Operation & Maintenance Manual

SEAM052800T

GALEO

GD655-3A

MOTOR GRADER

SERIAL NUMBERS GD655-3A-10001 and up

⚠ 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.

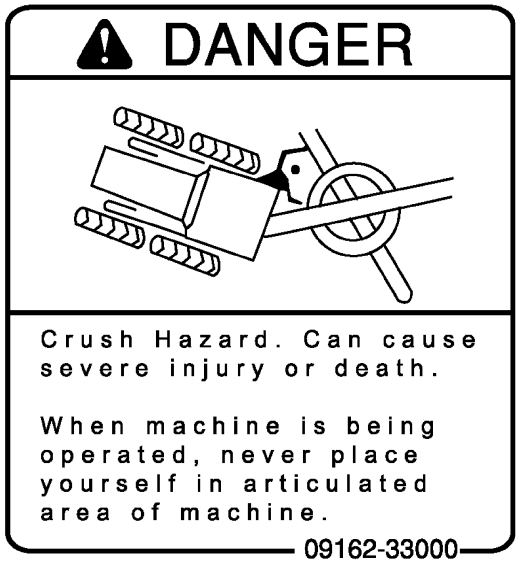
NOTICE

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

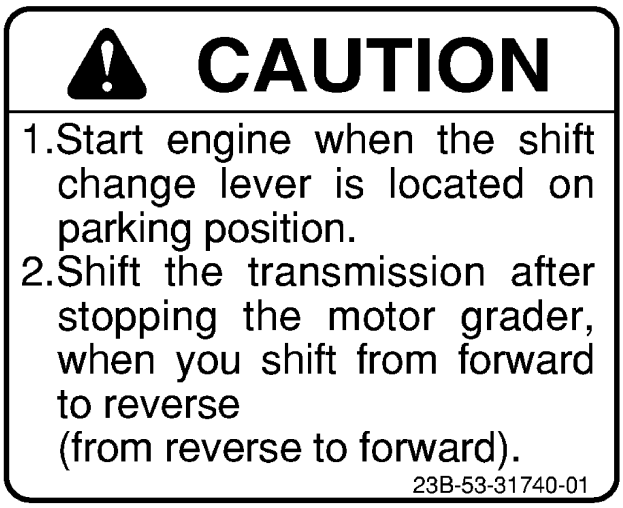
KOMATSU

CONTENTS

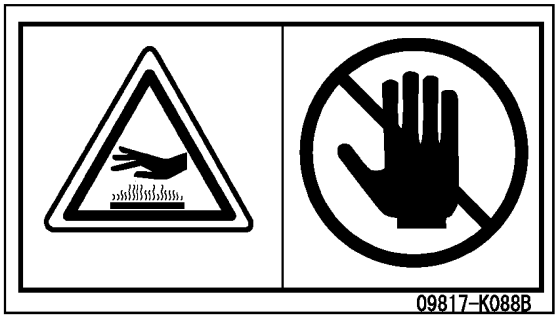
(13) Prohibited to enter
(09162-33000)



(14) Precautions when startling and traveling
(232-53-31740)



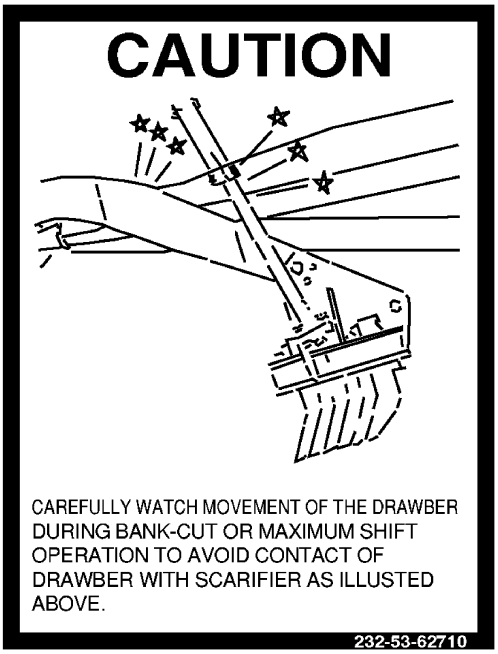
(15) Exhaust pipe is hot !
(09817-K088B)



Sign indicates a burn hazard from touching heated parts, such as engine, motor, or muffler during or right after operation.

Never touch when hot.

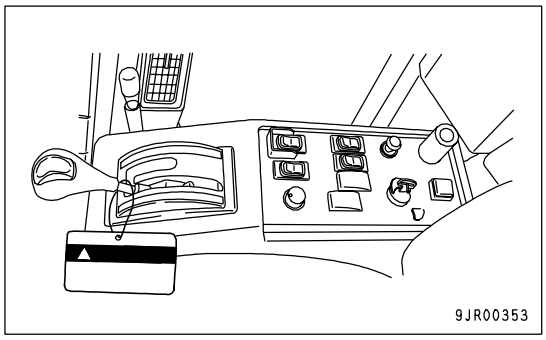
(16) Caution for scarifier (if equipped)
(232-53-62710)



PRECAUTIONS DURING OPERATION

STARTING ENGINE

- If there is a warning tag hanging from gear shift lever, do not start the engine or touch the levers.



CHECKS BEFORE STARTING ENGINE, ADJUST

Carry out the following checks before starting the engine at the beginning of the day's work.

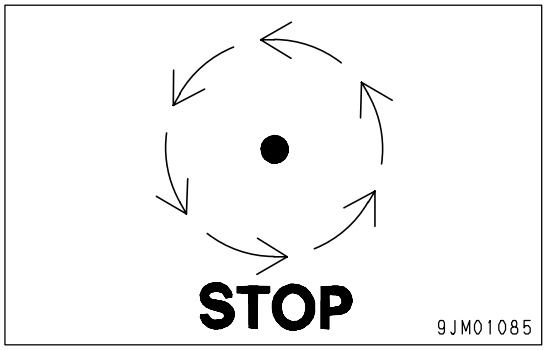
- Remove all dirt from the surface of the window glass to ensure a good view.
- Remove all dirt from the surface of the lens of the front lamps, working lamps, and rear combination lamp, and check that they light up correctly.
- Check the coolant level, fuel level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Check that there is no mud or dust accumulated around the movable parts of the accelerator pedal or brake pedal, and check that the pedals work properly.
- Adjust the operator's seat to a position where it is easy to carry out operations, and check that there is no damage or wear to the seat belt or mounting clamps.
- Check that the gauges work properly, check the angle of the lights and working lamps, and check that the control levers are all at the neutral position.
- Before starting the engine, check that the gearshift lever is at the P (Parking) position.
- Adjust the mirrors so that the rear of the machine can be seen clearly from the operator's seat.
  Refer to "WALK-AROUND CHECK (PAGE 3-32)".
- Check that there are no persons or obstacles above, below, or in the area around the machine.

