Operation & Maintenance Manual

SEAM018400

avance LOADER

WA600-3

WHEEL LOADER

SERIAL NUMBERS WA600-50001 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

6. GENERAL PRECAUTIONS

⚠ WARNING: For reasons of safety, always follow these safety precautions.

SAFETY RULES

- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- Do not operate the machine if you are not feeling well, or if you are taking medicine which will make you sleepy, or if you have been drinking. Operating in such a condition will adversely affect your judgement and may lead to an accident.
- When working with another operator or with a person on worksite traffic duty, be sure that all personnel understand all hand signals that are to be used.
- Always follow all rules related to safety.

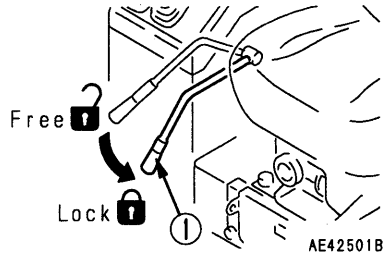
SAFETY FEATURES

- Be sure all guards and covers are installed in their proper position. Have guards and covers repaired immediately if damaged.
  Proper position → See "12.1.1 WALK-AROUND CHECK"

- Use safety features such as safety lock lever ① and seat belts properly.

- NEVER remove any safety features. ALWAYS keep them in good operating condition.
  Safety lock lever → See "12.13 PARKING MACHINE"
  Seat belts → See "12.1.3 ADJUSTMENT BEFORE OPERATION"

- Improper use of safety features could result in serious bodily injury or death.



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CLOTHING AND PERSONAL PROTECTIVE ITEMS

- Avoid loose clothing, jewelry, and loose long hair. They can catch on controls or in moving parts and cause serious injury or death.
- Also, do not wear oily clothes, because they are flammable.
- Wear a hard hat, safety glasses, safety shoes, mask or gloves when operating or maintaining the machine. Always wear safety goggles, hard hat and heavy gloves if your job involves scattering metal chips or minute materials particularly when driving pins with a hammer and when cleaning the air cleaner element with compressed air. Check also that there is no one near the machine.
- Check that all protective equipment functions properly before using.


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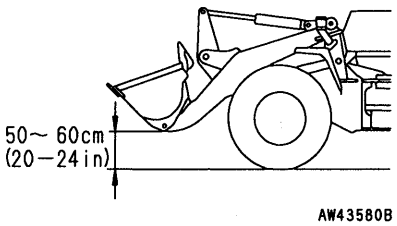
PRECAUTIONS WHEN TRAVELING

- Never turn the key in the starting switch to the OFF position when traveling.
  It is dangerous if the engine stops when the machine is traveling, because the steering becomes heavy. If the engine stops, apply the brake immediately to stop the machine.
- It is dangerous to look around you when operating. Always concentrate on your work.
- It is dangerous to drive too fast, or to start suddenly, stop suddenly, turn sharply, or zigzag.
- If you find any abnormality in the machine during operation (noise, vibration, smell, incorrect gauges, air leakage, oil leakage, etc.), move the machine immediately to a safe place and look for the cause.
- Set the work equipment to a height of 50 – 60 cm (20 – 24 in) from the ground level and travel on level ground.
- When traveling, do not operate the work equipment control levers. If the work equipment control levers have to be operated, stop the machine first, then operate the levers.
- Do not operate the steering wheel suddenly. The work equipment may hit the ground surface and cause the machine to lose its balance, or may damage the machine or structures in the area.
- When traveling on rough ground, travel at low speed, and avoid sudden changes in direction.
- Avoid traveling over obstacles as far as possible. If the machine has to travel over an obstacle, keep the work equipment as close to the ground as possible and travel at low speed.
- When traveling or carrying out operations, always keep your distance from other machines or structures to avoid coming into contact with them.
- NEVER be in water which is in excess of the permissible water depth.
  Permissible water depth → See "12.11 PRECAUTIONS FOR OPERATION".
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the mass of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- Always obey the traffic regulations when traveling on public roads. This machine travels at a lower speed than normal automobiles, so keep to the side of the road and be careful to leave the center of the road free for other vehicles.
- If you drive the machine at high speed continuously for a long time, the tires will overheat and the internal pressure will become abnormally high. This may cause the tires to burst. If a tire bursts, it produces an extremely large destructive force, and this may cause serious injury or accident.
- If you are going to travel continuously, please consult your Komatsu distributor.



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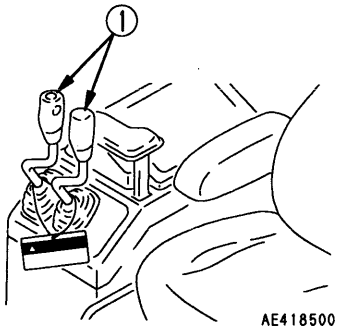
8.1 BEFORE CARRYING OUT MAINTENANCE

NOTIFICATION OF FAILURE

Carrying out maintenance not described in the Komatsu operation and maintenance manual may lead to unexpected failures.
Please contact your Komatsu distributor for repairs.

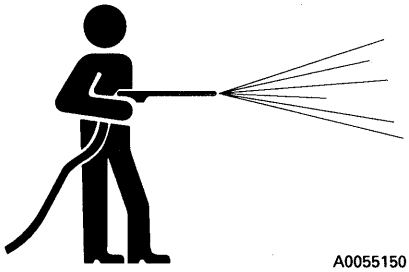
WARNING TAG

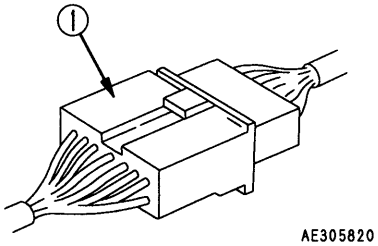
- If others start the engine or operate the controls while you are performing service or lubrication, you could suffer serious injury or death.
- ALWAYS attach the WARNING TAG to control lever ① in the operator's cab to alert others that you are working on the machine. Attach additional warning tags around the machine, if necessary.
- These tags are available from your Komatsu distributor. (Part No. 09963-03000)



CLEAN BEFORE INSPECTION AND MAINTENANCE

- Clean the machine before carrying out inspection and maintenance. This will ensure that dirt does not get into the machine and will also ensure that maintenance can be carried out safely.
- If inspection and maintenance are carried out with the machine still dirty, it will be difficult to find the location of problems, and there is also the danger that you will get dirty or mud in your eyes, and that you will slip and injure yourself.
- When washing the machine, always do as follows.
  - Wear non-slip shoes to prevent yourself from slipping on the wet surface.
  - When using high-pressure steam to wash the machine, always wear protective clothing. This will protect you from being hit by high-pressure water, and cutting your skin or getting mud or dust into your eyes.
  - Do not spray water directly on to the electrical system (sensors, connectors) ①. If water gets into the electrical system, there is danger that it will cause defective operation and malfunction.





TIRE MAINTENANCE

Disassembly, repair, and assembly of tires requires specialist equipment and skill, so please ask your specialist tire repair shop to carry out repairs.

CHECKS AFTER INSPECTION AND MAINTENANCE

Failure to carry out inspection and maintenance fully, or failure to check the function of various maintenance locations may cause unexpected problems and may even lead to personal injury or damage, so always do as follows.

- Checks when engine is stopped
  - Have all the inspection and maintenance locations been checked?
  - Have all the inspection and maintenance items been carried out correctly?
  - Have any tools or parts dropped inside the machine? It is particularly dangerous if they get caught in the lever linkage.
  - Has water and oil leakage been repaired? Have bolts been tightened?

- Checks when engine is running
  For details of checks when the engine is running, see "8.2 DURING MAINTENANCE, MAINTENANCE WITH ENGINE RUNNING", and be extremely careful to ensure safety.
  - Do the inspection and maintenance locations work normally?
  - Is there any oil leakage when the engine speed is raised and load is applied to the hydraulic system?

