TEN00446-02

Operation & Maintenance Manual

MOTOR GRADER **GD655-5**

SERIAL NUMBERS 55016 and up

ecot3

⚠ WARNING

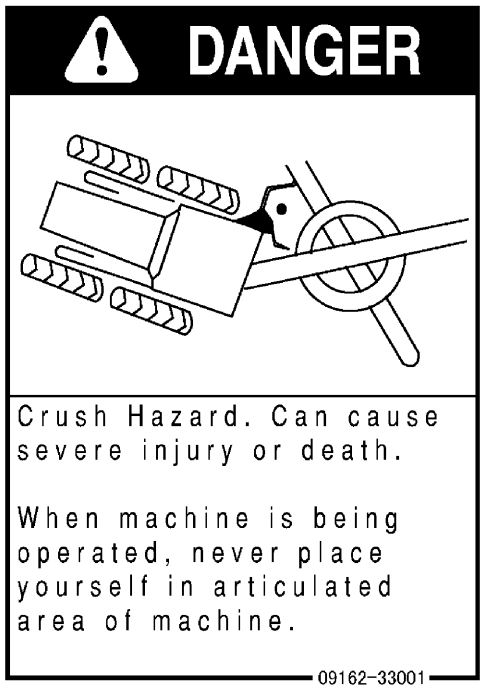
Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read this manual before operating or maintaining this machine. This manual should be kept near the machine for reference and periodically reviewed by all personnel who will come into contact with it.

NOTICE

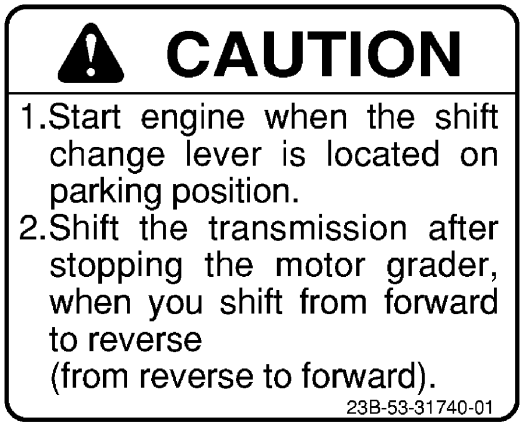
Komatsu has Operation & Maintenance Manuals written in some other languages. If a foreign language manual is necessary, contact your local distributor for availability.

KOMATSU

(13) Prohibited to enter (09162-33001)



(14) Caution when startling and traveling (23B-53-31740)



UNAUTHORIZED MODIFICATION

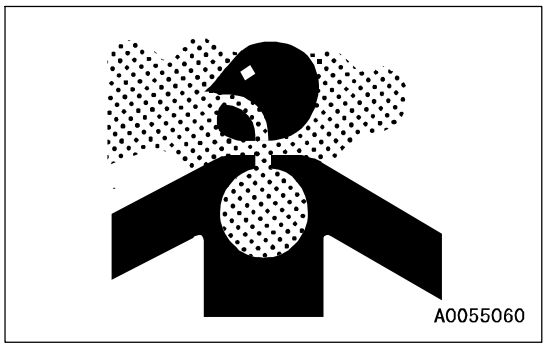
- Komatsu will not be responsible for any injuries, accidents, product failures or other property damages resulting from modifications made without authorization from Komatsu.
- Any modification made without authorization from Komatsu can create hazards. Before making a modification, consult your Komatsu 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.
- When installing and using optional attachments, read the instruction manual for the attachment, and the general information related to attachments in this manual.

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.



TRANSPORTATION

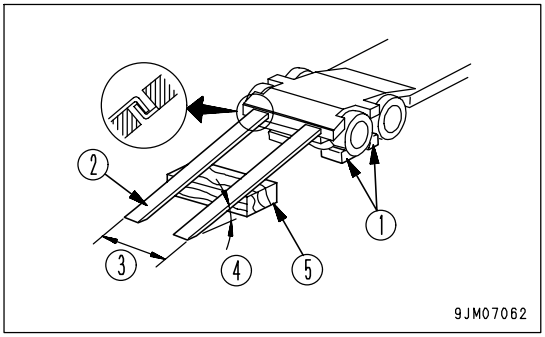
When the machine is transported on a trailer, there is danger of serious personal injury or death during transportation. Always do as follows.

- Always check the machine dimensions carefully. Depending on the work equipment installed, the machine weight, transportation height, and overall length may differ.
- Check beforehand that all bridges and other structures on the transportation route are strong enough to withstand the combined weight of the transporter and the machine being transported.
- When traveling on public roads, apply to the local authorities to obtain permission to transport the machine.
- The machine can be divided into parts for transportation, so when transporting the machine, please contact your Komatsu distributor to have the work carried out.
- Lock the frame with the articulate lock pin to prevent the machine from articulating.
- Lock the front axle with the leaning stopper to prevent the front tires from falling down.
- For details of the procedure for transporting the machine, see "TRANSPORTATION (PAGE 3-170)".

LOADING AND UNLOADING

When loading or unloading the machine, mistaken operation may bring the hazard of the machine tipping over or falling, so particular care is necessary. Always do as follows.

- Perform loading and unloading on firm, level ground only. Maintain a safe distance from the edge of the road or cliff.
- Always use ramps of adequate strength. Be sure that the ramps are wide, long, and thick enough to provide a safe loading slope. Take suitable steps to prevent the ramps from moving out of position or coming off.
- Be sure the ramp surface is clean and free of grease, oil, ice and loose materials. Remove dirt from the tire of the machine. On a rainy day, in particular, be extremely careful since the ramp surface is slippery.
- Run the engine at low idle and drive the machine slowly at low speed.
- Never correct your steering on the ramps. If necessary, drive off the ramps, correct the direction, then enter the ramps again.



(1) Blocks
(2) Ramp
(3) Width of ramps: Same width as tiers
(4) Angle of ramps: Max. 15 deg.
(5) Block

- When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
- For machines equipped with a cab, always lock the door after boarding the machine. If this is not done, the door may suddenly open during transportation.
  Refer to "TRANSPORTATION (PAGE 3-170)".

PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

- For using the machine safely for an extended period of time, replace safety-critical parts like hoses and seat belts periodically.
  Replacement of safety-critical parts: See "PERIODIC REPLACEMENT OF CRITICAL PARTS (PAGE 4-14)".

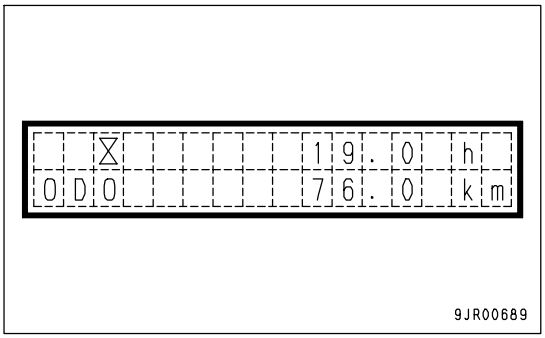
- The material of these components naturally changes over time, and repeated use causes deterioration, wear, and fatigue. As a result, there is a hazard that these components may fail and cause serious personal injury or death. It is difficult to judge the remaining life of these components from external inspection or the feeling when operating, so always replace them at the specified interval.
- Replace or repair safety-critical parts if any defect is found, even when they have not reached the specified replacement time.

SERVICE METER

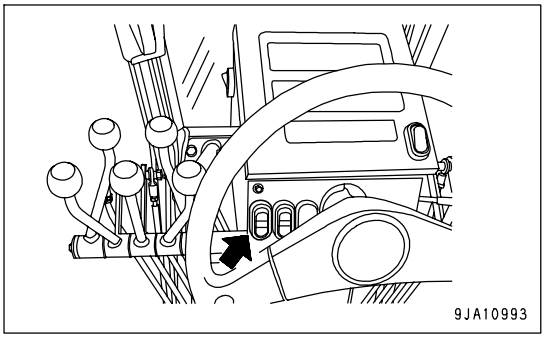
This display (1) shows the total amount of time that the machine has been operated.

If the engine is running, the service meter advances, even if the machine is not moving.

The meter reading advances by 1 for every 1 hour of operation, regardless of the engine speed.



Even if the starting switch is OFF, the service meter gives a display while the top (◇) of machine monitor mode selector switch 1 is being pressed.

