TEN00391-00

Operation & Maintenance Manual

HYDRAULIC
EXCAVATOR

PC228US -8
PC228USLC -8

SERIAL NUMBERS 50001 and up

ecot3

⚠ WARNING

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

NOTICE

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

KOMATSU

(15) Warning against falling (09805-13000)

(16) Keep off swing area (09133-23000)

(17) Bware of work equipment (09134-A1681)

Sign indicates a hazard of being hit by the working device of the machine.

Keep away from machine during operation.

(18) Jump start prohibited (09842-A0481)

Start the engine only after sitting down in the operator's seat.

Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious bodily injury or fire.

UNAUTHORIZED MODIFICATION

- Komatsu will not be responsible for any injuries, accidents, product failures or other property damages resulting from modifications made without authorization from Komatsu.
- Any modification made without authorization from Komatsu can create hazards. Before making a modification, consult your Komatsu distributor.

PRECAUTIONS RELATED TO ATTACHMENTS AND OPTIONS

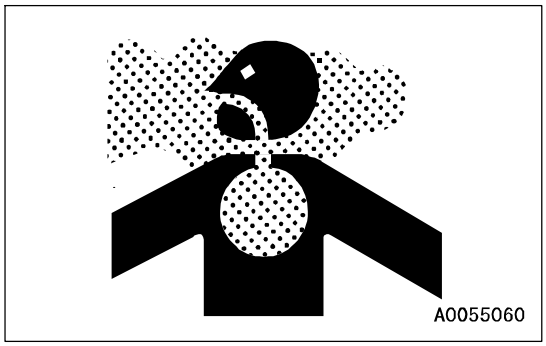
- Any injuries, accidents, product failures or other property damages resulting from the use of unauthorized attachments or parts will not be the responsibility of Komatsu.
- When installing optional parts or attachments, there may be problems with safety or legal restrictions. Therefore contact your Komatsu distributor for advice.
- Depending on type of combination of work equipment, there is hazard that the work equipment may hit the cab or other parts of the machine. During operation, an interference of the work equipment with the machine may cause a serious personal injury. Before using unfamiliar work equipment, check there is hazard of interference, and operate within not contact.
- When installing and using optional attachments, read the instruction manual for the attachment, and the general information related to attachments in this manual.

PRECAUTIONS RELATED TO CAB GLASS

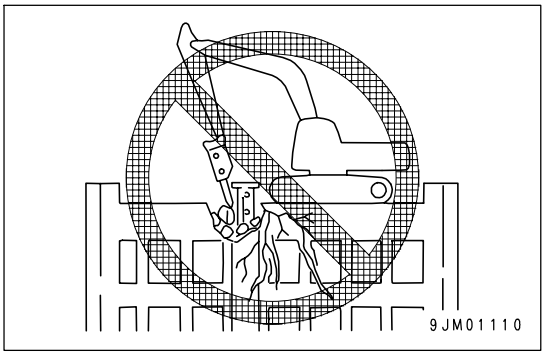
- If the cab glass is broken during operations, stop operations and repair the cab glass immediately.
- If the cab glass on the work equipment side is broken, there is a hazard that the operator may be directly hit or caught in the work equipment. If the glass is broken, stop operations immediately and replace the glass.
- The ceiling window is made of plastic, so if it is scratched, the visibility will become poor and there is danger that it may break. If it is scratched, replace it with the new part as soon as possible. If the window is scratched and is not replaced, there is danger that any rocks falling on it will cause it to break, leading to injury to the operator.

PRECAUTIONS WHEN RUNNING ENGINE INSIDE BUILDING

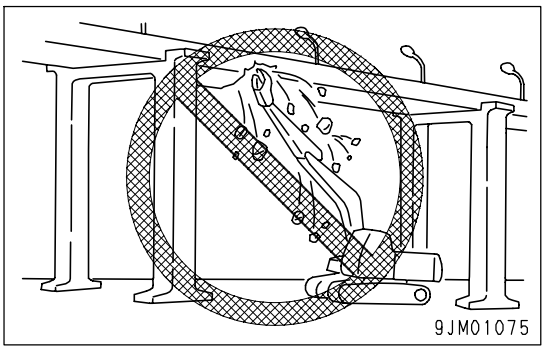
The engine exhaust gas contains substances that may damage your health or even cause death. Start or operate the engine in a place where there is good ventilation. If the engine or machine must be operated inside a building or under ground, where the ventilation is poor, take steps to ensure that the engine exhaust gas is removed and that ample fresh air is brought in.



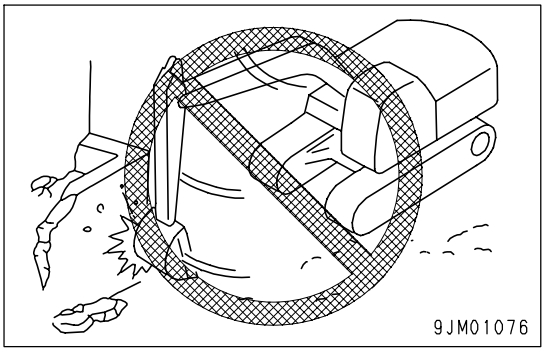
- When carrying out demolition work, do not carry out demolition work under the front of the machine. This makes the ground unstable, and there is a hazard of the machine falling.



- When carrying out demolition work, do not carry out demolition work above your head. There is a hazard of broken parts falling or of the building collapsing and causing serious injury or death.



- When carrying out demolition work, do not use the impact force of the work equipment for breaking work. There is a hazard of damage to the work equipment and also a hazard of serious personal injury or death being caused by flying pieces of broken materials, or of the machine tipping over due to reaction from the impact.



- The not pass the bucket over the heads of other workers or over the operator's seat of dump trucks or other hauling equipment. There is danger that the load may spill or the bucket may hit the dump truck and cause serious personal injury or death.
- When working on or from the top of buildings or other structures, check the strength and the structure before starting operations. There is a hazard of the building collapsing and causing serious injury or damage.
- Generally speaking, the machine is more liable to overturn when the work equipment is at the side than when it is at the front or rear.
- When using a breaker or other heavy work equipment, there is a hazard of the machine losing its balance and tipping over. When operating on flat ground as well as on slopes.
  - Do not suddenly lower, swing, or stop the work equipment.
  - Do not suddenly extend or retract the boom cylinder. There is a hazard that impact will cause the machine to tip over.

PRECAUTIONS FOR INSPECTION AND MAINTENANCE

PRECAUTIONS WHEN WELDING

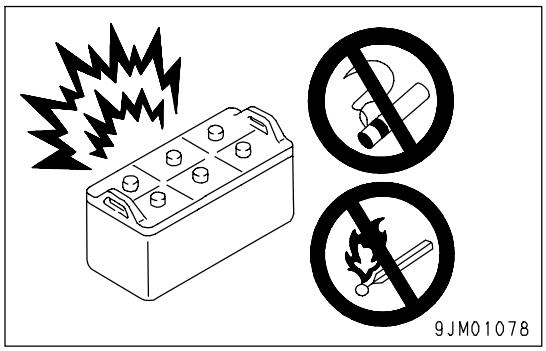
Welding operations must always be carried out by a qualified welder and in a place equipped with proper equipment. There is a hazard of gas, fire, or electrocution when carrying out welding, so never allow any unqualified personnel to carry out welding.

HANDLING BATTERY

Before inspecting or handling the battery, turn the key in the starting switch to the OFF position.

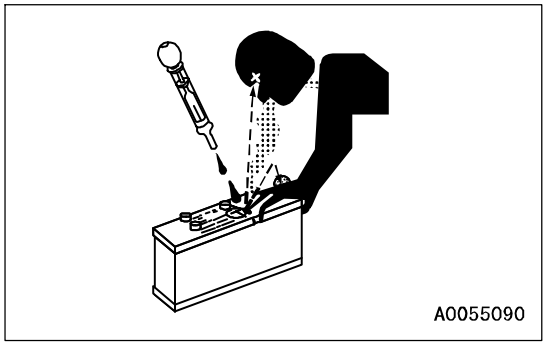
- **Danger of battery exploding**

  When the battery is being charged, flammable hydrogen gas is generated and may explode. In addition, the battery electrolyte includes dilute sulphuric acid. Any mistake in handling may cause serious personal injury, explosion, or fire, so always observe the following.
  - Do not use or charge the battery if the battery electrolyte is below the LOWER LEVEL mark. This will cause explosion. Always carry out periodic inspection of the battery electrolyte level, and add distilled water (or commercially available battery filler solution) to the UPPER LEVEL mark.
  - Do not smoke or bring any flame close to the battery.
  - Hydrogen gas is generated when the battery is being charged, so remove the battery from the machine, take it to a well-ventilated place, remove the battery caps, then carry out the charging.
  - After charging, tighten the battery caps securely.



- **Danger from dilute sulphuric acid**

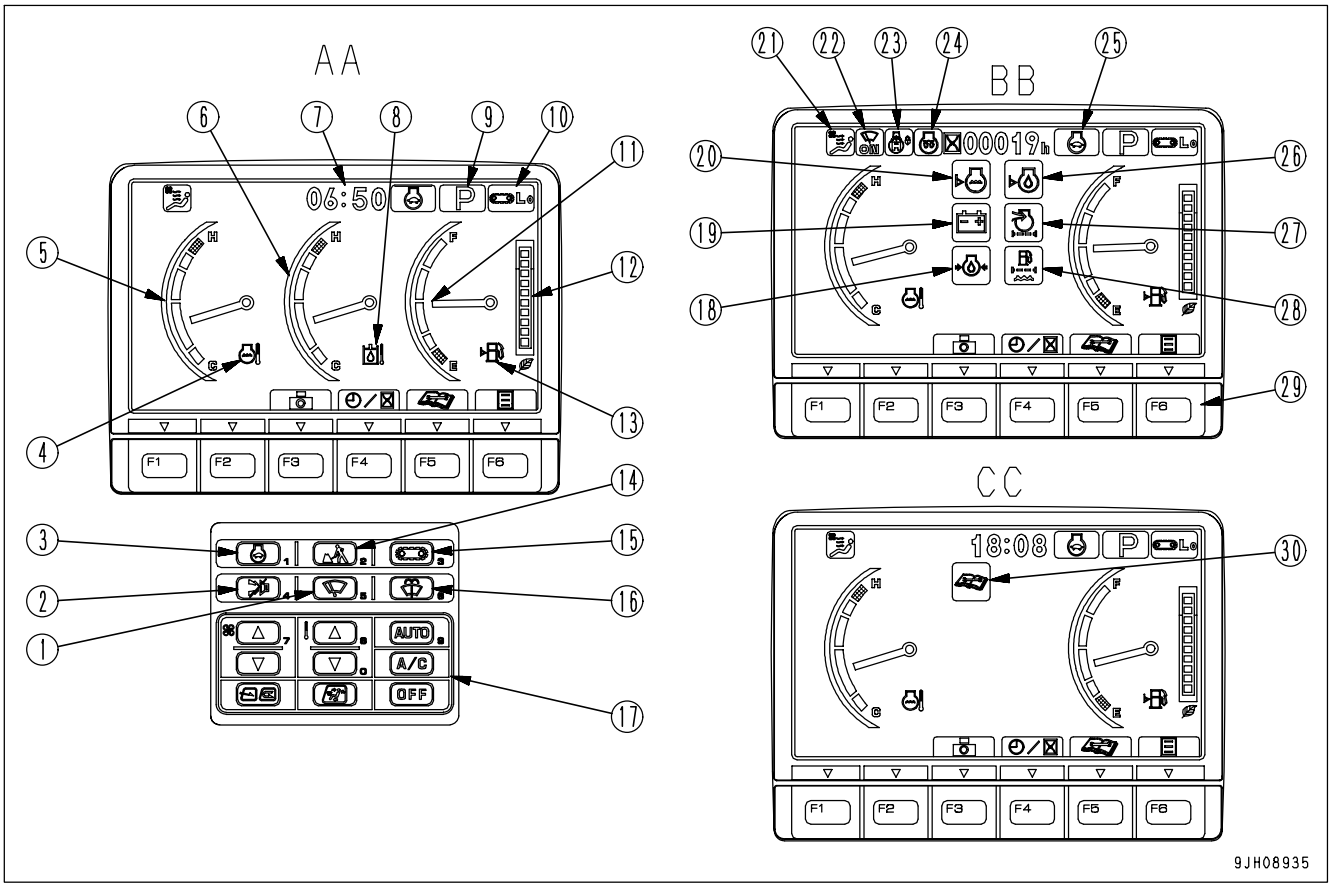
  When the battery is being charged, flammable hydrogen gas is generated and may explode. In addition, the battery electrolyte includes dilute sulphuric acid. Any mistake in handling may cause serious personal injury, explosion, or fire, so always observe the following.
  - When handling the battery, always wear protective goggles and rubber gloves.
  - If battery electrolyte gets into your eyes, immediately wash your eyes with large amounts of fresh water. After that, get medical attention immediately.
  - If battery electrolyte gets on your clothes or skin, wash it off immediately with large amounts of water.