PRECAUTIONS WHEN STARTING

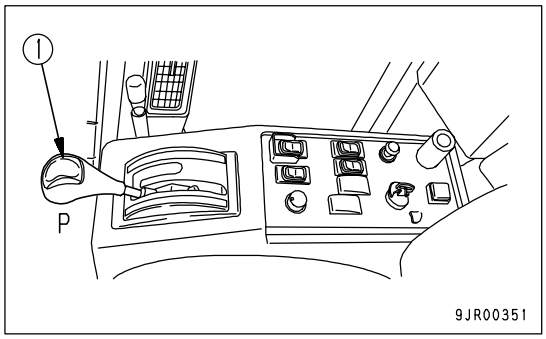
- When starting the engine, sound the horn as a warning.
- Start and operate the machine only while seated.
- Do not allow anyone apart from the operator to ride on the machine.
- Do not short circuit the starting motor circuit to start the engine. Short circuit can cause fire.
- For machines equipped with a back-up alarm, check that the alarm works properly.

STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE

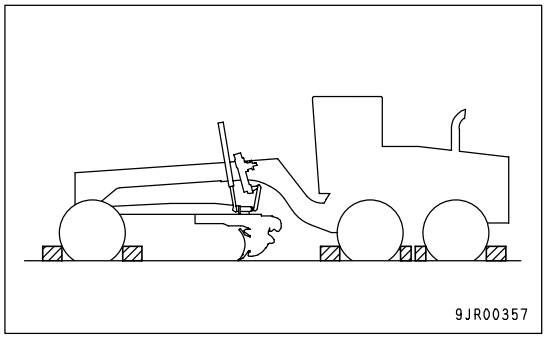
- Stop the machine on firm, level ground.
- Select a place where there is no hazard of falling rocks or landslides, or of flooding if the land is low.
- Lower the work equipment completely to the ground and stop the engine.



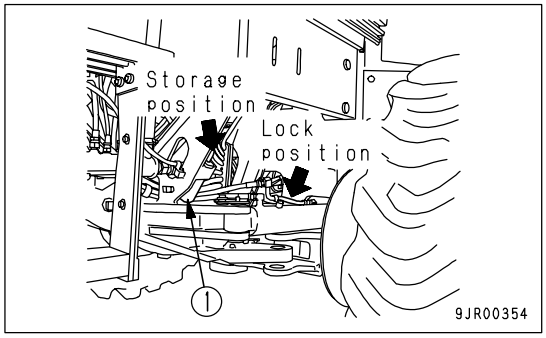
- After stopping the engine, operate the left and right blade lift cylinder control levers fully to the RAISE and LOWER positions 2 or 3 times to release the pressure remaining in the hydraulic circuit, then set gearshift lever (1) to the P (Parking) position.



- Put blocks under the front and rear of the tires.



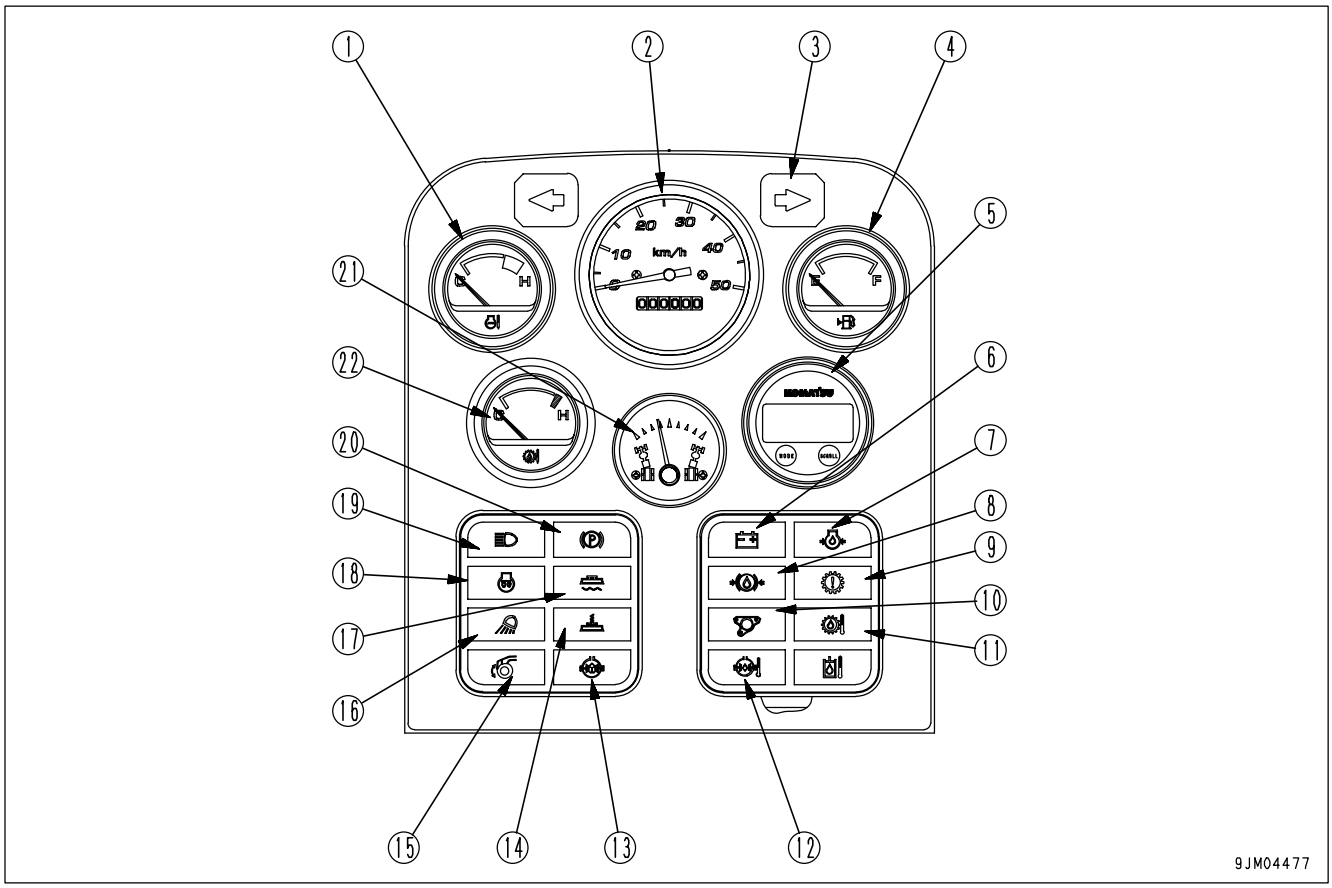
- Lock the frame with articulate lock pin (1) to prevent the machine from articulating.



EXPLANATION OF COMPONENTS

The following is an explanation of the devices needed for operating the machine.
To carry out suitable operations correctly and safely, it is important to understand fully the methods of operating the equipment and the meanings of the displays.

