TEN00066-02

Operation & Maintenance Manual

GALEO

WA700-3

WHEEL LOADER

SERIAL NUMBERS WA700-3 51005 and up

January 2007

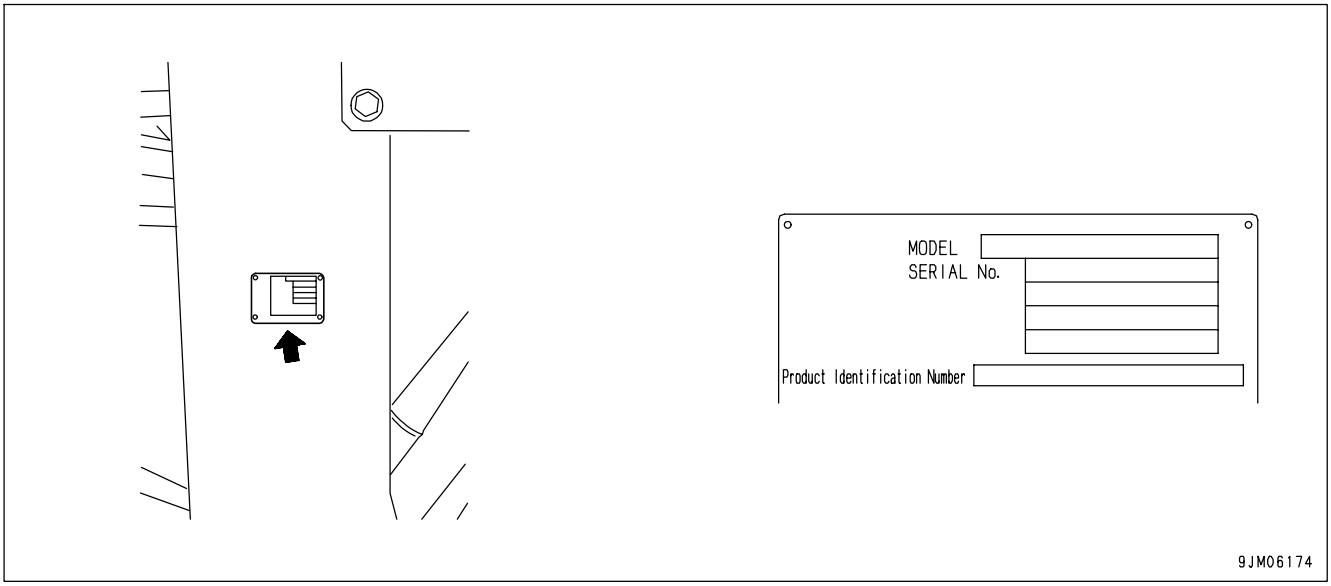
NECESSARY INFORMATION

When requesting service or ordering replacement parts, please inform your Komatsu distributor of the following items.

PRODUCT IDENTIFICATION NUMBER (PIN)/MACHINE SERIAL NO. PLATE

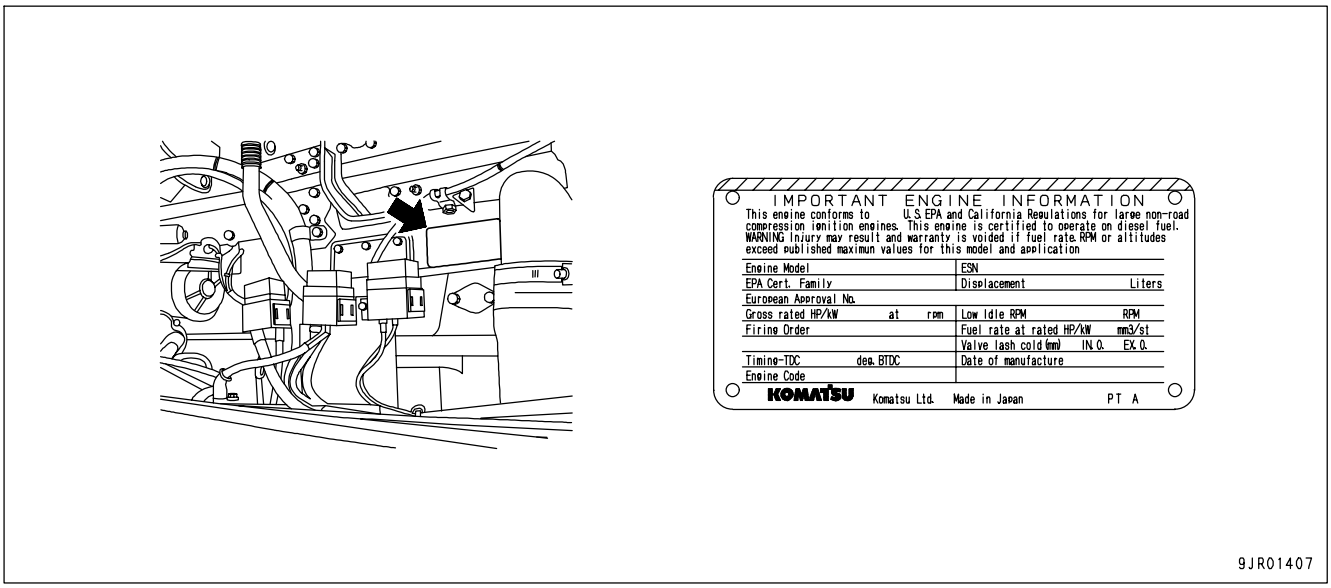
On the center right of the front frame.

The design of the nameplate differs according to the territory.

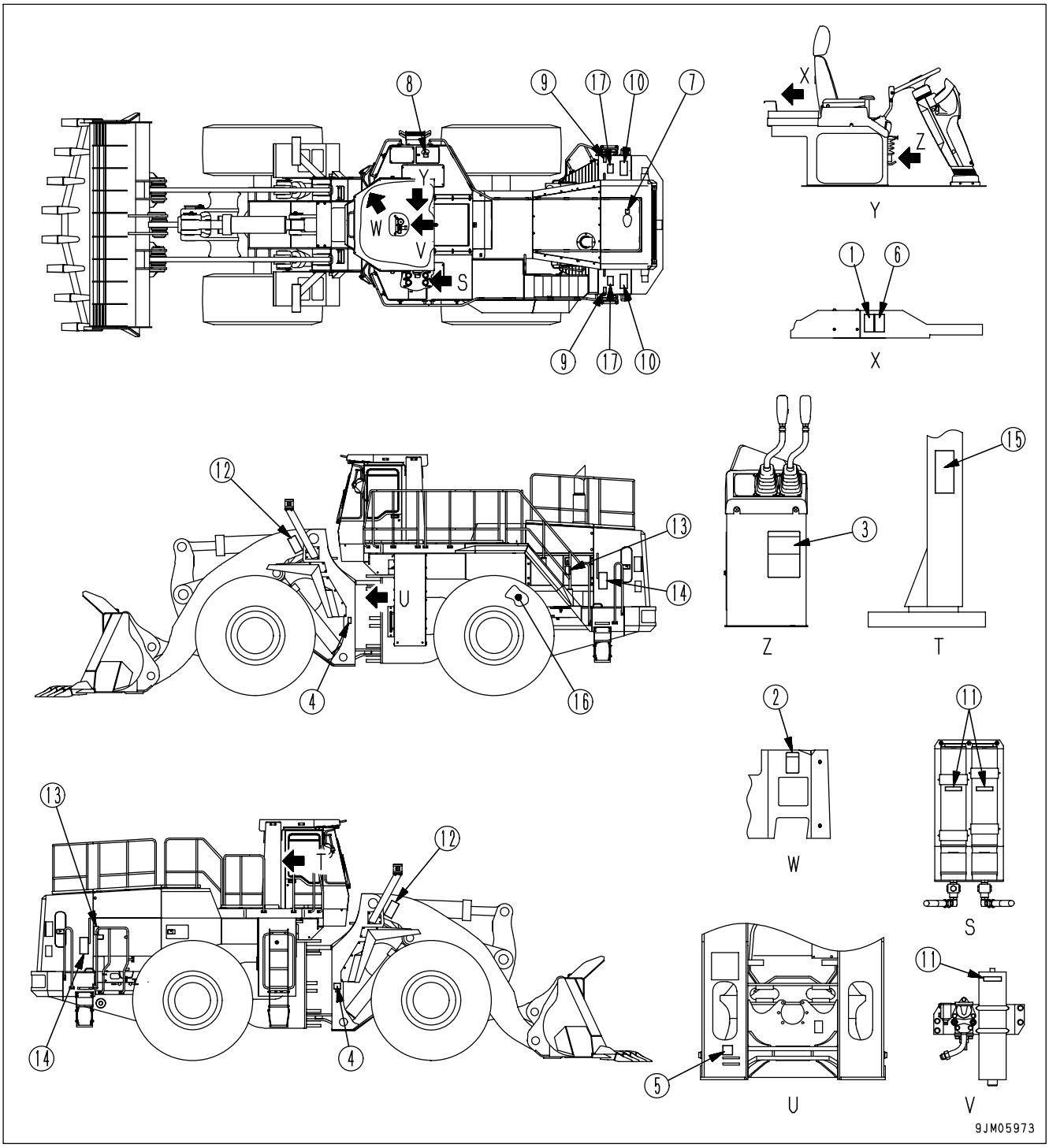


ENGINE SERIAL NO. PLATE AND POSITION

On the upper left of the cylinder block, when seen from the fan side.