- **Removing battery cables**

  Before repairing the electrical system or carrying out electric welding, turn the starting switch OFF. Wait for approx. 1 minute, then remove the negative (-) battery cable to stop the flow of electricity.

Machine monitor



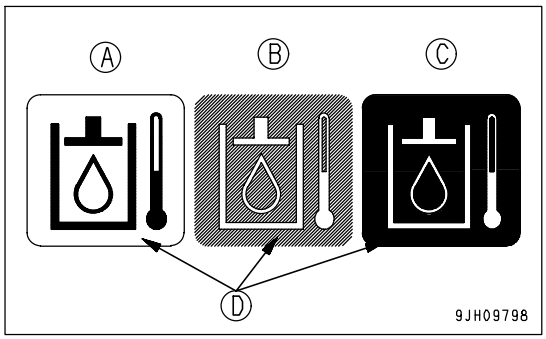
AA: Screen for standard
BB: Screen with all lamps lighted up
CC: Maintenance time warning screen

(1) Wiper switch
(2) Buzzer cancel switch
(3) Auto-deceleration switch
(4) Engine coolant temperature monitor
(5) Engine coolant temperature gauge
(6) Hydraulic oil temperature gauge
(7) Service meter, Clock
(8) Hydraulic oil temperature monitor
(9) Working mode monitor
(10) Travel speed monitor
(11) Fuel gauge
(12) ECO gauge
(13) Fuel level monitor
(14) Working mode selector switch
(15) Travel speed selector switch
(16) Window washer switch
(17) Air conditioner control switches
(18) Engine oil pressure monitor
(19) Charge level monitor
(20) Radiator coolant level monitor
(21) Air conditioner monitor
(22) Wiper monitor
(23) Swing lock monitor
(24) Engine pre-heating monitor or One-touch power max. monitor
(25) Auto-deceleration monitor
(26) Engine oil level monitor
(27) Air cleaner clogging monitor
(28) Water separator monitor
(29) Function switches (F1 to F6)
(30) Maintenance interval monitor

Hydraulic Oil Temperature Monitor

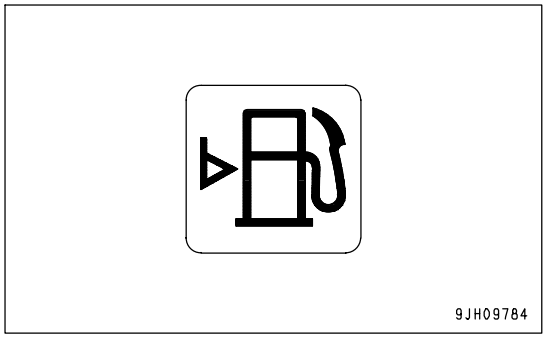
If this monitor (2) shows low-temperature display (A), carry out the warm-up operation. For details, see "Hydraulic Equipment Warm Up (PAGE 3-140)".
Carry out the warm-up operation for the hydraulic equipment until monitor (2) shows normal display (B).

Display (A) at low temperatures: Monitor background (D) is white
Display (B) at correct temperatures: Monitor background (D) is blue
Display (C) when condition is abnormal: Monitor background (D) is red



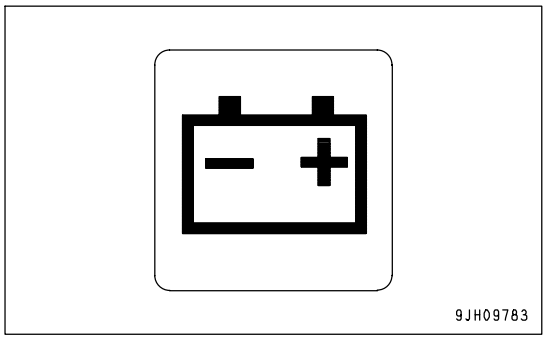
Fuel Level Monitor

This monitor (3) lights up to warn that the operator that the level in the fuel tank is low.
When the remaining fuel level reaches approx. 40 liters (10.57 US gal), the monitor lamp lights up red, so add fuel as soon as possible.



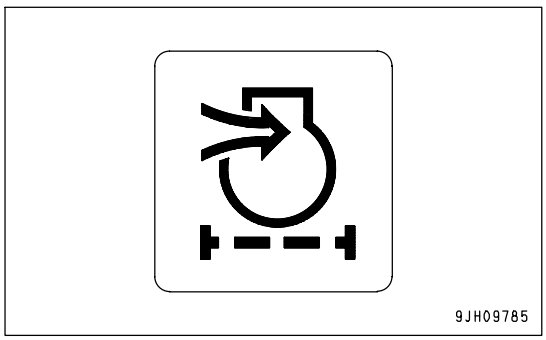
Charge Level Monitor

This monitor (4) warns the operator that there is an abnormality in the charging system when the engine is running.
If the battery is not being charged properly while the engine is running, monitor lights up red.
If monitor lights up red, check the V-belt for looseness. If any abnormality is found, perform the necessary actions. For details, see "OTHER TROUBLE (PAGE 3-199)".



Air Cleaner Clogging Monitor

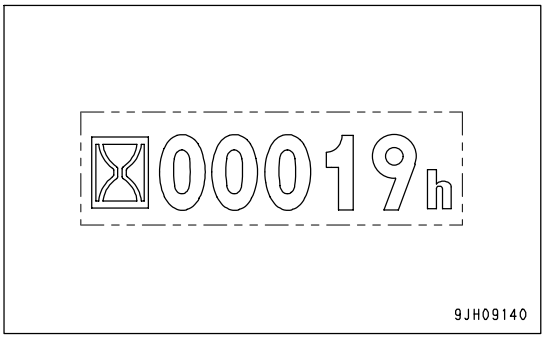
This monitor (5) warns the operator that the air cleaner is clogged.
If it lights up red, stop the engine and inspect and clean the air cleaner.
For details of checking and cleaning the air cleaner, see "CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT (PAGE 4-19)".

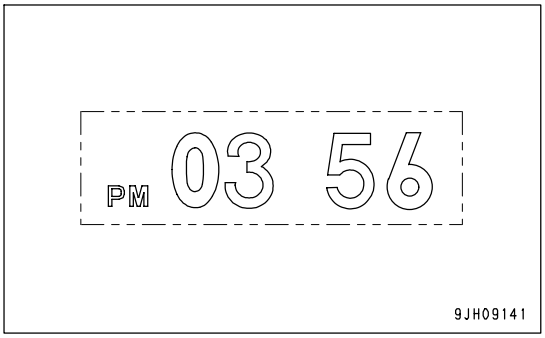


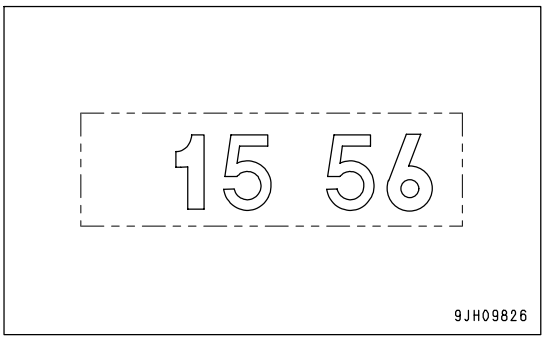
Service Meter, Clock

This meter (13) shows the total hours of operation of the machine or the present time.

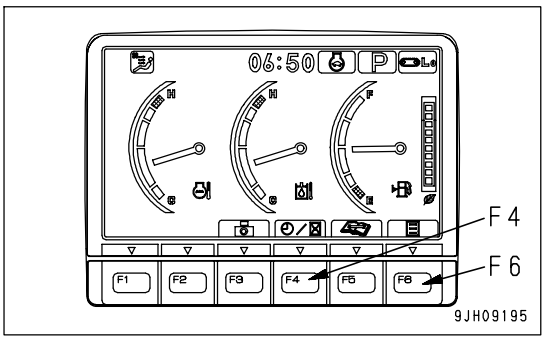
When the engine is running, the service meter advances even if the machine is not moving. The service meter advances 1 for every hour that the machine is working, regardless of the engine speed.







- When the standard screen is being displayed, if function switch F4 is pressed, it is possible to switch between the clock display and the service meter display.
- Clock display (12-hour or 24-hour displays are available)
  To set or correct the time, press function switch F6 (user mode switch).

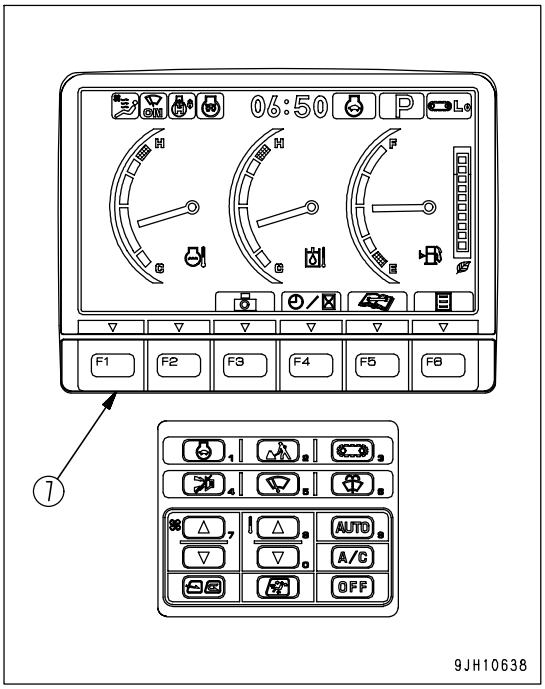


Function Switches

Function switches (7) consist of 6 switches (F1 to F6). The function of each switch differs according to the content of each screen.
When the monitor display shows the standard screen, the functions are displayed as follows.

