VEAM190100

Operation & Maintenance Manual

WA480-5H

WHEEL LOADER

SERIAL NUMBERS WA480H50051 AND UP

DANGER

Incorrect operation and maintenance of this machine may be hazardous and cause injuries. The operator and maintenance personnel must read this manual before commencing operation or maintenance. Keep this manual within reach at all times and ensure that operating personnel read it at regular intervals.

NOTE

Komatsu has had the operating and maintenance instructions translated into all the languages of the European Union. Should you require a copy in another language please inquire at your local dealer's.

KOMATSU

SAFETY LABELS

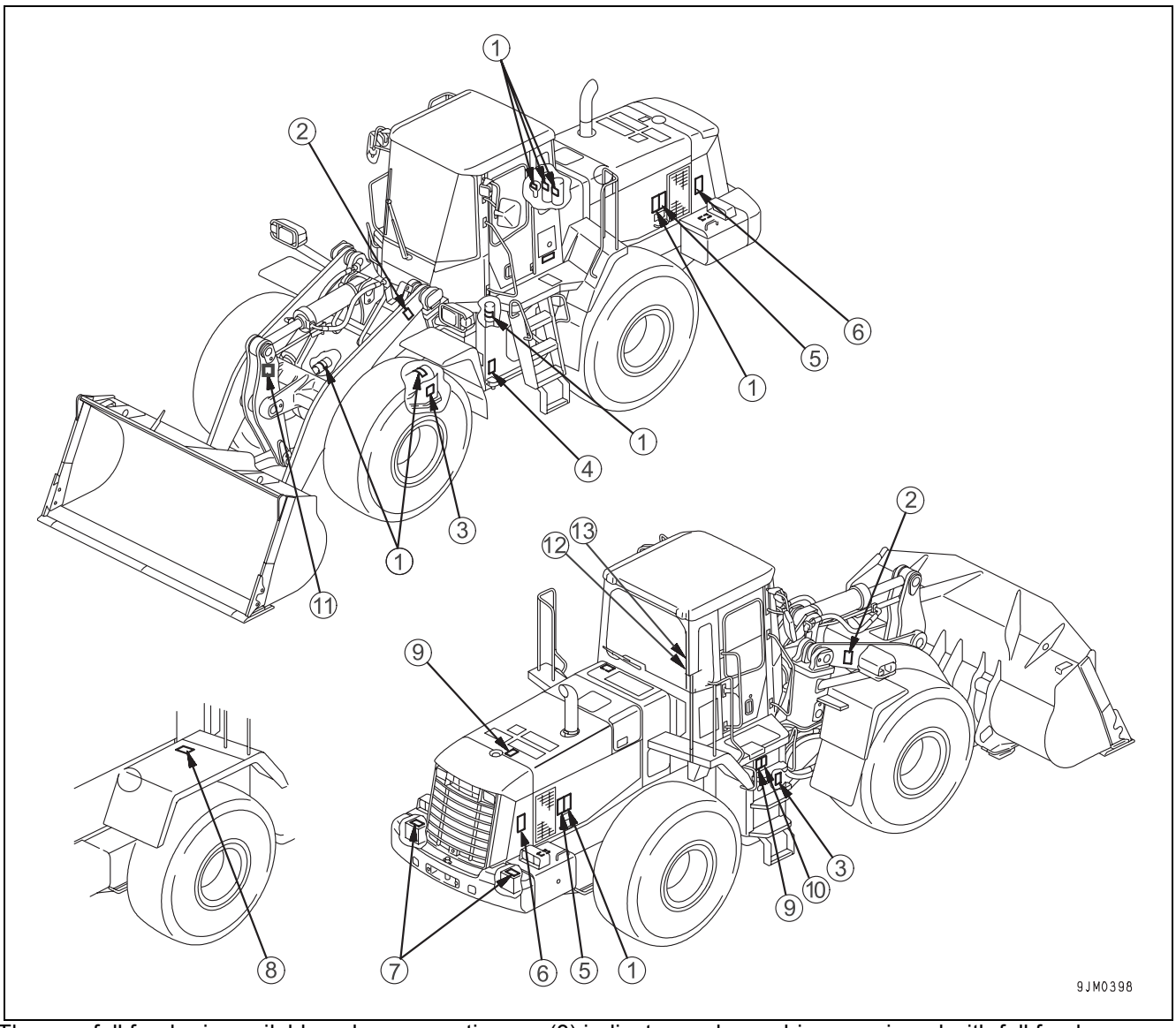
The following safety labels are used on this machine. Be sure that you fully understand the correct position and content of these safety labels.

To ensure that the content of these safety labels can be read properly, be sure that they are in the correct place and always keep them clean. When cleaning them, use soap and water. Do not use organic solvents or gasoline. These may cause the safety labels to peel off.

If the safety labels are damaged or lost, or cannot be read, replace them with new parts. For details of the part numbers, see this manual or check on the actual part, and order the new part from your Komatsu distributor.