WASTE MATERIALS

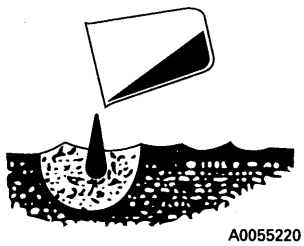
To prevent pollution, particularly in places where people or animals are living, always follow the procedures given below.

- Never dump waste oil in a sewer system, rivers, etc.

- Always put oil drained from your machine in containers. Never drain oil directly on the ground.

- Obey appropriate laws and regulations when disposing of harmful objects such as oil, fuel, coolant, solvent, filters, batteries, and others.

INCORRECT



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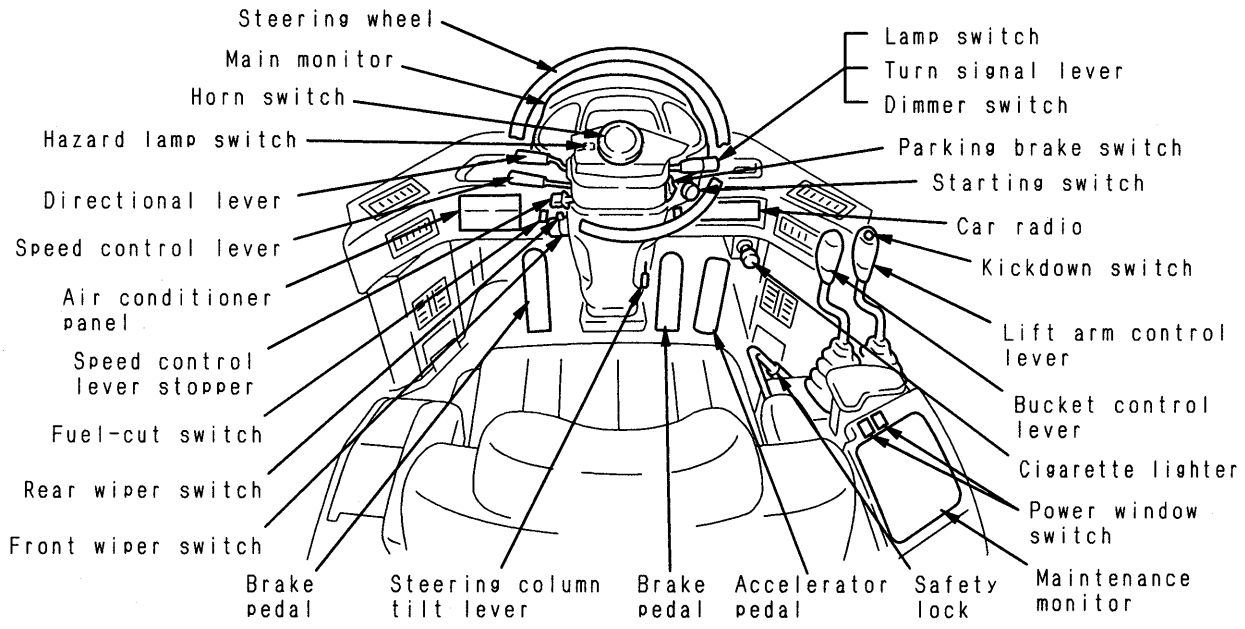
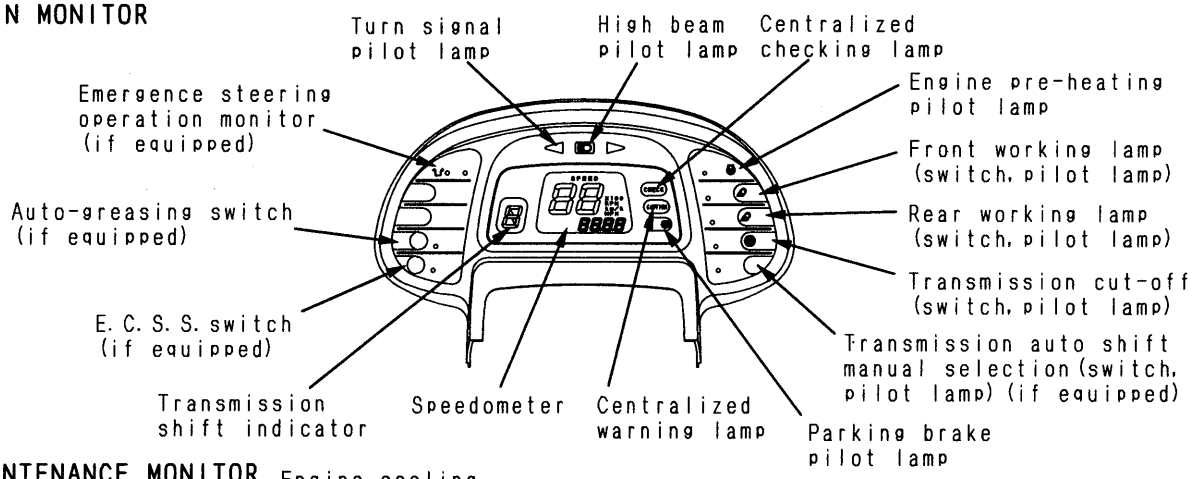
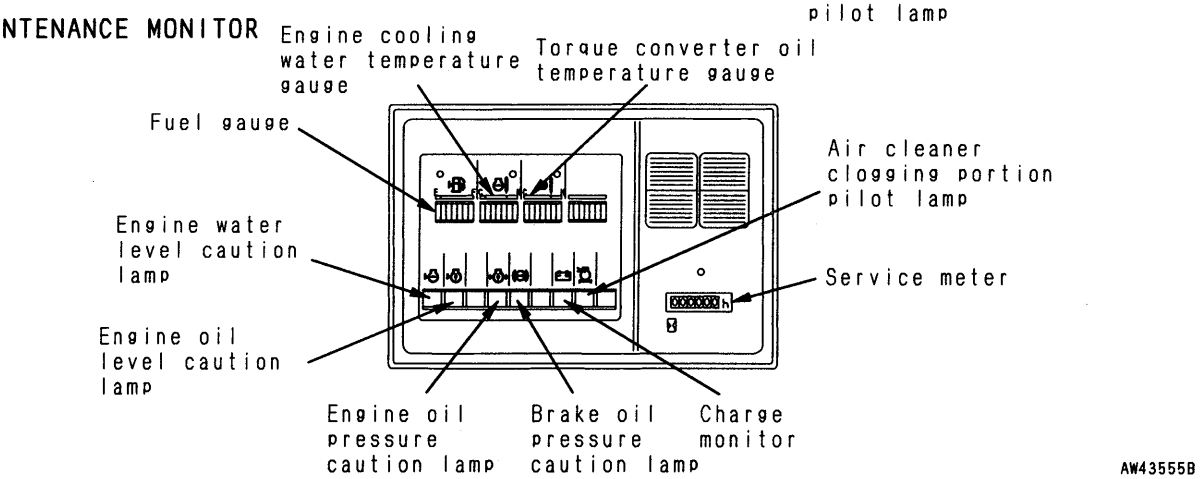
10.2 GENERAL VIEW OF CONTROLS AND GAUGES



MAIN MONITOR



MAINTENANCE MONITOR



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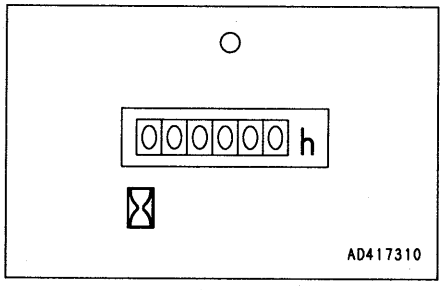
12. SERVICE METER

This meter shows the total operation hours of the machine.

