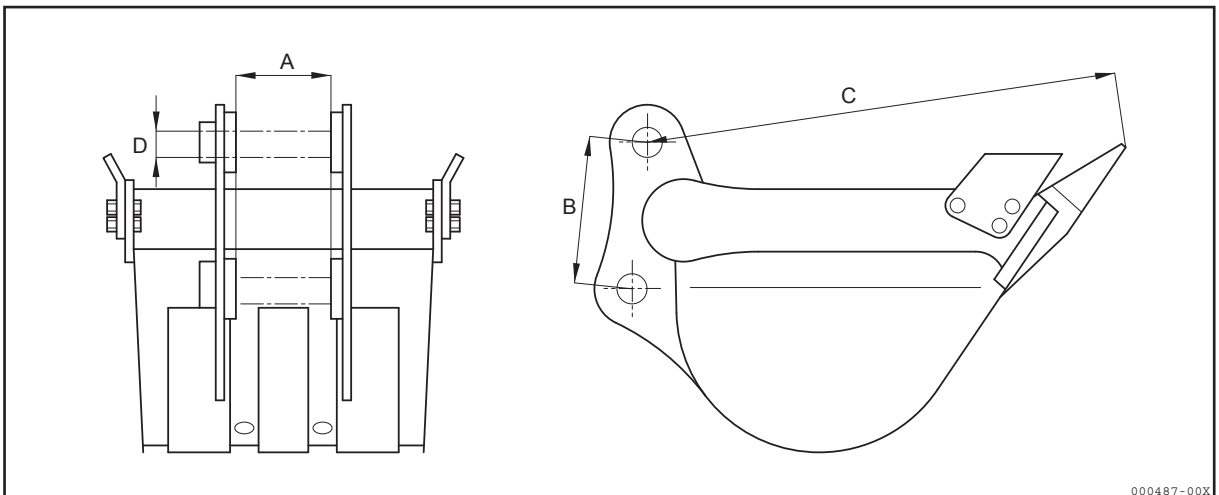
- 1) The attachments, which can be mounted on the machine with quick coupler, are only the same 2-pin type as the bucket. The 1-pin type such as clamshell cannot be mounted in the quick coupler.
- 2) The following 2-pin type of attachments exceptionally cannot be mounted in the quick coupler.
 - (1) Attachments much different from the standard bucket in shape of mounting part
 - (2) Attachments with excessively long or short pin pitch
- 3) Do not use any attachments improper for the machine with the quick coupler.

13-14-5. Allowable size of bucket

Allowable size of bucket to be mounted in the quick coupler

Unit : in. (mm)

Mark	Part		
A	Attachment width	5.51 (140) or more	
B	Distance between pins	Pin diameter Ø1.57 (40)	7.52 to 11.7 (191 to 298)
		Pin diameter Ø1.77 (45)	7.95 to 12.5 (202 to 317)
C	Operating radius of bucket	34.6 (880) or less	
D	Pin diameter	Ø1.57 to 1.77 (40 to 45)	



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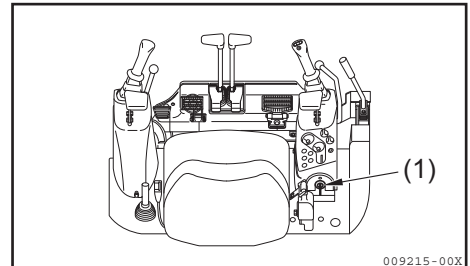
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13-17. Stopping the engine

IMPORTANT

- Stopping the engine after rotation at high speed may shorten the engine life. Do not stop the engine suddenly except in case of emergency.
- If the engine is overheated, do not stop the engine immediately. Gradually lower the engine temperature by rotating the engine at medium rotational speed before stopping the engine.

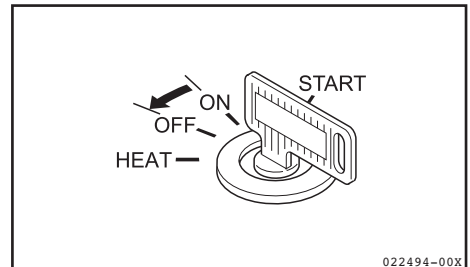
- 1) Idle the engine for approximately five minutes with no load.
(The engine temperature gradually lowers.)



- 2) To stop the engine, turn the starter switch key (1) to the "OFF" position.
- 3) Take the key out of the starter switch (1).

Note :

As long as the starter switch key is in "ON" position and the lock lever(s) is(are) in unlock position, each implement can be moved by its own weight when respective control levers are operated soon after the engine is stopped.