There are also other labels in addition to the safety labels. Handle these labels in the same way.

LOCATION OF SAFETY LABELS

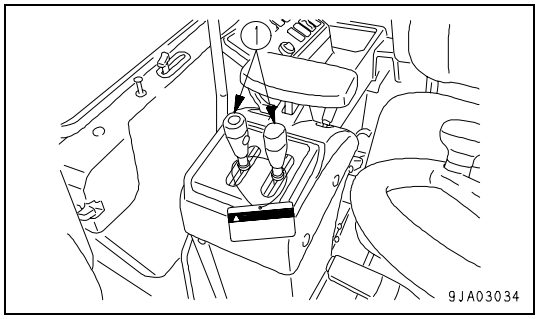


The rear full fender is available only as an option, so (8) indicates only machines equipped with full fender.

PRECAUTIONS FOR OPERATION

BEFORE STARTING ENGINE

If there is a warning tag hanging from the work equipment control lever, do not start the engine or touch the levers (1).



CHECKS BEFORE STARTING ENGINE

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, make sure that the safety lock lever is in the LOCK position.
- Adjust the mirrors so that the rear of the machine can be seen clearly from the operator's seat. See "ADJUST REAR VIEW MIRROR (3-78)".
- 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. It is not only dangerous, but will also cause damage to the equipment.
- For machines equipped with a back-up alarm, check that the alarm works properly.

PRECAUTIONS IN COLD AREAS

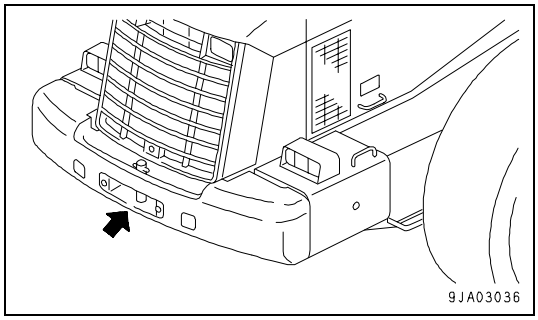
- Carry out the warming-up operation thoroughly. If the machine is not thoroughly warmed up before the control levers are operated, the reaction of the machine will be slow, and this may lead to unexpected accidents.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery.
  Before charging or starting the engine with a different power source, melt the battery electrolyte and check for frost and leakage of battery electrolyte before starting.

TOWING

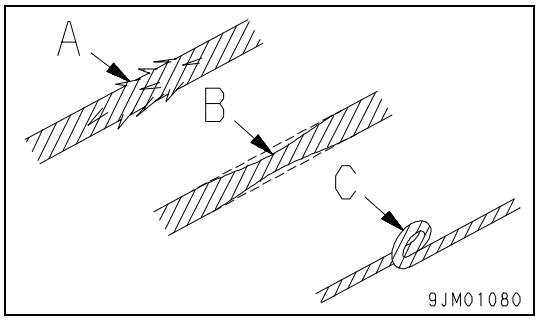
WHEN TOWING

Serious injury or death could result if a disabled machine is towed incorrectly or if there is a mistake in the selection or inspection of the wire rope.
For towing, see “TOWING THE MACHINE (3-127)“.

- Always wear leather gloves when handling wire rope.
- During the towing operation, never stand between the towing machine and the machine being towed.
- Never tow a machine on a slope.