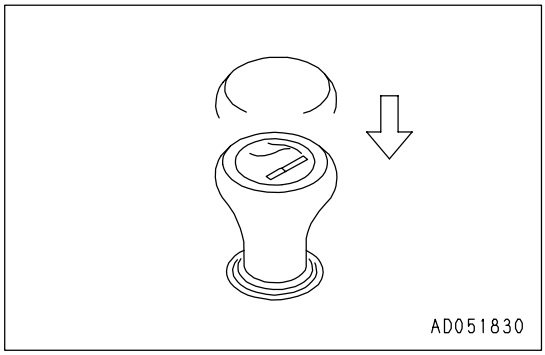
METERS AND LAMPS



(1)Engine water temperature gauge
(2)Speedometer (if equipped)
(3)Turn signal pilot lamp
(4)Fuel gauge
(5)Message center
(6)Battery charge
(7)Engine oil pressure lamp
(8)Brake oil pressure lamp
(9)Transmission system electric circuit monitor
(10)Lift arm lock
(11)Torque converter oil temperature
(12)Differential oil temperature (if equipped)
(13)Differential control (if equipped)
(14)Blade accumulator (if equipped)
(15)AWD (if equipped)
(16)Working lamp (if equipped)
(17)Blade float (if equipped)
(18)Preheating lamp
(19)High beam of front lamp
(20)Parking brake
(21)Articulation gauge
(22)Torque converter oil temperature gauge (if equipped)
(23)Service meter (to the left side of the steering wheel column)

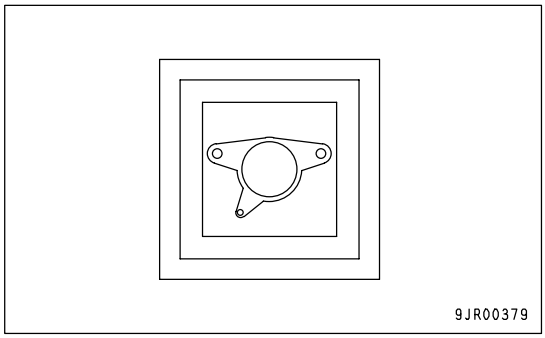
CIGARETTE LIGHTER

This cigarette lighter (7) is used to light cigarettes. When the cigarette lighter is pushed in, it will return to its original position after several seconds, so pull it out and use it to light your cigarette.



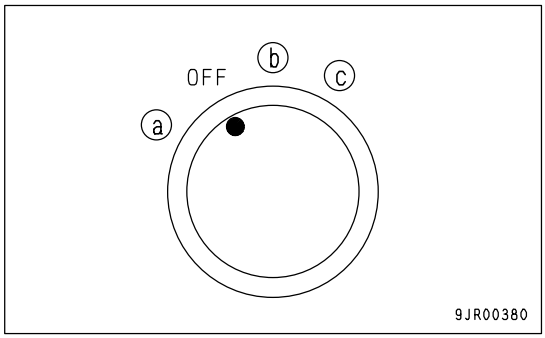
LIFT ARM LOCK SWITCH

This switch (8) 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; press the switch again to return the switch and insert the pin.



FRONT WIPER SWITCH (TOP)

This switch (9) is used to operate the wiper at the top of the front glass.
Position (a): Washer liquid is sprayed out
Position (b): Wiper is operated
Position (c): Wiper is operate and washer liquid is sprayed out



ARTICULATE CONTROL LEVER

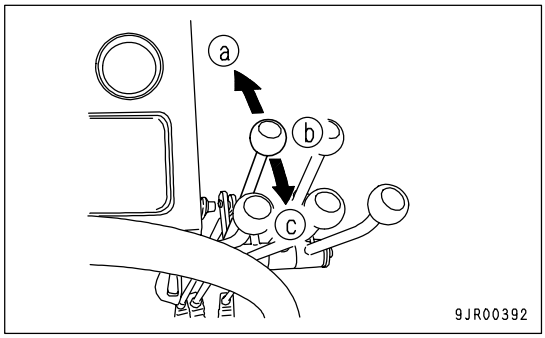
WARNING

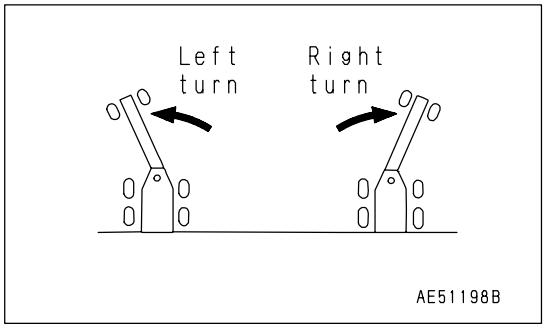
Operate this lever only when traveling at a speed of below 10 km/h (6.2 MPH). If the articulation is operated at a speed of over 10 km/h (6.2 MPH), there is danger that the machine may overturn.

NOTICE

To prevent damage to the tires, be careful not to let the blade hit the tires when articulating the machine.

This lever (6) is used to operate the articulation.
(a)LEFT TURN :
(b)HOLD : The articulation is kept in the same condition.
(c)RIGHT TURN :





FRONT ATTACHMENT LEVER

This lever (7) is used when an optional front attachment is installed.

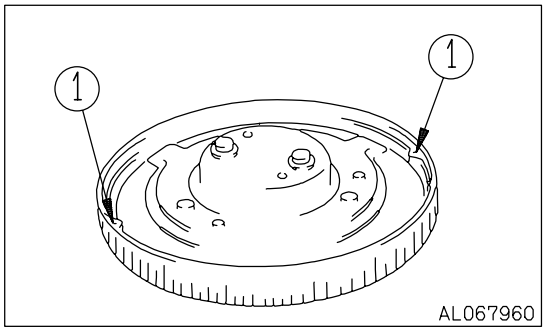
CHECK FUEL LEVEL, ADD FUEL

WARNING

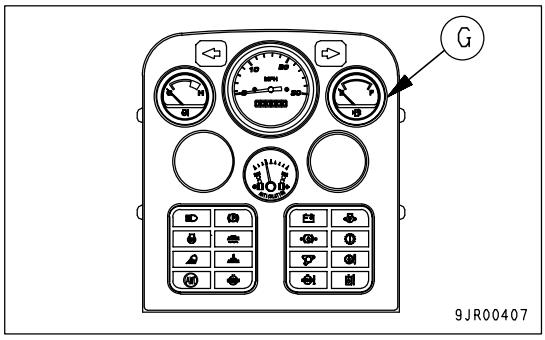
When adding fuel, never let the fuel overflow. This may cause a fire. If any fuel is spilled, wipe it up completely. Never bring flames near fuel because it is highly flammable and dangerous.

NOTICE

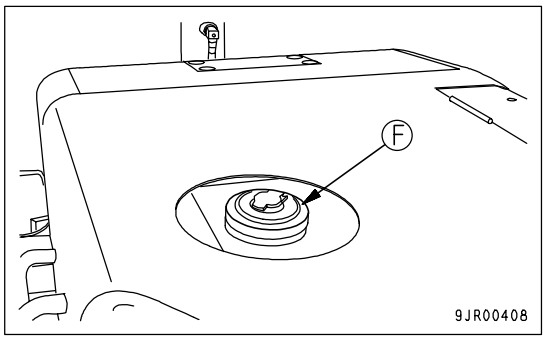
If breather hole (1) in the cap becomes clogged, the pressure inside the tank will go down and the fuel may not flow, so clean the breather hole from time to time.