The service meter advances while the engine is running - even if the machine is not traveling.

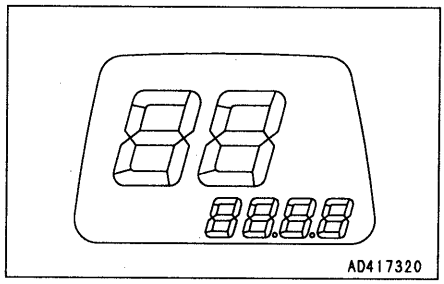
While the engine is running, green pilot lamp on the service meter flashes to show the service meter advances.

The service meter progresses by 1 when the engine is operated for one hour, regardless of the engine speed.



13. SPEEDOMETER

This meter indicates the travel speed of the machine.

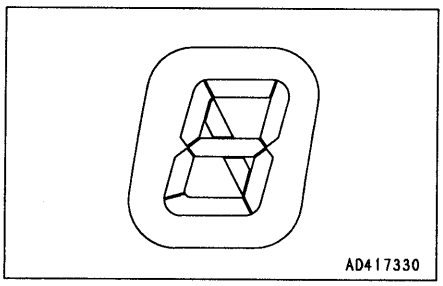


14. TRANSMISSION SHIFT INDICATOR

This indicates the present speed range of the transmission.

When the directional lever is at the N position, N is displayed on the indicator.

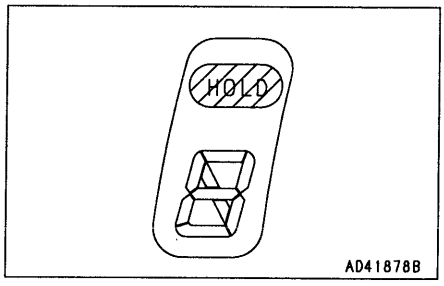
When the directional lever is at the F or R position, the shift position of the speed lever is displayed as a numeral.

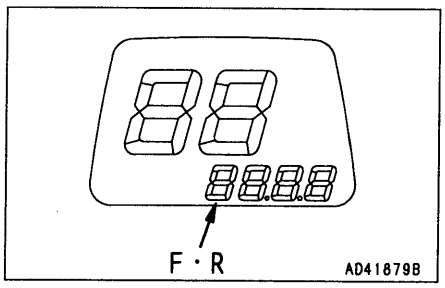


WHEN USING JOYSTICK STEERING SYSTEM (if equipped)

This indicates the transmission speed range. When the N button of the FNR buttons on the head of the joystick lever is pressed, the indicator displays N.

When the F (FORWARD) or R (REVERSE) buttons of the FNR buttons on the head of the joystick lever are pressed, F or R is displayed at the bottom of the speedometer and the shift indicator displays the transmission speed range and N.



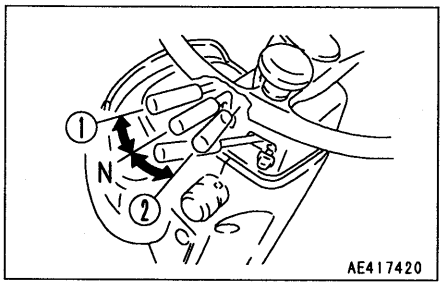


2. DIRECTIONAL LEVER

This lever is used to change the direction of travel of the machine.

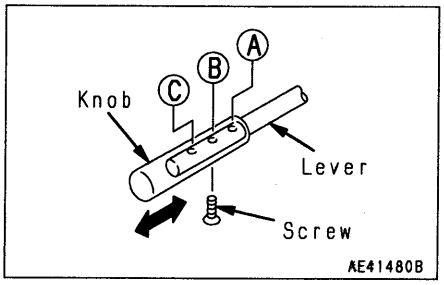
The engine cannot be started if the directional lever is not at N (neutral).

Position ① : Forward
Position N : Neutral
Position ② : Reverse



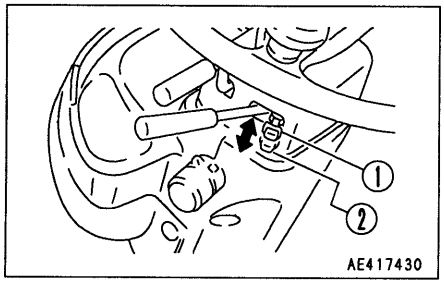
REMARK

The length of the lever can be adjusted to 3 stages (positions Ⓐ, Ⓑ, Ⓒ). To adjust the length, remove the screw at the bottom of the lever knob, slide the knob to the desired position, then tighten the screw again.
(The lever is installed to position Ⓑ when it is shipped from the factory.)



3. SPEED CONTROL LEVER STOPPER

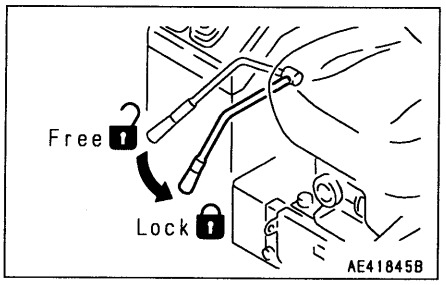
This stopper prevents the speed control lever from entering the 3rd positions when working.
Position ①: Stopper actuated.
Position ②: Stopper released.