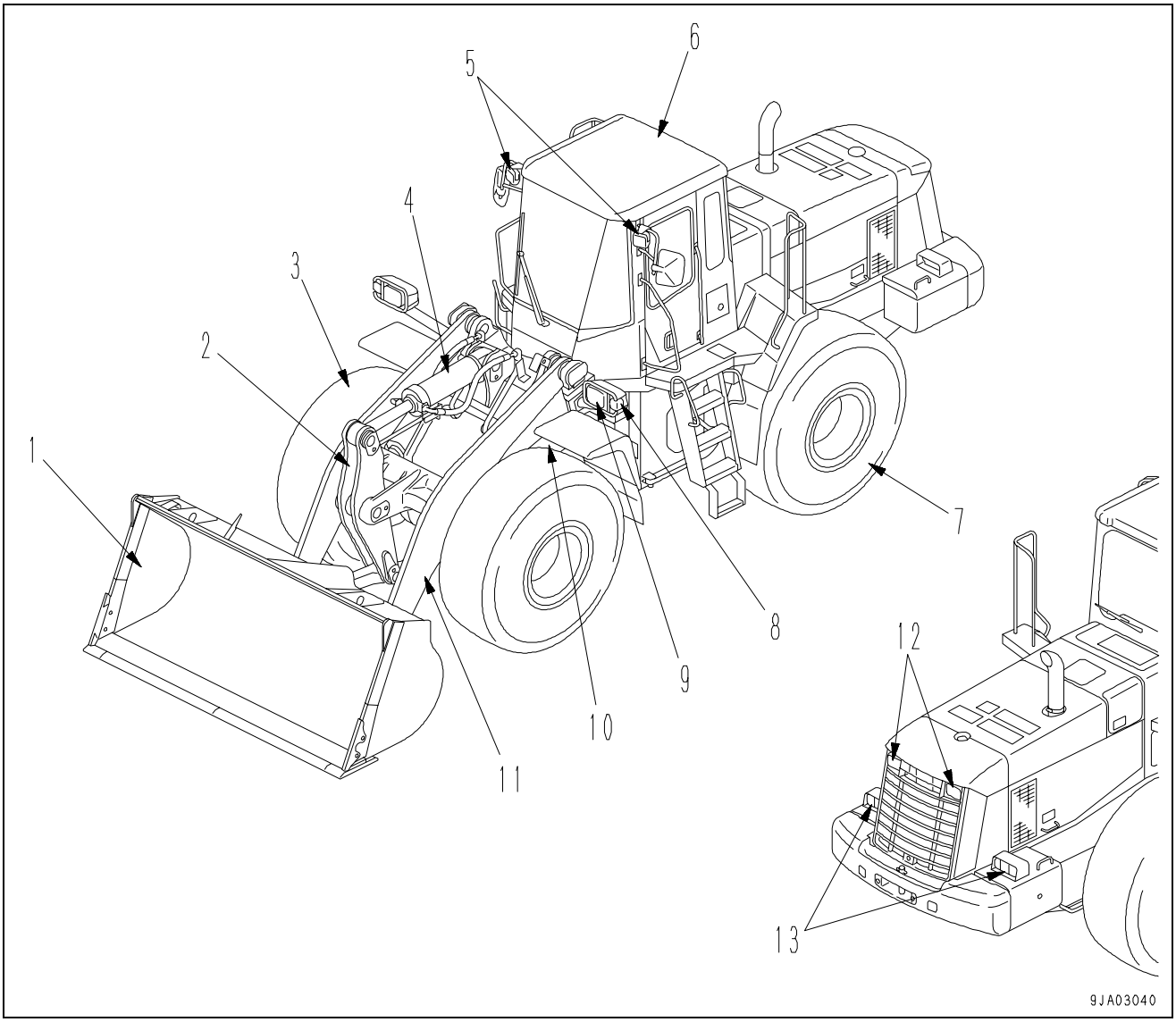


- Never use a wire rope which has cut strands (A), reduced diameter (B), or kinks ©. There is danger that the rope may break during the towing operation.



GENERAL VIEW

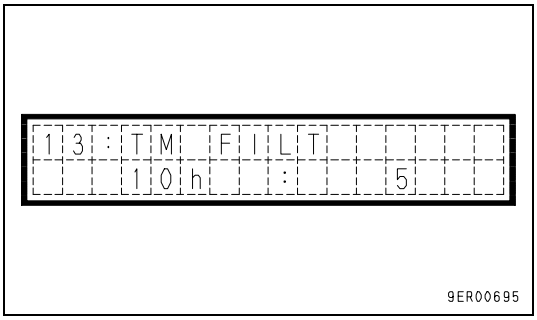
GENERAL VIEW OF MACHINE



1) Bucket	(8) Turn signal lamp
(2) Tilt lever	(9) Head lamp
(3) Front wheel	(10) Lift cylinder
(4) Bucket cylinder	(11) Lift arm
(5) Front working lamp	(12)Rear working lamp
(6) ROPS cab	(13) Rear combination lamp
(7) Rear wheel	

FILTER, OIL REPLACEMENT TIME DISPLAY

After completion of the system check when the starting switch is turned ON, if any filter or oil item is approaching the replacement time, this display (5) shows the item for approx. 30 seconds. When this happens, the maintenance caution lamp also flashes or lights up.
After replacing the filter or changing the oil, reset the replacement interval. For details, see “RESET METHOD FOR FILTER, OIL REPLACEMENT TIME (3-32)”.



REMARK

- **The top line of the character display shows the ID No. and item name for the item needing replacement; the bottom line shows the time remaining until replacement and the total number of times the replacement has been carried out.**
- **If the replacement time has already passed, a minus (-) sign appears before the time.**
- **After the display has been given for 30 seconds, it does not appear again until the starting switch is turned to the ON position.**
- **The message in the illustration above is not shown on the character display if an action code is being displayed.**
- **If there are two or more items to be displayed, the display changes repeatedly every three seconds. If there are more than 10 items, all the items are displayed once each, then the display returns to the normal display.**
- **The display appears when there is 30 hours remaining until the filter or oil replacement time. If the replacement time has passed, a minus (-) sign appears before the time for the first 30 hours. When more than 30 hours have passed, the display is no longer given.**
- **The maintenance caution lamp flashes as the replacement time approaches, and after the replacement time has passed, it lights up.**