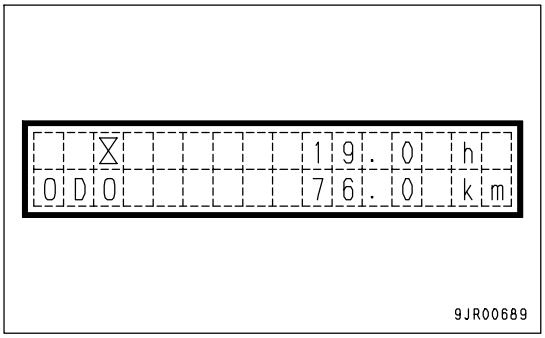


NOTICE

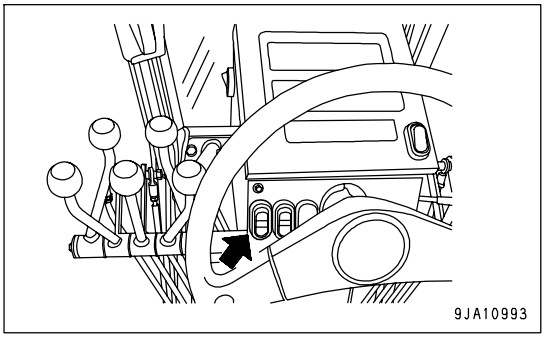
When the starting switch is at the OFF position, if the service meter is displayed even though the top (◇) of machine monitor mode selector switch 1 is not being pressed, there is probably a failure in the machine, so please contact your Komatsu distributor for inspection.

ODOMETER

This display (2) shows the total distance that the machine has traveled in units of km.



Even if the starting switch is OFF, the odometer gives a display while the top (◇) of machine monitor mode selector switch 1 is being pressed.

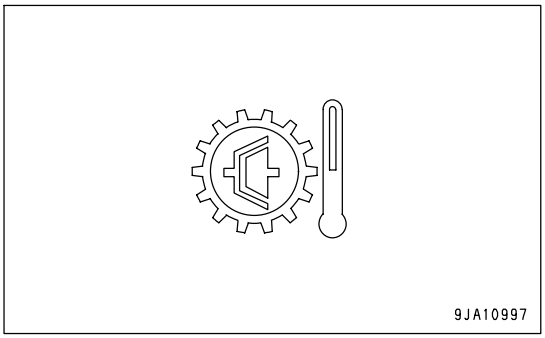


NOTICE

When the starting switch is at the OFF position, if the total distance is displayed even although the top (◇) of machine monitor mode selector switch 1 is not being pressed, there is probably a failure in the machine, so please contact your Komatsu distributor for inspection.

INCHING CLUTCH OVERHEAT CAUTION LAMP

This monitor (8) warns the operator that the clutch temperature in the transmission rose due to partially applied clutch operations.



- Measures to be taken when the inching clutch overheat caution lamp lights up

1. Set the gear shift lever to N (NEUTRAL) position immediately.
2. Release the inching pedal.
3. Depress the brake pedal.
4. Even after the inching clutch overheat caution lamp goes out, keep the engine running at medium speed (1200 to 1400 rpm) for at least 1 minute, placing the gear shift lever in N (NEUTRAL) position, to cool down the clutch.

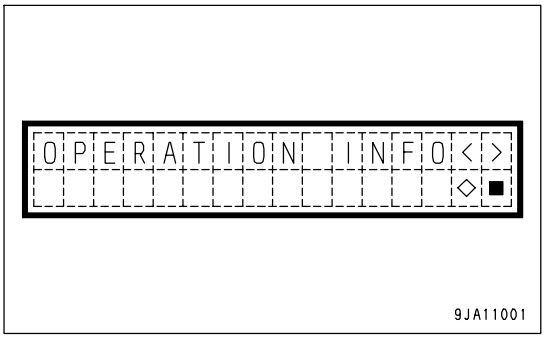
NOTICE

- **When the inching clutch overheat caution lamp lights up, be sure to set the gear shift lever to N (NEUTRAL) position and then release the inching pedal.**
  If releasing the inching pedal without setting the gear shift lever to N (NEUTRAL) position, the clutch temperature rises further depending on the clutch engaging condition.
- **Lighting of the inching clutch overheat caution lamp is likely to indicate that excessive loads are being applied.**
  Lower the engine speed, lighten the load on the blade, etc., and see the effect.

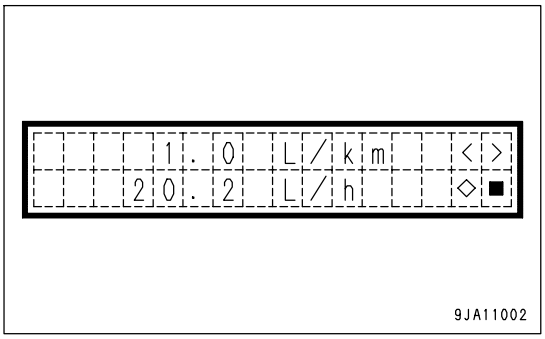
DISPLAY METHOD OF OPERATION INFORMATION (FUEL CONSUMPTION)

Use to confirm the fuel consumption.

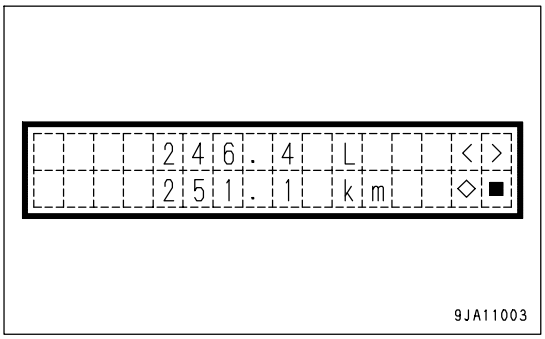
1. Check that the character display is showing the service meter/odometer, or the action code. If it is giving any other display, turn the starting switch OFF, then turn the starting switch to the ON position and wait for the above display to be given.
2. Press the (◇) of the machine monitor mode selector switch 1 and display "OPERATION INFO".
   To finish as it is, press the (■) of the machine monitor mode selector switch 1 or turn the starting switch OFF.



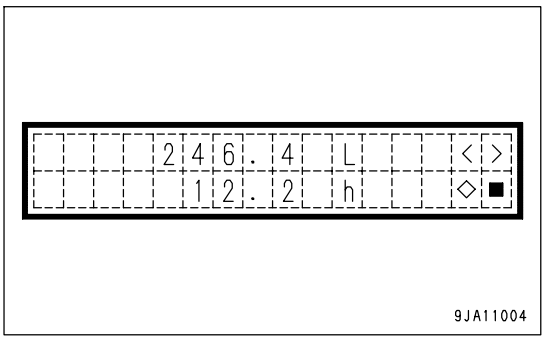
3. Press the (◇) of the machine monitor mode selector switch 1.
   The fuel consumption per km or per mile (L/km or L/mile) after the previous reset and the average fuel consumption per hour (L/h) after the previous reset are displayed.
   To finish as it is, press the (■) of the machine monitor mode selector switch 1 or turn the starting switch OFF.



4. Press the (>) of the machine monitor mode selector switch 2.
   The cumulative fuel consumption (L) after the previous reset and the travel distance (km or mile) after the previous reset are displayed.
   To return to 1 screen before, press the (<) of the machine monitor mode selector switch 2.
   To finish as it is, press the (■) of the machine monitor mode selector switch 1 or turn the starting switch OFF.

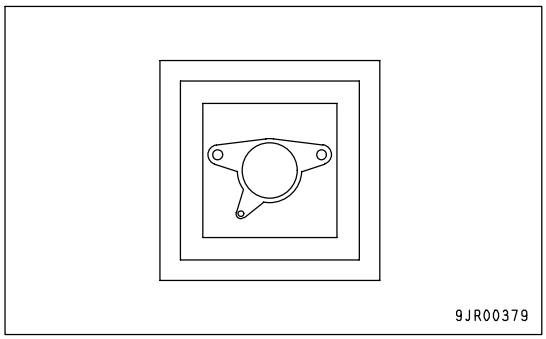


5. Press the (>) of the machine monitor mode selector switch 2.
   The cumulative fuel consumption (L) after the previous reset and the elapsed time (h) after the previous reset are displayed.
   To return to 1 screen before, press the (<) of the machine monitor mode selector switch 2.
   To finish as it is, press the (■) of the machine monitor mode selector switch 1 or turn the starting switch OFF.



LIFT ARM LOCK SWITCH

This switch (6) is used to remove or insert the lifter lock pin.
This switch is used when setting the blade to the bank cut posture or shoulder reach posture. Press the switch to remove the pin, and press the switch again to return the switch and insert the pin.
A cover is provided to prevent accidental operations. Before pressing the switch, open the cover.