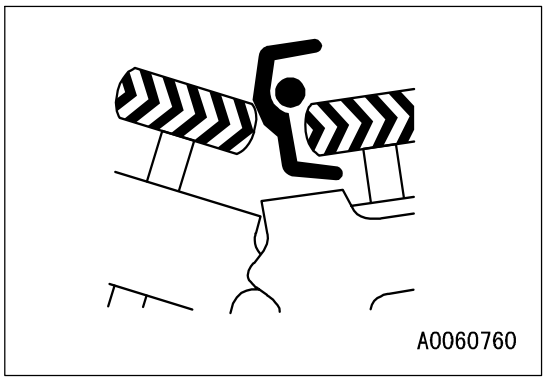


LOCATION OF SAFETY LABELS



DO NOT GET CAUGHT IN ARTICULATED PORTION

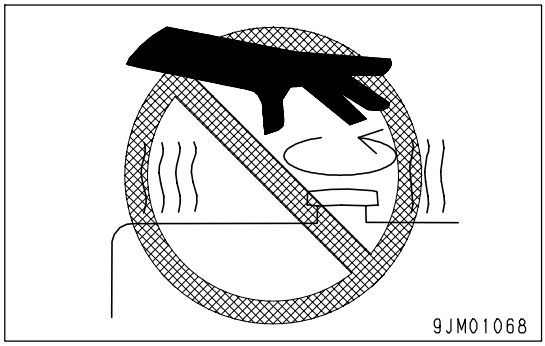
- If the clearance at the articulating portion changes, it will lead to serious personal injury.
  Do not allow anyone to come inside the articulation range.
- The clearance in the area around the work equipment changes according to the movement of the link. If you get caught, it will lead to serious injury. Do not allow anyone near any of the rotating or telescoping parts.



PREVENTION OF BURNS

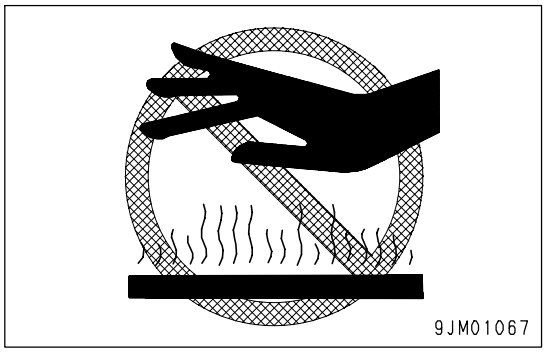
Hot coolant

- To prevent burns from hot water or steam spurting out when checking or draining the coolant, wait for the water to cool to a temperature where it is possible to touch the radiator cap by hand before starting the operation. Even when the coolant has cooled down, loosen the cap slowly to relieve the pressure inside the radiator before removing the cap.



Hot oil

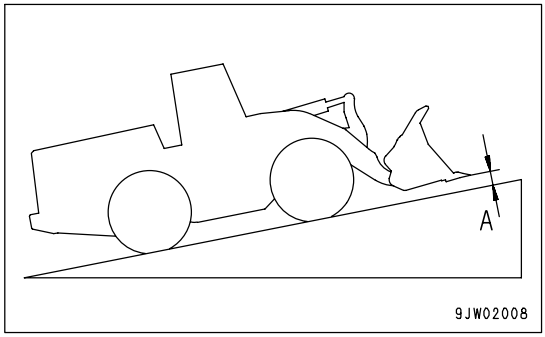
- To prevent burns from hot oil spurting out when checking or draining the oil, wait for the oil to cool to at temperature where it is possible to touch the cap or plug by hand before starting the operation. Even when the oil has cooled down, loosen the cap or plug slowly to relieve the internal pressure before removing the cap or plug.

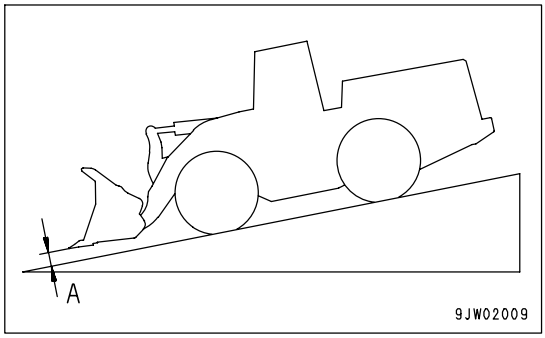


TRAVELING ON SLOPES

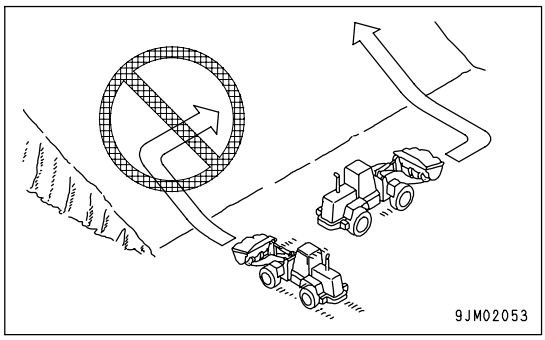
To prevent the machine from tipping over or slipping to the side, always do as follows.

- When traveling on slopes, keep the bucket at height "A" of approximately 72 to 85 cm (28.3 to 33.5 in) above the ground. In case of emergency, quickly lower the bucket to the ground to help the machine to stop.





- Always travel straight up or down a slope. Traveling at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or travel across slopes. Always go down to a flat place to change the position of the machine, then travel on to the slope again.

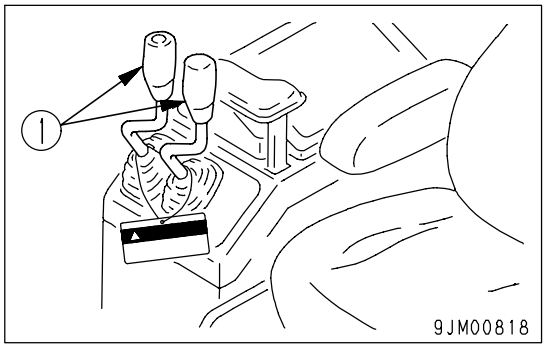


- Travel on grass, fallen leaves, or wet steel plates with low speed. Even with slight slopes there is a hazard that the machine may slip.
- If the engine stops, depress the brake pedal immediately, lower the bucket to the ground, and apply the parking brake to stop the machine.
- When traveling downhill, never shift gear or place the transmission at neutral. It is dangerous not to use the braking force of the engine. Always place the transmission in a low gear before starting to travel downhill.
- When traveling downhill, travel slowly. If necessary, use the braking force of the engine together with the brake pedal to control the travel speed.
- When traveling up or down hills with a loaded bucket, always travel with the bucket facing uphill. If the machine travels with the bucket facing downhill, there is danger that the machine may tip over.

PRECAUTIONS FOR MAINTENANCE

WARNING TAG

- Always attach the "DO NOT OPERATE" warning tag to work equipment control lever (1) in the operator's cab to alert others that you are performing service of maintenance on the machine. Attach additional warning tags around the machine if necessary.



- Warning tag Part No.09963-03001
  Keep this warning tag in the tool box while it is not used. If there is not the tool box, keep the tag in the operation manual pocket.

- If others start the engine, or touch or operate the work equipment control lever while you are performing service or maintenance, you could suffer serious injury or property damage.

KEEP WORK PLACE CLEAN AND TIDY

Do not leave hammers or other tools lying around in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean the tidy to enable you to carry out operations safely. If the work place is not kept claen and tidy, there is the danger that you will trip, slip, or fall over and injure yourself.

APPOINT LEADER WHEN WORKING WITH OTHERS

When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his instructions during the operation.
When working with others, misunderstandings between workers can lead to serious accidents.

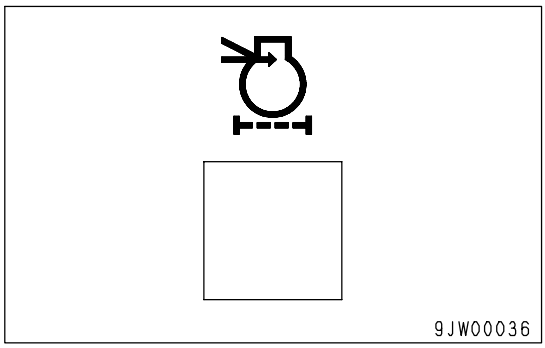
OPERATION

⚠ WARNING

Please read and make sure that you understand the SAFETY section before reading this section.