Items for display of filter, oil replacement time

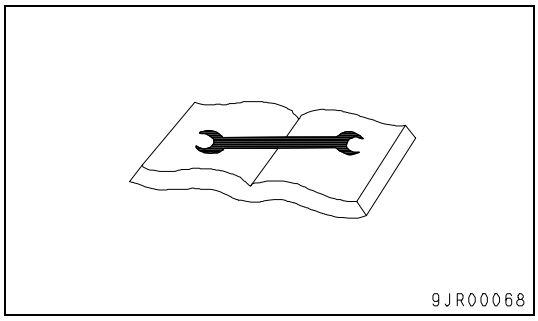
Item	Replacement interval (H)	Character display	ID number
Engine oil	500	ENG OIL	01
Engine oil filter	500	ENG FILT	02
Fuel filter	500	FUEL FILT	03
Corrosion resistor	1000	CORR RES	06
Transmission oil	1000	TM OIL	12
Transmission oil filter	1000	TM FILT	13
Hydraulic filter	2000	HYD FILT	04
Hydraulic tank breather element	2000	HYD BREATH	05
Hydraulic oil	2000	HYD OIL	10
Axle oil	2000	AXLE OIL	15

MAINTENANCE CAUTION LAMP

⚠ CAUTION

If the caution monitor lamp lights up, repair the problem as soon as possible.

When the oil change interval is reached, this monitor (4) flashes or lights up for approx. 30 seconds after completion of the system check when the starting switch is at the ON position.

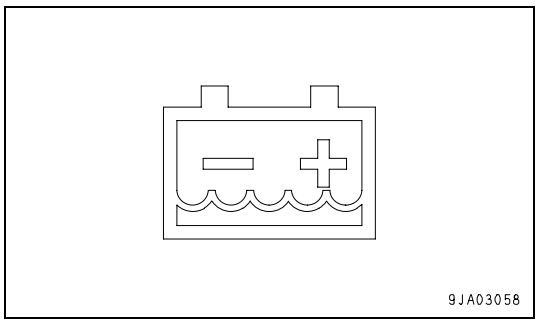


REMARK
The maintenance caution lamp flashes when there is less than 30 hours to the replacement time, and after the replacement time has passed, it lights up.

For details of the items covered by filter and oil replacement, see "FILTER, OIL REPLACEMENT TIME DISPLAY (3-12)".
After replacing the filter or changing the oil, reset the replacement interval. For details, see "RESET METHOD FOR FILTER, OIL REPLACEMENT TIME (3-32)".

BATTERY ELECTROLYTE LEVEL CAUTION LAMP

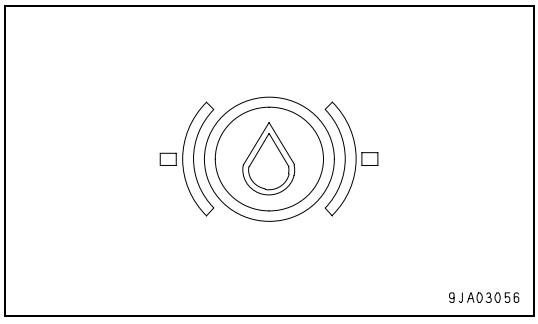
(option)
This monitor (5) lights up to warn the operator that the battery electrolyte level has gone down.
During checks before starting (when the starting switch is turned to the ON position but the engine is not started), this monitor lights up if the battery electrolyte level is low.
At the same time, "E01 BATTERY LEV LOW" is displayed on the character display, so check the electrolyte level and add distilled water.



During operation (engine running)
If the battery electrolyte level becomes too low, the battery electrolyte level caution lamp will light up.
At the same time, "E01 BATTERY LEV LOW" is displayed on the character display, so check the electrolyte level and add distilled water.

BRAKE OIL LEVEL CAUTION LAMP

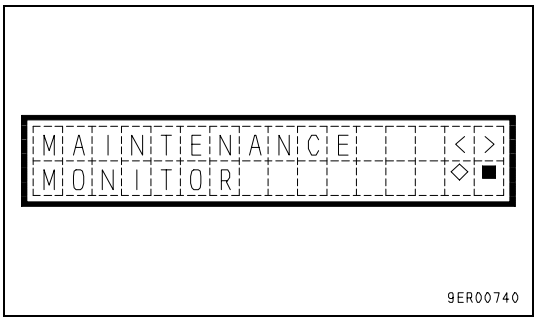
This monitor (6) is not used.
On this machine, the hydraulic oil is used for the brake oil.