1. Turn the engine starting switch to the ON position and check the fuel level with fuel level gauge (G).
   After checking, turn the switch back to the OFF position.

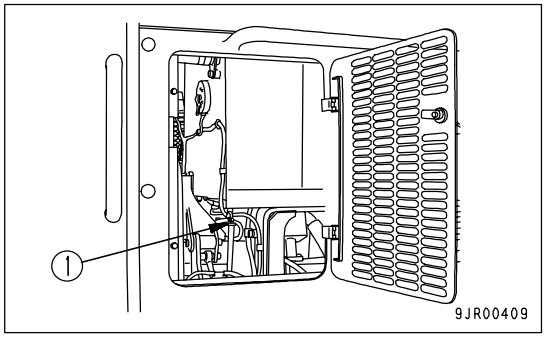


2. After completing work, fill the fuel tank through fuel filler port (F).
3. After adding fuel, tighten the cap securely.
   Fuel capacity : 340 liters (89.76 US gal)

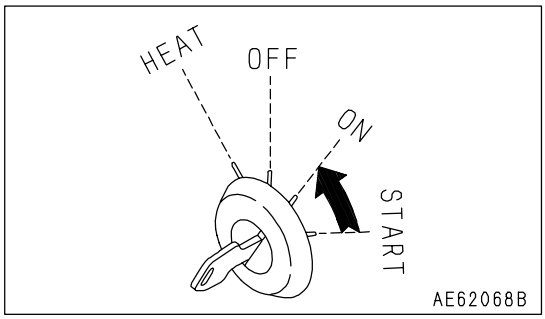


DRAIN WATER AND SEDIMENT IN FUEL TANK

Loosen fuel tank drain valve (1) and drain the sediment and water, accumulated at the bottom, together with fuel.



3. When the engine starts, release the key in starting switch (2). The key will return automatically to the ON position.



STARTING IN COLD WEATHER

⚠ WARNING

- **Check that there are no people or obstacles in the surrounding area, then sound the horn and start the engine.**
- **Never use starting aid fluids as they may cause explosions.**

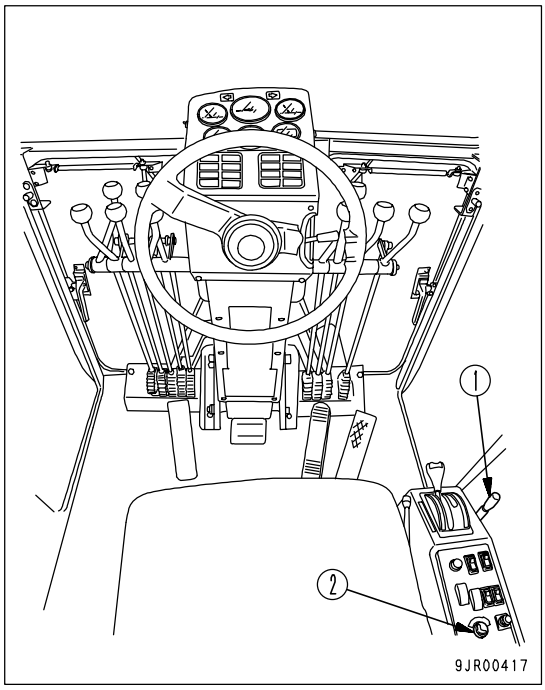
NOTICE

Do not keep the starting motor rotating continuously for more than 20 seconds.

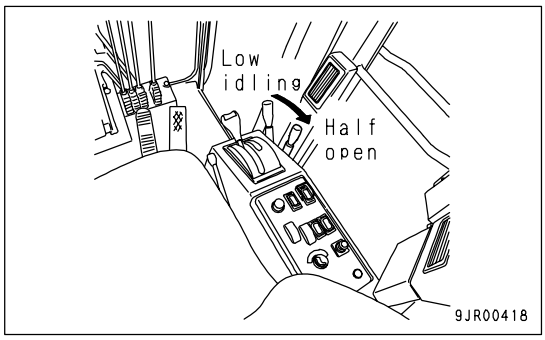
If the engine fails to start, repeat steps 1 - 3 after waiting for about 2 minutes.

Do not start the engine with the fuel control lever and the accelerator pedal depressed to the FULL OPEN position.

When starting is low temperatures, do as follows.



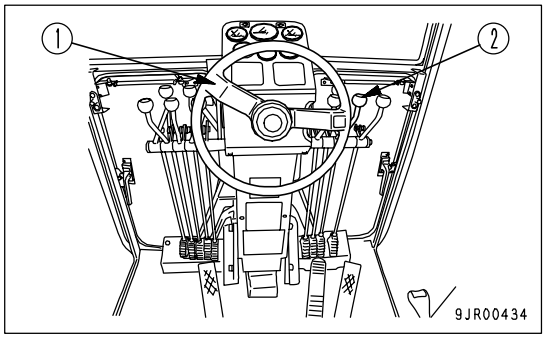
1. Set fuel control lever (1) to the half-open position.



TURNING MACHINE

⚠ WARNING

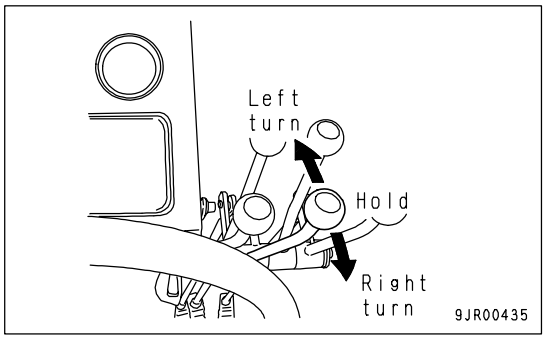
- **It is dangerous to turn the machine suddenly at high speed or to turn the machine on steep slopes.**
- **If the engine stops when the machine is traveling, the steering will become heavy, so never stop the engine.**
  This is particularly dangerous on slopes, so never allow the engine to stop while traveling on slopes under any circumstance.
  If the engine stops, immediately apply the brake and stop the machine in a safe place.

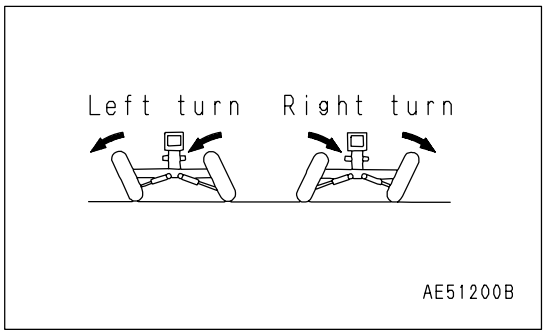


To turn the machine when traveling, turn steering wheel (1) in the direction of the turn.