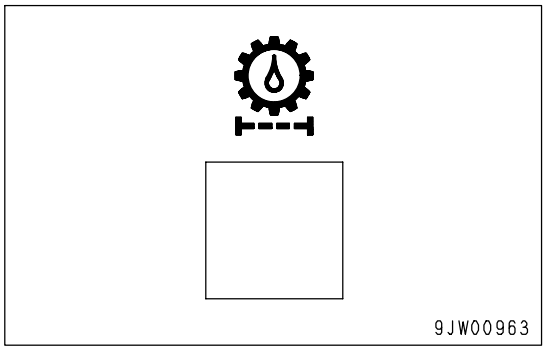
AIR CLEANER CLOGGING CAUTION PILOT LAMP

When the engine is running, this lamp (8) warns the operator that the air cleaner element is clogged.
Check before starting: OFF
When operating:
If the air cleaner becomes clogged, the caution pilot lamp and central CHECK lamp will flash.
If they flash, clean or replace the element.



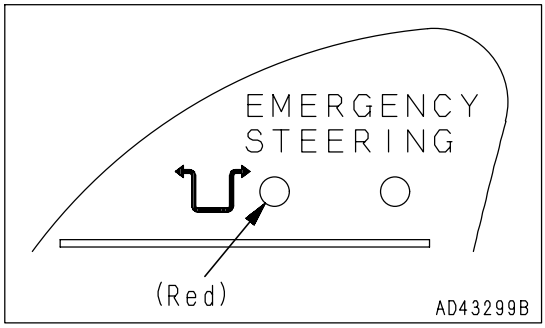
TRANSMISSION OIL FILTER PILOT LAMP

This lamp (9) warns the operator that the transmission oil filter is clogged.
If this lamp flashes, replace the filter element.



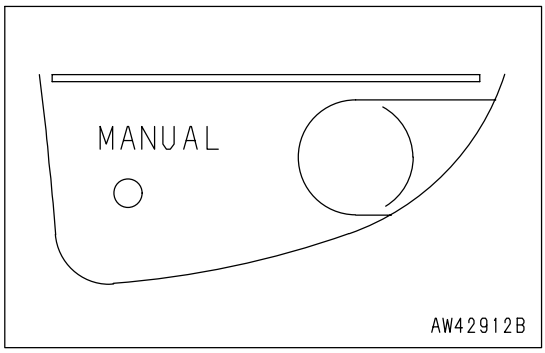
EMERGENCY STEERING PILOT LAMP

(If equipped)
This lamp (10) indicates that the engine has stopped when the machine is traveling, or there is any abnormality in the pump circuit.
The monitor flashes (red) to indicate that the emergency steering system has been actuated. If the monitor flashes, stop the engine immediately.
The emergency steering does not work when the machine is stopped.
When the starting switch is turned ON, the emergency steering pilot lamp (red) flashes.
If the pilot lamp does not flash, it indicates that there is an abnormality, so please ask your Komatsu distributor to carry out repairs.
Do not operate the machine until the problem has been removed.



TRANSMISSION AUTO SHIFT/MANUAL SELECTOR SWITCH

Press this push button switch (5) to turn ON or OFF.
If the switch is pressed once, the pilot lamp lights up and the system is turned ON; if the switch is pressed again, the pilot lamp goes out and the system is turned OFF.
Normally, set it to the OFF position.



OFF: System is set to auto shift
The transmission shifts automatically according to the travel speed. The maximum speed range selected for automatic shifting is displayed by the 1st, 2nd, 3rd, or 4th indicator lamps at the bottom of the main monitor.

ON: System is set to manual shift
Use the shift up and shift down switches to select the speed range when traveling.
The 1st, 2nd, 3rd, and 4th indicator lamps go out.

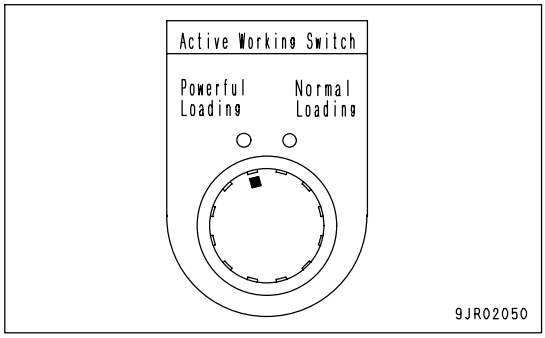
When the switch is set to the ON position, the transmission auto shift/manual selector pilot lamp lights up.

REMARK

- The speed range after turning the starting switch to the ON position is the final speed range selected by the previous operation.
- If the system is shifted from auto shift to manual shift, or from manual shift to auto shift when the machine is stopped, the speed range is automatically set to 2nd.

ACTIVE WORKING SWITCH

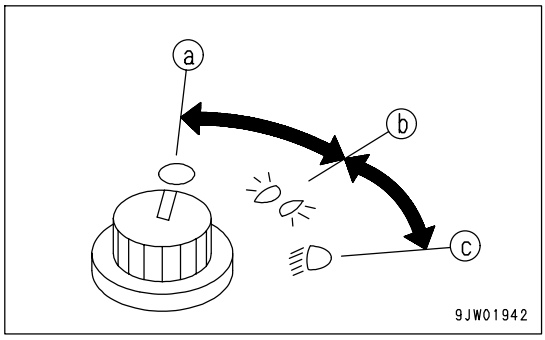
Use this switch (6) to select the machine condition to match the purpose of the operation.



Powerful Loading position: The drive force when digging becomes larger. When the drive force is large, the work equipment speed is slow, so this is suitable only for loading rocks.
Normal Loading position: The work equipment speed is fast, so this is suitable only for loading products.

LAMP SWITCH

This switch (7) is used to light up the front lamps, side clearance lamps, tail lamps, and instrument panel.
Position (a): OFF
Position (b): Side clearance lamps, tail lamps, and instrument panel light up
Position (c): Head lamps light up in addition to lamps at (b) position



LIFT ARM CONTROL LEVER

This lever (5) is used to operate the lift arm.

Position (a): RAISE

When the lift arm control lever is pulled further from the RAISE position, the lever is stopped in this position until the lift arm reaches the preset position of the kickout, and the lever is returned to the HOLD position.

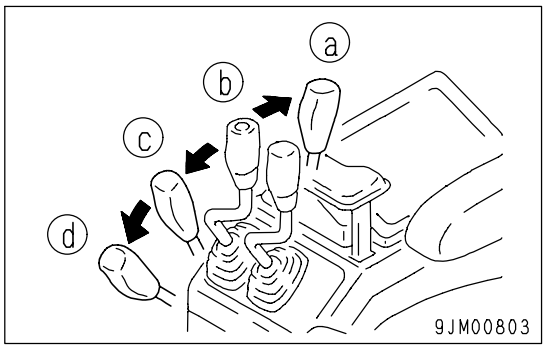
Position (b): HOLD

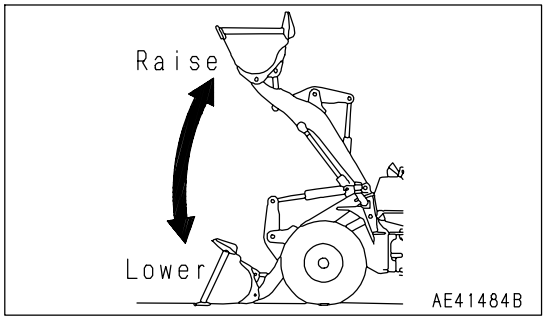
The lift arm is kept in the same position.

Position (c): LOWER

Position (d): FLOAT

The lift arm moves freely under external force.

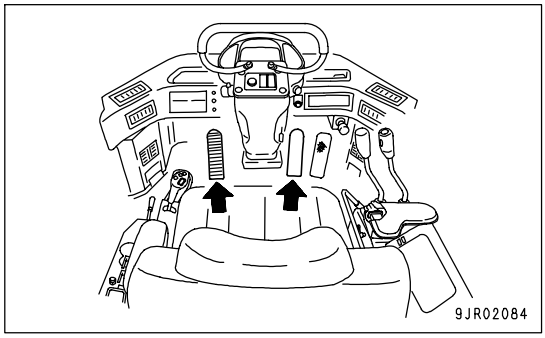




BRAKE PEDAL

⚠ WARNING

- **When traveling downhill, always use the right brake pedal, and use the braking force of the engine together with the brake.**
- **Do not use the brake pedal repeatedly more than necessary. If the brake is used too frequently, the brake will overheat. If this happens, the brakes will not work, so this may lead to a serious accident.**
- **Do not put your foot on this pedal unless necessary.**



These pedals (6) operate the brakes.

RIGHT BRAKE PEDAL

The right brake pedal operates the wheel brakes.

Use the right brake pedal for normal braking operations.

LEFT BRAKE PEDAL

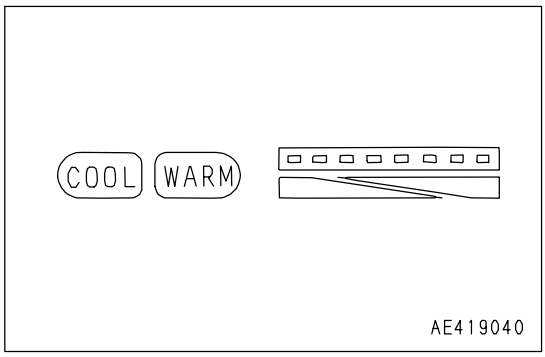
The left brake pedal operates the wheel brakes.