4. SAFETY LOCK LEVER

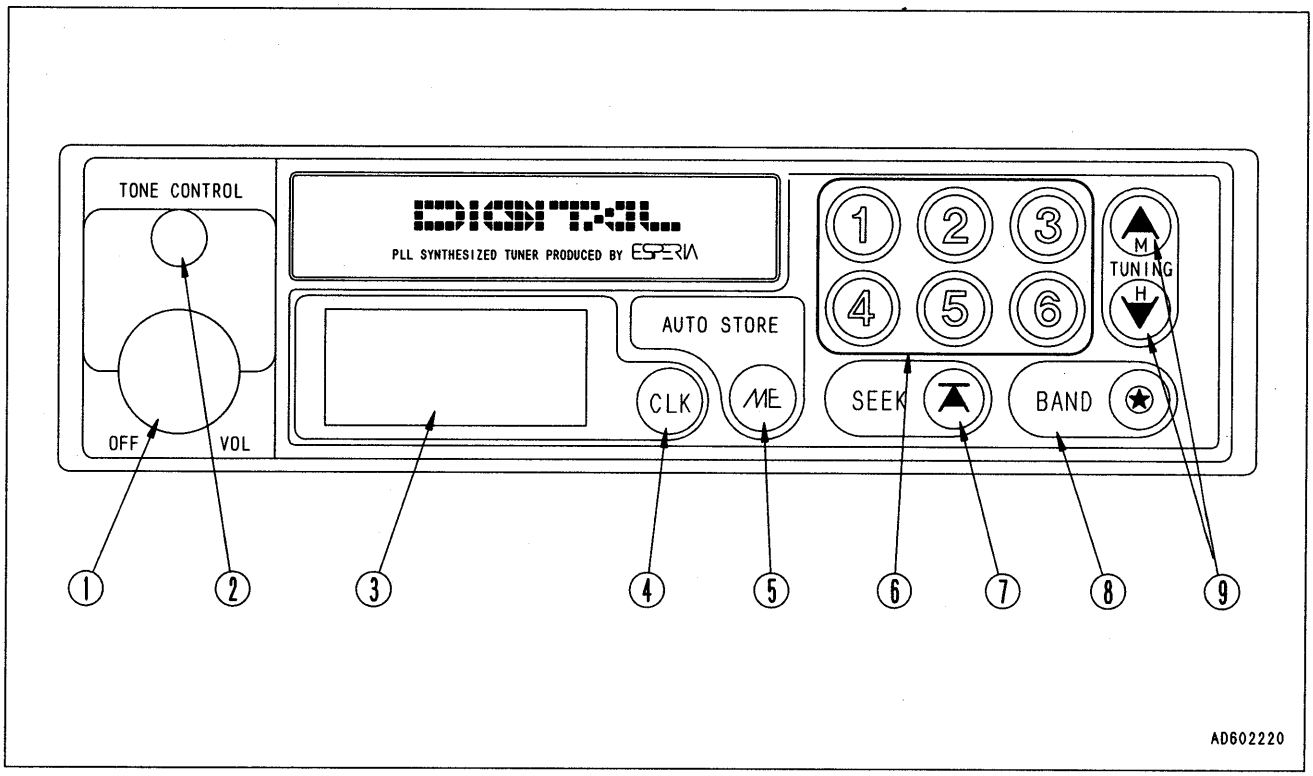
⚠ WARNING

- **When leaving the operator's compartment, set the safety lock lever securely to the LOCK position. If the control levers are not locked, and they are touched by mistake, this may lead to a serious accident.**
- **If the safety lock lever is not placed securely in the LOCK position, the control levers may not be properly locked. Check that the situation is as shown in the diagram.**
- **When parking the machine or carrying out maintenance, always lower the bucket to the ground and apply the lock.**

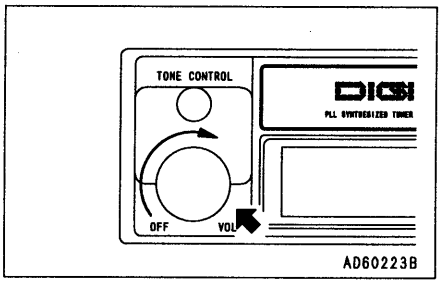


This is used to lock the work equipment levers.
Push the lever down to apply the lock.

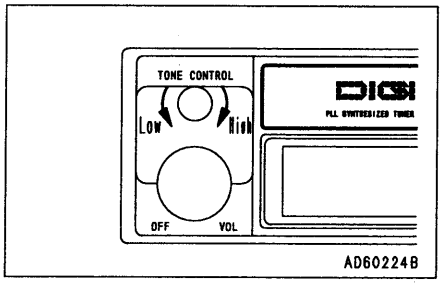
11.18 AM/FM CAR RADIO
11.18.1 EXPLANATION OF COMPONENTS



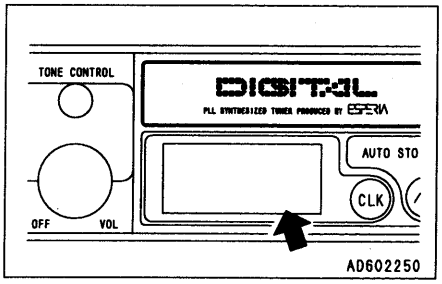
1. **POWER SWITCH/VOLUME CONTROL KNOB**
   Push this knob to switch the radio on.
   Turn the knob clockwise to increase the sound, and counterclockwise to reduce it.



2. **TONE CONTROL KNOB (TONE)**
   Turn this knob clockwise from the center position to emphasize the high sounds, and counterclockwise to emphasize the low sounds.



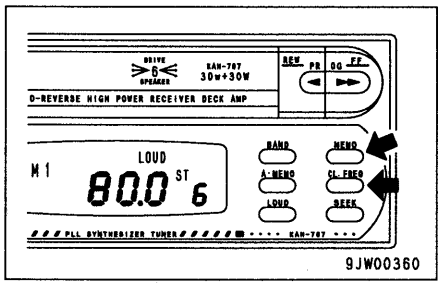
3. **DISPLAY**
   This displays the frequency, time, and operation modes.



ADJUSTING TIME

1. Turn on the ignition key, then turn on the power switch of the car stereo. If the frequency is displayed on the display, change the display to the clock using the display changeover switch.

2. Pressing and holding the memory switch, press H button ① to set the hour and M button ② to set the minute. About 5 seconds after setting the time, the display returns to the frequency automatically.



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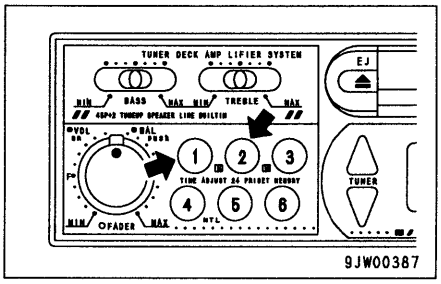

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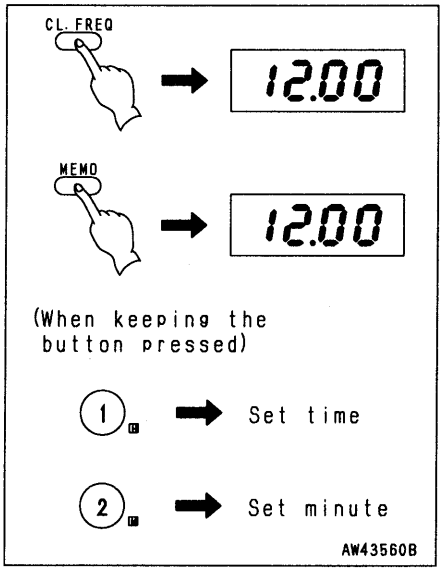

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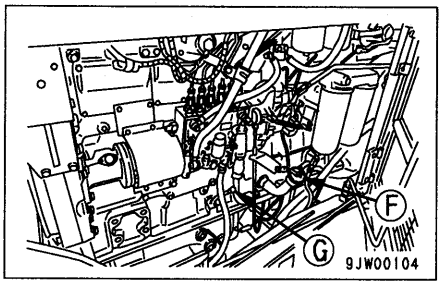
CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

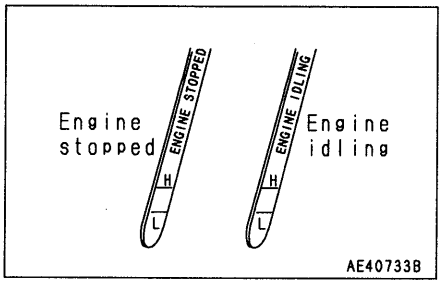
1. Open the inspection window at the rear right side of the machine.



2. Remove dipstick Ⓖ and wipe the oil off with a cloth.

3. Insert dipstick Ⓖ fully in the oil filler pipe, then take it out again.

4. The oil level should be between the H and L marks on dipstick Ⓖ.
   If the oil level is below the L mark, add engine oil through oil filler Ⓕ.

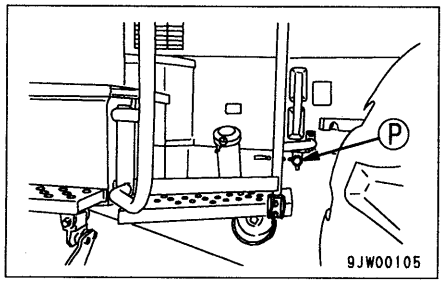


For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

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 Ⓟ, and check the oil level again.



6. If the oil level is correct, tighten the oil filler cap securely, then close the inspection window.

REMARK

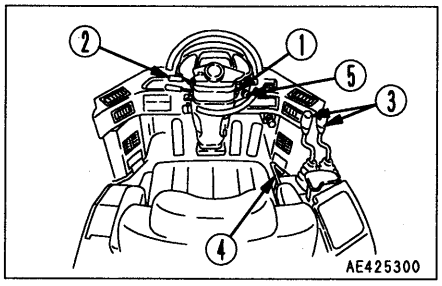
When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine before checking.

Checking the oil level with the engine idling may be allowed, if the following precautions are thoroughly satisfied:

- Check that the engine water temperature gauge shows green range.
- Use the side of the dipstick marked ENGINE IDLING.
- Remove the oil filler cap.