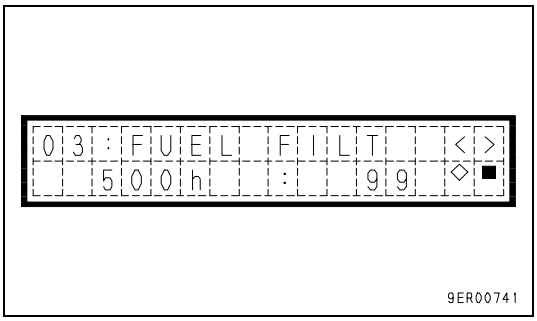
RESET METHOD FOR FILTER, OIL REPLACEMENT TIME

The filter and oil replacement time is displayed on the character display, so if the filter and oil have been replaced, reset the filter and oil change time.

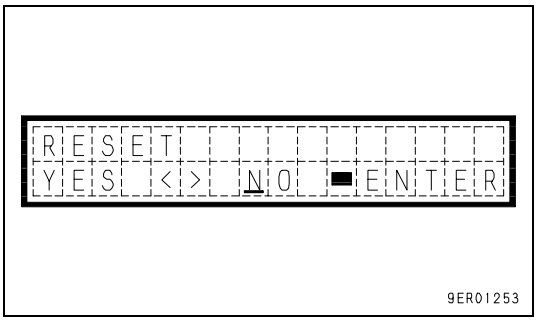
1. Press the (◇) of monitor panel mode selector switch 1, and display the odometer.
2. Press (>) or (<) of monitor panel selector switch 2 and display "MAINTENANCE MONITOR".



3. Press the (◇) of monitor panel mode selector switch 1. It will change to the display in the diagram on the right.
   The bottom line shows two items: the replacement time on the left and the total number of times the item has been replaced on the right.
4. Press the (>) or (<) monitor panel mode selector switch 2 to display the item (filter or oil) which has reached the replacement time.



5. Press the (◇) of monitor panel mode selector switch 1. It will change to the display in the diagram on the right.
   The top line shows [Reset] and [Item to be reset] in turn.
6. When resetting the replacement time, press (■) of machine monitor mode selector switch 1. It will reset and returned to the previous screen.
   To abandon, align the cursor with “NO“, then press (■) of monitor panel mode selector switch 1.

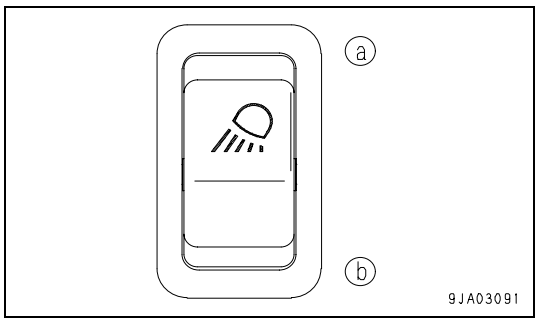


7. When resetting the replacement time for another item, carry out the procedure from Step 4. After completing, press (■) of monitor panel mode selector switch 1 twice or turn the starting switch OFF.

FRONT WORKING LAMP SWITCH

⚠ WARNING

Always turn the working lamp off before traveling on public roads.

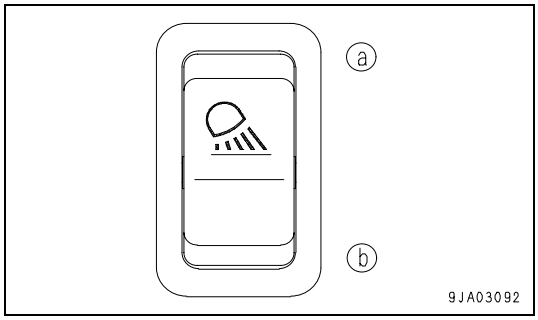


When turning the front working lamp ON, operate the lamp switch to turn the side clearance lamp ON or the head lamp ON, then operate this switch (10).
Position (a): Working lamp lights up
Position (b): Working lamp goes out
If position (a) is pressed, the pilot lamp will light up and the working lamp circuit will be switched ON.
If the lamp switch is not at the ON position for the side clearance lamp or head lamp, the working lamp will not light up.

REAR WORKING LAMP SWITCH

⚠ WARNING

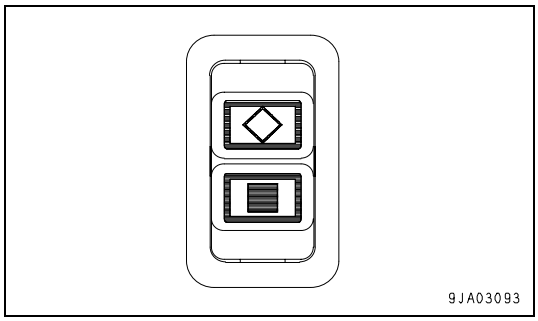
Always turn the working lamp off before traveling on public roads.



When turning the rear working lamp ON, operate the lamp switch to turn the side clearance lamp ON or the head lamp ON, then operate this switch (11).
Position (a): Working lamp lights up
Position (b): Working lamp goes out
If position (a) is pressed, the pilot lamp will light up and the working lamp circuit will be switched ON.
If the lamp switch is not at the ON position for the side clearance lamp or head lamp, the working lamp will not light up.