F3: Camera screen selector switch (if equipped)
F4: Service meter/time display selector switch
F5: Maintenance mode switch
F6: User mode switch
F1 and F2 are auxiliary switches for expanded functions.

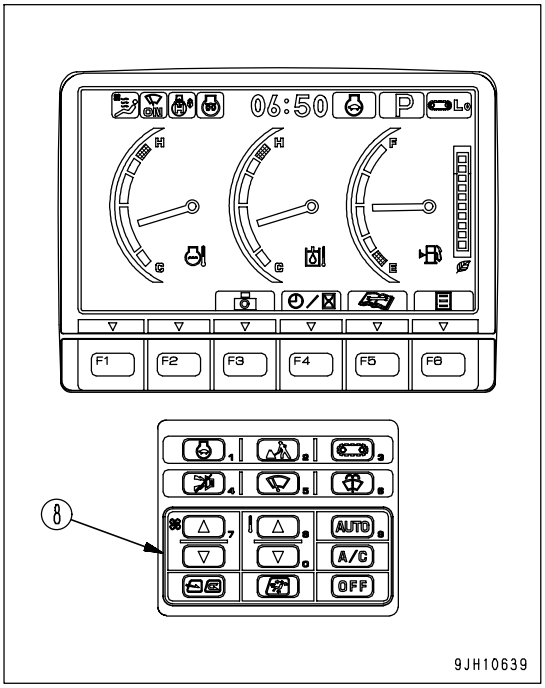
For explanation of each switch, see "Handling Function Switches (PAGE 3-35)".



Air Conditioner Switch

The air conditioner switches (8) consist of 9 switches.

For explanation of each switch, see "AIR CONDITIONER CONTROLS (PAGE 3-90)".

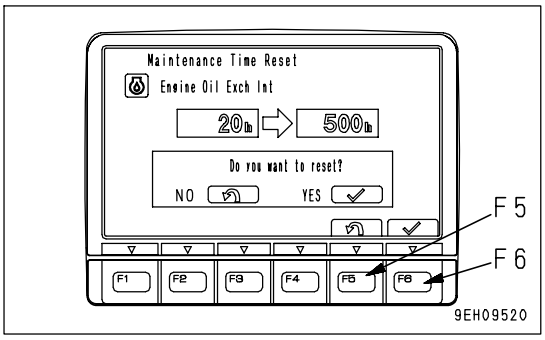


Operations on Maintenance Interval Reset Screen

On the maintenance list screen, if switch F6 is kept pressed for at least 1.5 seconds, the screen changes to the maintenance time reset screen.

Reset the remaining time on this screen.

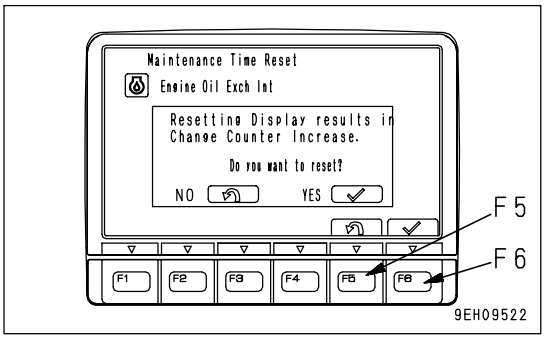
1. Press switch F6 when the reset screen is in the condition shown in the diagram on the right. The screen switches to the reconfirmation screen.



REMARK

- It is desired to cancel the reset, press switch F5. The screen returns to the maintenance list screen.
- On the reset screen, if no switch is operated for more than 30 seconds, the screen automatically switches to the maintenance list screen.

2. The reconfirmation screen shown on the right is displayed.
3. If switch F6 is pressed again, the remaining time is reset and the screen switches to the maintenance list screen.



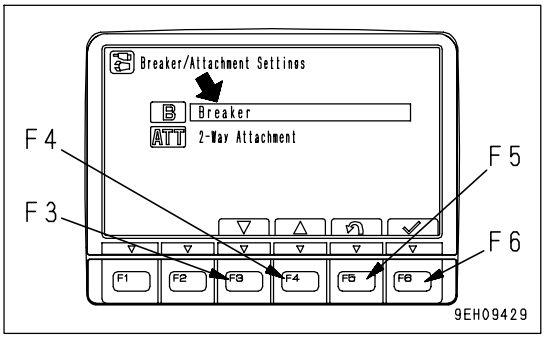
REMARK

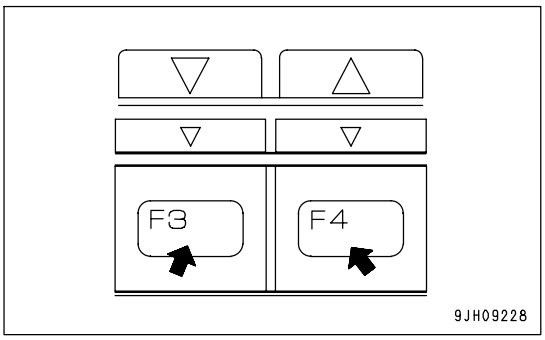
- It is desired to cancel the reset, press switch F5. The screen returns to the maintenance list screen.
- On the reconfirmation screen, if no switch is operated for more than 30 seconds, the screen automatically switches to the maintenance list screen.

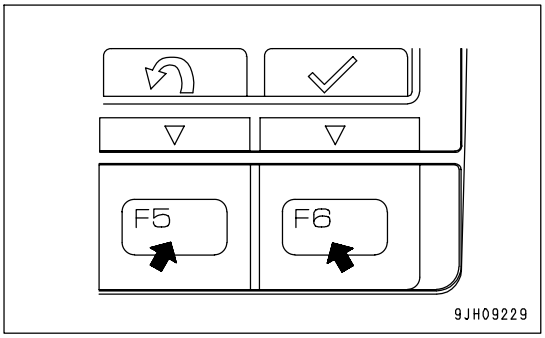
3. On the working mode selection screen shown on the right, select ATT 2-Way Attachment, then press switch F6.

   • On the working mode selection screen shown on the right, it is possible to carry out the following operations with switches F3 to F6.

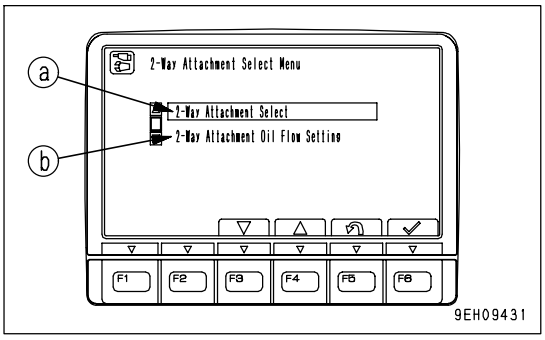
   F3: Moves to next item (1 line down).
   F4: Moves to previous item (1 line up).
   F5: Returns to user menu screen.
   F6: Switches to setting screen for selected item.





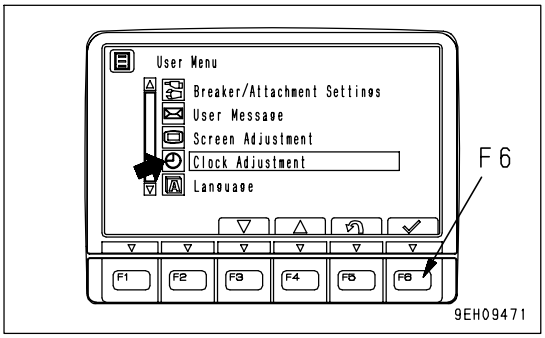


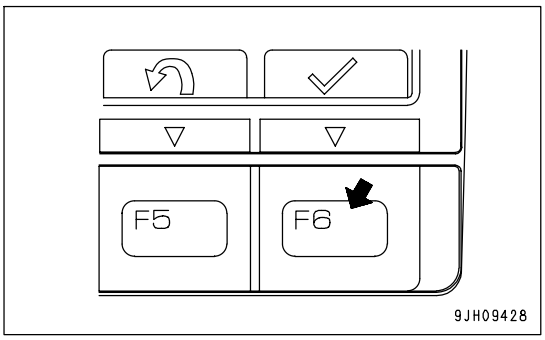
4. The screen switches to the 2-Way Attachment Select menu.
   • 2-Way Attachment Select menu
     In 2-Way Attachment Select (a), the oil flow to be set in ATT mode can be set to one of two set values.
   • 2-Way Attachment Oil Flow Setting menu
     In 2-Way Attachment Oil Flow Setting (b), it is possible to change the oil flow set for the ATT mode.

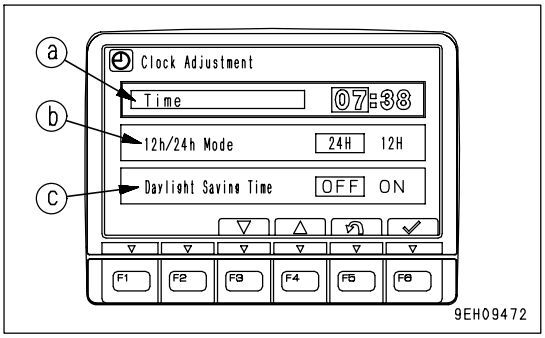


2. Select "Clock Adjustment" on the user menu, then press switch F6. The screen switches to the time adjustment selection menu screen.

   - The following three items can be changed.
     (a) Clock setting
     (b) 12/24 hour display mode
     (c) Daylight saving time







Emergency Pump Drive Switch

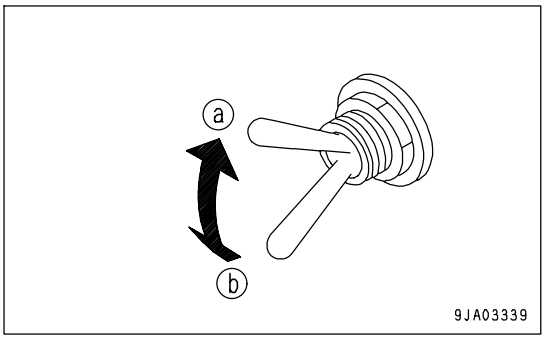
NOTICE

- **This switch is provided to enable you to carry out operation temporarily, when any problem occurs on the pump control system. Do not use it except in emergency. Furthermore, remove the cause of the problem immediately.**
- **If this switch is depressed and moved to the EMERGENCY position by mistake, thereby engaging the machine in the work, while the machine is in normal condition, an "E02" mark is shown in the display.**
  If "E02" is displayed during the work, check that the switch is in the NORMAL position.

This switch (9) is used to make it possible to carry out operations temporarily if any problem should occur in the pump control system (when the display shows "E02").

(a) EMERGENCY: When abnormal (move switch up)
(b) NORMAL: When normal (move switch down)

If the display shows "E02", move the switch up to make it possible to carry out work.