■ Precautions

- Make proper use of the general attachments following the handling instructions in the operation manual provided by the manufacturer of the general attachments.

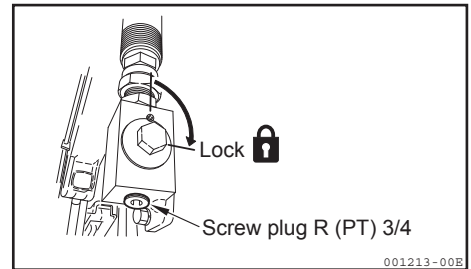
13-21-4. Long-term storage

If the hydraulic tool is not used, do the followings:

- Close the stop valves.
- Disconnect the hoses for the hydraulic tool. Wind the screw plug R (PT) 3/4 with seal tape and tighten them to the stop valve.

⚠ CAUTION

Operating the P.T.O. switches when the breaker or general attachment is not mounted may cause overheating.

**13-21-5. Specification**

Hydraulic oil pressure specification

- Oil flow rate
21.1 GPM (80 L / min)

16. Long-term Storage

16-1. Before storing

IMPORTANT

When storing the machine, set up the machine as illustrated in the right figure to protect the hydraulic cylinder rods from being corroded.

When storing the machine for a long period, do the following:

- Clean all parts and store the machine indoors. If you have to store the machine outdoors, park the machine on level ground and cover it with a protective sheet.
- Apply lube oil and grease to the machine and replace the engine oil.
- Apply a little amount of antirust to exposed parts of the hydraulic cylinder rods.
- Fill the battery with distilled water up to the upper level mark. After the battery has fully recharged, disconnect the negative terminal, and cover the battery or remove the battery from the machine to store it.
- Add an anti-freeze to the cooling water if the air temperature can fall below 32°F (0°C).

Because a long-life coolant (LLC) is added to the cooling water, you need not change it until the temperature falls down to -31°F (-35°C).

If the temperature falls below -31°F (-35°C), refer to Section "25-2. Nonperiodic services" to control the density of the cooling water.

- Lock the control levers and pedals with the lock levers and pedal guards respectively.
- Antirust

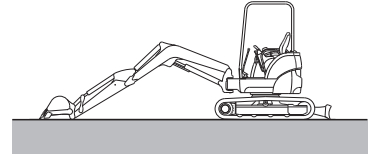
When stored near the sea or in a place exposed to sea breezes, the machine easily becomes rusty. Carefully apply an antirust to all exposed parts of the piston rods and cover the machine with a polyethylene sheet or oil paper.

Recommended antirust	Manufacturer
P-1300 (Solvent cutback rust preventive oil)	Nippon Oil
P-3 (Solvent cutback rust preventive oil)	Japan Energy
P-300 (Solvent cutback rust preventive oil)	Cosmo Oil

Some antirust solvent damages rubber materials. Be sure to use the recommended antirust or its equivalent.

- To prevent condensation inside the fuel tank, either drain off the fuel tank or fill the tank.

Retract the bucket and arm cylinders to place the bucket on the ground.



000512-00B

17-4-2. Machine body

- Contact your dealer about the measures shown in parentheses in the list below.
- If there is any abnormality or trouble whose cause is unknown other than those shown below, ask your dealer for repair.

	Problem	Cause	Measure
Machine body	Power or speed of moving part is low.	<ul style="list-style-type: none"> • Deteriorated function caused by worn hydraulic pump • Pressures of main relief valve, or port relief valve of control valve are dropped below set value. • Damaged hydraulic cylinder • Insufficient amount of hydraulic oil • Clogged filter 	<ul style="list-style-type: none"> (• Replace hydraulic pump.) (• Check and repair valves.) (• Check and repair.) • Replenish hydraulic oil up to specified level. • Clean or replace filter.
	Upperstructure does not swing or does not swing smoothly.	<ul style="list-style-type: none"> • Swing brake is not released • Insufficient amount of grease • Defective swing brake valve • Defective swing motor 	<ul style="list-style-type: none"> (• Check and repair.) • Check and grease. (• Check and repair.) (• Check and repair.)
	Temperature of hydraulic oil is too high.	<ul style="list-style-type: none"> • Insufficient amount of hydraulic oil • Overload 	<ul style="list-style-type: none"> • Replenish hydraulic oil up to specified level. • Lower load.
	Machine does not move straight.	<ul style="list-style-type: none"> • Improperly adjusted track or trapped foreign material • Damaged hydraulic motor. • Defective hydraulic pump • Defective control valve • Damaged sprocket, idler or track roller. 	<ul style="list-style-type: none"> • Adjust or clean. (• Check and repair.) (• Check and repair.) (• Check and repair.) (• Check and repair.)