MONITOR PANEL MODE SELECTOR SWITCH 1

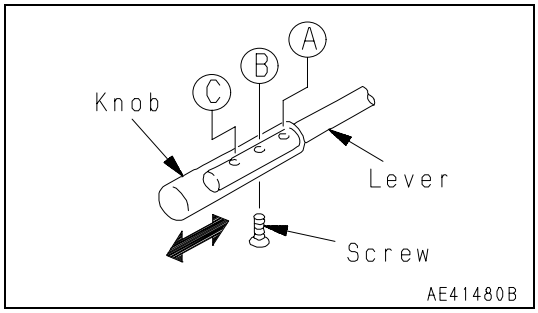
This switch (12) is used to switch the function of the character display.
When the switch is released, it automatically returns to its original position.



The basic operation is as follows.
Position (◇): Press here to select (confirm) each mode or operation
Position (■): Press here to cancel each mode or operation

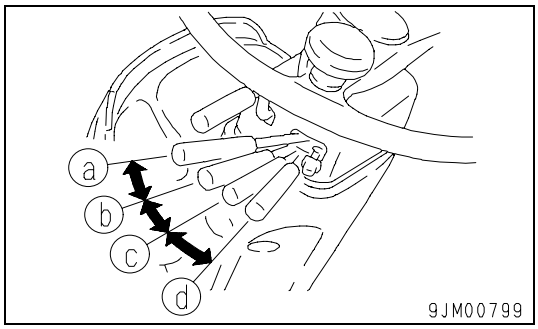
REMARK

The length of the lever can be adjusted to 3 stages (positions (A), (B), (C)). 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 (B) when it is shipped from the factory.)

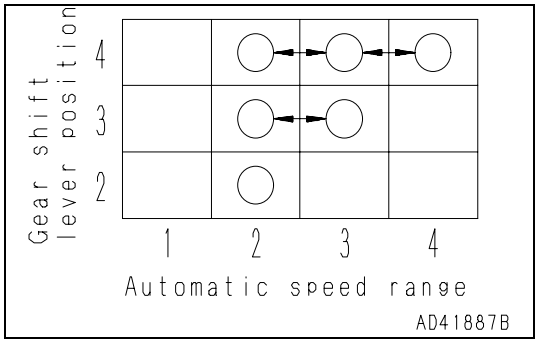


AUTOMATIC SHIFT

Automatic gear shifting canbe carried out in the 2nd and 4th speed range of the four forward and reverse speeds depending on the travel conditions.
Position (a):1st
Position (b):2nd
Position (c):3rd
Position (d):4th

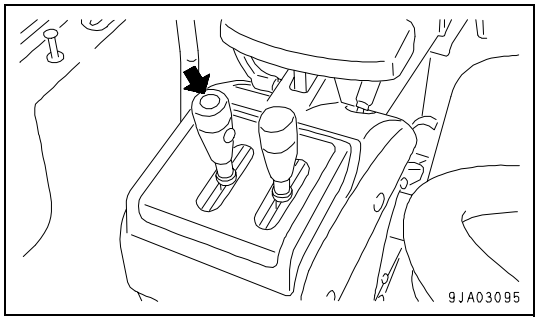


The range of speeds during automatic gear shifting is determined by the position of the gear shift lever as shown in the chart on the right.



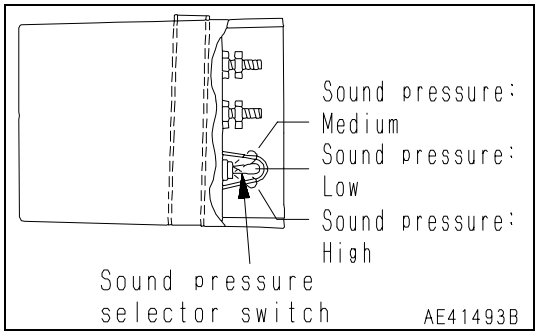
REMARK

- **The 1st position for the gearshift lever fixes the transmission in 1st. There is no automatic shifting of the transmission.**
- **When shifting down from 2nd to 1st, press the kick-down switch on the lift arm control lever.**
- **If the transmission is in auto-shift and the travel speed is below 12.5 km/h (7.8 MPH) in any speed range when traveling in either forward or in reverse, the kick-down switch is actuated and makes it possible to shift down to 1st.**
- **This makes it easy to carry out load and carry operations.**
- **Even if the travel speed is more than 12.5 km/h (7.8 MPH), this switch can be used to shift the transmission down. Each time the kick-down switch is pressed, the speed range will shift down one range at a time (when in 4th: F4 -> F3 -> F2 when in 3rd: F3 -> F2).**



METHOD OF CHANGING

Operate the sound pressure selector switch at the rear face of the backup alarm to adjust the volume.