When the transmission cut-off switch is in the ON position, and if this brake pedal is depressed, wheel brakes are applied and the transmission is set to the neutral position at the same time. If the transmission cut-off switch is at OFF, the left brake pedal acts in the same way as the right brake pedal.

REMARK

When the accelerator is being used for operating the work equipment, always set the transmission cut-off switch to the ON position and use the left brake pedal to slow or stop the machine.

TEMPERATURE CONTROL SWITCH



The temperature can be adjusted with this switch (5) by pressing and holding the up or down button.
The temperature level indicator lamps light up to display the temperature of the air coming from the vents.
The more the blue lamps light up, the lower the temperature is.

The color of the indicator lamp changes while the switch is being pressed.
When the temperature reaches the desired level, release the switch to set the temperature.
The settings for each mode are retained in memory even when the starting switch is turned OFF.
However, in the following cases, the settings must be reset.

- When the machine has been out of use for more than 7 days
- When the battery voltage is extremely low
- When there has been abnormal interference from outside
- When the fan switch is turned OFF (the setting is not kept in memory with only the air conditioner switch)

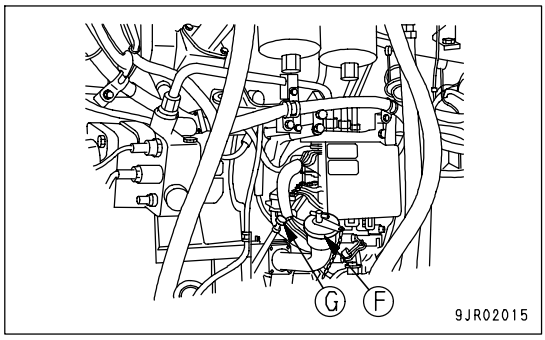
If the air conditioner is used in the FRESH position, the inside of the cab will be pressurized and this will prevent the entry of dust.
The higher the position of the fan switch, the more effective the pressurizing becomes.

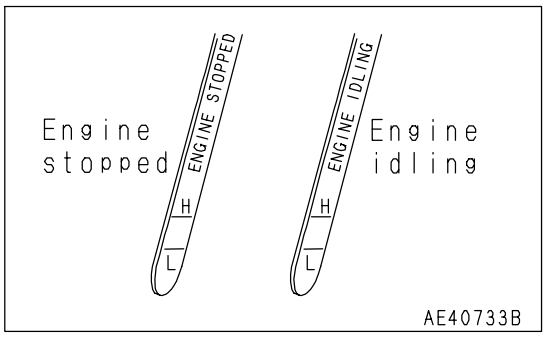
CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

WARNING

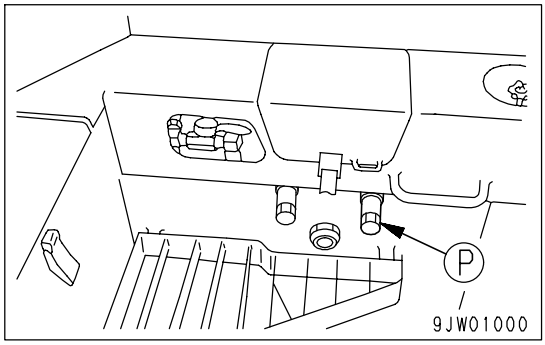
Parts and oil are at high temperature immediately after the engine is stopped and may cause serious burns. Wait for the oil temperature to go down before performing this operation.

1. Open the inspection cover of the right side at the rear of the machine.
2. Take out the dipstick (G) and wipe off the oil with cloth.
3. Fully insert dipstick (G) into filler pipe (F), then remove it.
4. The oil level should be between the H and L marks on dipstick (G).
   If the oil level is below the L mark, add oil through oil filler (F).
   The dipstick has level markings on both sides. One side gives the levels for measuring when the engine is stopped (ENGINE STOPPED) and the other side gives the levels for when the engine is idling (ENGINE IDLING).
   When measuring the oil level, measure with the engine stopped and use the side of the dipstick marked "ENGINE STOPPED".





5. If the oil is above the H mark, drain the excess engine oil from drain plug (P), and check the oil level again.
6. If the oil level is correct, tighten oil filler cap (F) securely and close the inspection window.



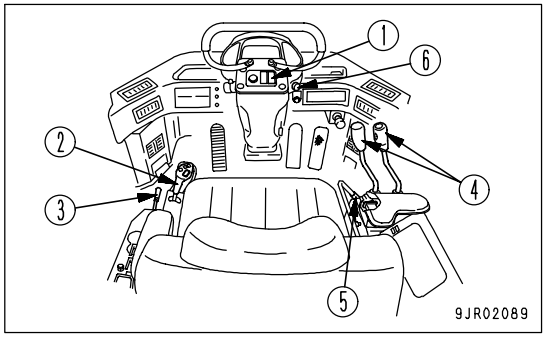
REMARK

- When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine before checking.
  Checking the oil level with the engine idling may be allowed, if the following precautions are thoroughly satisfied:
  - o Check that the engine water temperature gauge shows green range.
  - o Use the side of the dipstick marked "ENGINE IDLING".
  - o Remove the oil filler cap.
- If the machine is at an angle, make it horizontal before checking.

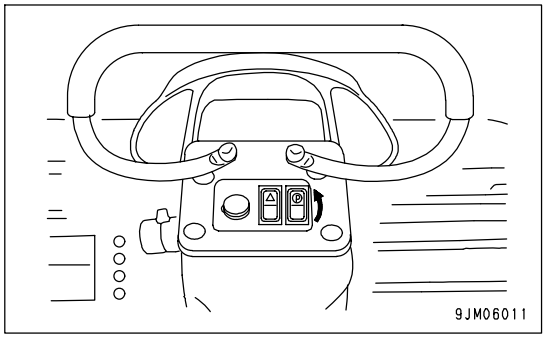
OPERATIONS AND CHECKS BEFORE STARTING ENGINE

WARNING

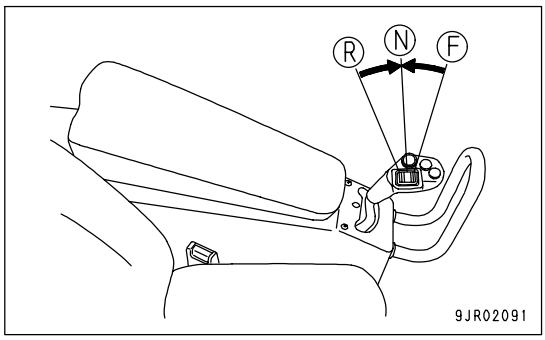
Before starting the engine, check that the safety lock lever is securely at the LOCK position.
If the work equipment control lever is touched by accident when starting the engine, the work equipment may move unexpectedly and cause serious damage or personal injury.



1. Check that parking brake switch (1) is at the ON position.

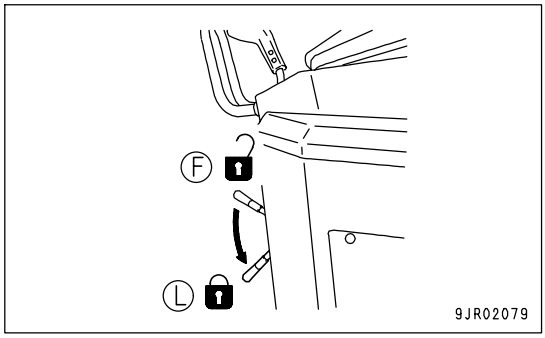


2. Check that the directional selector switch of the joystick steering lever (2) is at the N position and that the joystick steering lever is also at the neutral position.
   When starting the engine, if the directional selector switch is not at the N position and the joystick steering lever is not at the neutral position, the engine will not start.
   When doing this, check that safety lock lever (3) for the joystick steering lever is at LOCK position (L).
   If it is not at LOCK position (L), move it from FREE position (F) to LOCK position (L).



REMARK

- If the directional selector switch is not at the N position, the alarm buzzer will sound.
- If the joystick steering lever is not at the neutral position, the alarm buzzer will sound.
  If this happens, return the joystick steering lever to the neutral position (to the position where the alarm buzzer stops).