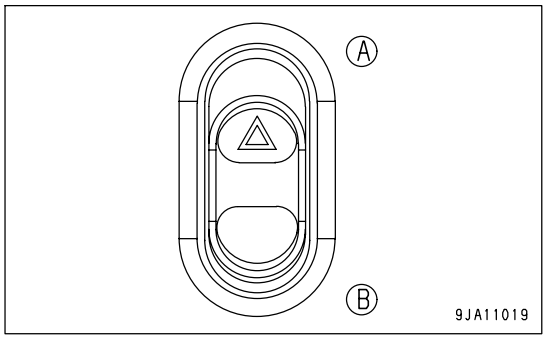


HAZARD LAMP SWITCH

WARNING

Never use the hazard lamp except in emergencies. If it is used while traveling when there is no problem, it may cause misunderstanding for drivers of other vehicles.

Use this switch (7) only in emergencies such as the case when having to park on a road due to a failure, etc.
Position (A): All turn signal lamps and turn signal pilot lamps flash.
Position (B): OFF



Conditions for switching fan rotation

Switching from normal rotation to reverse rotation

The fan will switch from normal rotation to reverse rotation only if all the following conditions are fulfilled.
If the direction is switched, the cooling fan reverse rotation pilot lamp on the machine monitor will change from flashing and will stay lighted up.
If all the conditions are not fulfilled, the fan direction will not change.
If the direction is not switched, the cooling fan reverse rotation pilot lamp on the machine monitor will continue to flash.
Conditions

- Position (A) of the cooling fan reverse rotation switch is pressed once.
- The engine speed is between low idle speed and 1200 rpm.
- The engine coolant temperature is less than 90°C (The indicator of the engine coolant temperature gauge is at scale of 8th or less of the bar graph).
- The torque converter oil temperature is less than 100°C (The display of the torque converter oil temperature gauge is within the green range).
- At least 30 seconds passed after the engine started.
- The gear shift lever is placed in P (PARKING) position.

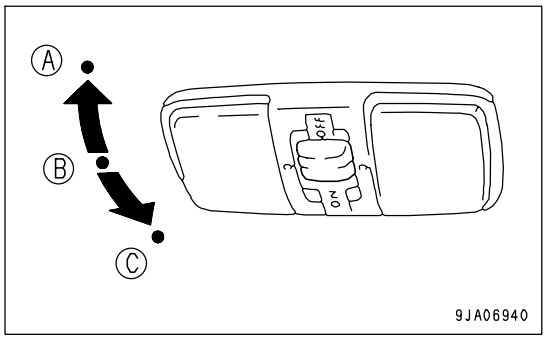
Switching from reverse rotation to normal rotation

The fan will switch from reverse rotation to normal rotation if any of the following conditions are fulfilled.
If the direction is switched, the cooling fan reverse rotation pilot lamp on the machine monitor will change as follows: Lighted up -> flashing -> OFF.
If none of the conditions are fulfilled, the fan direction will not change.
If the direction is not switched, the cooling fan reverse rotation pilot lamp on the machine monitor will change from being lighted up to flashing and will continue to flash.
Conditions

- The engine speed becomes less than 1200 rpm in 10 minutes after the fan starts to rotate in reverse.
- When pressing the position (A) of the cooling fan reverse rotation switch again during reverse rotation of the fan, the engine speed becomes less than 1200 rpm.

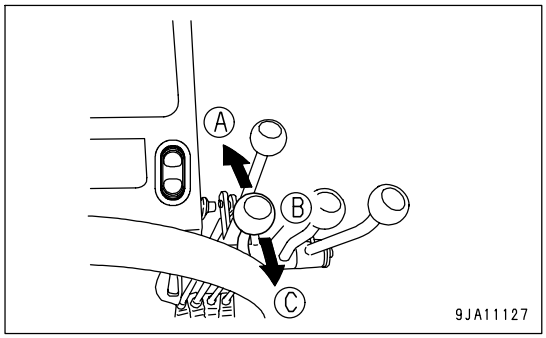
ROOM LAMP SWITCH

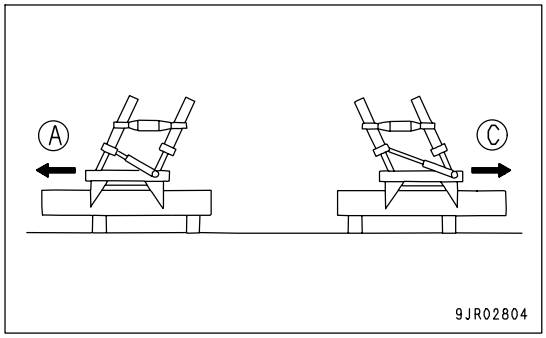
This switch (21) is used to light up the room lamp.
Position (A): OFF
Position (B): Lights up when cab door is opened
Position (C): ON



DRAWBAR SIDE SHIFT CONTROL LEVER

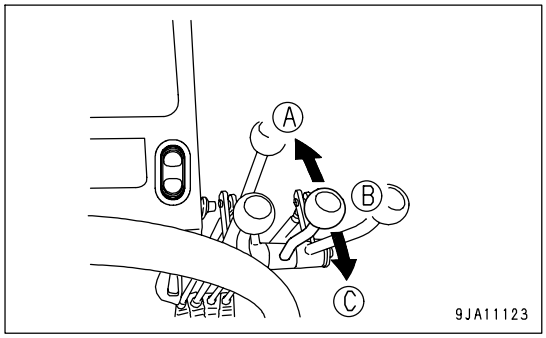
This lever (8) shifts the drawbar to the side.
(A) LEFT SHIFT: The drawbar is shifted to the left.
(B) HOLD: The drawbar stops and is held in the same position.
(C) RIGHT SHIFT: The drawbar is shifted to the right.

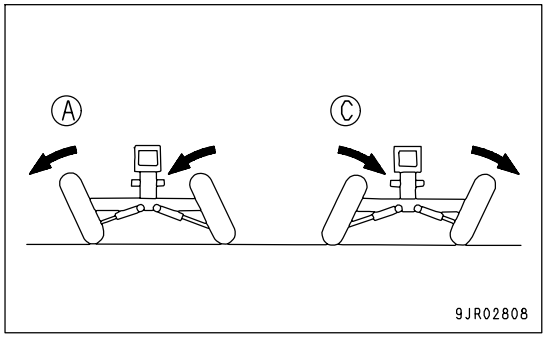




LEANING CONTROL LEVER

This lever (9) is used to operate the leaning.
(A) LEFT TURN: The tires lean to the left.
(B) HOLD: The leaning is kept in the same condition.
(C) RIGHT TURN: The tires lean to the right.





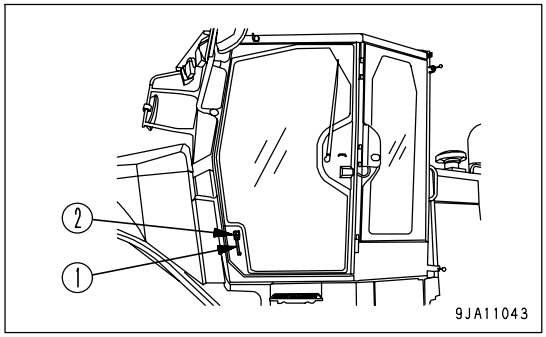
OPENING, CLOSING CAB DOORS

CAUTION

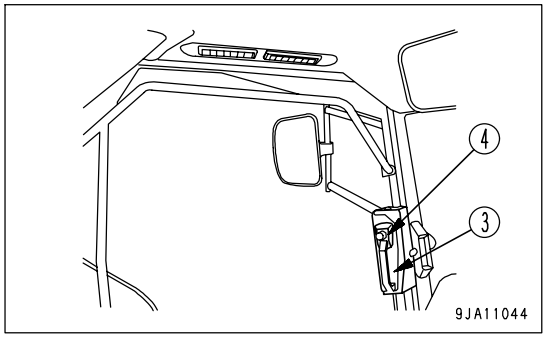
- **Be sure to open or close the door on level ground.**
  Avoid opening or closing the door on a slope. There is a danger that the operating effort changes suddenly. In addition, carefully open or close when it is windy around the machine.
- **When locking the door in opening state, be sure to lock from the ground. It is automatically locked when opened to the end.**
- **Be careful not to get your hands caught by the front pillar or center pillar.**
- **In case of operating the door from the ground when there is any person inside the cab, call out a warning before opening or closing the door.**

WHEN OPENING

When opening the door from the ground, grasp the door handle (1) and press the release button (2).

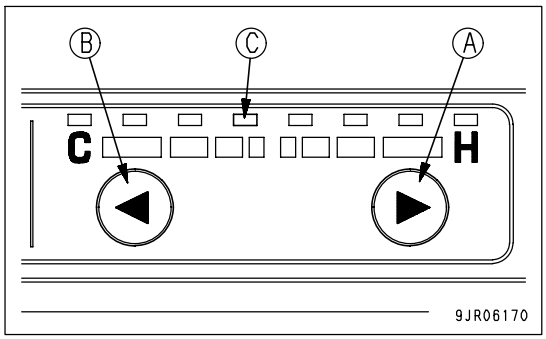


When opening the door from inside of the cab, grasp the door handle (3) and press the release button (4).
Be careful as the door tends to open by its own weight.