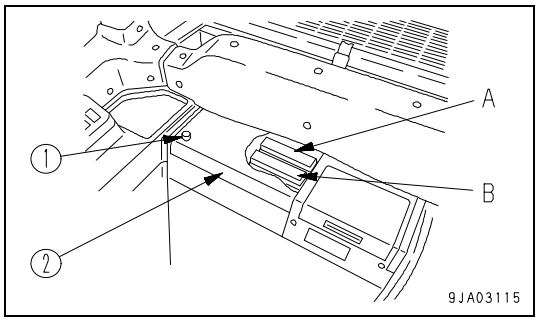
FUSE

NOTICE

Before replacing a fuse, be sure to turn off the starting switch.

The fuses protect the electrical equipment and wiring from burning out.
If the fuse becomes corroded, or white powder can be seen, or the fuse is loose in the fuse holder, replace the fuse.
Replace the fuse with another of the same capacity.

Loosen knob (1) at two places, then remove cover (2). The fuse boxes are A and B.



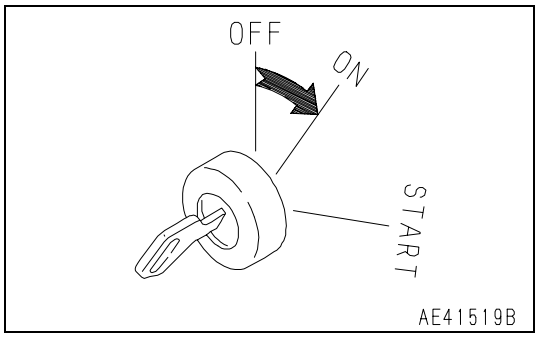
CHECK FUEL LEVEL, ADD FUEL

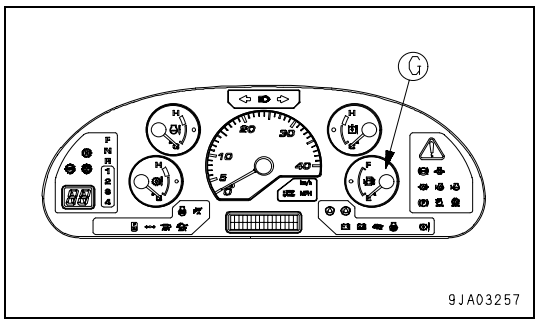
⚠ WARNING

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 the engine has run out of fuel and has stopped, it is necessary to operate the priming pump to bleed the air completely from the fuel line before starting the engine again.
Take care not to let the engine stop because of lack of fuel.
If the engine has run out of fuel, the air bleeding operation can be carried out more quickly if the fuel tank is completely filled with fuel.

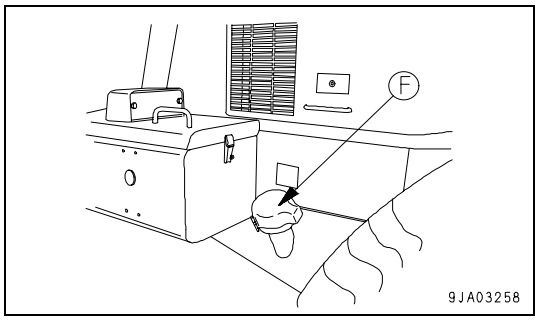
1. Turn the engine starting switch to the ON position and check the fuel level with fuel level gauge (G).
   After checking, turn the switch back to the OFF position.



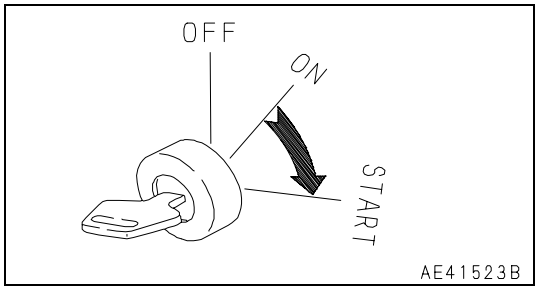


2. After completing operations, add fuel through fuel filler (F) to fill the tank.
   For details of the method for opening and closing the cap, see “CAP WITH LOCK (3-58)“.
3. After adding fuel, tighten the cap securely.

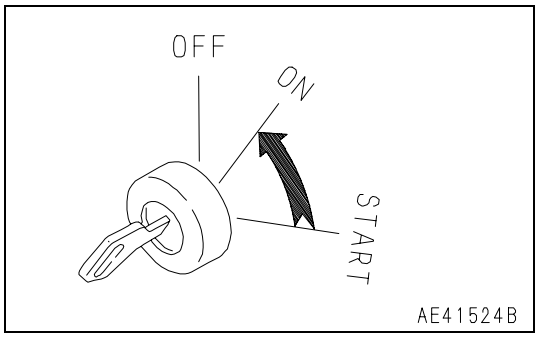
   Fuel capacity: 417 liters (110.17 US gal)



3. When preheating pilot lamp (2) goes out, turn the key in starting switch (1) to the START position.
   The starting motor will be cranked and after the engine rotates under no load for 2 or 3 seconds, the engine will start.