Swing Parking Brake Release Switch

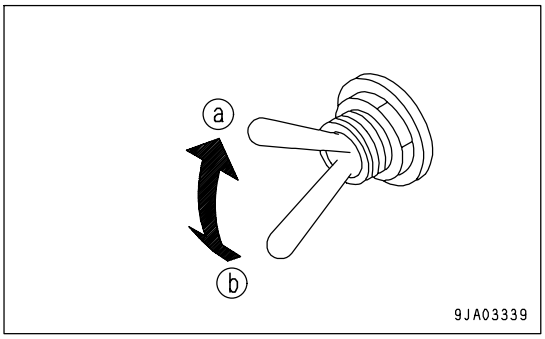
NOTICE

This switch makes it possible to perform swing operations for a short time even when there is a problem in the swing parking brake electric system. DO NOT use this switch except in emergencies. Repair the problem as soon as possible.

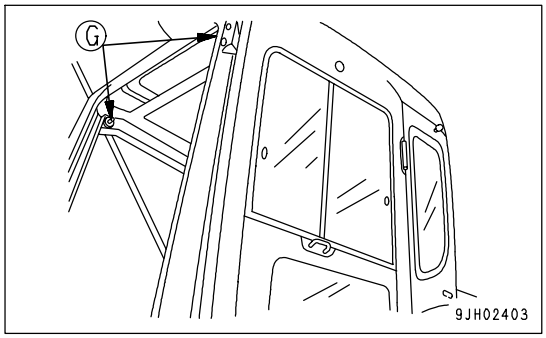
This switch (10) is used to make it possible to carry out operations temporarily if any problem should occur in the swing parking brake system
(when the upper structure does not swing but the display does not show "E03").

(a) FREE: When abnormal (move switch up)
(b) NORMAL: When normal (move switch down)

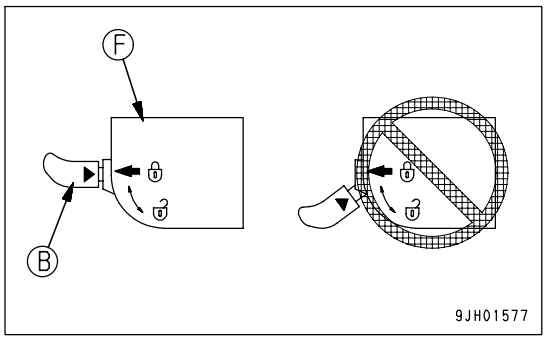
- If the display does not show "E03", move the switch up to FREE position (a) to make it possible to carry out work.
- When the switch is moved to FREE position (a), the swing lock monitor flashes.



5. When the bottom of the window reaches the top of the bottom window, push the top of the window to the front to push it against left and right lock catches (G) and engage the lock.



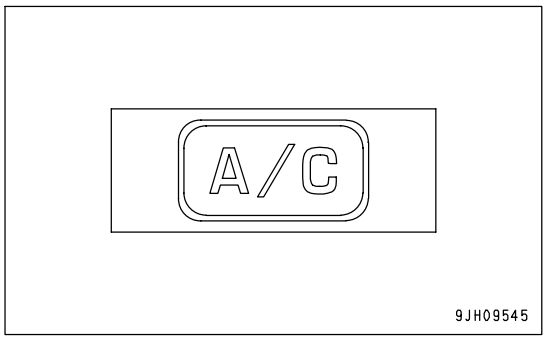
6. Check that lever (B) is securely at the LOCK position.
   - The lock is engaged if the arrow on lock case (F) matches the position of the arrow on lever (B). Check visually.
   - If the arrow on lock case (F) does not match the position of the arrow on lever (B), the lock is not engaged. Repeat the operation in Step 5 to engage the lock.



Air Conditioner Switch

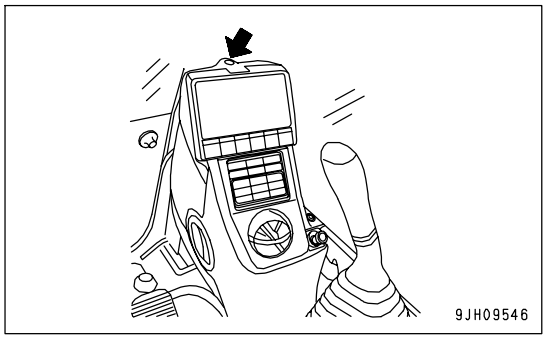
Switch (8) is used to turn the air conditioner (cooling, dehumidifying, heating) ON or OFF.

- Press air conditioner switch (8) when the fan is operating (when display (b) is shown on the display monitor). The air conditioner is switched ON and starts to work. Press the switch again to stop the air conditioner.
- Air conditioner cannot be operated while the fan is off.



Sunlight Sensor

This sensor (9) automatically adjusts the flow of air from the vents to match the strength of the sun's rays. In addition, it automatically detects changes in the temperature inside the cab caused by changes in the strength of the sun's rays beforehand and automatically adjusts the temperature.



Display Selection Button (TIME)
On this machine, priority is given to the frequency display. When the frequency is being displayed, press button (4) and the display will show the present time for 5 seconds. After 5 seconds pass, the display returns automatically to the frequency display. If any button other than TIME ADJ (H, M, ADJ) is pressed within 5 seconds, the display returns to the frequency display. For details of the method of adjusting the time, see "Setting Correct Time (PAGE 3-106)".

AS/PS button
This button (5) actuates the auto store and preset scan functions.

- Auto store
  If this button is kept pressed for at least 2 seconds during radio reception, it will automatically search for six available AM and FM stations each, starting with the lowest frequency and going up to the highest frequency. These frequencies can then be saved in the preset memory.
- Preset scan
  If this button is pressed within 2 seconds, it is possible to select one of the already preset stations. Wait for 6 sec. after pressing the button and then press the button again to select the next preset station. If it is impossible to receive the preset frequency, the selection advances after 1 second to the next preset station.

Preset Station Buttons (1, 2, 3, 4, 5, 6)
If this button (6) has been used to decide which stations to preset, it is possible to select the desired station at a touch. It is possible to preset 6 stations each for both AM and FM.
For details of the method of presetting the stations, see "Method of Setting with Preset Button (PAGE 3-105)".

REMARK
The preset button can be used to save the frequency manually. To save the frequency automatically, use the Auto store button.

Display
This display (7) shows the reception band, frequency, preset No., and time.

Time Reset Button
Use this button (8) when adjusting the time. For details of the method of adjusting the time, see "Setting Correct Time (PAGE 3-106)".
H: Hour
M: Minute
ADJ: Sets to 00 minutes

Tuning Button (TUNING)
Use this button (9) to change the frequency.
For further details, see "Method of Tuning (PAGE 3-105)"

MACHINE OPERATIONS AND CONTROLS

BEFORE STARTING ENGINE

Walk-around Checks

Before starting the engine, walk around the machine and look at the underside of chassis for anything unusual like loose bolts and nuts, leakage of fuel, oil and coolant. Also check the condition of the work equipment and the hydraulic system.
Also check for loose wiring, play, and collection of dust at places that reach high temperature.

⚠ WARNING

Remove any flammable materials from around the battery, engine, muffler, turbocharger, or other high temperature engine parts. Leakage of fuel or oil will cause the machine to catch fire. Check carefully, be sure to repair any problem, or contact your Komatsu distributor.

Perform the following inspections and cleaning every day before starting engine for the day's work.

1. Check for damage, wear, play in work equipment, cylinders, linkage, hoses
   Check for cracks, excessive wear, play in wotk equipment, cylinders, linkage, and hoses. If any problem is found, repair it.

2. Remove dirt and debris from around the engine, battery, and radiator.
   Check for dirt accumulated around the engine and radiator. Also check for flammable material (dry leaves, twigs, etc.) around the battery, engine muffler, turbocharger, or other high temperature engine parts. If any dirt or flammable materials are found, remove them.
   For the method of removing dirt from the radiator, see "CLEAN AND INSPECT RADIATOR FINS, OIL COOLER FINS, AFTERCOOLER FINS, FUEL COOLER FINS, AND AIR CONDITIONER CONDENSER FINS (only machines equipped with air conditioner) (PAGE 4-62)".

3. Check for coolant and oil leakage around the engine
   Check for oil leakage from the engine and coolant leaks from the cooling system. If any problem is found, repair it.

4. Check for leakage from fuel line.
   Check that there is no leakage of fuel or damage to the hoses and tubes. If any problem is found, carry out repairs.

5. Check for oil leakage from hydraulic equipment, hydraulic tank, hoses, and joints
   Check for oil leakage. If any problem is found, repair the area where oil is leaking.

6. Check the undercarriage (track, sprocket, idler, guard) for damage, wear, loose bolts, or leakage of oil from rollers.
   If any problem is found, repair it.

7. Check for problems in handrails, steps, loose bolts.
   If any problem is found, repair it. Tighten any loose bolts.

Adjustment

Seat Adjustment

WARNING

When adjusting the position of the operator's seat, always set the lock lever to the LOCK position to prevent any accidental contact with the control levers.

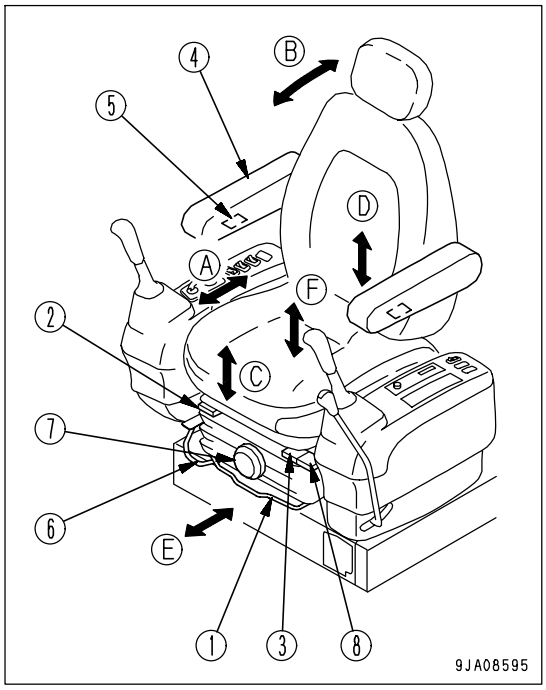
- Always adjust the operator’s seat before starting each operation or when the operators change shift.
- Adjust the operator’s seat so control levers and switches can be operated freely and easily with the operator’s back against the backrest.

(A) Fore-and-aft adjustment
Pull up lever (1). After the seat is set to the desired position, release the lever.
Adjustable distance:100 mm (3.3 in) in 10 steps

(B) Adjusting reclining

REMARK
The seat can be reclined more when the seat is pushed to the front. The amount of reclining decreases as the seat is pushed back, so when moving the seat back, return the seatback to the upright position.

Pull up lever (2) and set the backrest to a position that is comfortable for operation, then release the lever.
Sit with your back against the seat backrest when adjusting. If your back is not against the backrest, the backrest may suddenly move forward.



(C) Adjusting seat tilt
- Forward tilt

Push lever (3) down to adjust the angle of the front of the seat. (4 stages)
- To raise the angle at the front of the seat, keep the lever pushed down and apply your weight to the rear of the seat.
- To lower the angle at the front of the seat, keep the lever pushed down and apply your weight to the front of the seat.

- Rear tilt

Pull up the lever (8) to adjust the seat backrest angle.(4 stages)
- To raise up the backrest, half rise from seat with pulling up lever (8).
- To lower the backrest, lean back the seat with pulling up lever (8).