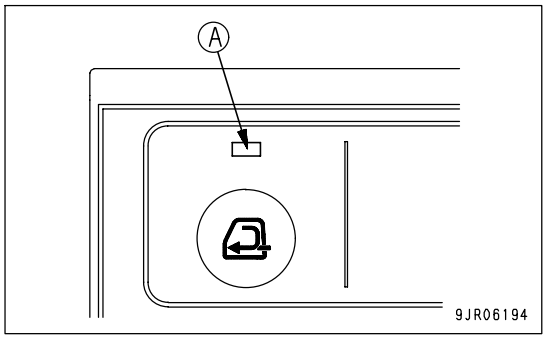
TEMPERATURE CONTROL SWITCH

Use this switch (4) to adjust the temperature between low temperature and high temperature.
When switch (A) is pressed, the temperature of the air blowing out becomes higher; when switch (B) is pressed, the temperature of the air blowing out becomes lower.
LED display (C) shows the position set for the temperature adjustment.



FRESH/RECIRC SELECTOR SWITCH

Use this switch (5) to switch between recirculation of the air inside the cab and intake of fresh air from outside.
When this switch is pressed, the system is set to recirculation of air inside the cab and LED display (A) lights up.
If the switch is pressed again, the system switches to intake of fresh air from outside and LED display (A) goes out.

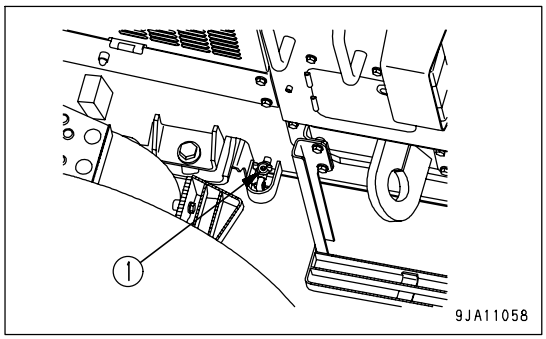


Recirculation of air inside cab
Only the air inside the cab is circulated. Use this setting when carrying out quick cooling or heating of the cab or when the outside air is dirty.

Intake of fresh air from outside
Air from the outside is taken into the cab. Use this setting when taking in fresh air from outside or when removing the mist from the windows.

DRAIN WATER AND SEDIMENT IN FUEL TANK

Loosen fuel tank drain valve (1) and drain the sediment and water which are accumulated at the bottom, together with fuel to a container.



ADJUSTING MIRROR

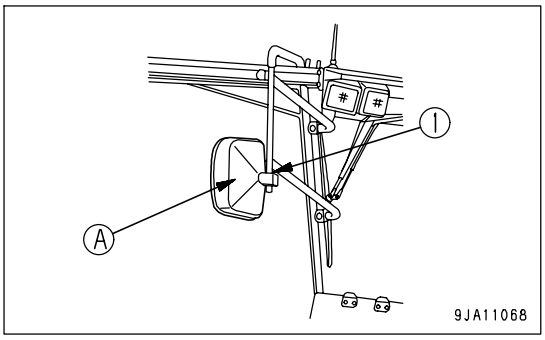
WARNING

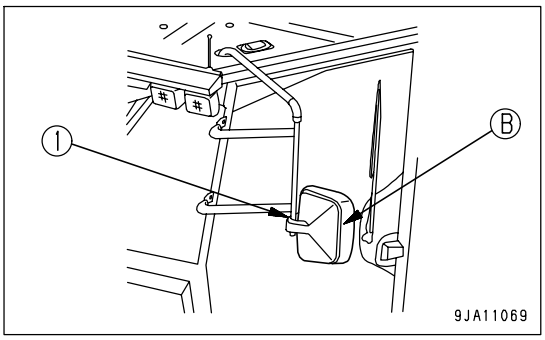
- **Be sure to adjust the mirrors before starting operations. If not adjusting them properly, you cannot secure the visibility and may be injured or may injure someone seriously.**
- **When adjusting the mirrors, keep your scaffolding by using a stool before starting the work.**

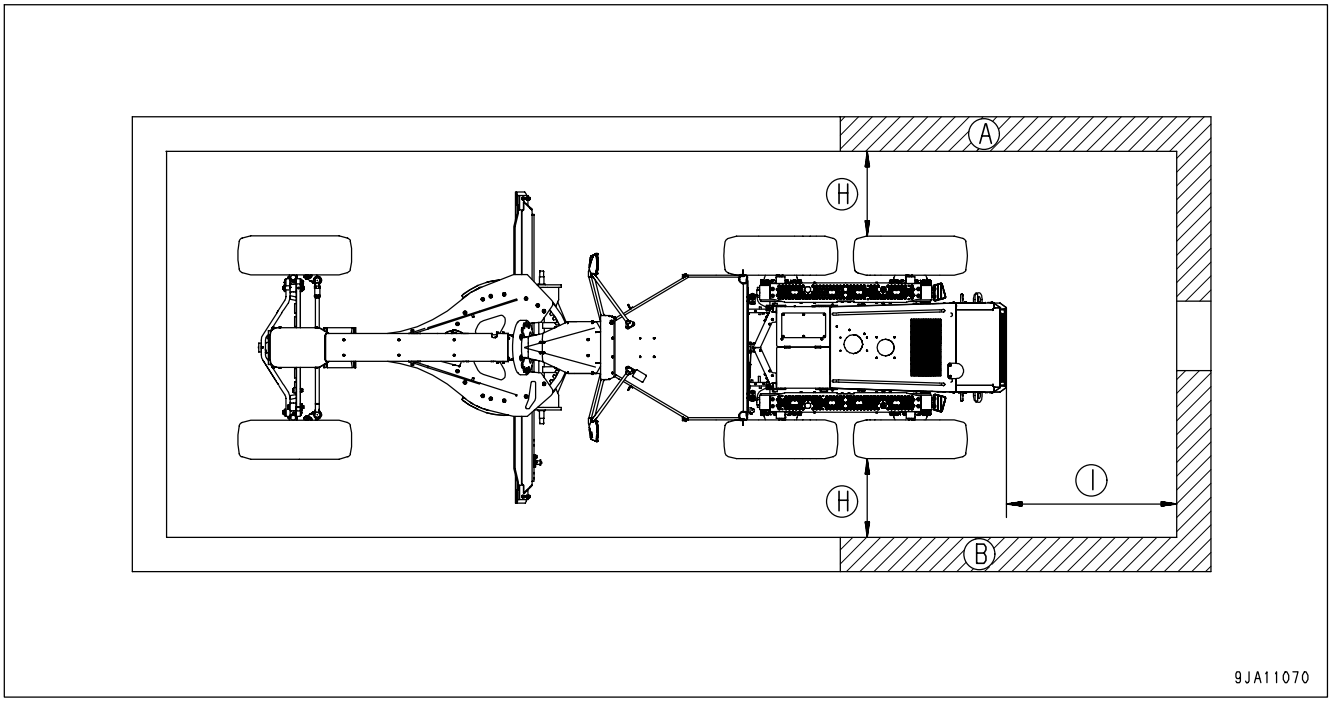
Loosen mounting bolt (1) and nuts (2) of the mirror, then adjust the mirror to a position which gives the best view from the operator's seat.
When doing this, adjust so that is possible also to see part of the machine.

- Visible range
  Mirror (A): The hatched portion (A) and 1.5 m (4 ft 11 in) height from the ground can be seen.
  Mirror (B): The hatched portion (B) and 1.5 m (4 ft 11 in) height from the ground can be seen.

(H) 1 m (3 ft 3 in)
(I) 2 m (6 ft 7 in)







MOVING MACHINE OFF (FORWARD, REVERSE, SHIFTING GEAR), STOPPING

WARNING

- **When moving off, check that the area around the machine is safe, and sound the horn before moving.**
  Clear all personnel from the machine and the area.
  Use extreme care when reversing the machine. Note there is a blind spot behind the machine.
- **When brake oil pressure alarm buzzer sounds due to lowering of brake oil pressure, do not operate the machine and wait with engine idle (low engine speed with no load) until brake oil pressure alarm buzzer stops.**
- **Before starting operations, check that the seat belt is properly installed.**

NOTICE

Before starting the machine off, check that the brake oil pressure warning buzzer is not sounding.

CAUTION

Don't shift the gear while depressing the inching pedal.