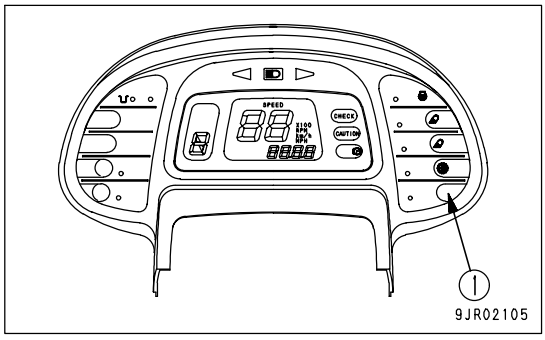


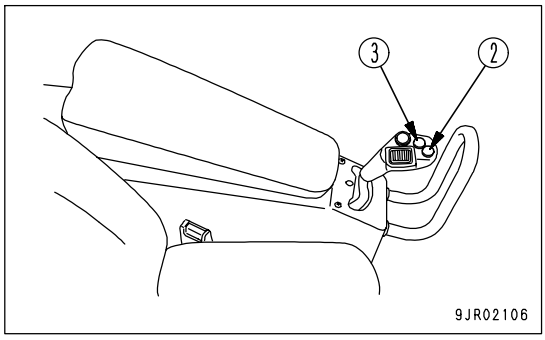
CHANGING GEAR SPEED

WARNING

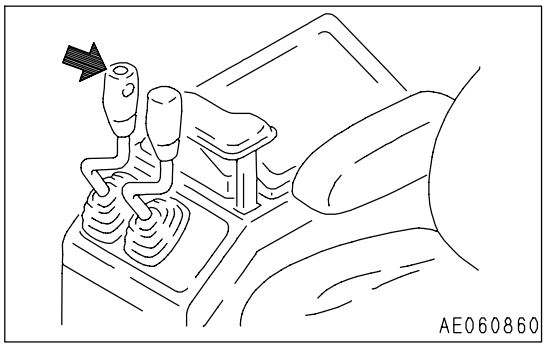
When traveling at high speed, do not shift gear suddenly. Use the brake to reduce the travel speed before shifting gear.

When shifting gear, do as follows.
To set the speed range, select with transmission auto shift/manual selector switch (1) and set with shift up switch (2) or shift down switch (3) on the head of the joystick steering lever.
For details, see Section "PREPARATIONS FOR MOVING MACHINE (PAGE 3-68)".
Use 1st or 2nd speed for digging or loading operations.

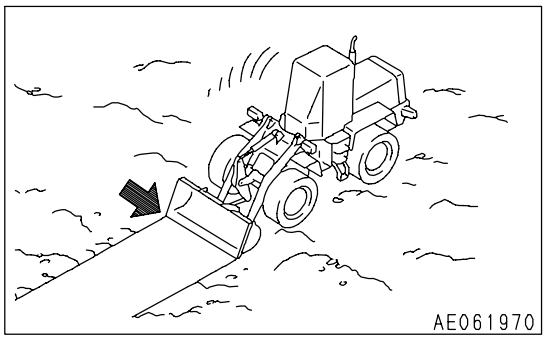




REMARK
This machine is equipped with a kick-down switch. When traveling in 2nd, if the button at the tip of the lift arm control lever is pressed, the speed range shifts down to 1st.
We recommend use of the kick-down switch when using 1st or 2nd speed for digging or loading operations.
For details of the method of use, see Section "KICKDOWN SWITCH (PAGE 3-23)".



LEVELING OPERATIONS



NOTICE

Always operate the machine in reverse when carrying out leveling operations.

If it is necessary to carry out leveling operations when traveling forward, do not set the bucket dumping angle to more than 20 degrees.

1. Scoop soil into the bucket. Move the machine backward while spreading soil from the bucket little by little.
2. Go over the spread soil with the bucket teeth touching the ground and level the ground by back-dragging.
3. If the pushing force is insufficient, perform "LOWER" operation to increase the pushing force.

PUSHING OPERATION

⚠ CAUTION

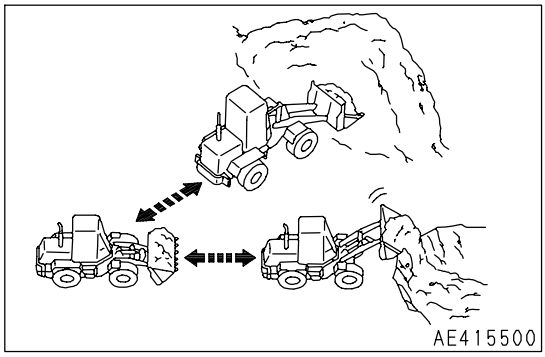
Never set the bucket to the DUMP position when carrying out pushing operation.

When carrying out pushing operations, set the bottom of the bucket parallel to the ground surface.

LOAD AND CARRY OPERATIONS

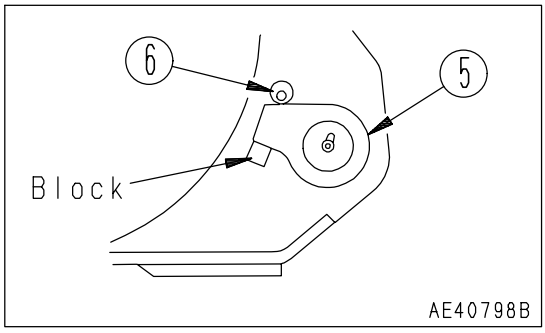
⚠ WARNING

When carrying a load, lower the bucket to lower the center of gravity when traveling.

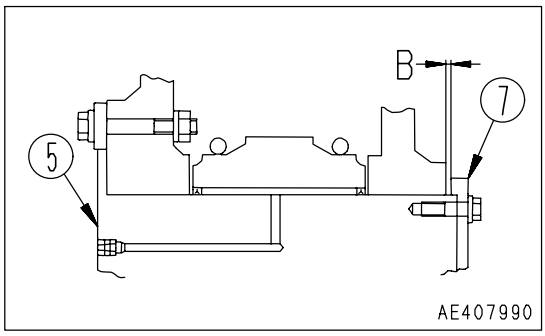


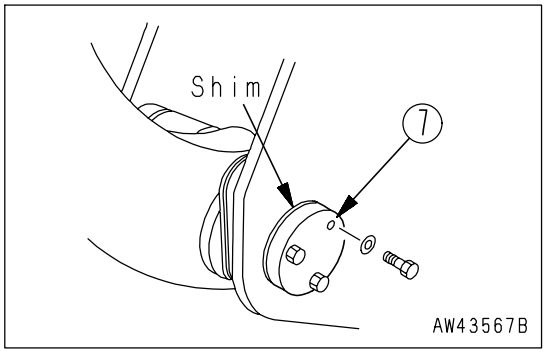
The load and carry method for wheel loaders consists of a cycle of scooping -> hauling -> loading (into a hopper, truck, etc.).
Always keep the travel path properly maintained.
When using the load and carry method, see "PRECAUTIONS FOR USING LOAD AND CARRY METHOD (PAGE 3-96)".

6. Put bucket hinge pin stopper plate (5) in contact with the hinge plate block, and secure it with cam (6).



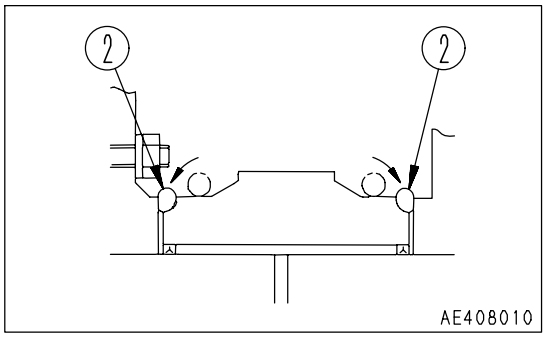
7. Install retainer (7) to bucket hinge pin (5), then measure clearance B between the end face of the retainer and the bucket hinge boss.
8. Select the number of shims so that clearance B is 0.2 mm (0.008 in) or less, then add one 0.2 mm (0.008 in) shim, and assemble.





9. Move cord ring (2) down to the groove.
10. Use the same procedure as in steps 1 - 9 to install the bucket link pin.
    Assemble a pin that has no grease hole at the bucket link.

11. Coat the bucket hinge pin and bucket link pin with grease. For details, see "LUBRICATING (PAGE 4-39)".

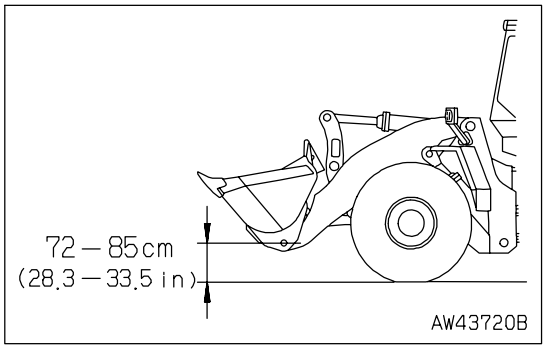


For details of removing and installing the bucket, please contact your Komatsu distributor.

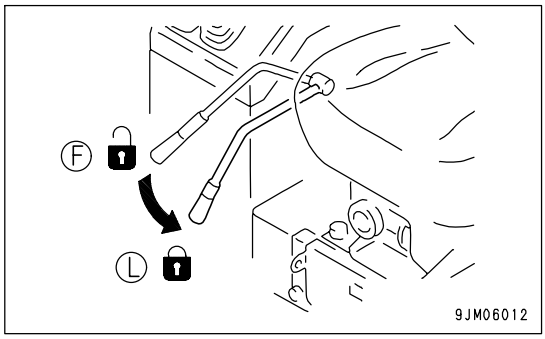
LIFTING PROCEDURE

Lifting work can be carried out only for machines with lifting marks. Before starting the lifting operation, stop the machine in a horizontal place and do as follows.