Amount of tilt: Up 13°, down 13°

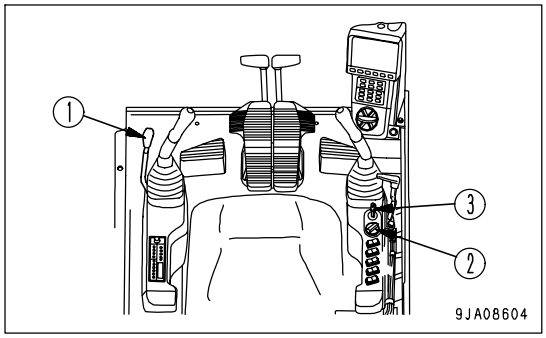
STARTING ENGINE

⚠ WARNING

- **Start the engine only after sitting down in the operator's seat.**
- **Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious bodily injury or fire.**
- **Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.**
- **Never use starting aid fluids as they may cause explosions.**
- **Exhaust gas is toxic. When starting the engine in confined spaces, be particularly careful to ensure good ventilation.**

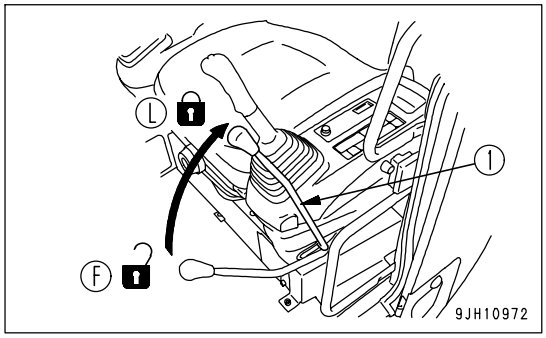
NOTICE

- **Before starting the engine, check that fuel control dial (2) is at the low idling (MIN) position. If the fuel control dial is at the full speed (MAX) position, the engine will accelerate suddenly and cause damage to the engine parts.**
- **Do not keep the key in starting switch (3) at the START position continuously for more than 20 seconds.**
  If the engine does not start, wait for at least 2 minutes, then start again from the beginning.
- **After the engine starts, wait for the engine oil pressure monitor to go out. Do not touch the control levers or control pedal while the engine oil pressure monitor is lighted up.**

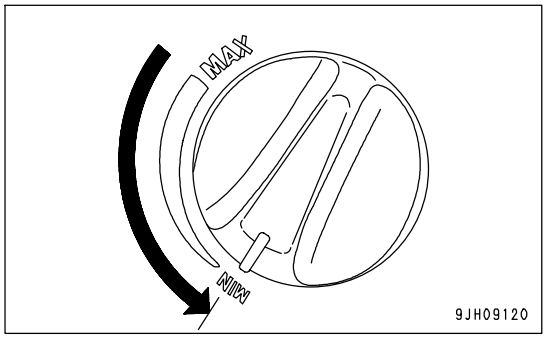


This machine is equipped with an engine automatic preheating device that functions to start the engine preheating automatically.
If the ambient temperature is low, the preheating monitor will light up when the key in starting switch (3) is turned to the ON position to inform the operator that preheating has been started automatically.

1. Check the lock lever (1) is in the LOCK position (L). If the lock lever is in the FREE position (F), the engine does not start.

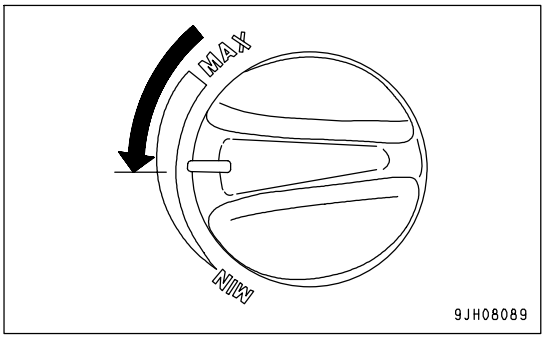


2. Set fuel control dial (2) to the low idling (MIN) position.



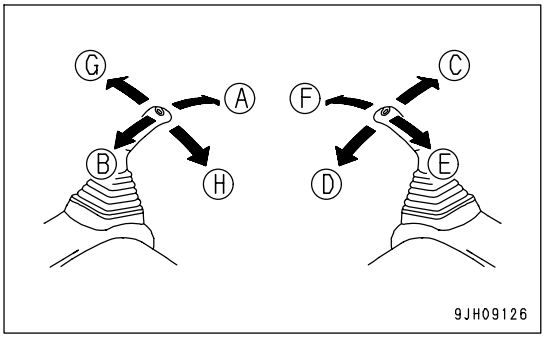
For both normal temperatures and cold temperatures, carry out the following operation.

16. Check that fuel control dial (4) is at a point midway between low idling (MIN) and full speed (MAX).
    If it is not at the midway position, set it to the midway position and run the engine at a mid-range speed before operating.



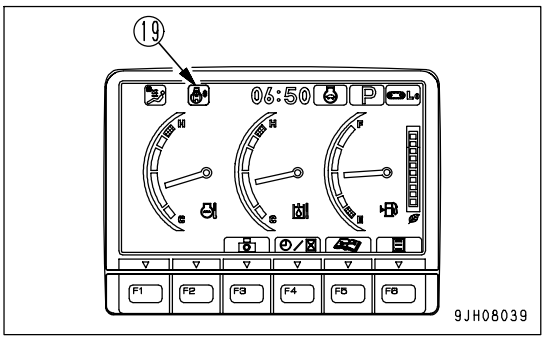
17. Before starting operations, repeat the following operations slowly 3 to 5 times to circulate warm oil through the control circuits.

    - Boom operation RAISE (E) ←→ LOWER (F)
    - Arm operation IN (B) ←→ OUT (A)
    - Bucket operation CURL (D) ←→ DUMP (C)

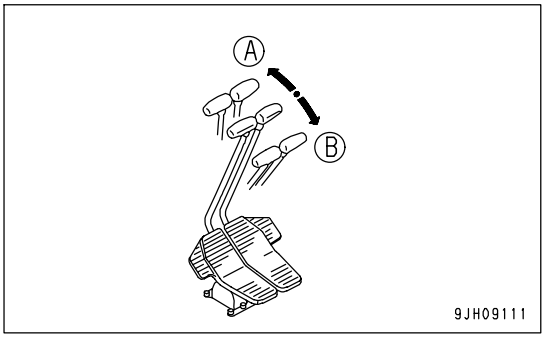


    When carrying out swing operations, release swing lock switch (2), check that swing lock monitor (19) goes out, then operate the swing.

    - Swing operation Left (G) ←→ Right (H)



- Travel (Lo) operation FORWARD (A) ←→ REVERSE (B)



Changing Direction of the Machine

When turning to the left:

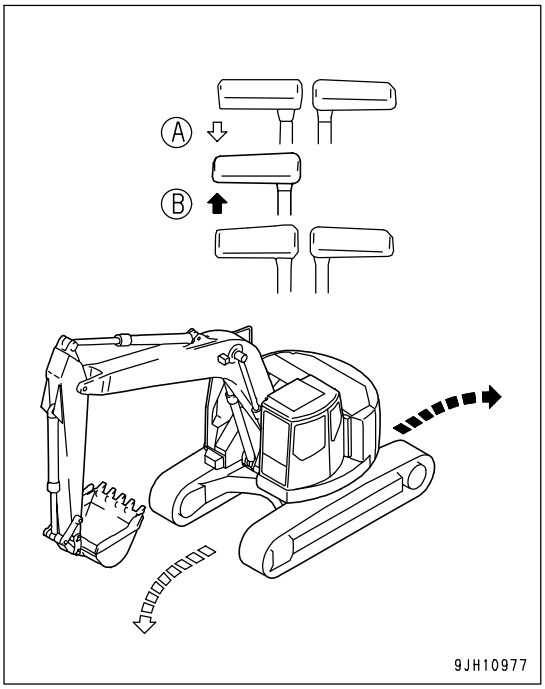
If the left travel lever is returned to the neutral position, the machine will turn to the left.

(A): Forward left turn

(B): Reverse left turn

REMARK

When turning to the right, operate the right travel lever in the same way.

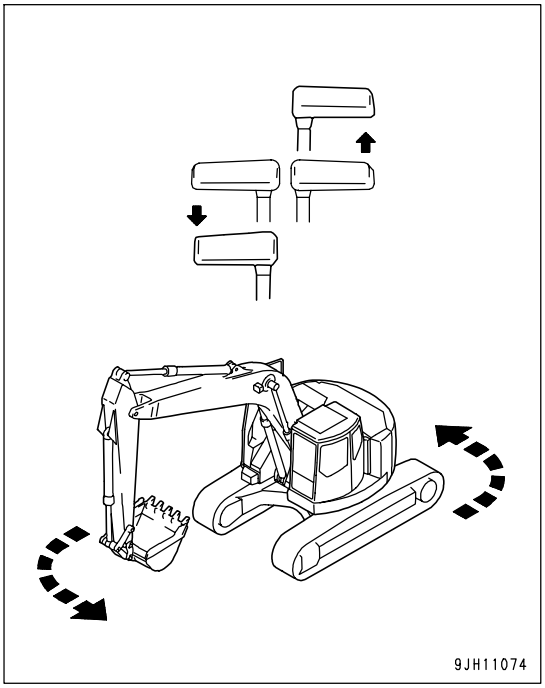


Counter-rotation Turn (Spin Turn)

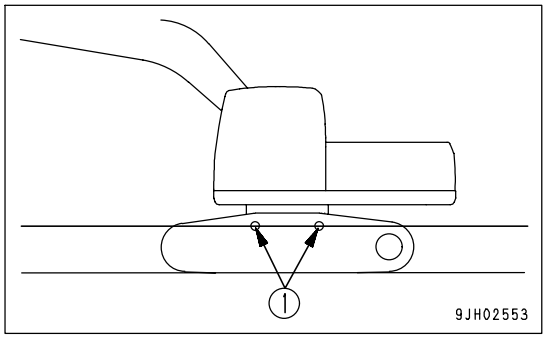
When using counter-rotation (spin turn) to turn left, pull the left travel lever back and push the right travel lever forward.

REMARK

When using counter-rotation to turn right, pull the right travel lever back and push the left travel lever forward.



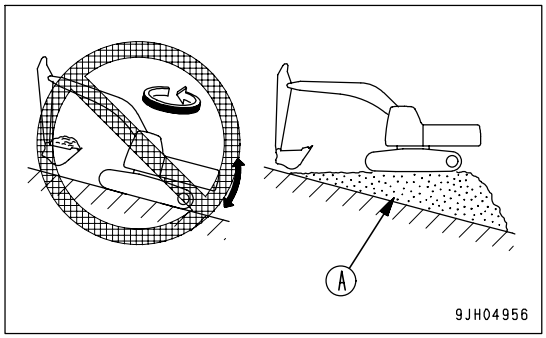
Do not drive the machine in water deeper than the center of carrier roller (1).
Supply grease to the parts which have been under water for a long time until the used grease is projected out of the bearings (around the bucket pin, in particular).