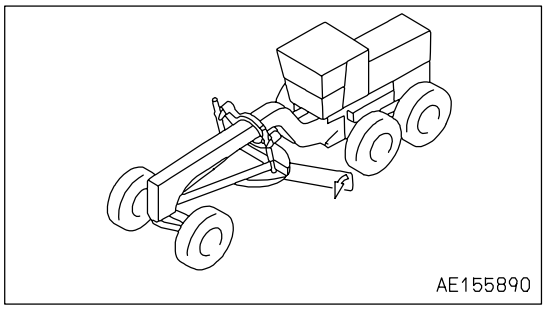
LEANING OPERATION

Operate leaning control lever (2) to change the angle of the front tires as follows.
Pull BACK to lean to RIGHT.
Push FORWARD to lean to LEFT.
When traveling forward and turning the machine, the radius of the turn becomes smaller if the tires are leaned in the direction of the turn.
When traveling in reverse and turning the machine, the radius of the turn becomes smaller if the tires are leaned in the opposite direction to the turn.





6. Operate the power tilt so that the top of the blade is slightly in front of the cutting edge, then start operation.
7. Discharge the soil to the side to prevent any excessive load from bearing on the machine.



8. Spread fine crushed loose soil over the ground surface until it is level.

REMARK

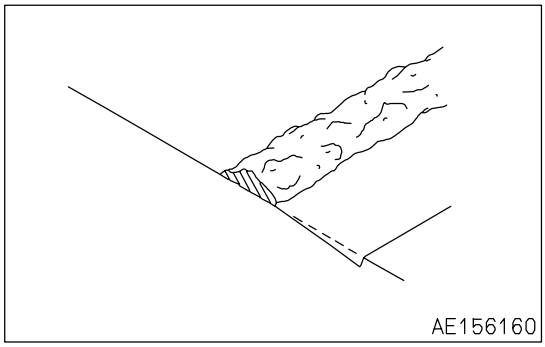
- Generally speaking, carry out operations on flat ground with the frame straight to the blade. Articulate the frame to deal with the force in the side direction caused by the load on the blade.
- If the tires start to spin, turn the blade to a greater angle to reduce the digging width, thereby reducing the load on the machine.
- In leveling operations, discharge the soil outside the rear wheels. This makes it easier to steer with the rear wheels.

CONSTRUCTING ROAD - METHOD OF MAKING V-DITCH

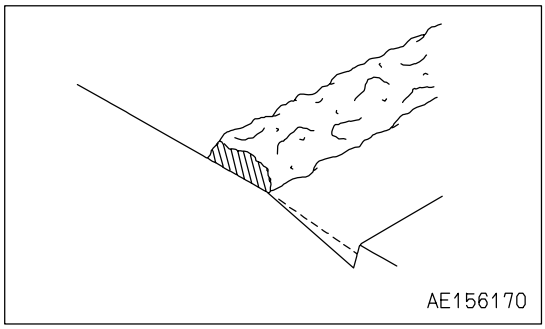
The procedure shown in the diagrams is for one side of the road. Repeat the same operation on the opposite side of the road.

When carrying out Steps 4 and 7, articulate the frame.

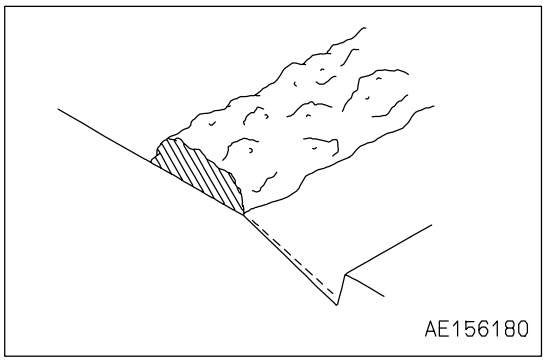
1. Line of ditch: Light-duty digging
   - Determine the line of the ditch along the measured points.
     Depth: approx. 50 mm (2.0 in)
     Travel speed: approx. 2 km/h (1.2 MPH)



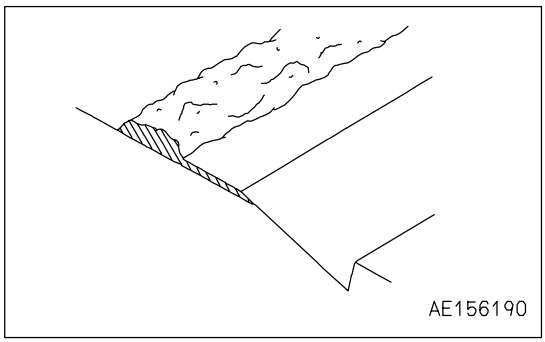
2. Second digging pass: Heavy-duty digging



3. Third digging pass: Heavy-duty digging



4. Finishing road shoulder



PRECAUTIONS WHEN OPERATION

PRECAUTIONS WHEN TRAVELING UPHILL OR DOWNHILL

⚠ WARNING

- **Never shift gear or place the transmission in neutral when traveling on a slope. It is dangerous to do this, as the engine cannot be used to brake the machine. Always place the transmission in the appropriate speed range before starting to travel down a hill.**
- **To prevent overrun, always shift down one gear at time.**

TRAVELING DOWNHILL

When traveling downhill, use the same speed range as when traveling uphill, and make full use of the braking force of the engine.
If the machine travel speed is still too fast, use the foot brake.

REMARK

If there is danger of overrunning, a short warning will be sounded and the transmission will automatically shift up to the next speed range, but this does not indicate any abnormality. When the travel speed is reduced, the transmission will automatically return to the speed range set by the gearshift lever.

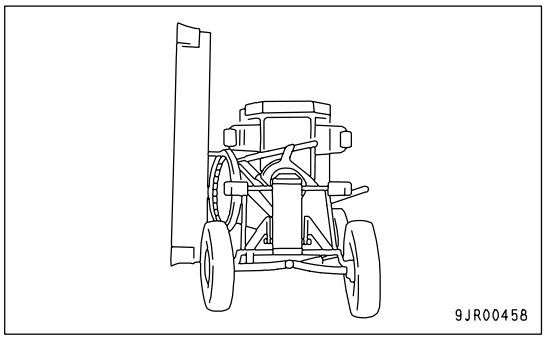
IF ENGINE STOPS

⚠ CAUTION

If the engine stops, the brake booster will not work, so the operating effort of the pedal will become heavier and the effect of the brake will become lower, even when the pedal is depressed with the same force.

If the engine stops on a slope, immediately depress the brake pedal fully to stop the machine, set the gearshift lever to the P (Parking) position, then start the engine again.

4. Retract the right lift cylinder and extend the left lift cylinder repeatedly, then raise the blade and rotate it to the right side of the machine to set the blade to the bank cut position.
   When setting to the bank cut posture on the left side, use the same procedure as above, but in the opposite direction.



REMARK

The banking performance can be improved by changing the mounting position of the piston rod of the blade side shift cylinder to the left for right side banking and to the right for left side banking.

LONG-TERM STORAGE

BEFORE STORAGE

When putting the machine in storage for a long time, do as follows.