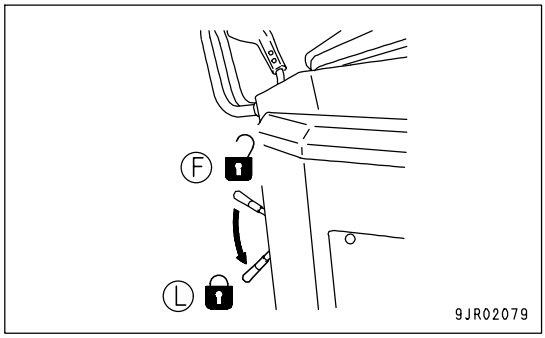
1. Start the engine, make sure that the machine is horizontal, then set the work equipment to the travel posture.
   For details, see "PREPARATIONS FOR MOVING MACHINE (PAGE 3-68)".



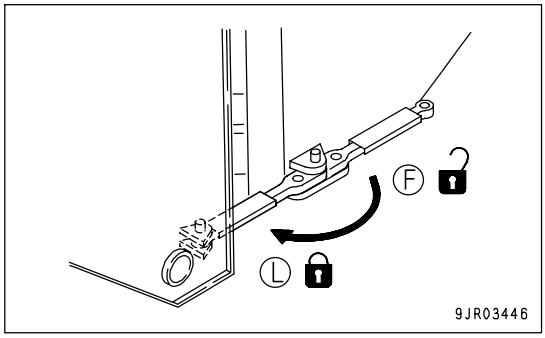
2. Set the safety lock lever for the work equipment control lever to the LOCK position (L).



3. Set the joystick steering lever to the Neutral position, then set the safety lock lever for the joystick steering to LOCK position (L).



4. Stop the engine, check that the area around the operator's compartment is safe, then set the safety bar to LOCK position (L) to prevent the front frame and rear frame from articulating.



RELEASING PARKING BRAKE

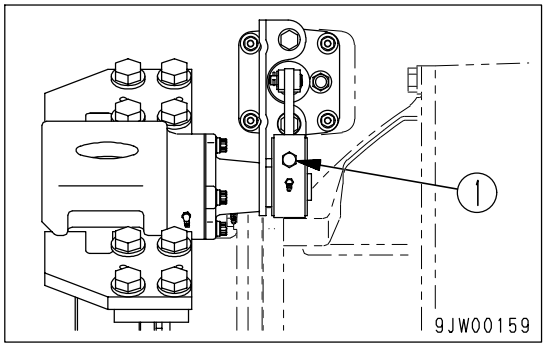
Please ask your Komatsu distributor to release the parking brake.

WARNING

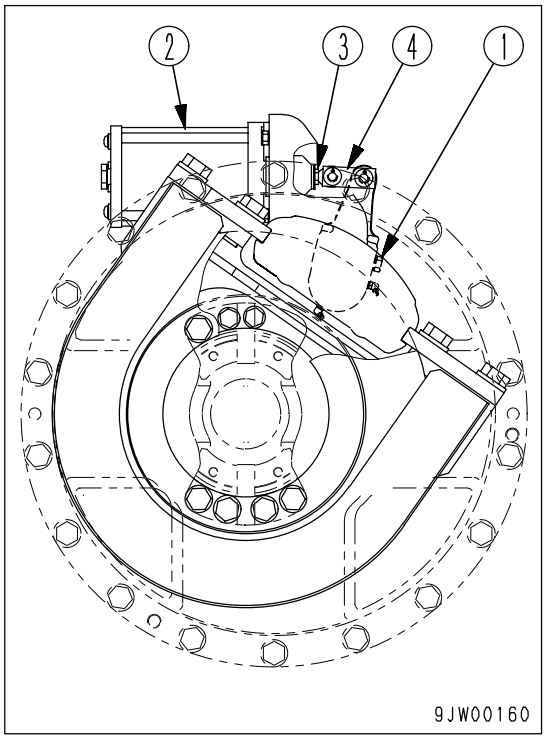
- **When releasing the parking brake, stop the machine on level ground and check that the surrounding area is safe. If it is necessary to release the brake on a slope in an emergency, block the tires before starting the operation.**
- **If the parking brake is released, the brake cannot be used, so check the safety carefully when moving the machine.**

The parking brake is released by the accumulator oil pressure of the brake.
If the accumulator pressure is lowered for some trouble, however, release the parking brake mechanically, then tow the machine.

1. Turn adjustment screw (1) at the end of the hydraulic cylinder linkage for the parking brake clockwise to retract rod (3) of spring cylinder (2) fully into spring cylinder (2) to loosen plate (4).



2. Turn adjustment screw (1) further by 1/2 turn. This releases the parking brake.



RELATIONSHIP OF ELECTRONIC CONTROL SYSTEM

If the error code is displayed on the main monitor section (normally the speedometer display) of the machine monitor, follow the corresponding operator's troubleshooting table below.

MAIN MONITOR FAILURE DISPLAY

Error code	Transion control system		Option		Alarm buzzer	Action by operator
			Joystick control system			
	Problem system	Condition of machine	Problem system	Condition of machine		
E00	Disconnection in travel speed sensor system	Does not shift gear automatically (switches to manual gear shifting)	Disconnection, short circuit, or short circuit with ground in joystick FNR signal system (or L, R signal system)	Returns to neutral (Steering with steering wheel can be selected.)	No	Normal work possible with manual operation
	Disconnection in engine speed sensor system	Engine speed taken as 2100 rpm (there is gear shifting shock. Gear does not shift in auto-shift mode, however.)	–	–		Normal work is possible in manual mode.
CALL	Disconnection, short circuit with ground, or short circuit in shift lever system	Becomes neutral, travel impossible (judges controller input as N)	–	–	Yes	Stop machine, turn starting switch OFF, in do same as above, then call service
	Disconnection, short circuit with ground, or short circuit in F, R solenoid signal system	Becomes neutral, travel impossible (solenoid signal output OFF)	–	–		
	Disconnection, short circuit with ground, or short circuit with speed range solenoid signal system	Becomes neutral, travel impossible (solenoid signal output OFF)	–	–		

USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

PROPER SELECTION OF FUEL, COOLANT AND LUBRICANTS

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE
		-22 -4 14 32 50 68 86 104 122°F -30 -20 -10 0 10 20 30 40 50°C
Engine oil pan	Engine oil	SAE30 / SAE10W / SAE10W-30 / SAE15W-40
Transmission case		SAE30 / SAE10W
Hydraulic system		SAE10W
Brake		SAE10W
Axle (Front and rear) (each)		See Note 1
Greasing system	Grease	NLGI No. 2
Fuel tank	Diesel fuel	ASTM D975 No. 2 / ※
Cooling system	Water	Add antifreeze

※ ASTM D975 No. 1

NOTICE

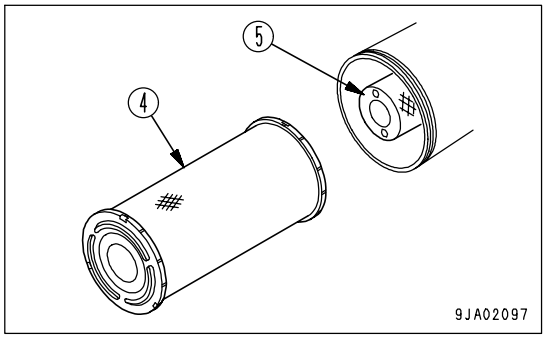
Use only diesel fuel.

The engine mounted on this machine employs electronic control and a high-pressure fuel injection device to obtain good fuel consumption and good exhaust gas characteristics. For this reason, it requires high precision for the parts and good lubrication. If kerosene or other fuel with low lubricating ability is used, there will be a big drop in durability.

If the machine is operated at temperatures below -20°C (-4°F), a separate device is needed, so please consult your Komatsu distributor.

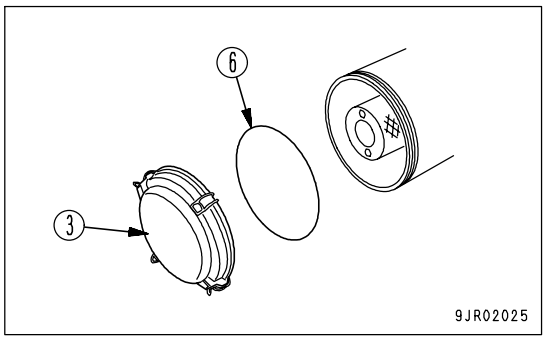
NOTICE

Never remove inner element (5). If it is removed, dust will enter and cause engine trouble.