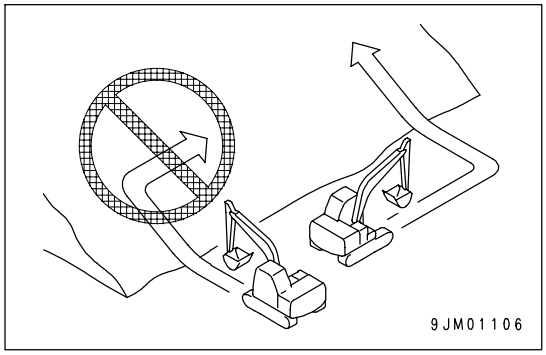


TRAVELING ON SLOPES

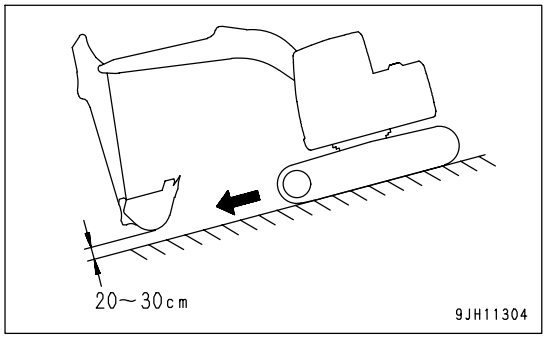
WARNING

- **Turning or operating the work equipment when working on slopes may cause the machine to lose it balance and turn over, so avoid such operations.**
  It is particularly dangerous to swing downhill when the bucket is loaded. If such operations have to be performed, pile soil to make a platform (A) on the slope so the machine is kept horizontal during operation.
- **Do not work on a slope covered with the steel plates. Even with slight slopes there is a hazard that the machine may slip.**
- **Do not travel up or down steep slopes. There is a danger that the machine may turn over.**
- **When traveling, raise the bucket approx. 20 to 30 cm (8 to 12 in) from the ground.**
  Do not travel downhill in reverse.
- **Never turn on slopes or travel across slopes.**
  Always go down to a flat place to perform these operations. It may be longer, but it will ensure safety.
- **Always operate or travel in such a way that it is possible to stop safely at any time if the machine slips or becomes unstable.**
- **When traveling uphill, if the shoes slip or it is impossible to travel uphill using only the force of the tracks, do not use the pulling force of the arm to help the machine travel uphill. There is danger that the machine may turn over.**





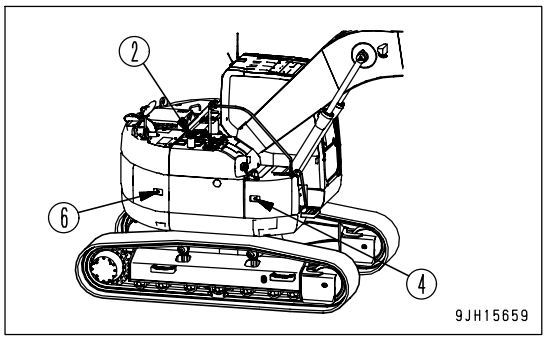
1. When traveling down steep hills, use the travel lever and fuel control dial to keep the travel speed low. When traveling down a steep hill of more than 15°, set the work equipment to the posture shown in the diagram on the right, and lower the engine speed.

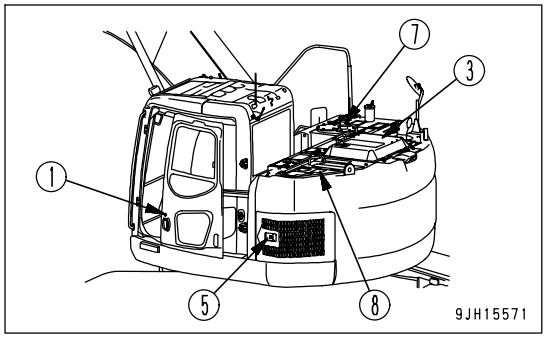


LOCKING

Always lock the following places.

(1) Operator's cab door
    Always close the window.
(2) Fuel tank filler port
(3) Engine hood
(4) Front door at the right of the machine
(5) Rear door at the left of the machine
(6) Rear door at the right of the machine
(7) Hydraulic tank filler port
(8) Cab rear cover

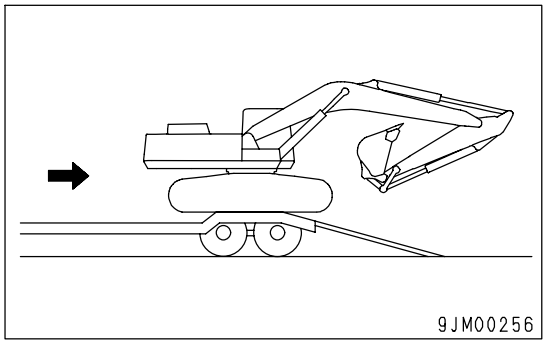




REMARK

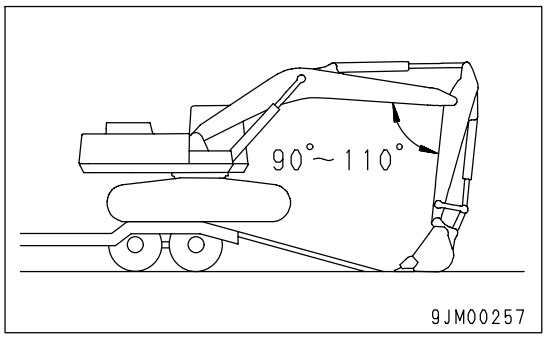
Use the starting switch key to lock and unlock all these places.

8. Raise the work equipment, pull in the arm under the boom, then move the machine slowly.
9. When the machine is horizontal on top of the rear wheels of the trailer, stop the machine.

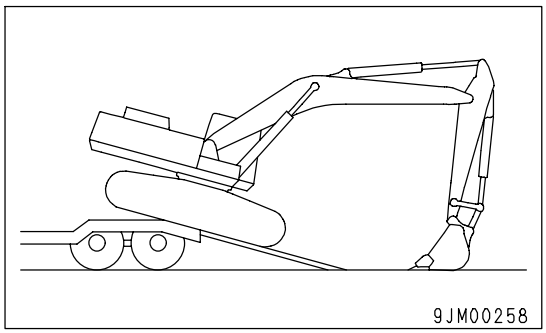


NOTICE

- **When unloading the machine, always keep the arm and boom at an angle of 90° - 110°.**
  If the machine is unloaded with the arm pulled in, it will cause damage to the machine.
- **When moving onto the ramps, do not thrust the bucket into the ground. This will cause damage to the hydraulic cylinders.**



10. When moving from the rear of the trailer on to the ramps, set the angle of the arm and boom to 90° to 110°, lower the bucket to the ground, then move the machine slowly.
11. When moving down the ramps, operate the boom and arm slowly to lower the machine carefully until it is completely off the ramps.



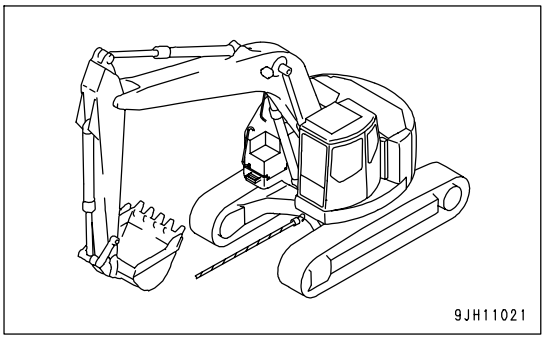
LIGHTWEIGHT TOWING HOLE

WARNING

- **The shackle must always be used.**
- **Hold the wire rope level and direct it straight to the track frame.**
- **Move the machine slowly and be careful not to apply any sudden load to the wire rope.**

There is a hole in the track frame to fit the shackle when towing light objects.

Permissible towing load:
Max. 58,800 N (6,000 kg)

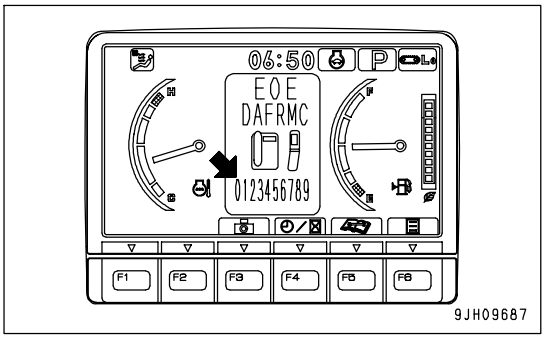


SEVERE JOB CONDITION

- When carrying out digging operations in water, if the work equipment mounting pin goes into the water, carry out greasing every time the operation is carried out.
- For heavy-duty operations and deep digging, carry out greasing of the work equipment mounting pins every time before operation.
  After greasing, operate the boom, arm and bucket several times, then grease again.

Point of Contact to Telephone when Error Occurs

If an error screen is displayed on the monitor, the telephone number for the point of contact is displayed at the bottom of the error screen.



REMARK

If no point of contact telephone number has been registered, no telephone number is displayed.

It is necessary to register the telephone number, please ask your Komatsu distributor to carry out the registration.

Reservoir	Fluid Type	Ambient Temperature, degrees Celsius -22 -4 14 32 50 68 86 104 122°F -30 -20 -10 0 10 20 30 40 50°C	Recommended Komatsu Fluids
Engine oil pan	Engine oil	(Note.1)	Komatsu EOS0W30
		(Note.1)	Komatsu EOS5W40
			Komatsu EO10W30-DH
			Komatsu EO15W40-DH
			Komatsu EO30-DH
Swing machinery case Final drive case Damper case	Powertrain oil (Note.2)		TO30
Hydraulic system	Powertrain oil		TO10
	Hydraulic oil		HO46-HM
Grease fitting	Hyper grease (Note.3)		G2-T, G2-TE
	Lithium EP grease		G2-LI
Cooling system	Supercoolant AF-NAC (Note.4)		AF-NAC
Fuel tank	Diesel fuel		ASTM Grade No.1-D S15 ASTM Grade No.1-D S500
			ASTM Grade No.2-D S15 ASTM Grade No.2-D S500

AJH00507

- ASTM: American Society of Testing and Material

		Engine oil pan	Swing machinery case	Final drive case (each)	Damper case	Hydraulic system	Cooling system	Fuel tank
Specified capacity	liter	25.4	7.1	5.4	0.65	185	21	320
	US gal	6.71	1.88	1.43	0.17	48.88	5.55	84.54
Refill capacity	liter	23.1	7.1	5.2	0.65	126	21	-
	US gal	6.10	1.88	1.37	0.17	33.29	5.55	-

NOTICE

Always use diesel oil for the fuel.

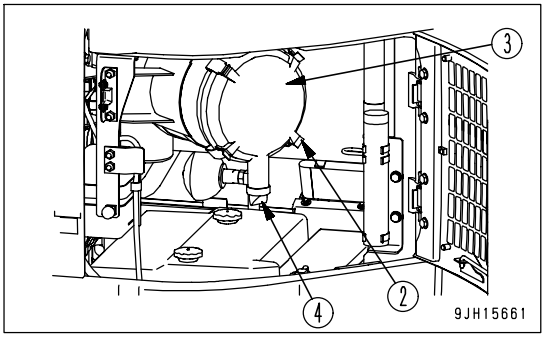
To ensure good fuel consumption characteristics and exhaust gas characteristics, the engine mounted on this machine uses an electronically controlled high-pressure fuel injection device. This device requires high precision parts and lubrication, so if low viscosity fuel with low lubricating ability is used, the durability may drop markedly.

Cleaning Outer Element

NOTICE

Before and after cleaning the element, do not leave or keep it in direct sunlight.