If the machine is at an angle, make it horizontal before checking.

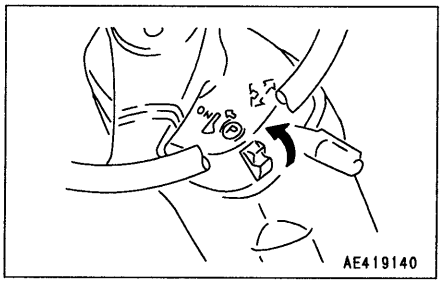
12.1.4 OPERATIONS AND CHECKS BEFORE STARTING ENGINE



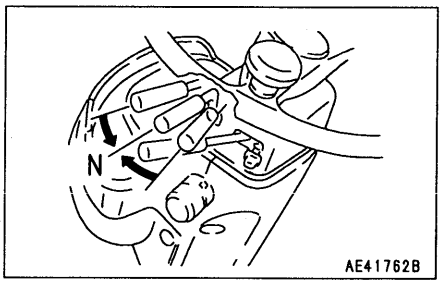
⚠ WARNING

- **If the control levers are touched by accident, the work equipment may move suddenly. When leaving the operator's compartment, always set the safety lever securely to the LOCK position.**
- **Before starting the engine, use a damp cloth to wipe off the dust accumulated on the top surface of the battery or on the starting motor and the alternator.**

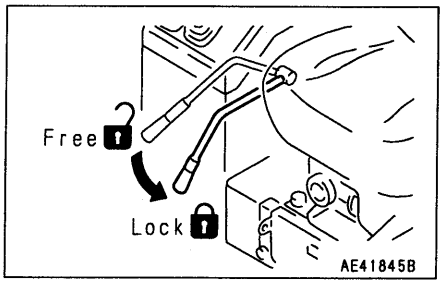
1. Check that parking brake switch ① is at the ON position.



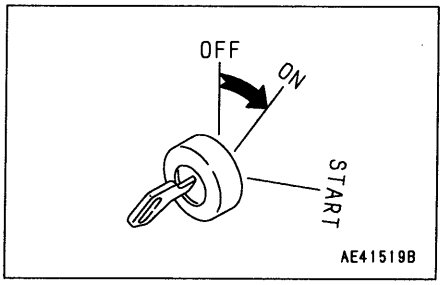
2. Check that directional lever ② is at the N position.
   When starting the engine, if directional lever ② is not at the N position, the engine will not start.



3. Lower the bucket to the ground, then check that work equipment control lever ③ is locked by safety lock ④.



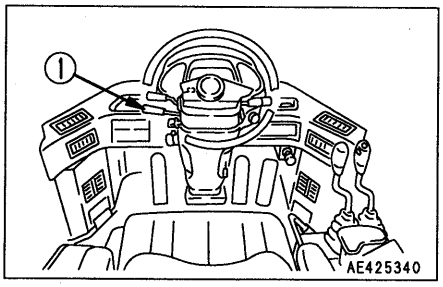
4. Insert the key in starting switch ⑤, turn the key to the ON position, and check that the pilot lamp lights up.



12.5 CHANGING GEAR SPEED

⚠ WARNING

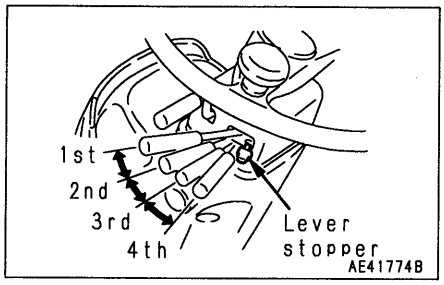
When traveling at high speed, do not change the gear speed suddenly. When shifting gear, use the brakes to reduce the travel speed, then shift gear.



Shift the gear as follows.

Move speed control lever ① to the desired position.

Only 1st or 2nd speeds are used for digging and loading operations, so actuate speed control lever stopper.



REMARK

This machine is equipped with a kickdown switch that shifts the gear down to 1st if the button at the tip of the lift arm control lever is pushed when the machine is traveling in 2nd gear.

We recommend the use of the kickdown switch when carrying out digging or loading operations in 1st or 2nd gear.

For details of use, see "11. EXPLANATION OF COMPONENTS".

REMARK

If the gear shift lever is operated slowly or it is stopped between speed ranges, error code "CALL" may be displayed. This is not a failure: the gear shift lever must be operated to complete the gear shifting within 2 seconds.

12.11.4 PRECAUTIONS WHEN DRIVING MACHINE

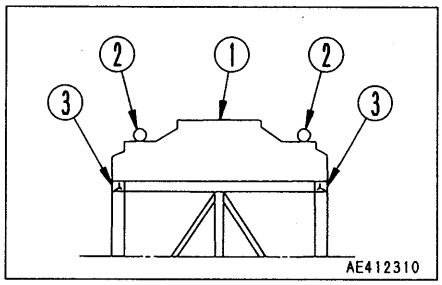
When the machine travels at high speed for a long distance, the tires become extremely hot. This causes early wear of the tires, so it should be avoided as far as possible. If the machine must be driven for a long distance, take the following precautions.

- Follow the regulations related to this machine, and drive carefully.
- Before driving the machine, carry out the checks before starting.
- The most suitable tire pressure, travel speed, or tire type differ according to the condition of the travel surface. Contact your Komatsu distributor or tire dealer for information.
- The following is a guide to suitable tire pressures and speeds when traveling on a paved surface with standard tires.
  Tire pressure: front 0.39 MPa (4.0 kgf/cm^2, 56.8 PSI)
  rear 0.34 MPa (3.5 kgf/cm^2, 49.7 PSI)
  Speed: 13 km/h (8.1 MPH)
- Check the tire pressure before starting, when the tire is cool.
- After traveling for 1 hour, stop for 30 minutes. Check the tires and other parts for damage; also check the oil and coolant levels.
- Always travel with the bucket empty.
- Never put calcium chloride or dry ballast in the tires when traveling.

NSTALLING THE BUCKET

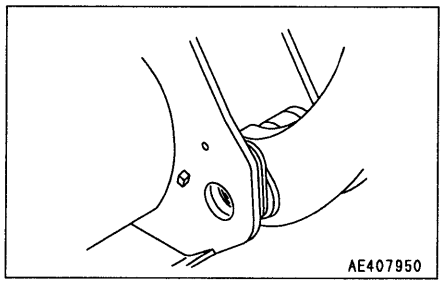
1. Set cord ring ② on top of lift arm boss ① as shown in the diagram.

   After completions of assembly of the bucket and adjustment with shims in step 8, move the cord ring down to the groove.

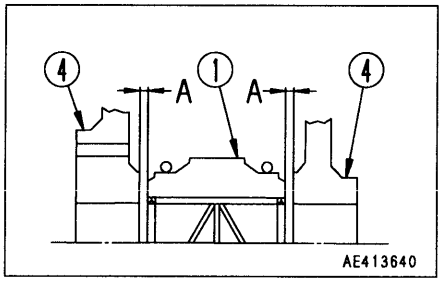


2. Coat dust seal lip portion ③ with grease.

3. Align the left and right bucket pin holes.

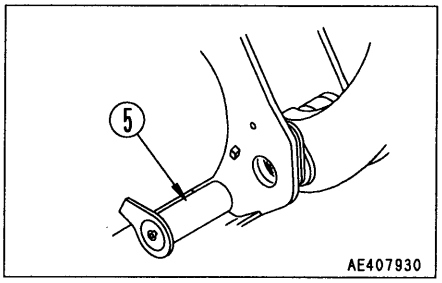


4. Select the number of shims so that clearance A between bucket hinge boss ④ and lift arm boss ① are less than 1.0 – 1.5 mm (0.04 – 0.06 in).