19-2. Electrical equipment

- If electrical equipment gets wet or wiring insulation is broken, electric leaks may occur and the machine may malfunction which is very dangerous.
- Check the fan belt for tension and damage, and also check the battery for electrolyte level.
- Never disconnect or disassemble the electrical equipment mounted on the machine.
- Do not mount any electrical equipment other than those items provided by the manufacturer.
- Be careful not to spray water on the electrical equipment when washing the machine or operating in the rain.
- After working near the sea, take necessary precautions to protect the electrical equipment from corrosion.

■ List of periodic inspection and servicing

*Applicable to models with the relevant equipment

◇ : Check ○ : Supply ● : Replace □ : Adjust (clean) ■ : Oil & grease

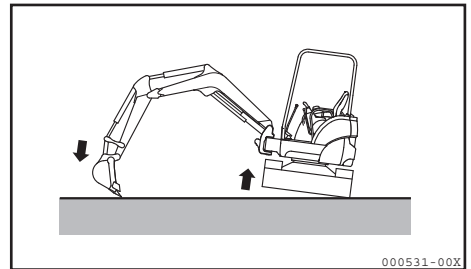
Check & service items		Daily	Every 50	Every 100	Every 250	Every 500	Every 1000 hrs	
General	Check falling off, breakage of parts	◇						
	Check loosened bolts & nuts, retighten	◇						
	Check engine condition	◇						
	Clean	□						
Lube oil	*Swing gear case oil	Check, resupply			○			
		Replace			●1st time		●	
	Travel reduction gear oil	Check, resupply				○		
		Replace			●1st time			●
	*Transmission oil	Check, resupply	◇					
		Replace			●1st time			●
*Differential gear oil	Check, resupply			◇				
	Replace			●1st time			●	
Hydraulic system	Hydraulic oil	Check, resupply	◇					
		Replace					●	
	Clean suction filter					□1st time	□	
	Replace return filter				●1st time	●		
	Check for abnormality of hydraulic pump	◇						
Grease	Check grease-up positions, grease	■						
	Greasing the swing gears and the swing bearings		■					
	*Greasing the track gauge change cylinder and the link fulcrum		■					
Undercarriage	Check, adjust track tension	◇						
	*Check air pressure, wear, flaw in tyres	◇						
Steering equipment	*Check performance, play of steering lever	◇						
	Check performance, play of travel lever	◇						
	*Check performance of speed change lever	◇						
	*Check performance of forward/reverse pedal	◇						
	*Check performance, play of steering wheel	◇						
	*Brake pedal	Stroke	◇					
		Performance	◇					
	*Parking brake	Stroke	◇					
Performance		◇						
	Check performance of accel. lever	◇						
Electric equipment	Check front & work lights, horn	◇						
	Check hourmeter function	◇						
	Check function of change, oil and pilot lamps	◇						
	Check wire breakage, short-circuits, loosened terminals retighten	◇						
	Check, resupply battery fluid	◇						
	Check specific gravity of electrolyte						□As required	
	Check function of OK monitor	◇						

■ Removing the rubber track

WARNING

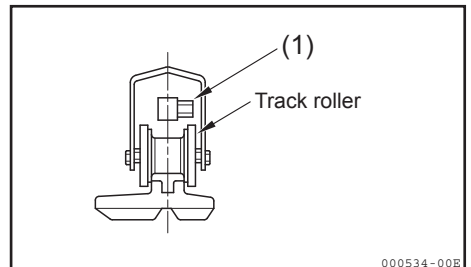
- It is very dangerous to discharge the grease by any procedure other than that described below.
- If the tension of the rubber track cannot be properly adjusted, ask your dealer to repair or replace the rubber track.
- When removing the rubber track, make sure that all of the grease has been completely discharged before turning the sprocket.

- 1) Raise the machine with the implement.
To do this, slowly operate the control lever.

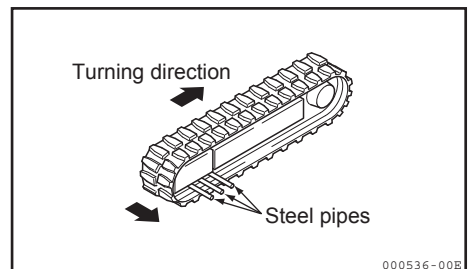


- 2) Loosen the greasing valve (1) little by little to discharge the grease.