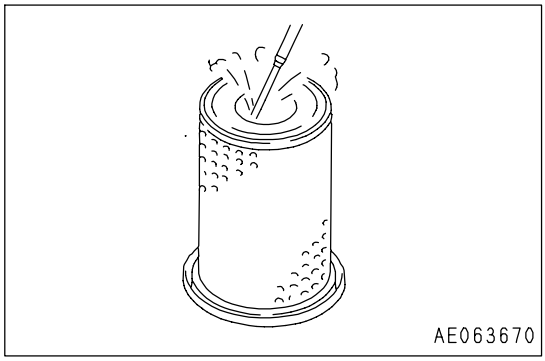


2. Remove outer element (4).

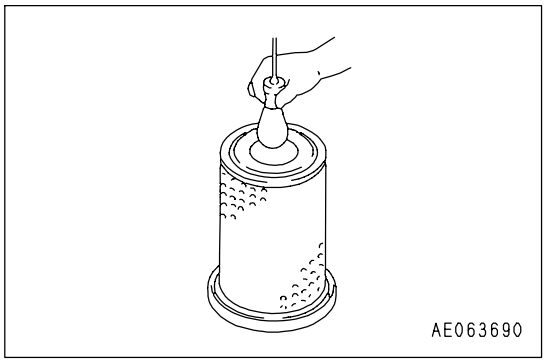
3. Clean the inside of the air cleaner body and dust cup.



4. Direct dry compressed air (less than 0.69 MPa (7 kgf/ cm^2, 99.4 PSI)) to the element from inside along its folds, then direct it from outside along its folds and again from inside.
   1) Replace the outer element if it 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 dust indicator red piston appears soon after installing the cleaned outer element even though it has not been cleaned 6 times.



5. 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 folds 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.**

6. Set the cleaned outer element and install dust cup (3), then secure them with clips (2).

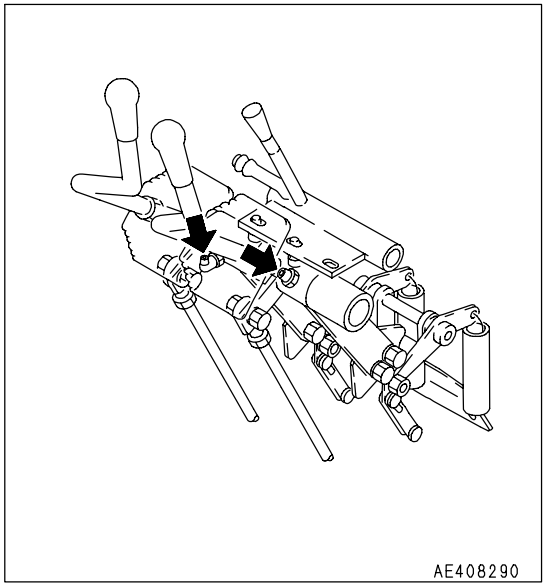
NOTICE

- **When installing the dust cup, check O-ring (6). If the O-ring has any defect, replace it.**
- **If the inner and outer element have been replaced, always replace O-ring (6) with a new part.**

LUBRICATE WORK EQUIPMENT CONTROL VALVE LINKAGE (2 PLACES)

If the work equipment control lever is heavy or does not move smoothly, apply grease.

1. Using a grease pump, pump in grease through the grease fittings shown by arrows.
2. After greasing, wipe off any old grease that was pushed out.



CHECK AIR CONDITIONER

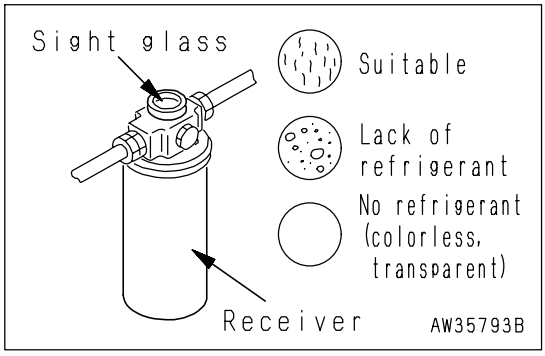
CHECK LEVEL OF REFRIGERANT (GAS)

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 (gas), the cooling performance will be poor. When operating the air conditioner at high speed with the engine at full throttle, use the receiver sight glass (inspection window) to check the condition of the refrigerant gas (R134a) flowing in the refrigerant circuit.

- No bubbles in refrigerant flow: Suitable
- Some bubbles in flow (bubbles pass continuously): Lack of refrigerant
- 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.

OPERATING THE AIR CONDITIONER OFF-SEASON

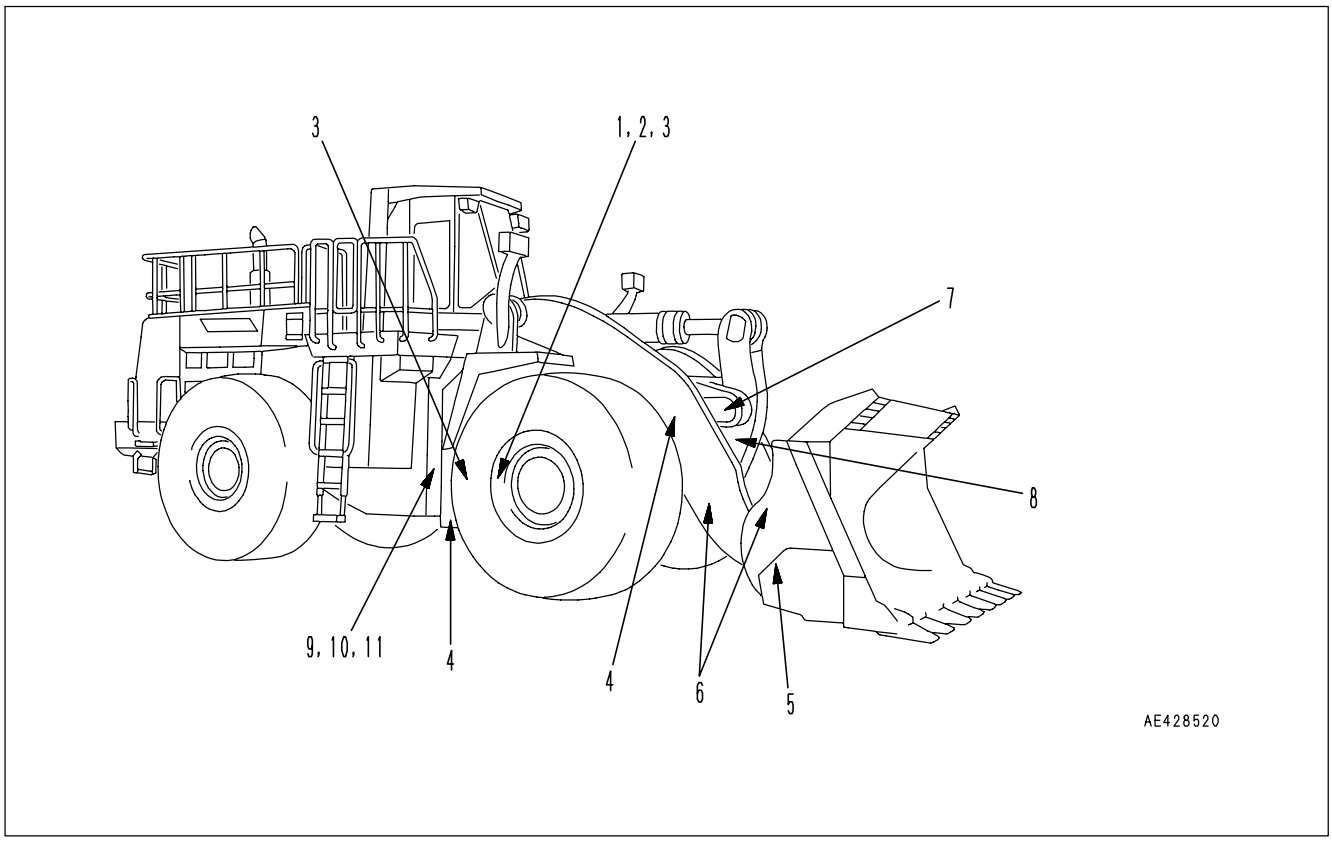
Even during the off-season, operate the air conditioner for 3 to 5 minutes once a month to maintain the oil film at all parts of the compressor.

EVERY 100 HOURS SERVICE

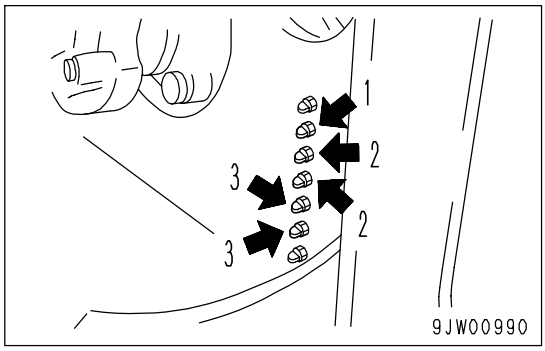
Maintenance for every 50 hours service should be carried out at the same time.

LUBRICATING

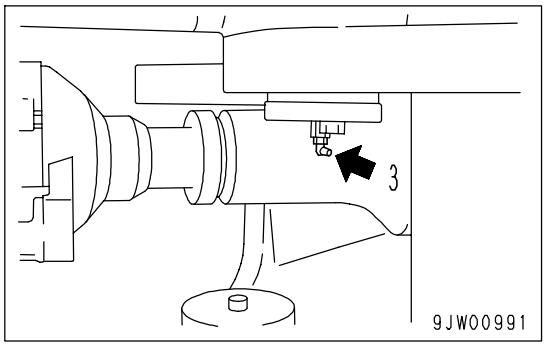
1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.
2. After greasing, wipe off any old grease that was pushed out.