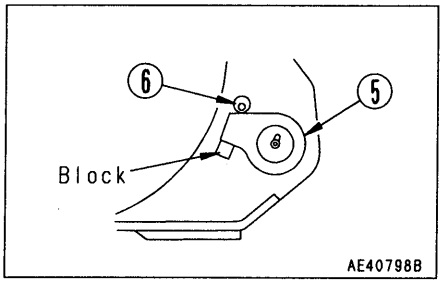


5. Assemble the shims the selected in Step 4, align the pin holes, then insert bucket hinge pin ⑤.
   Coat with grease to prevent damage to the dust seal when inserting the bucket hinge pin.

   Use a bucket hinge pin that has a grease hole.



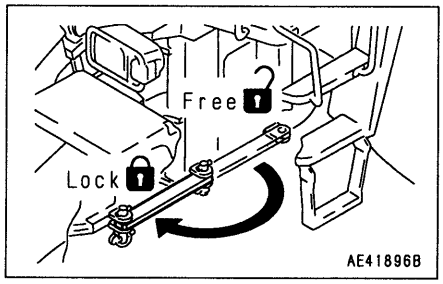
6. Put bucket hinge pin stopper plate ⑤ in contact with the hinge plate block, and secure it with cam ⑥.



14.4 WARMING-UP OPERATION FOR STEERING HYDRAULIC CIRCUIT IN COLD WEATHER

⚠ WARNING

If the steering wheel is turned and stopped while the oil temperature is low, it may take some time for the vehicle to stop turning. In this case, perform the warm-up operation in a wider place, secure safety with the safety bar. Do not relieve the hydraulic oil in the circuit continuously for more than 5 seconds.



When the temperature is low, do not start the operation of the vehicle soon after starting the engine.

Warming up the steering hydraulic circuit

Slowly turn the steering wheel to the right and left to warm up the oil in the steering valve. (Repeat this operation for about 10 minutes to warm up the oil.)

NOTICE

Turn the steering wheel a little and stop there. Then, confirm that the vehicle is steered by the angle equivalent to the turning angle of the steering wheel.

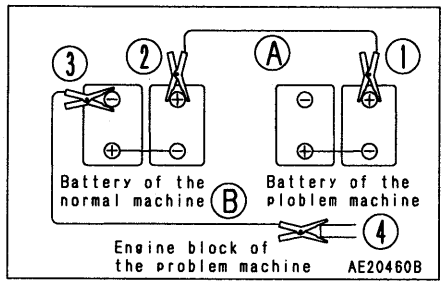
- **Recommended oil**
  Select the oil depending on the temperature as shown in the following table.

	Type of oil	Temperature –30 –20 –10 0 10 20 30°C
Hydraulic oil	Engine oil	SAE10WCD SAE5W-20CD

Even if SAE5W-20CD is used in low-temperature areas, always carry out the warming-up operation without fail.

If SAE5W-20CD is used in a cold season, replace it with SAE10WCD after the cold season.

CONNECTING THE BOOSTER CABLES



Keep the starting switch at the OFF position.

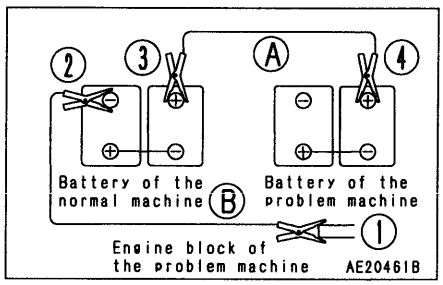
Connect the booster cable as follows, in the order of the numbers marked in the diagram.

1. Make sure that the starting switches of the normal machine and problem machine are both at the OFF position.
2. Connect one clip of booster cable Ⓐ to the positive ⊕ terminal of the problem machine.
3. Connect the other clip of booster cable Ⓐ to the positive ⊕ terminal of the normal machine.
4. Connect one clip of booster cable Ⓑ to the negative ⊖ terminal of the normal machine.
5. Connect the other clip of booster cable Ⓑ to the engine block of the problem machine.

STARTING THE ENGINE

1. Make sure the clips are firmly connected to the battery terminals.
2. Turn the starting switch of the problem machine to the START position and start the engine. If the engine doesn't start at first, wait for at least 2 minutes before trying again.

DISCONNECTING THE BOOSTER CABLES



After the engine has started, disconnect the booster cables in the reverse of the order in which they were connected.

1. Remove one clip of booster cable Ⓑ from the engine block of the problem machine.
2. Remove the other clip of booster cable Ⓑ from the negative ⊖ terminal of the normal machine.
3. Remove one clip of booster cable Ⓐ from the positive ⊕ terminal of the normal machine.
4. Remove the other clip of booster cable Ⓐ from the positive ⊕ terminal of the problem machine.

MAINTENANCE

REMARK

- When fuel sulphur content is less than 0.5%, change oil in the oil pan every periodic maintenance hours described in this manual.
  Change oil according to the following table if fuel sulphur content is above 0.5%.

Fuel sulphur content	Change interval of oil in engin oil pan
0.5 to 1.0%	1/2 of regular interval
Above 1.0%	1/4 of regular interval

- When starting the engine in an atmospheric temperature of lower than 0°C, be sure to use engine oil of SAE10W, SAE10W-30 and SAE15W-40, even though an atmospheric temperature goes up to 10°C more or less in the day time.

- Use API classification CD as engine oil and if API classification CC, reduce the engine oil change interval to half.

- There is no problem if single grade oil is mixed with multigrade oil (SAE10W-30, 15W-40), but be sure to add single grade oil that matches the temperature in the table.

- We recommend Komatsu genuine oil which has been specifically formulated and approved for use in engine and hydraulic work equipment applications.

Specified capacity: Total amount of oil including oil for components and oil in piping.
Refill capacity: Amount of oil needed to refill system during normal inspection and maintenance.

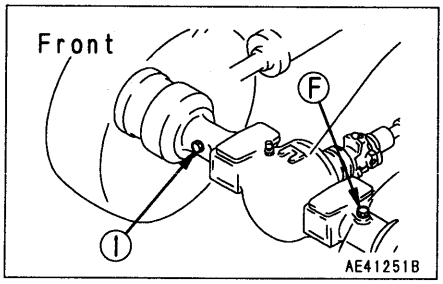
ASTM: American Society of Testing and Material
SAE: Society of Automotive Engineers
API: American Petroleum Institute

24.2.4 CHECK AXLE OIL LEVEL, ADD OIL

⚠ WARNING

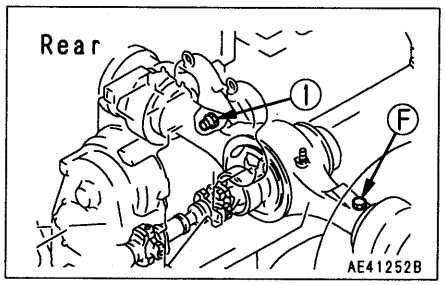
- **When checking the oil level, apply the parking brake, and lock the front and rear frames with the safety bar and pin.**
- **The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before starting this operation.**

Carry out this procedure if there is any sign of oil on the axle case.



Carry out the inspection with the machine on a horizontal road surface.
(If the road surface is at an angle, the oil level cannot be checked correctly.)

1. Stop the engine and remove oil level plug ①.
2. Check that the oil level reaches the bottom of the plug hole.
3. If the oil is not close to the bottom edge, add axle oil through filler port Ⓕ.



For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE."