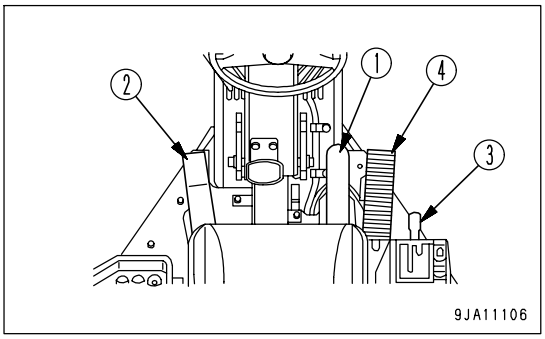
2 or more second after shifting gear, depress the inching pedal from pressed position.

PREPARATIONS FOR MOVING OFF

WHEN SELECTING MANUAL MODE

1. Set the blade to the travel posture.
   For traveling postures of the machine, see "TRAVELING POSTURE FOR MACHINE (PAGE 3-107)".

2. Depress the brake pedal (1), depress the inching pedal (2), and then set gear shift lever (3) to the 1st or 2nd speed.

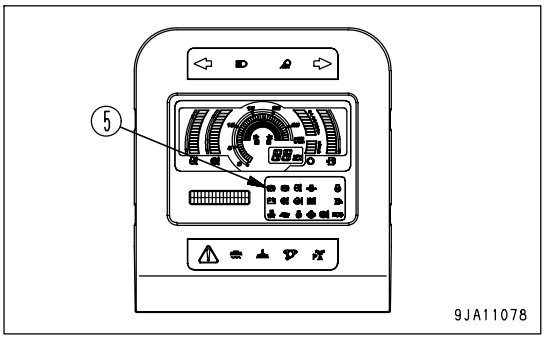


NOTICE

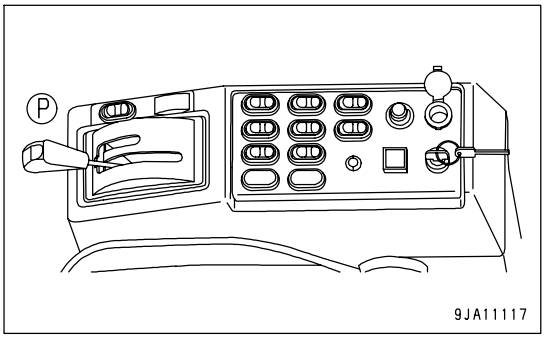
On slope, do not start the machine at higher gear speeds (3rd or higher).

Be sure to start at the 1st or 2nd gear speed on slope.

3. Always check that parking brake lamp (5) has gone out.



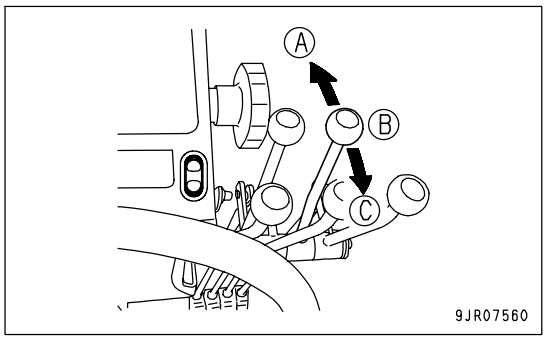
3. Set gear shift lever (3) to the P (PARKING) position while pressing its knob. The parking brake lamp lights up at the same time.

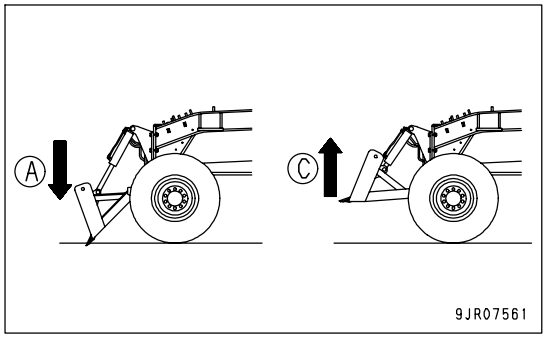


OPERATING FRONT ATTACHMENT

When the machine is equipped with a front blade

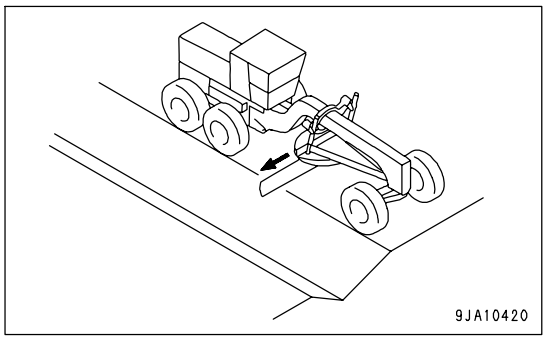
When front attachment control lever (8) is pushed forward (A), the front blade goes down; when it is pulled back (C), the front blade goes up.



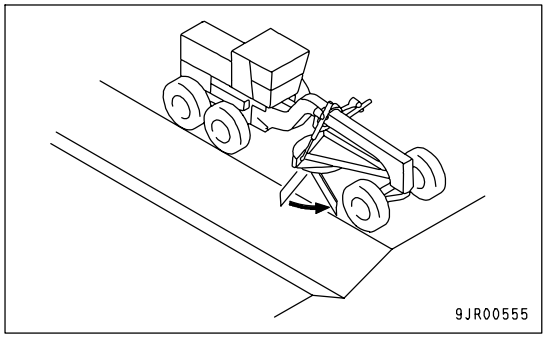


FINISHING RIGHT ROAD SHOULDER

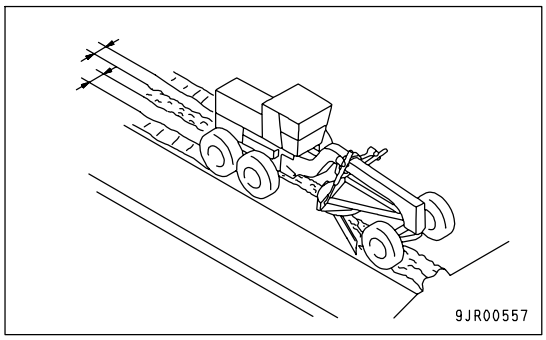
1. Operate the drawbar shift cylinder to set the circle to the right end.



2. Set so that the right end of the blade is in line with the outside of the right tire. Set the blade so that the soil is discharged between the 2 wheels. (The soil can be moved more smoothly if the blade is at a small propulsion angle.)



3. Align the center of the machine with the line of the soil discharged when digging the ditch.
4. Operate the left and right blade lift cylinders to keep the blade horizontal and at the desired digging depth.



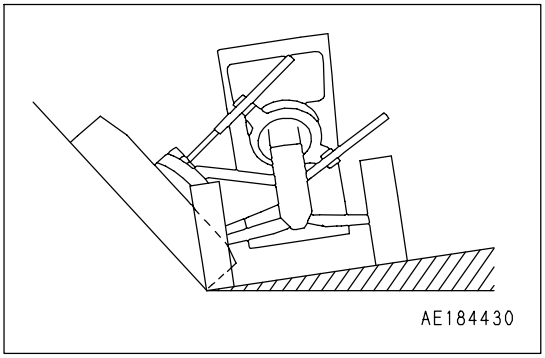
5. Lean the front wheels slightly to the left.

BANK CUTTING METHOD - RIGHT SIDE

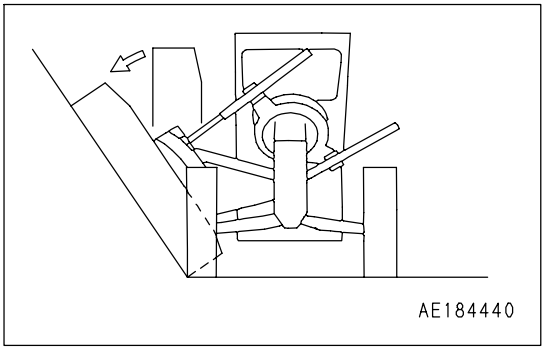
WARNING

Lower the blade to the ground before removing the bank control lock pin.

1. The roadbed where the foundation is to be dug must be uniform.
2. If the soil is hard, angle the roadbed slightly towards the bank to prevent the machine from sliding to the side away from the bank.
3. Set to the bank cut posture. For details, see "BANK CUTTING POSTURE (RIGHT SIDE) (PAGE 3-158)".