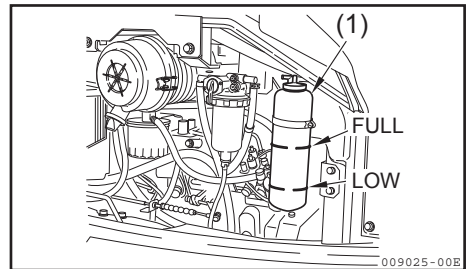
- 3) Do not loosen the greasing valve (1) more than one turn.



- 4) Insert the steel pipes into the rubber track and turn the sprocket in the reverse direction. When the rubber track is separated from the idler by the steel pipes, slide the rubber track off.



- 8) After washing with running water, stop the engine, stop pouring water, drain water completely and then securely reinstall the drain plug and the bottom cover.
- 9) Pour water mixed with anti-freeze through the water supply port of the radiator to fill it up.
- 10) To release air, idle the engine for 5 to 6 minutes and then run the engine without load at high speed for 5 to 6 minutes. (While running the engine, keep the radiator cap removed.)
- 11) Approximately 5 minutes after stopping the engine, pour water mixed with anti-freeze up to the water supply port of the radiator, and install and tighten the cap.
- 12) Open the engine hood rear cover, drain the cooling water from the sub-tank (1), wash the inside of the sub-tank (1) and pour water mixed with anti-freeze up to the "FULL" level.



25-5. Maintenance every 100 service hours

Perform the same maintenance every 50 service hours.

25-5-1. Cleaning the water separator element

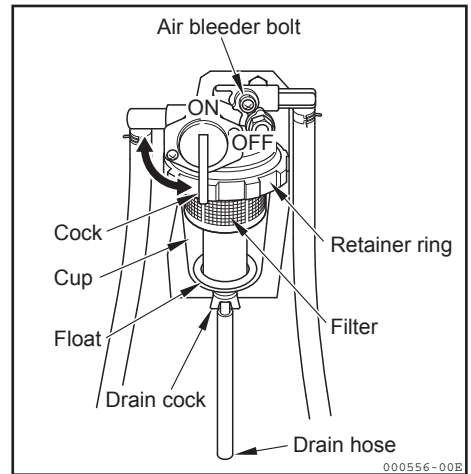
⚠ WARNING

- Keep sparks, flames and lit cigarettes away.
- At the operating temperature, the engine components are hot and can cause a burn.
- Disconnect the ground of the battery and clean the element after the engine has cooled sufficiently.
- Fuel oil leaked or spilled onto hot surfaces or electrical components could cause a fire.
- Drain the fuel from the water separator into a container before removing the water separator retainer ring.

■ Things to prepare

- Container for fuel waste

- 1) Open the engine hood.
- 2) Place the container for fuel waste under the water separator.
- 3) After setting the water separator cock to the closed position, loosen the retainer ring to remove the cup and drain the water from the cup.
Do not lose the red ring in the cup.
- 4) Remove the element and clean it and the inside of the cup, using light oil or a washing agent.
- 5) Check the O-ring and if it is damaged or deformed, replace it with a new one.
- 6) Install the element and the cup and turn the cock to the open position.
- 7) Close the engine hood.

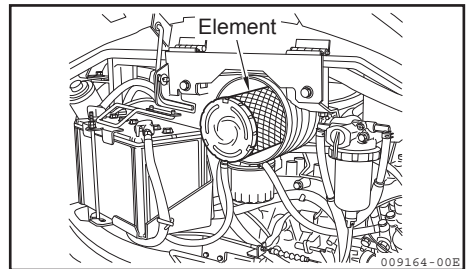
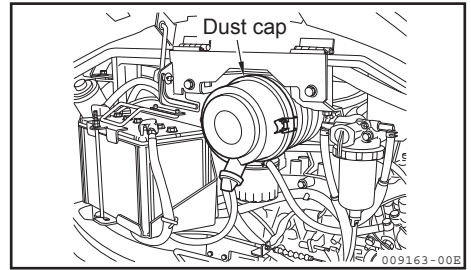


25-7-2. Replacing the air cleaner element**⚠ WARNING**

Never attempt to replace the air cleaner element while the engine is running.

Replace the air cleaner element after the engine has been stopped and cooled sufficiently.

- 1) Open the engine hood rear cover.
- 2) Remove the clip to remove the dust cup.
- 3) Remove the element.
Cover the connector side in the back of the air cleaner body with a clean cloth and tape to prevent dirt from entering.
- 4) Clean the dust cup and the inside of the body.
Remove the clean cloth and the tape used to cover the connector in the back side of the body.
- 5) Install a new element.
- 6) Install the dust cup, while checking the arrow on it.
- 7) Close the engine hood rear cover.



OPTIONAL PARTS AND ATTACHMENTS

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