4. If the oil level is correct, install plug ①.

Tightening torque: 152 ± 24.5 N·m (15.5 ± 2.5 kgf·m, 112.1 ± 18.1 lbft)

24.2.19 REPLACE FAN BELT, ADJUST AUTO-TENSIONER

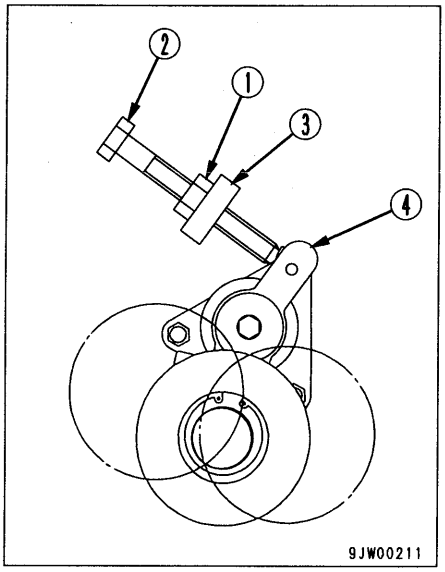
Replace the V-belts if they contact the bottom of the pulley grooves or if they are lower than the outside diameter of the pulleys or if they are cracked or flaked.

Replacement

1. Loosen locknut ①, then loosen adjustment screw ② and move them to bracket ③.

2. Insert a bar of a length of about 50 cm (20 in) in the dent of the tension pulley, and pull toward you strongly.

3. The spring extends and the tension pulley moves inwards, so remove the old belts and install new ones. Always replace the belts as a set (3 belts).



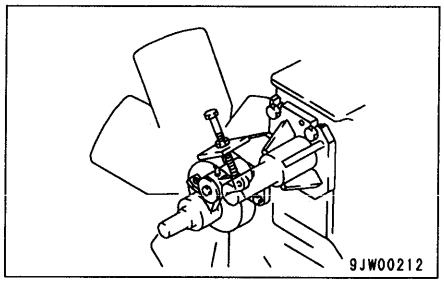
Adjustment

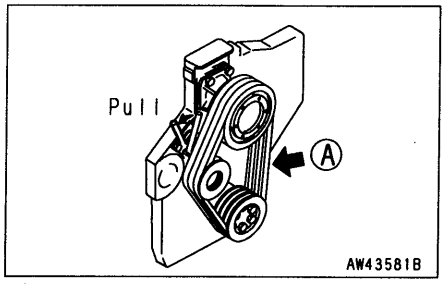
Press point midway Ⓐ of a belt between the fan pulley and crack pulley with a force of about 98.1N (10 kgf). The standard deflection at this time is about 9 – 11 mm (0.355 – 0.4 in).

If the deflection is larger, adjust the belt tension.

1. Tighten adjustment screw ②, and when the tip of the adjustment screw contacts tension pulley lever ④, tighten the adjustment screw further 1/2 turn, then lock it in position with locknut ①.

2. If a gap is made between tension pulley lever ④ and adjustment screw ② during operation, repeat Step 1 to adjust again.
   If the fan belts make any abnormal noise, adjust in the same way.

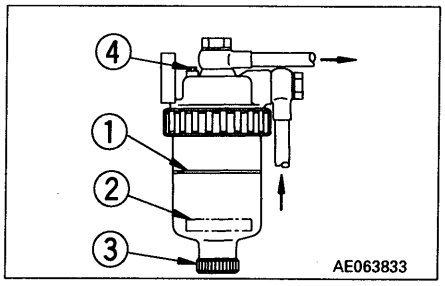




24.2.20 DRAIN WATER FROM WATER SEPARATOR

When float ② is at or above red line ①, drain the water according to the following procedure:

1. Loosen drain plug ③ and drain the accumulated water until the float reaches the bottom.
2. Tighten drain plug ③.
3. If the air is sucked into fuel line when drain the water, be sure to bleed air in the same manner as for the fuel filter.
   See Fuel Filter Cartridge in "24.7 EVERY 500 HOURS SERVICE" section.

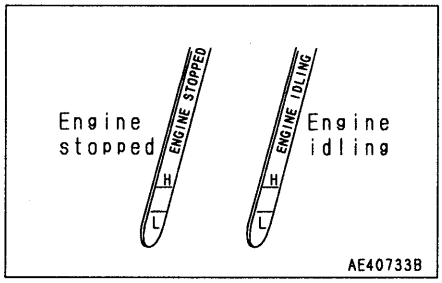


8. Clean the filter holder, fill the new filter cartridge with engine oil, then coat the seal and thread of the filter cartridge with engine oil (or coat thinly with grease) and install.

9. When installing, bring the seal surface into contact with the filter holder, then tighten a further 3/4 – 1 turns.

10. After replacing the filter cartridge, add engine oil through oil filler Ⓕ until the oil level is between the H and L marks on dipstick Ⓖ.

For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".



11. Run the engine at idling for a short time, then stop the engine, and check that the oil level is between the H and L marks on the dipstick. For details, see "24.3 CHECK BEFORE STARTING".

Even if the machine has not been operated for 250 hours, the oil and filter cartridge must be replaced when the machine has been operated for 6 months.

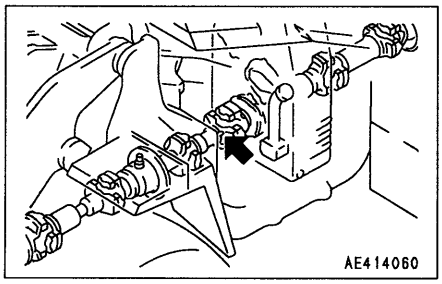
In the same way, even if the machine has not been operated for 6 months, the oil and filter cartridge must be replaced when the machine has been operated for 250 hours.

Use API category CD class oil. If CC class oil must be used, change the oil and replace the oil filter at half the usual interval (125 hours).

24.7.3 LUBRICATE CENTER DRIVE SHAFT SPLINE (1 point)

⚠WARNING

- **Apply the parking brake, and lock the front and rear frames with the safety bar and pin.**
- **Set the work equipment in a stable condition, then stop the engine and apply the locks securely to the work equipment control levers.**



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 is pushed out.

24.7.4 CHECK FAN BELT FOR WEAR

Check the V-belt and when the following conditions exist, replace or adjust the V-belt.

- When there is a gap between the tension pulley lever and tip of the adjustment screw.
- When the V-belt makes contact with the bottom of the groove in each pulley.
- When the V-belt is worn, and its surface is lower than the outer diameter of the pulley.
- When the V-belt is cracked or flaked.
- When the V-belt makes an abnormal noise.

Since an auto-tensioner is installed, the V-belt does not need to be replaced until it is replaced.

For details of the replacement procedure, refer to "24.2 WHEN REQUIRED".

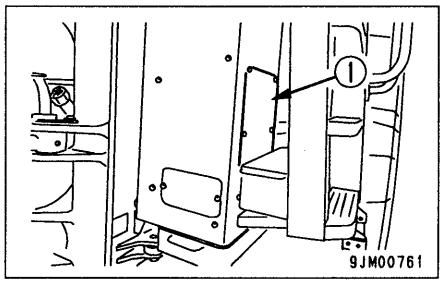
24.9.4 REPLACE AIR CONDITIONER FILTER (if equipped)

Remove both the recirculation air filter and fresh air filter in the same way as when cleaning, and replace them with new parts.

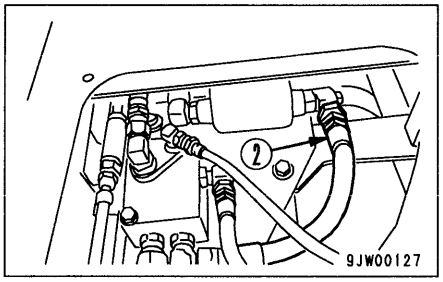
For details of cleaning the recirculation air filter, see "24.6.7 CLEAN ELEMENT IN AIR CONDITIONER RECIRCULATION FILTER".