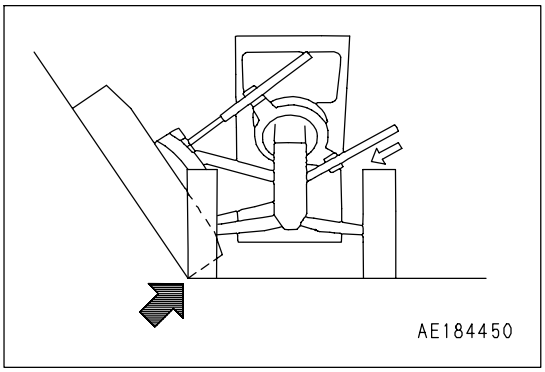


4. Rotate the circle and extend or retract the left and right blade lift cylinders to set to the bank slope face posture.
5. From the high bank position, rotate the blade so that the top of the blade is at the front. This sets it to the low bank posture, which is suited for scraping operations.



REMARK
If the top of the blade is rotated to the rear, the blade can be set to the reverse low bank posture, which makes it possible to cut the slope face while scraping up the soil.
To scrape up the soil smoothly, a shallow angle slope is needed. Rotate the blade until the bottom of the blade is close to the front tires. Be careful not to let the blade hit the tires.

6. Extend the left blade lift cylinder, and set the tip of the left cutting edge of the blade in line with the outside of the rear wheels at the bottom of the slope face.
7. The rear right wheel must be in the V at the base of the slope face.



8. Extend the right blade lift cylinder and set the angle to the desired bank slope face.
9. Gradually progress with the cutting.

REMARK
The wheels should normally be almost perpendicular.

BANK CUTTING POSTURE (RIGHT SIDE)

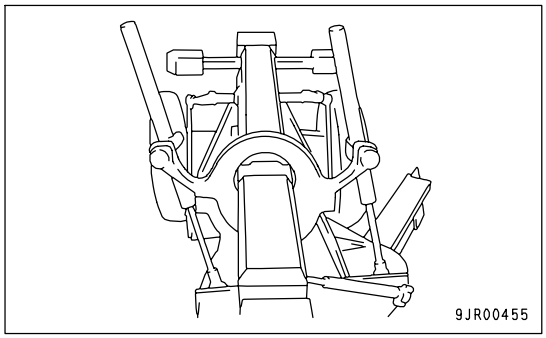
WARNING

Lower the blade to the ground before removing the bank control lock pin. Do not remove it at any other position. There is danger that it will rotate and the blade will fall.

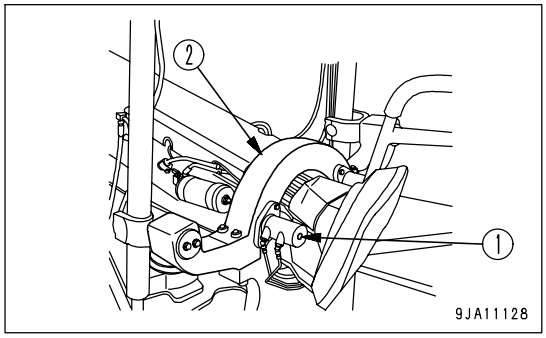
NOTICE

- **When shifting to the bank cut posture, be careful not to let the blade hit any other part of the machine.**
- **If the bank pin passes over the hole in the lifter guide, do not rotate the lifter any further. There is danger that the frame and bank pin case will come into contact and that the bank pin case will be broken.**

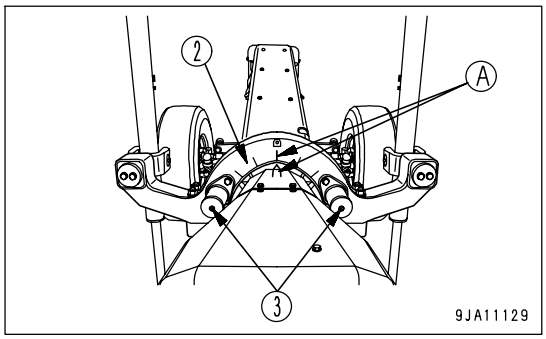
1. Extend the blade and drawbar fully to the right, rotate the circle and set the end of the blade at the side of the front right wheel, then lower the blade so that it is lightly in contact with the ground.



2. Push the bank control lock pin switch and remove lock pin (1). If lock pin (1) is held by lifter (2) and will not come out, operate the blade lift cylinder to make it possible to remove the pin.



3. Check that indicator pin (3) at the rear of the lock pin has come out fully and that the lock pin has been removed, then extend the right blade lift cylinder and retract the left blade lift cylinder to rotate lifter (2) counterclockwise.
   Operate lifter (2) to the desired counter mark (A), then lock with lock pin (1).
   Check that the protrusion of indicator pin (3) has been removed and that the lock pin is completely locked.



NOTICE

If the lock pin switch is kept pushed in the pin lock direction while the lifter is being rotated, there is danger that the bushing or lifter ring will be damaged. Rotate the lifter to the specified counter mark, then lock the lock pin.

HANDLING THE TIRES

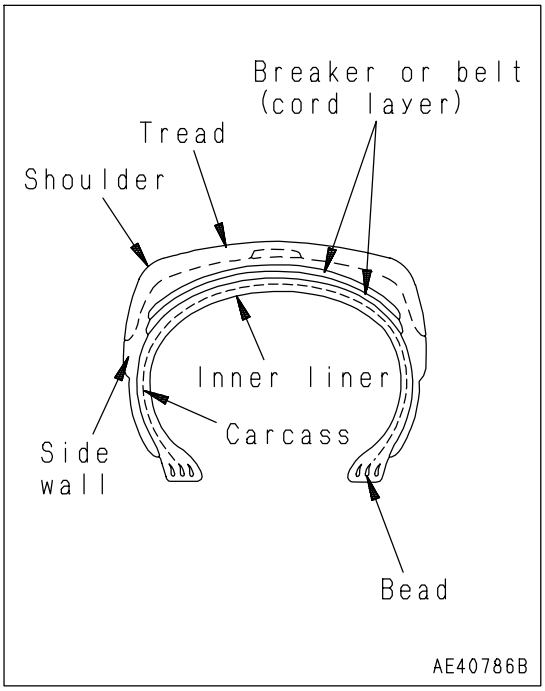
PRECAUTIONS WHEN HANDLING TIRES

WARNING

To ensure safety, the defective tires given below must be replaced with new tires.

- **Tires where the bead wire has been cut, broken, or greatly deformed**
- **Excessively worn tires where more than 1/4 of the circumference of the carcass ply (excluding the breaker) is exposed**
- **Tires where damage to the carcass exceeds 1/3 of the tire width**
- **Tires where ply separation has occurred**
- **Tires where radial cracks extend to the carcass**
- **Tires where there is abnormal deterioration, deformation, and damage, and the tire cannot withstand use.**

Please contact your Komatsu distributor when replacing the tires. It is dangerous to jack up the machine without taking due care.



TOWING THE MACHINE

WARNING

- **If any failure should occur in the brake system and the brakes will not work, then be extremely careful.**
- **If the machine is towed in the wrong way, there is the danger of an accident that could cause death or injury.**
- **Before releasing the brake, always put blocks under the wheels.**
- **Only use wire rope that has enough strength for the weight that it is being towed.**
- **Do not apply a load to the wire rope suddenly.**

NOTICE

- **Towing is for moving the machine to a place where inspection and maintenance can be carried out, and not for moving it long distances.**
  The machine must not be towed for long distances.
- **For details of the procedure for towing a machine when it has broken down, please contact your Komatsu distributor.**

WHEN ENGINE CAN BE USED

Always keep the engine running when towing the machine, so that the steering and braking can be used.

WHEN ENGINE CANNOT BE USED

- When towing a disabled machine the distance should be within 600 m (1968 ft) at a speed of 8 km/h (5.0 MPH) or less.
- If the distance is more than the above mentioned, or if more than 1 day has elapsed since the engine trouble, be sure to use a trailer for transportation.
- The parking brake is automatically applied. (A fixed time after the engine stops.)
  It is necessary to release the parking brake, but the brake will then have no effect at all, so it is necessary to take special measures to ensure safety when moving the machine. This is particularly important on slopes.

NOTICE

If the machine is towed without the engine running, no lubrication oil will be supplied to the transmission. The gears and bearings are rotated, so this may cause them to be damaged.