- After every part is washed and dried, house the machine in a dry building. Never leave it outdoors.
  In case it is indispensable to leave it outdoors, park the machine on the flat ground and cover it with canvas etc.
- Completely fill the fuel tank, lubricate and change the oil before storage.
- Apply a thin coat of grease to the metal surface of the hydraulic piston rods.
- Disconnect the negative terminals of the battery and cover it or remove it from the machine and store it separately.
- If the ambient temperature is expected to drop below 0ºC, always add antifreeze to the cooling water.
  Komatsu genuine Super Coolant (AF-ACL) is added to the cooling water, so there is no need to change the density for temperatures down to -10ºC.
  If the temperature goes below -10ºC, adjust the density. For details, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-17)".
- Place gear shift levers at the P (parking) position.
- Fit a block under the center of the front wheel and the tandem case, jack up the tires from the ground, then put a block under the blade and lower it on top of the block.

DURING STORAGE

⚠ WARNING

If it is unavoidably necessary to carry out the rust-preventive operation while the machine is indoors, open the doors and windows to improve ventilation and prevent gas poisoning.

Operate the engine and move the machine for a short distance once a month so that a new film of oil will be coated over movable parts and component surfaces. At the same time, also charge the battery.
Before operating the work equipment, wipe off the grease on the hydraulic piston rod.

AFTER STORAGE

NOTICE

If the machine is to be used when the monthly rust prevention operation has not been carried out, please contact your Komatsu distributor.

When using the machine after long-term storage, do as follows before using it.

- Wipe off the grease from the hydraulic cylinder rods.
- Add oil and grease to all places.

ENGINE

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
After warming-up operation, engine oil pressure monitor lights up even when engine speed is raised	• Oil level in engine oil pan is low (sucking in air)	• Add oil to specified level. For details, see CHECK BEFORE STARTING.
	• Clogged oil filter element	• Replace element. For details, see EVERY 250 HOURS SERVICE.
	• Leakage of oil due to damage, defective tightening of oil pipe, pipe joint	(• Check, repair)
	• Defective monitor	(• Replace)
	• Defective oil pressure switch	(• Replace)
	• Diluted with fuel, water	(• Check, repair)
	• Defective pressure adjustment valve	(• Check valve, replace spring)
Steam spurts out from top of radiator sub-tank (pressure valve)	• Coolant level is low	• Check, add cooling water, repair cooling system. For details, see WHEN REQUIRED.
	• Loose fan belt	• Adjust tension. For details, see EVERY 250 HOURS SERVICE.
	• Dirt or scale accumulated in cooling system	• Change cooling water, clean cooling system. For details, see WHEN REQUIRED.
	• Radiator fins clogged or bent	• Clean or repair. For details, see EVERY 500 HOURS SERVICE.
Water temperature gauge is in top of red range	• Defective thermostat	(• Replace thermostat)
	• Loose radiator filler cap (high altitude operations)	• Tighten cap or replace packing
	• Defective water temperature gauge	(• Replace)
	• Broken shroud or not installed	(• Check, repair, install)
	• Defective pressure cap	• Replace
	• Excessive load	(• Check brake, check defective return of parking brake)
After warming-up operation, water temperature gauge does not work even when engine speed is raised	• Defective thermostat	(• Replace thermostat)
	• Defective water temperature gauge	(• Replace water temperature gauge)

WEAR PARTS

Wear parts such as the filter element, air cleaner element, edge, etc. are to be replaced at the time of periodic maintenance or before their abrasion limits.
The wear parts should be changed correctly in order to use the machine economically.
For part change, Komatsu genuine parts of excellent quality should be used.
When ordering parts, please check the part number in the parts book.

WEAR PARTS LIST

The parts in parentheses are to be replaced at the same time.

Item	Part No.	Part Name	Q'ty	Replacement interval
Engine oil filter	6742-01-4540	Cartridge	1	Every 250 hours
Corrosion resister	6742-01-3980	Cartridge	1	Every 250 hours
Fuel filter	6732-71-6111	Cartridge	1	Every 500 hours
Water separator filter	6732-71-6120	Cartridge	1	Every 500 hours
Transmission oil filter	714-07-28711	Cartridge	1	Every 1000 hours
Hydraulic filter	07063-51100 (07000-15155)	Element (O-ring)	1 (1)	Every 1000 hours
Air cleaner	600-185-5100	Element ass'y	1	—
Blade	23B-70-31310 23B-70-31660 (232-70-12550) 232-70-31340 (232-70-12560) 23B-70-31331 23B-735-3320 23B-70-31630 23B-70-51560 234-71-13443	Edge Side edge (Bolt) End bit Bolt Guide bushing Guide bushing Wear plate Wear piece Shear pin	2 2 (34) 2 (10) 4 1 6 6 1	—
Electrical heater	6742-01-0840	Gasket	1	—
Scarifier	232-71-51320	Tooth	11	—
Ripper	234-785-1121 (113-78-21170)	Tooth (Pin)	3 (3)	—

WHEN REQUIRED

CLEAN INSIDE OF COOLING SYSTEM

⚠ WARNING

- **Immediately after the engine is stopped, the coolant is at a high temperature and the radiator is under high internal pressure. If the cap is removed to drain the coolant in this condition, there is a danger of burns. Wait for the temperature to go down, then turn the cap slowly to release the pressure before removing it.**
- **The cleaning is carried out with the engine running. When standing up or leaving the operator's seat, set the gearshift lever to the P (Parking) position.**
- **For details of starting the engine, see "CHECK BEFORE STARTING ENGINE (PAGE 3-32)", "STARTING ENGINE (PAGE 3-44)" in the OPERATION section.**
- **There is danger of touching the fan if the undercover is left removed.**
  Never enter the area behind the machine when the engine is running.

Clean the inside of the cooling system, change the coolant and replace the corrosion resistor according to the table below.

Kind of coolant	Cleaning inside of cooling system and changing coolant	Replacing corrosion resistor
Permanent type antifreeze (All season type)	Every year (autumn) or every 2000 hours, whichever comes first	Every 250 hours and when cleaning the inside of the cooling system and when changine coolant.
Nom-permanent type antifreeze containing ethylene glycol (winter, one season type)	Every 6 months (spring, autumn) (Drain antifreeze in spring, add antifreeze in autumn)	
When not using antifreeze	Every 6 months or every 1000 hours, whichever comes first	

Stop the machine on level ground when cleaning or changing the coolant.
Use a permanent type of antifreeze.
If, for some reason, it is impossible to use permanent type antifreeze, use an antifreeze containing ethylene glycol.
Super Coolant (AF-ACL) has an anti-corrosion effect as well as an antifreeze effect.
The ratio of antifreeze to water depends on the ambient temperature, but to obtain the corrosion resistance effect, a minimum ratio of 30% by volume is necessary.
When deciding the ratio of antifreeze to water, check the lowest temperature in the past, and decide from the mixing rate table given below.
It is actually better to estimate a temperature about 10°C (50°F) lower when deciding the mixing rate.