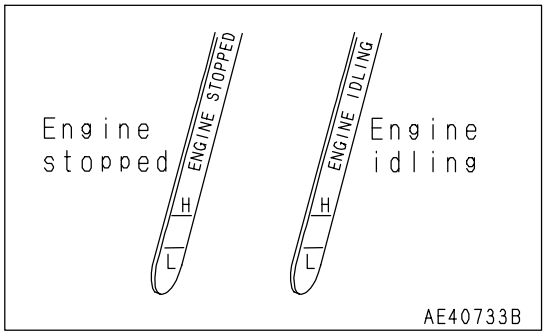
(1) Bucket cylinder bottom pin (1 place)
(2) Lift arm hinge pin (2 places)



(3) Steering cylinder pin (4 places)



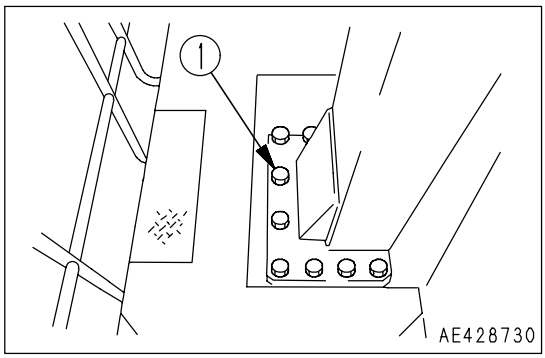
10. After replacing the filter cartridge, add engine oil through oil filler port (F) until the oil level is between the H and L marks on the dipstick.
11. Run the engine at idle for short time, then stop the engine, and check that the oil is between the H and L marks on the dipstick. For details, see "CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (PAGE 3-51)".



TIGHTEN ROPS CANOPY

1. Loosen the bolt, then remove the cover.
2. Check that there is no looseness in mounting bolts (1) of the ROPS canopy. If any bolt is loose, tighten it.
   Tightening torque: 1715 ± 195 N·m
   (175 ± 20 kgf·m, 1266 ± 145 lbft)
3. Install the cover.

   The tightening torque is large, so a power wrench is needed when tightening. Please request your Komatsu distributor to carry out this work.



EVERY 4000 HOURS SERVICE

Maintenance for every 50, 100, 250, 500, 1000 and 2000 hours service should be carried out at the same time.

CHECK WATER PUMP

Check that there is no play in the pulley or any grease leakage, water leakage, or clogging of the drain hole. If any problem is found, contact your Komatsu distributor for disassembly and repair or replacement.

CHECK VIBRATION DAMPER

Check that there is no drum-shaped deformation of the surface of the damper, and check that there are no traces of leakage of the damper oil around the damper.
If any abnormality is found, please contact your Komatsu distributor for replacement of the parts.

CHECK FAN PULLEY AND TENSION PULLEY

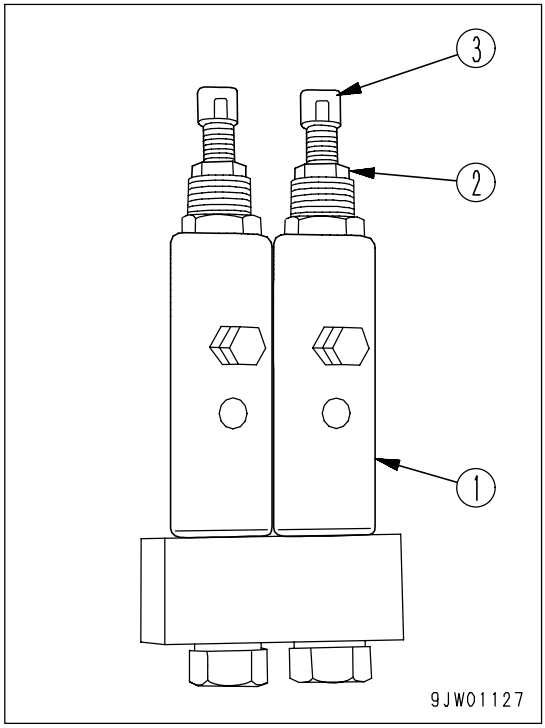
Check for play of the pulley and leakage of grease. If any problem is found, please contact your Komatsu distributor.

CHECK AIR CONDITIONER COMPRESSOR, ADJUST

As special tool is required for checking and adjusting the parts, request Komatsu distributor for service.

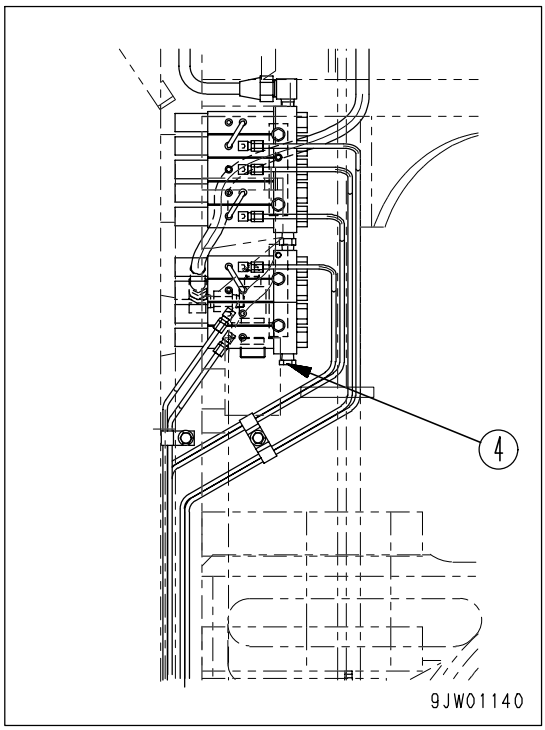
PRECAUTIONS WHEN HANDLING AUTO-GREASING SYSTEM

1. Adjustment of discharge from injector (1)
   Set the all injectors to the maximum discharge.
   Loosen lock nut (2) and turn adjustment screw (3) counterclockwise.



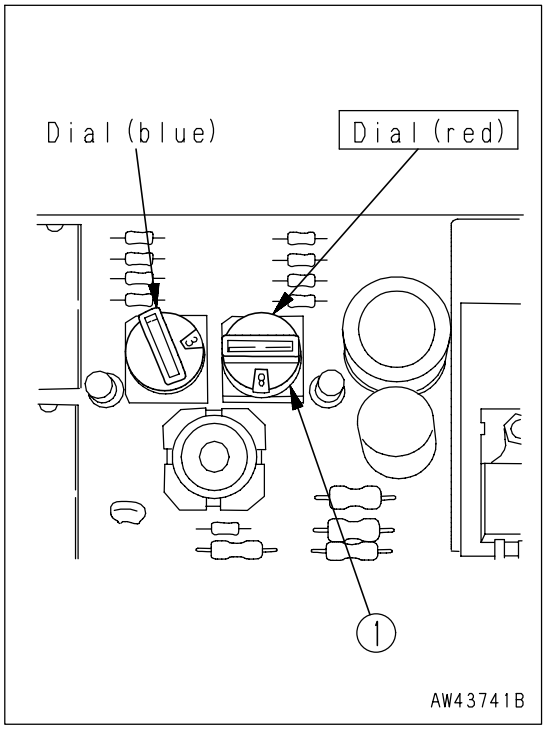
2. Method of bleeding air from main line
   Loosen the plug installed to each injector to bleed air from the main piping. This work shall be carry out by two persons. Start bleeding at the injector nearest the grease pump, then bleed at the other injectors in order (Rear frame -> Front frame -> Boom -> Bell crank).

   1) One person removes plug (4) from one injector, then stays there.
      This plug (4) is installed to the manifold end of each end injector.
      If air must be bled from the main piping, remove this plug.
   2) The other person presses the auto-greasing switch to start the grease pump.
   3) Discharge the grease containing air (milky white in many cases) from the injector. If normal grease comes out, stop the grease pump.
   4) Tighten plug (4) of the injector to prevent the grease from leaking.
      It is impossible to see if the air has been bled by simply checking the pressure gauge. Even if air is mixed in the grease, the auto-grease system operates since the discharge pressure of the grease pump is high. To see if the greasing system is working normally, check that the grease pump is balanced and stopped in the specified (operating) time (60 seconds).



3. Method of adjusting operating time (Red dial)

To adjust the operating time, turn red rotary switch 1 in the figure at right according to the following table. (Normally, fix this dial to position 8 (60 seconds).)



Position of switch	1	2	3	4	5	6	7	8	9
Operating time of pump (sec)	7.5	15	22.5	30	37.5	45	52.5	60	67.5
Position of switch	A	B	C	D	E	F			
Operating time of pump (sec)	75	82.5	90	97.5	105	112.5			

1) Set the red dial to division 8 (For normal operation)
2) When greasing is finished and the greasing pump is balanced, the greasing pump stops even if within the specified operating time (60 sec).