- Tow the machine properly according to the instructions given below.
- The explanation given here is only to be used for a machine that has failed and is to be moved to a safe place for repairs. It must be moved a maximum of 600 m (1968 ft) and at a maximum speed of 8 km/h (5.0 MPH). This procedure is only for emergency purposes. If the machine must be moved a long distance, use a transporter.
- To protect the operator if the towrope or bar should break, install a protector plate to the machine being towed.
- If it is impossible to use the steering or brakes on the machine being towed, then do not have anyone sitting in the operator's seat.
- Before towing, check that the tow rope or bar are in good condition, and that they have ample strength for the towing operation. If the machine being towed may get stuck in mud or may have to be towed uphill, the tow rope or bar must be of a strength of at least 1.5 times greater than the weight of the machine being towed.
- Keep the angle of the towing line to the minimum. Operate the machine so that the angle does not become greater than 30 deg. from the straight line.
- If the machine is moved suddenly, the towrope or bar will be subjected to an excessive load, and it may break. Start the machine gradually and travel at a constant speed.
- Normally, use a towing machine of about the same capacity as the machine being towed. The towing machine must have ample brake capacity, weight, and rimpull. Check that both machines can be controlled on slopes and on the tow road.

Problem	Main causes	Remedy
Even when brake pedal is depressed, braking effect is poor	• Worn lining • Oil leakage in brake piping • Defective brake valve • Defective piston seal	(• Check, repair) (• Check, repair) (• Check, repair) (• Replace)
Brake is dragging or always applied	• Clogging of the vent hole of the brake valve	• Cleaning
Poor braking effect of parking brake	• Defective adjustment of brake • Oil on disc surface • Seized disc	(• Adjust) (• Finish surface of disc with sandpaper) (• Finish surface of disc with sandpaper)
Blade moves up and down excessively during operation	• Play in lift cylinder ball joint • Excessive clearance between sliding surface of circle and drawbar • Worn blade rail guide bushing	• Adjust shim. For details, see EVERY 250 HOURS SERVICE. • Adjust shim at circle guide connector. For details, see EVERY 500 HOURS SERVICE. • Replace guide bushing,shim Correct blade rail
Rotation of blade during operation is excessive	• Excessive clearance in circle in radial direction	• Adjust position of guide connector. For details, see EVERY 500 HOURS SERVICE.
Work equipment does not move properly when work equipment control lever is operated	• Lack of oil	• Add oil to specified level. For details, see EVERY 250 HOURS SERVICE.
Heat generated from parking brake disc	• Brake pad in contact with disc	(• Adjust clearance)

OUTLINES OF SERVICE

- Always use Komatsu genuine parts for replacement parts, grease or oil.
- When changing the oil or adding oil, do not mix different types of oil. When changing the type of oil, drain all the old oil and fill completely with the new oil. Always replace the filter at the same time. (There is no problem if the small amount of oil remaining in the piping mixes with the new oil.)
- Unless otherwise specified, when the machine is shipped from the factory, it is filled with the oil and coolant listed in the table below.

Item	Type
Engine oil pan	Engine oil EO15W40-DH (Komatsu genuine parts)
Transmission case	Power train oil TO10 (Komatsu genuine parts)
Hydraulic system	
Final drive case	Power train oil TO30 (Komatsu genuine parts)
Tandem drive case	
Circle reverse gear case	Gear oil GO90 (Komatsu genuine parts)
Radiator	SUPERCOOLANT (AF-NAC) (Komatsu genuine parts) (density: 30% or above)

HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

OIL

- Oil is used in the engine and hydraulic equipment under extremely severe conditions (high temperature, high pressure), and deteriorates with use.
  Always use oil that matches the grade and maximum and minimum ambient temperatures recommended in the Operation and Maintenance Manual. Even if the oil is not dirty, always change the oil at the specified interval.
- Oil corresponds to blood in the human body, always be careful when handling it to prevent any impurities (water, metal particles, dirt, etc.) from getting in.
  The majority of problems with the machine are caused by the entry of such impurities.
  Take particular care not to let any impurities get in when storing or adding oil.
- Never mix oils of different grades or brands.
- Always add the specified amount of oil.
  Having too much oil or too little oil are both causes of problems.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit. In such cases, please contact your Komatsu distributor.
- When changing the oil, always replace the related filters at the same time.
- We recommend you have an analysis made of the oil periodically to check the condition of the machine. For those who wish to use this service, please contact your Komatsu distributor.
- When using commercially available oil, it may be necessary to reduce the oil change interval.
  We recommend that you use the Komatsu oil clinic to carry out a detailed checks of the characteristics of the oil.

PERIODIC REPLACEMENT OF CRITICAL PARTS

To ensure safety at all times when operating or driving the machine, the user of the machine must always carry out periodic maintenance. In addition, to further improve safety, the parts in the safety-critical parts list on the next page must also be replaced at the specified interval. These parts are particularly closely connected to safety and fire prevention, so please contact your Komatsu distributor to have them replaced.

Material quality of these parts can change as time passes and they are likely to wear out or deteriorate. However, it is difficult to determine the extent of wear or deterioration at the time of periodic maintenance. Hence, it is required to replace them with new ones regardless of their condition after a certain period of usage. This is important to ensure that these parts maintain their full performance at all times.

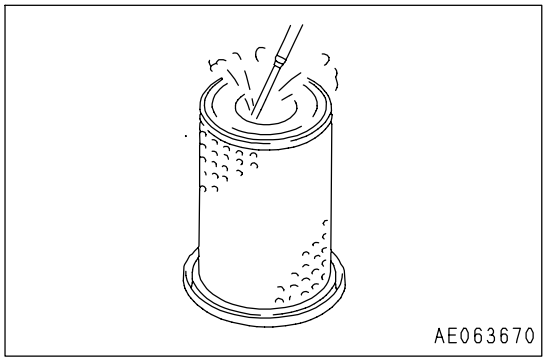
Furthermore, should anything abnormal be found on any of these parts, replace it with a new one even if the periodic replacement time for the part has not yet arrived.

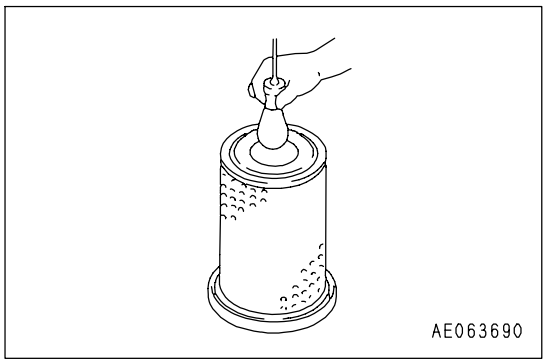
If any of the hose clamps show deterioration like deformation or cracking, replace the clamps at the same time as the hoses.

Also perform the checks with hydraulic hoses which need to be replaced periodically. Tighten all loose clamps and replace defective hoses, as required.

When replacing hoses, always replace O-rings, gaskets, and other such parts at the same time.

5. Direct dry compressed air (less than 0.2 MPa {2.1 kg/cm^2, 30.0 PSI}) to the outer element from inside along its pleats, then direct it from outside along its pleats and again from inside.
   1) Replace the outer element if it has been cleaned 6 times repeatedly or used throughout 1 year. Replace the inner element at the same time.
   2) If the yellow display panel of the dust indicator reaches the center of the scale (5 kPa) immediately after the outer element has been cleaned, replace both the inner and outer elements, even when the outer element has not been cleaned 6 times.
6. If small holes or thinner parts are found on the element when it is checked by shining a light through it after cleaning, replace the element.