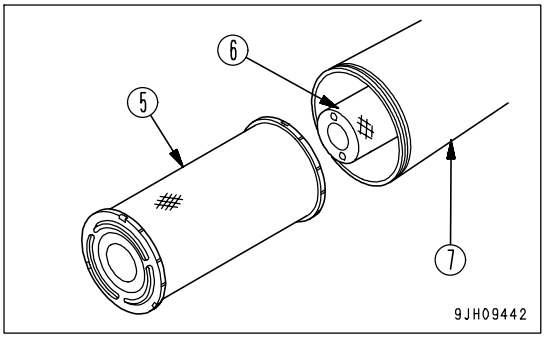
1. Open the rear door at the left side of the machine, remove 4 hooks (2), then remove cover (3).

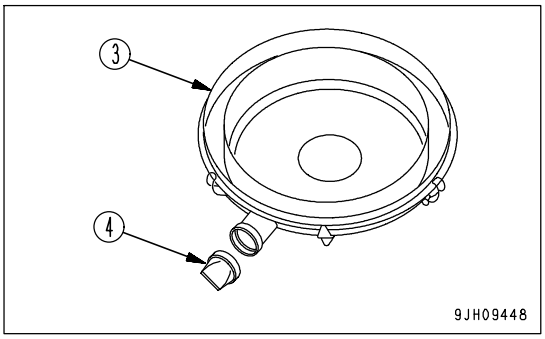


NOTICE

- **Never remove the inner element (6). It will allow dirt to enter and cause failure of the engine.**
- **Do not use a screwdriver or other tool.**

2. Hold the outer element (5), rock it lightly up and down and to the left and right, and rotate the element to the left and right to pull it out.
3. When the outer element (5) has been removed, check that the inner element has not come out of position and is not at an angle. If is is at an angle, insert your hand and push it in straight.
4. After removing the outer element (5), cover the inner element (6) with a clean cloth or tape to prevent dirt or dust from entering.
5. Wipe off or brush off the dirt stuck to cover (3) and the inside of the air cleaner body (7).
6. Remove any dirt or dust that is accumulated to evacuator valve (4) installed to cover (3).

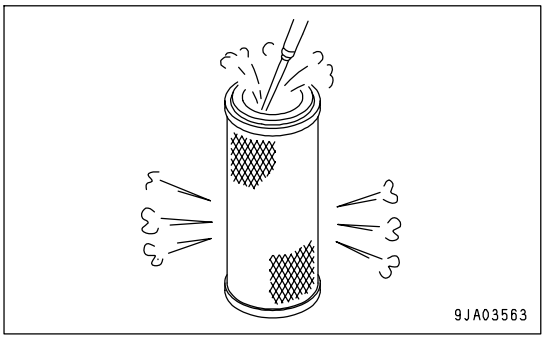




NOTICE

When cleaning the element, do not hit or beat it against anything.

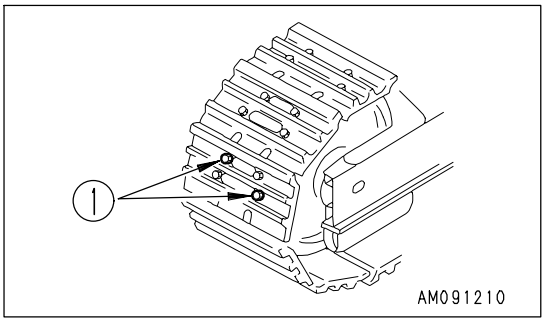
7. Direct dry compressed air (less than 0.69 MPa (7 kg/cm^2, 99.4 PSI)) to the outer element from inside along its folds, then direct it from outside along its folds and again from inside.
   1) Replace the outer element which has been cleaned 6 times repeatedly or used throughout a year. Replace the inner element at the same time.



   2) Replace both inner and outer elements when the air cleaner clogging monitor (1) lights up soon after installing the cleaned outer element even though it has not been cleaned 6 times.

CHECK AND TIGHTEN TRACK SHOE BOLTS

If the machine is used with track shoe bolts (1) loose, they will break, so tighten any loose bolts immediately.



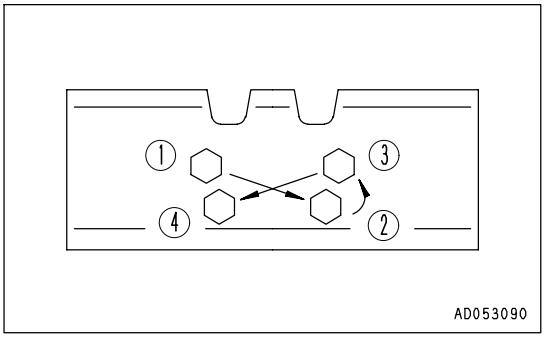
Tightening

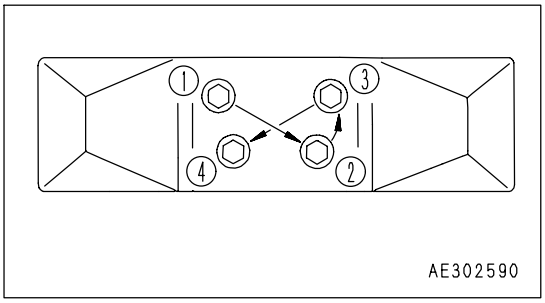
Triple shoe, flat shoe

1. First tighten to a tightening torque of 490 ± 49 Nm (50 ± 5 kgm, 360 ± 36 lbft) then check that the nut and shoe are in close contact with the link contact surface.
2. After checking, tighten a further 120° ± 10°.

Order for Tightening

Tighten the bolts in the order shown in the diagram on the right. After tightening, check that the nut and shoe are in close contact with the link mating surface.





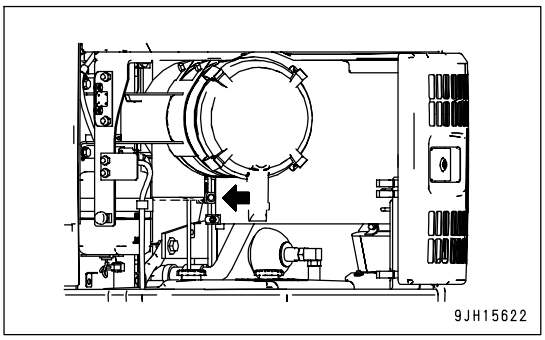
CHECK AND MAINTENANCE AIR CONDITIONER

Check Level of Refrigerant (gas)

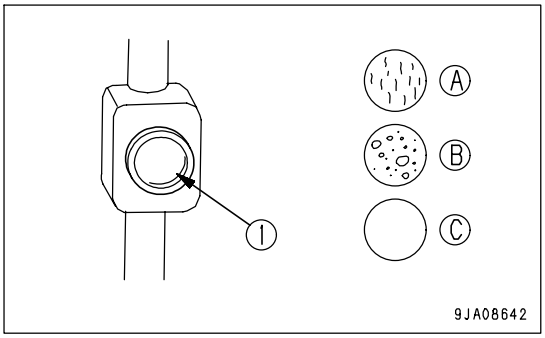
WARNING

If the refrigerant used in the air conditioner gets into your eyes or on your hands, it may cause loss of sight or frostbite. Do not touch the refrigerant. Never loosen any part of the refrigerant circuit.
Do not bring any flame close to any point where the refrigerant gas is leaking.

If there is a lack of refrigerant (Freon 134a), the cooling performance will be poor.
When operating the cooler at high speed, there should be no bubbles in the sight glass (1) (inspection window) mounted on the condenser unit receiver.



(A) No bubbles in refrigerant flow: Suitable
(B) Some bubbles in flow (bubbles pass continuously):
Lack of refrigerant
(C) Colorless, transparent: No refrigerant



REMARK
When there are bubbles, the refrigerant gas level is low, so contact your Komatsu distributors to have refrigerant added. If the air conditioner is run with the refrigerant gas level low, it will cause damage to the compressor.

Inspection During Off Season

Even during the off-season, operate the air conditioner for 3 to 5 minutes once a month to maintain the oil film at all parts of the compressor.

Inspection and Maintenance Items

Check, maintenance items	Content of check, maintenance	Guideline for maintenance interval
Refrigerant (gas)	Charge amount	Twice a year (spring, autumn)
Air conditioner condenser	Clogged fins	Every 500 hours
Compressor	Operating condition	Every 4000 hours
V-belt	Damage, tension	Every 250 hours
Blower motor, fan	Operating condition (does it make abnormal noise?)	When required
Control mechanism	Operating condition (does it function normally?)	When required
Piping mounts	Mounting condition, looseness at tightening or connecting portions, leakage of gas, damage	When required

EVERY 250 HOURS MAINTENANCE

CHECK LEVEL OF BATTERY ELECTROLYTE

Carry out this procedure before operating the machine.

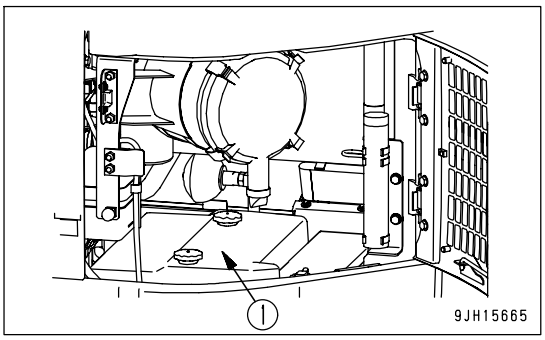
WARNING

- **Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. This will accelerate deterioration of the inside of the battery and reduce the service life of the battery. In addition, it may cause an explosion.**
- **The battery generates flammable gas and there is danger of explosion, do not bring fire or sparks near the battery.**
- **Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with a large amount of water and consult a doctor.**

NOTICE

- **When adding distilled water to the battery, do not allow the battery electrolyte to go above the UPPER LEVEL line. If the electrolyte level is too high, it may leak and cause damage to the paint surface or corrode other parts.**
- **When adding distilled water in cold weather, add it before starting operations in the morning to prevent the electrolyte from freezing.**

Inspect the battery electrolyte level at least once a month and follow the basic safety procedures given below.
Open the rear door at the left of the machine and remove cover (1) installed above the battery.



Bleed the air as follows:

16. Add fuel to the fuel tank until full (to FULL mark on the fuel gauge).
17. Loosen the knob of feed pump (7), pull it out, then pump it in and out until the movement becomes heavy.

REMARK

- It is not necessary to remove the plug at the top of the fuel pre-filter and fuel main filter.
- After the engine runs out of fuel, use the same procedure to operate feed pump (7) and bleed the air.

18. After finishing to bleed air, push in the knob of feed pump (7) and tighten it.
19. After replacing the filter cartridge, start the engine and run it at low idling for 10 minutes.
    Check for leakage of oil from the filter seal surface and tranparent cap mounting. If any oil is leaking, check the tightening of the filter cartridge.
    If there is still oil leakage, repeat Steps 1 - 7 to remove the filter cartridge, and if any damage or embedded foreign material in the packing surface is found, replace it with a new cartridge and repeat Steps 8 - 19 to install it.

REMARK

Sometimes some air is still left inside water separator (3) after air bleeding, but the engine can be started by operating feed pump (7) until its motion gets hard. The remaining air is naturally bled when the water separator is left as it is for some time after the engine comes to a stop.