Mixing rate of water and antifreeze

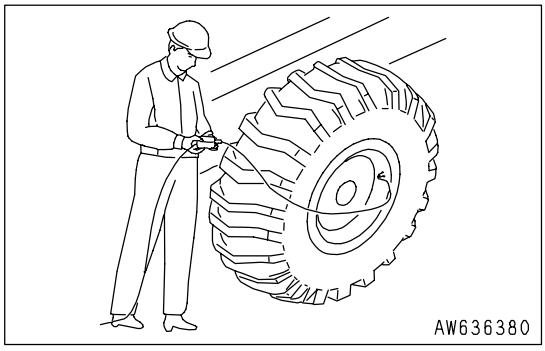
Min. ambient temperature	˚C	- 10	- 15	- 20	- 25	- 30
	°F	14	5	- 4	- 13	- 22
Amount of antifreeze	Liters	13	16	18	20	22
	US gal	3.43	4.23	4.76	528	5.81
Amount of water	Liters	31	28	26	24	22
	US gal	8.19	7.39	6.86	6.34	5.81

CHECK OF INFLATION PRESSURE OF TIRES AND INFLATION OF THEM

⚠ WARNING

When inflating a tire, check that no one will enter the working area. Use an air chuck which has a clip and which can be fixed to the air valve.

- **While inflating the tire, check the inflation pressure occasionally so that it will not rise too high.**
- **If the rim is not fitted normally, it may be broken and scattered while the tire is inflated. To ensure safety, place a guard around the tire and do not work in front of the rim but work on the tread side of the tire.**
- **Abnormal drop of inflation pressure and abnormal fitting of the rim indicate trouble in the tire or rim. In this case, be sure to ask a tire repair shop to carry out repairs.**
- **Be sure to observe the specified inflation pressure.**
- **Do not adjust the inflation pressure of the tires just after high-speed travel or heavy-duty work.**



Check

Measure the inflation pressure with a tire pressure gauge while the tires are cool before starting work.

Inflation of tires

Adjust the inflation pressure properly.

When inflating a tire, use an air chuck which can be fixed to the air valve of the tire as shown in the figure. Do not work in front of the rim but work on the tread side of the tire.

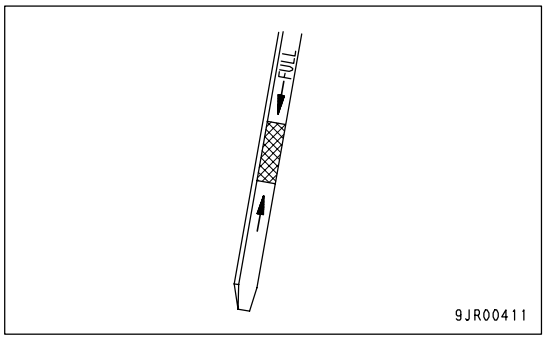
The proper inflation pressure is shown below.

Tire size	Inflation pressure kPa (kgf/cm^2, PSI)
14.00-24-10PR	250 (2.55, 36)
14.00-24-12PR	275 (2.80, 40)
14.00R24TG☆	300 (3.06, 44)
17.5-25-12PR	250 (2.55, 36)
17.5R24TG☆	250 (2.55, 36)

NOTICE

The optimum inflation pressure differs according to the type of work. For details, see "HANDLING THE TIRES (PAGE 3-101)" .

9. After replacing the filter cartridge, add engine oil through oil filler (F) until the oil level is between the marks on the dipstick (G).
10. Run the engine at idling for a short time, then stop the engine, and check that the oil level is between the marks on the dipstick. For details, see "CHECK ENGINE OIL PAN LEVEL, ADD OIL (PAGE 3-36)".

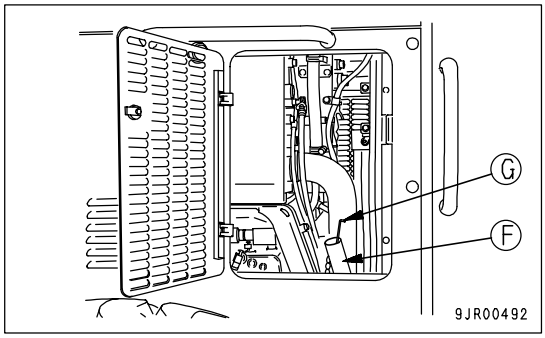


CHECK OIL LEVEL IN TRANSMISSION CASE, ADD OIL

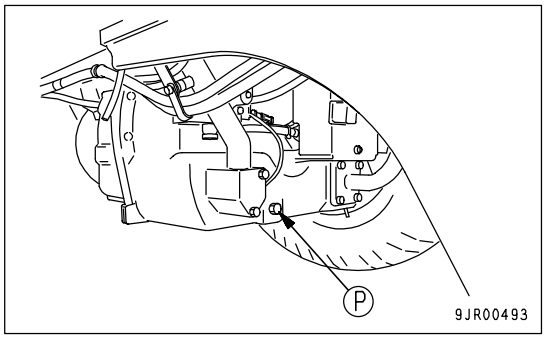
⚠ WARNING

- **The parts and oil are at high temperature after the engine is stopped. Wait for the temperature to go down before starting the operation.**
- **Before starting inspection, to prevent the machine from moving, set the gearshift lever to the P (Parking) position, and check that all the levers are at the neutral position.**
- **After starting the engine, run at idling for at least 5 minutes to make the oil level stable, then carry out the inspection.**

1. Start the engine and run at low idling. Remove the transmission case oil filler cap, then leave in this condition for at least 5 minutes.
2. Remove dipstick (G) from oil filler port (F), then wipe the oil off with a cloth.
3. Insert dipstick (G) fully in the oil filler pipe, then take it out again.
4. Check that the oil is between the marks on dipstick (G).
   If the oil is below the bottom mark, add engine oil through oil filler port (F).



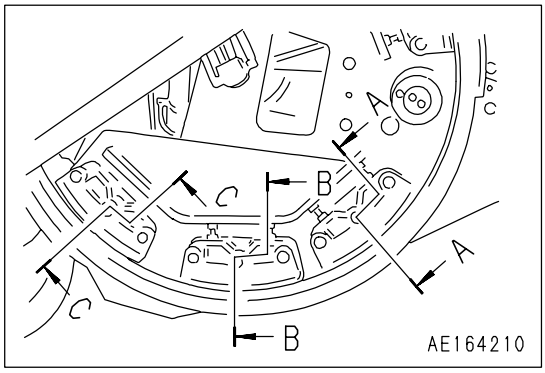
5. If the oil is above the top mark, drain the excess oil from drain plug (P), then check the oil level again.
6. If the oil level is correct, insert dipstick (G) in the oil filler guide, then install the oil filler cap.