NOTICE

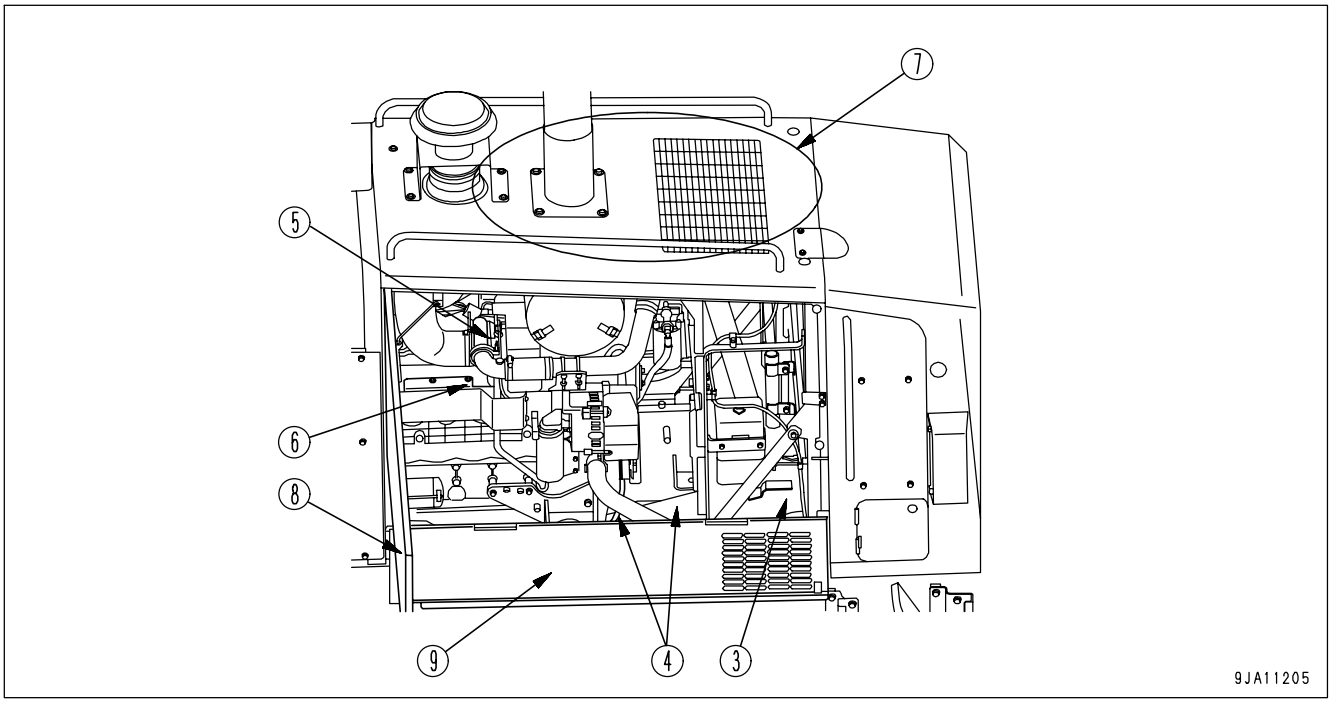
- **When cleaning the element, do not hit it or beat it against something.**
- **Do not use an element whose pleats or gasket or seal are damaged.**
- **If force is used when assembling, the clip or air cleaner body will be damaged, so push it in straight when installing it.**
- **Do not operate the machine with the inner element removed. This will damage the engine.**

7. Set the cleaned outer element and install dust cup (4), then secure them with clips (3).

⚠ CAUTION

If the inner and outer element have been replaced, always replace O-ring (8) with a new part.

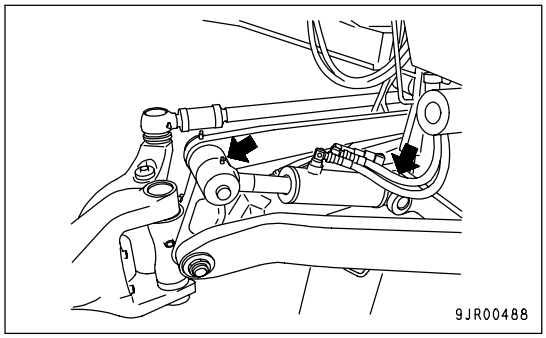
8. Press the button on dust indicator (1) to return the yellow display panel to its original position.
9. Close the engine side cover on the right side of the machine.



(1) Lower part of the cooling room
(2) Lower part of the engine room
(3) Surrounding area of the turbo charger
(4) Surrounding area of the exhaust manifold
(5) Upper part of the engine hood

After cleaning, close engine side covers (8) and covers (9) on the right and left sides of the machine respectively. In addition, clear the flown dirt, etc. off from around the machine.

Leaning cylinder pin (2 places)



CHECK LEVEL OF BATTERY ELECTROLYTE

Perform this check 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.**
- **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.**

NOTICE

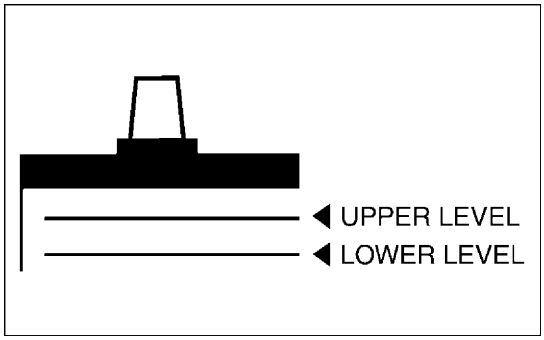
When adding distilled water in cold weather, add it before starting operations in the morning to prevent the electrolyte from freezing.

Inspect the battery electrolyte level at least once 1 month and follow the basic safety procedures given below.

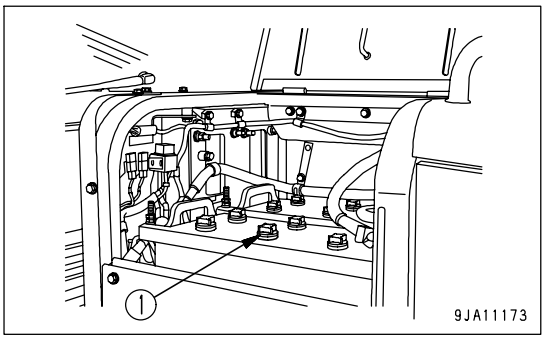
WHEN CHECKING ELECTROLYTE LEVEL FROM SIDE OF BATTERY

If it is possible to check the electrolyte level from the side of the battery, check as follows.

1. Use a wet cloth to clean the area around the electrolyte level lines and check that the electrolyte level is between the UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines.
   If the battery is wiped with a dry cloth, static electricity may cause a fire or explosion.



2. If the electrolyte level is below the midway point between the U.L. and L.L. lines, remove cap (1) and add distilled water to the U.L. line.
3. After adding distilled water, tighten cap (1) securely.



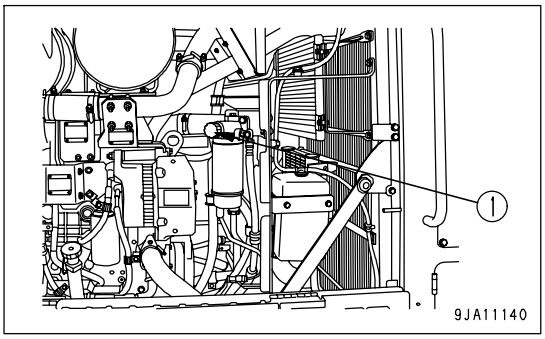
REMARK

If distilled water is added to above the U.L. line, use a syringe to lower the level to the U.L. line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.

7. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it 3/4 of a turn.
   If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten the correct amount.
8. After completing replacement of filter cartridge (1), bleed the air from the system. For details, see "PROCEDURE FOR BLEEDING AIR (PAGE 4-64)".
9. After completing the air bleeding, start the engine and check that there is no leakage of fuel from the filter seal surface. If there is any leakage, check the tightening condition of the filter cartridge. If there is still fuel leakage, repeat Steps 1 to 3 to remove the filter cartridge, then check the packing surface for damage or embedded dirt. If any damage or embedded dirt is found, replace the cartridge with a new part and repeat Steps 4 to 8 to install it.

PROCEDURE FOR BLEEDING AIR

1. Fill the fuel tank with fuel.
2. Open the engine side cover on the left side of the machine.
3. Loosen and pull out feed pump knob (1) and move it forward and backward.
   - The plug on the side surface of the fuel prefilter head does not need to be removed.
   - Keep moving knob (1) until it becomes heavy.
4. After bleeding air, push in and tighten knob (1).



REPLACE TRANSMISSION OIL FILTER CARTRIDGE

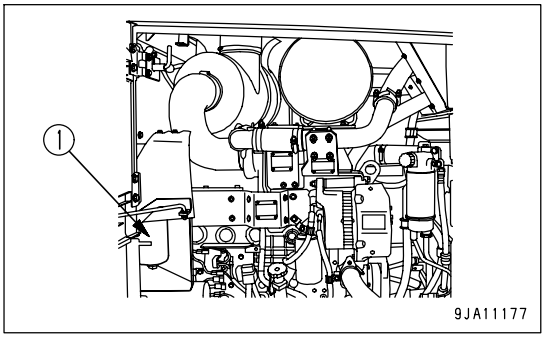
⚠ WARNING

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.

- Prepare a ring wrench

1. Set the container under the filter cartridge to catch the drained oil.
2. Using the ring wrench, turn filter cartridge (1) to the left to remove it.
3. Clean the filter holder, coat the seal surface of the new filter cartridge thinly with clean engine oil, then install to the filter holder.

   Tightening torque: 49 to 59 Nm (5 to 6 kgm, 36.2 to 43.4 lbft)



CHANGE OIL IN TANDEM DRIVE CASE

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.

- Refill amount of oil: 57 liters (15.06 US gal) each of right and left

1. Put an oil container under drain plug (P) to catch the oil.
2. Remove drain plug (P) and drain the oil.
3. After draining the oil, clean drain plug (P) and install it again.
4. Pour in the specified amount of engine oil from oil filler (F).
5. After refilling the oil, check that the oil is at the specified level. For details, see "CHECK OIL LEVEL IN TANDEM DRIVE CASE, ADD OIL (PAGE 4-52)".