For details of cleaning the fresh air filter, see "24.5.2 CLEAN ELEMENT IN AIR CONDITIONER FRESH AIR FILTER".

24.9.5 CLEAN PPC CIRCUIT STRAINER



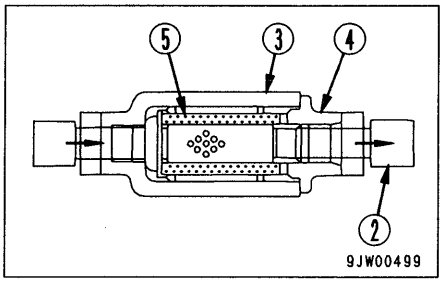
1. Remove cover ① of the accumulator on the left side of the rear frame, then take out hose ② on the outlet side of the PPC circuit strainer.



2. Remove cap ④ from strainer case ③, then take out strainer ⑤ and wash it in light oil.

NOTICE

Install the strainer with its cover side on the deeper side.



3. Install the strainer in strainer case ①, and install it with the bolts.

4. Operate the bucket control lever to the TILT position and the boom control lever to the FLOAT position, and when the cylinder reaches the end of its stroke, hold it there for one minute.

5. Operate the bucket control lever to the DUMP position and the boom control lever to the RAISE position, and when the cylinder reaches the end of its stroke, hold it there for one minute.

6. Bleed the air from the hydraulic circuit. For details, see "24.9.1 CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT".

For details of the procedure for bleeding air from the hydraulic circuit, please contact your Komatsu distributor.

28. HANDLING AUTO-GREASING SYSTEM

With this system, the electric pump is connected to the divider valve, and a lubricating controller with built-in micro computer controls the electric pump and automatically supplies the grease.

28.1 METHOD OF OPERATING AUTO-GREASING SYSTEM

1. Turn the starting switch ON and start the electric pump.

REMARK

Immediately after the power is turned on, all the display lamps on the lubrication controller inside the box under the step on the left side of the machine light up for several seconds.
This is a self check for the lamps, and does not indicate any abnormality.

The display portion for starting the calculation of the greasing interval will flash, but all other displays will go out after a few seconds.

However, even if the greasing interval has not been reached, if the switch is turned ON/OFF repeatedly, greasing will automatically start due to the function of the supplemental circuit, immediately after the starting switch is turned ON. After display of the 7-segment LED and greasing-in-progress LED, as shown in the LUBRICATION CONTROLLER DISPLAY TABLE, the above condition will be returned.

2. When the starting switch is turned ON, centralized greasing is carried out in accordance with the set time and frequency limit for greasing.

REMARK

If the starting switch is turned ON/OFF frequently, the action of the lubrication compensation circuit may cause the grease level warning to be given even when the greasing interval has not been reached. This is not a defect.

28.3 TROUBLESHOOTING

If any abnormality occurs in the greasing system, the error codes will flash alternately to display the type of abnormality.

Error code	Item	Cause	Remedy
E → a	Defective pressurizing of pump	Air in main piping	Run pump as necessary and release grease from end of piping to bleed air
		Air inside pump	Release grease from air bleed in pump to bleed air
		Grease tank is empty	Add grease
		Grease leaking from main piping	Check, tighten connections of main piping (including hoses)
E → b	Abnormality in release of pressure	Abnormality in pressure-releasing structure built into pump	Disassemble pressure-releasing portion carefully, then check and clean
		Abnormality in pressure-detection equipment built into pump	Check limit switch at pressure-detection portion
E → c	Abnormality in pressure detection	Abnormality in pressure-releasing structure built into pump	Check limit switch
		Abnormality in pressure-detection equipment built into pump	Check limit switch at pressure-detection portion
E → 0	Empty tank	Greasing frequency limit has been reached	Add grease
		Grease added during frequency count	Confirm that 0 flashes three times on 7-segment LED by pressing reset button on controller for more than 5 seconds.

28.4 SPECIFICATIONS

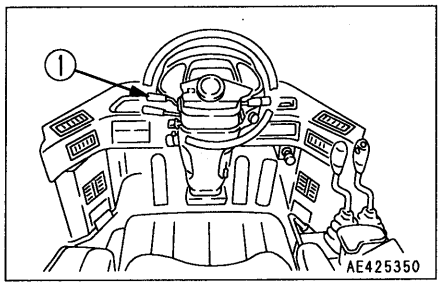
Electric pump

Model: LD10CP-22
Delivery pressure: 245 kgf/cm^2 (MAX)
Tank specification: 1000 cc x 2 cartridge type
Available temperature range: –20 to 60°C
Applicable grease: NLGI No. 2 to No. 0 lithium-based grease
Rated voltage: DC24V
Rated current: 3A (Note: 6.5A when temperature is –20°C)

Divider valve

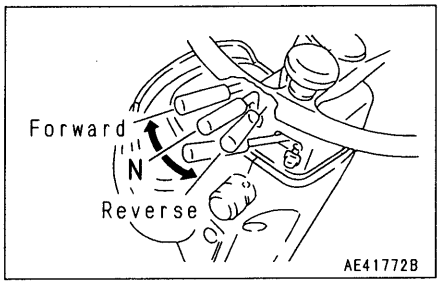
Model: LL1
Discharge amount adjustment method: Fixed type
Available pressure: 245 kgf/cm^2 (MAX)
Discharge amount: 0.6 – 0.1 cc/st
No. of valves (discharge ports): 1 – 5
Available temperature range: –20 to 60°C
Applicable grease: NLGI No. 2 to No. 0 lithium-based grease

31.1.1 CHANGING DIRECTION



⚠ WARNING

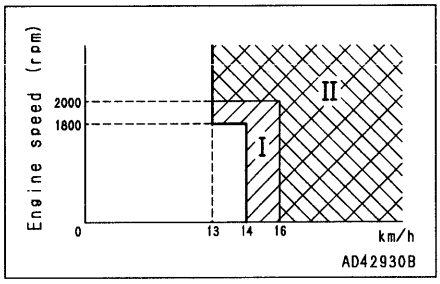
- **When changing direction between FORWARD and REVERSE, check that the new direction of travel is safe. There is a blind spot behind the machine, so be particularly careful when changing direction to travel in reverse.**
- **Do not switch between FORWARD and REVERSE when traveling at high speed.**
  When switching between FORWARD and REVERSE, depress the brake to reduce the travel speed sufficiently, then change the direction of travel. (Max. speed for changing direction: 12 km/h (7.5 MPH))



There is no need to stop the machine even when switching between FORWARD and REVERSE.

Place directional lever ① in the desired position.

When changing direction between FORWARD and REVERSE on a machine equipped with automatic shift, the transmission automatically starts from 2nd speed.



- **Operation in joystick mode and manual mode**

1. While traveling at 2nd to 4th speed
   While the machine is traveling in the joystick steering mode and normal mode.
   If the travel direction is changed between FORWARD and REVERSE in travel speed and engine speed area **I** shown at right, the alarm buzzer sounds for 3 seconds (rapid intermitted sound).

If the alarm buzzer sounds, depress the brake immediately to reduce the speed sufficiently, then change direction between FORWARD and REVERSE.

If it is attempted to change direction between FORWARD and REVERSE in area II in the diagram on the right, the alarm buzzer will sound, and at the same time, the transmission will shift to the speed ranges shown in the table below, and the travel speed will be reduced in comparison to area I in order to decelerate the machine.

Gear speed before charging between FORWARD and REVERSE	Gear speed after charging between FORWARD and REVERSE
F2	R2
F3	R3
F4	R4
R2	F2
R3	F3
R4	F4

REMARK

If the gear shift lever is operated slowly or it is stopped between speed ranges, error code "CALL" may be displayed.
This is not a failure: the gear shift lever must be operated to complete the gear shifting within 2 seconds.