REPLACE HYDRAULIC OIL FILTER ELEMENT

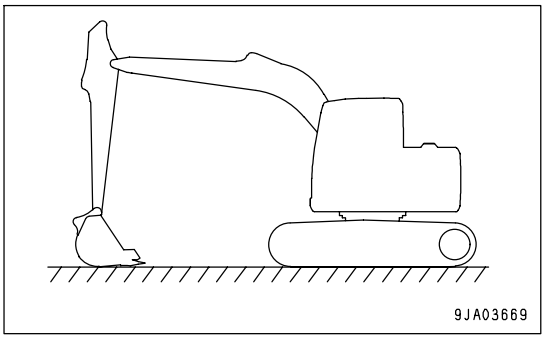
WARNING

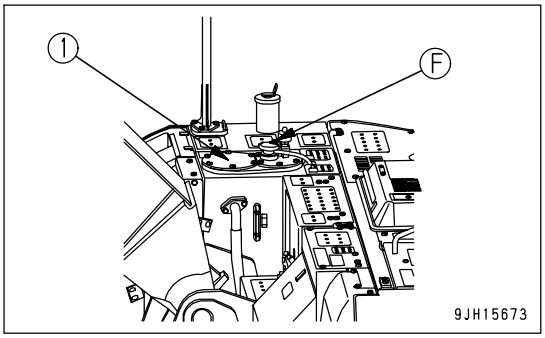
- **The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.**
- **When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.**

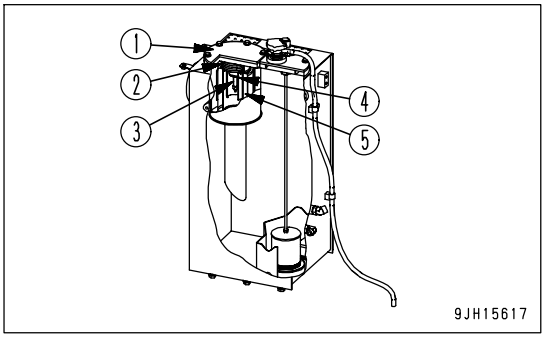
NOTICE

If the machine is equipped with a hydraulic breaker, the hydraulic oil will deteriorate much faster than during normal bucket operations. For details, see "MAINTENANCE INTERVAL FOR HYDRAULIC BREAKER (PAGE 4-17)" when carrying out maintenance.

1. Set the work equipment on the hard and flat ground in the maintenance posture as shown in the figure, then lower it to the ground and stop the engine.
2. Remove the cap from oil filler (F), and release the internal pressure.
3. Loosen 6 bolts, then remove cover (1). When doing this, the cover may fly out under the force of spring (2), so hold the cover down when removing the bolts.
4. After removing spring (2), valve (3) and strainer (4), take out element (5).
   - Inspect the bottom of the filter case for dirt, and remove it, if any. Take good care then not to let fall the dirt into the hydraulic tank.
5. Clean the removed parts in flushing oil.
6. Install the new element in the place where old element (5) was installed.
7. Set valve (3), strainer (4) and spring (2) on top of the element.
8. Set cover (1) in position, push it down by hand, and install the cover with the mounting bolts.
9. Screw in the oil filler cap and install the cover.
10. To bleed the air, start the engine according to "STARTING ENGINE (PAGE 3-134)" and run the engine at low idle for 10 minutes.
11. Stop the engine.







REMARK

Operate the machine after halting for more than 5 minutes to eliminate bubbles in the oil inside the tank.

12. Check for oil leakage and wipe off any spilled oil.

CHECK ALTERNATOR

Contact your Komatsu distributor to have the alternator checked.

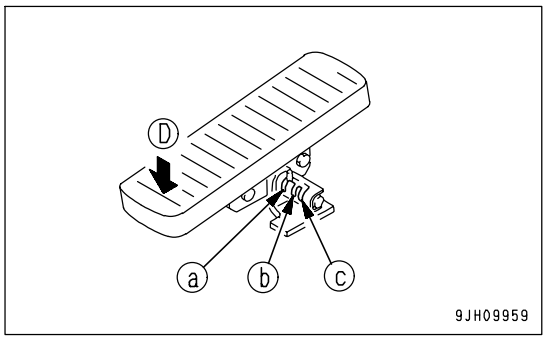
If the engine is started frequently, have this inspection carried out every 1000 hours.

CHECK ENGINE VALVE CLEARANCE, ADJUST

Special tools are needed for inspection and maintenance, so contact your Komatsu distributor.

Lock Pin

This pin (4) locks the control pedal.
Position (a): Locked
Position (b): Only front of pedal can be operated to full position (rear is locked)
Position (c): Both front and rear of pedal can be operated to full position



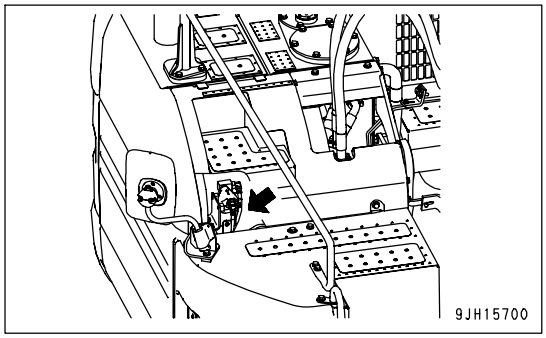
- When not using the attachment, set the lock pin to position (a).
- When using the breaker, use the working mode selector switch on the monitor switch portion to set the working mode to B mode, and set the lock pin to position (b) when using the pedal.
- When using the crusher, use the working mode selector switch on the monitor switch portion to set the working mode to ATT mode, and set the lock pin to position (c) when using the pedal.

NOTICE

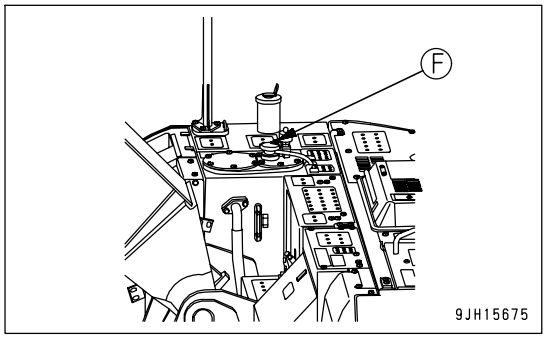
- **When using the breaker, if the lock pin is set to position (c) and the pedal is operated in direction (D), it will cause damage or defective operation of the breaker. To prevent this, when using the breaker, always set the lock pin to position (b).**
- **Before changing the position of the lock pin, stop the engine.**

Breaker Circuit Additional Pilot Oil Filter

This filter (5) is installed in the pilot circuit for the electromagnetic valve and prevents the entry of dirt or foreign material into the electromagnetic valve.

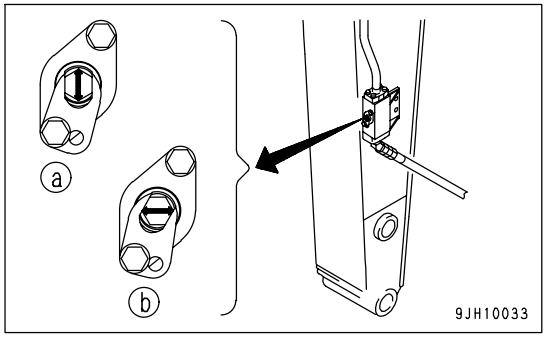


7. Loosen slowly oil filler cap (F) on top of the hydraulic tank to eliminate the internal pressure in the hydraulic circuit.

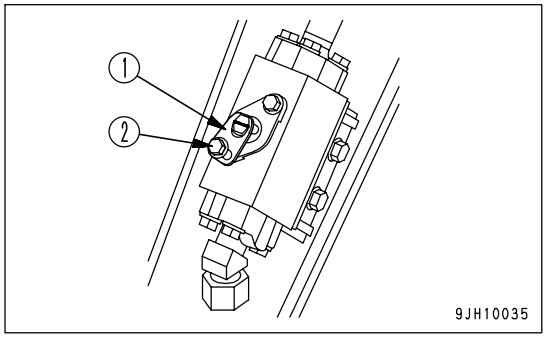


8. After checking that the hydraulic oil temperature has gone down, remove the plugs from 2 places at the outlet port and inlet port. Be careful not to get any dirt or mud on the hose mouthpiece.
   If the O-ring is damaged, replace it with a new part.
9. Connect the hose at the attachment side.
   When doing this, check the direction of flow of the oil and be careful not to make any mistake.
10. Set the rotor of the stop valve installed to the inlet port on the side face of the arm and the outlet port piping to FREE position (a).

    (a) FREE: Hydraulic oil flows (direction of arrow is parallel to long direction of arm)
    (b) LOCK: Hydraulic oil does not flow (direction of arrow is at right angles to long direction of arm)



    • When setting the FREE or LOCK position of the stop valve rotor, remove bolt (2), turn over plate (1), then turn the rotor. After setting, install plate (1) again with bolt (2).



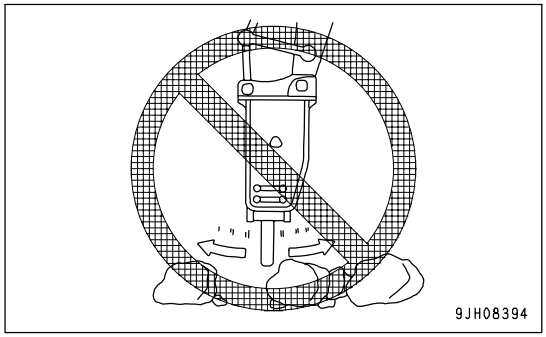
11. After installing the attachment, check the oil level in the hydraulic tank.

Prohibited Works

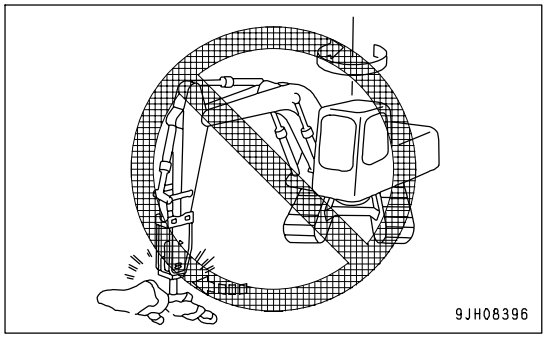
To ensure that the machine has a long life, and to ensure that operations are carried out in safety, do not operate the machine in any of the following ways.

- Do not operate all cylinders to the end of their strokes. Always leave approx. 5 cm (2 in) to spare.

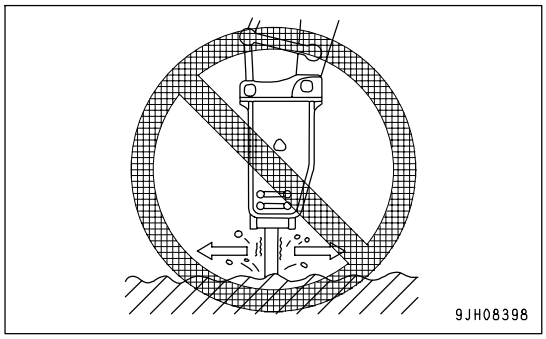
Using the mount to gather in pieces of rock



Operations using the swing force



Moving the chisel while carrying out impacting operations



Holding the chisel horizontal or pointed up when carrying out impacting operations