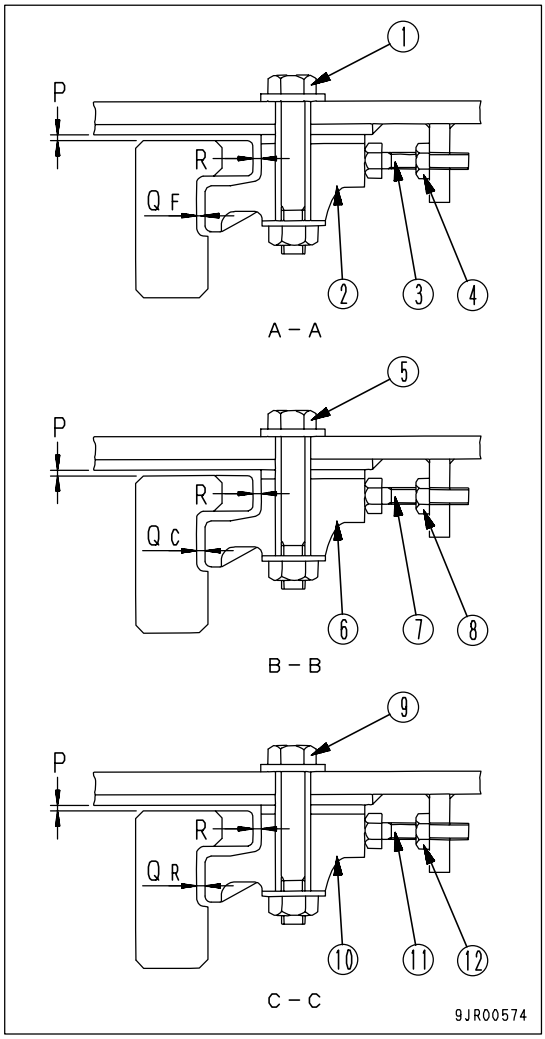


ADJUSTING

Adjusting top and bottom position

1. Raise the blade, remove bolts (1), (5), and (9) for clearance (P), remove circle guides (2), (6), and (10), then adjust the shim thickness. (Shim thickness: 1 mm (0.039 in), 0.5 mm (0.020 in); 2 types)





CHECK DISC BRAKE

⚠ WARNING

A small amount of oil will come out from the inspection plug hole, so do not look through the plug hole when the brake is applied.

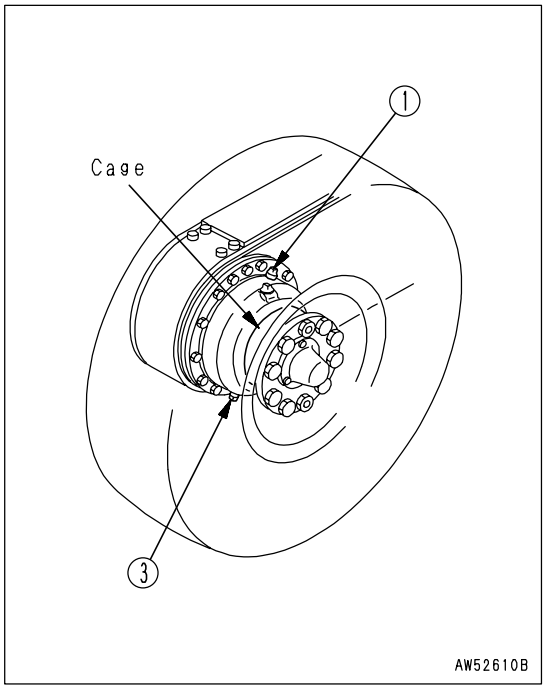
PERIODICAL REPLACEMENT OF DISC BRAKE

Inspection: Every 12 months or 2000 hours.

Disassembly: If the disc brake has reached the wear limit or there is any abnormality in the brake system, judge if it is necessary to carry out disassembly or maintenance.

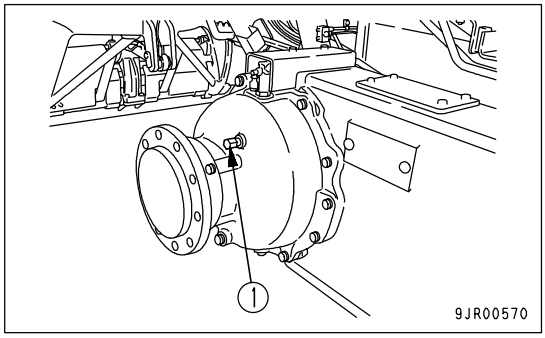
METHOD OF INSPECTING PISTON SEAL FUNCTION

1. Remove drain plug (3) from the cage, and measure the amount of oil that leaks out from the piston chamber.
2. Depress the brake pedal and keep the brake applied.
3. If the amount of oil leaking is more than 20 cc, disassemble and replace the seal.



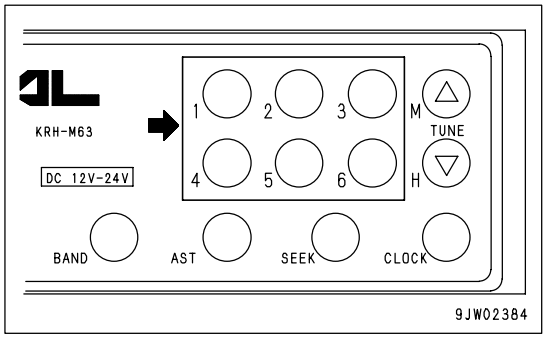
METHOD OF CHECKING BRAKE DISC WEAR

1. Remove cap (1) from the wear indicator.
2. Depress the brake pedal and keep the brake applied.



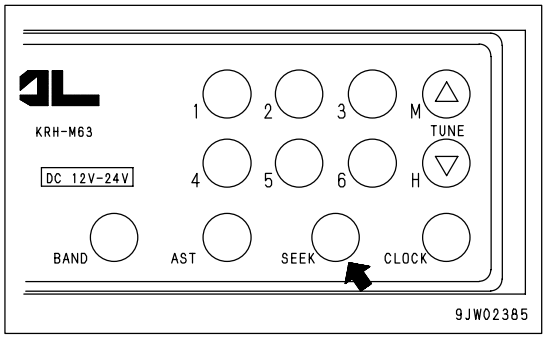
PRESET SWITCH

With this switch (6), each button can be set to one station each for FM and MW (AM). (For details of the method of resetting, see "METHOD OF PRESET (PAGE 6-8)".)



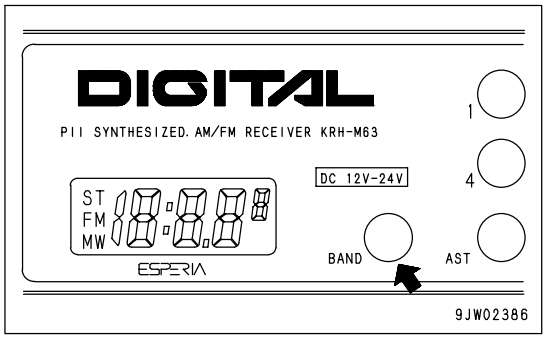
SEEK

When this switch (7) ("SEEK") is pressed, it automatically searches for stations that can be received, and when it receives a station, it stops.



BAND SELECTOR SWITCH

When this switch (8) ("BAND") is pressed, the band is switched between FM and MW (AM).
The reception band and frequency are displayed on the display.



TUNING SWITCH

When the "TUNE" button △ of switch (9) is pressed, the frequency goes up; when the ▽ button is pressed, the frequency goes down. If it is kept pressed, the frequency changes continuously.