4. After the engine starts, release the key in starting switch (1). The key will automatically return to the ON position.
5. After the engine starts, if the engine water temperature is low (below 20 °C (68 °F)), the warming-up operation (engine speed: 1130 rpm) is automatically carried out.
   For details, see “AUTOMATIC WARMING-UP OPERATION (3-83)“.



REMARK

- **Because of the turbo protect function, immediately after the engine starts, even if the accelerator pedal is depressed, the engine speed will not rise above 1130 rpm.**

Engine water temperature	Turbo protect time
above 20°C (68°F)	0 sec.
-18°C to 20°C (-0.4°F to 68°F)	0 to 12 sec.
Below - 18°C (-0.4°F)	15 sec.

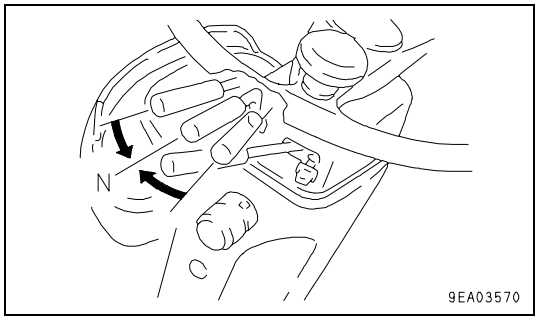
- The turbocharger rotates at extremely high speed. Immediately after the engine is started, the pressure of the lubricating oil has not risen sufficiently, so if the engine speed is suddenly raised, it may lead to damage or seizure of the turbocharger bearing. The turbo protect function acts to prevent this problem. It uses electronic control to prevent the engine speed from rising above a certain speed for the first few seconds after the engine started.
- To improve the ease of starting in cold weather, the low idling speed becomes slightly higher for the time given below and the engine sound is different. In addition, it functions to make the acceleration gradual during this time.

Engine water temperature	Injection characteristics change time
above 20°C (68°F)	0 sec
0°C to 20°C (32°F to 68°F)	0 to 6 sec
-20°C to 0°C (-4°F to 32°F)	6 to 12 sec
-30°C to -20°C (-22°F to -4°F)	12 to 15 sec

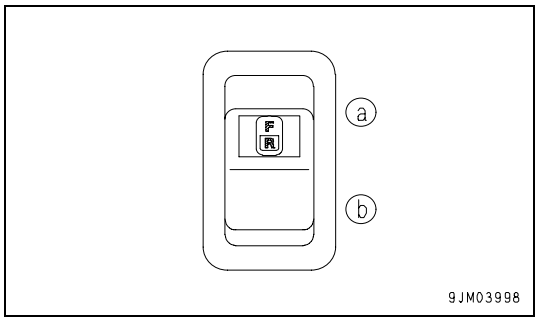
USING SWITCH TO CHANGE BETWEEN FORWARD AND REVERSE

(option)

1. Place the directional lever at the N position.

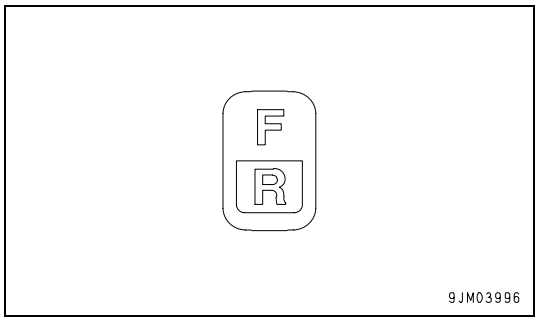


2. Turn the directional selector switch actuation switch on the right switch panel ON.
   The pilot lamp inside the switch and the directional selector pilot lamp on the machine monitor light up.
   This actuates the operation of the directional selector switch.

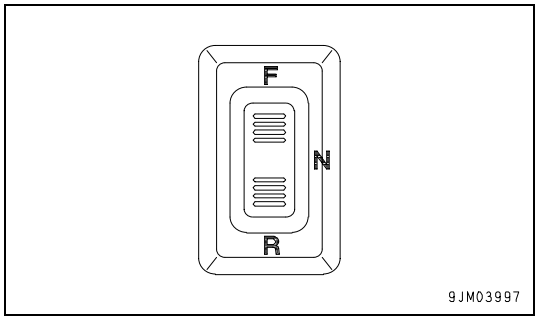


If the directional selector pilot lamp on the machine monitor flashes, the switch for the lever is in one of the following conditions. Set it to the correct position.

- When directional lever is not at N position
  If the directional lever is not at the N position, the pilot lamp flashes, and at the same time, the central warning lamp lights up and the alarm buzzer sounds. In addition, “E00 SHIFTLEVER NEUT“ is displayed on the character display.
  In this condition, the machine will move forward or in reverse according to the set position of the directional lever. Return the directional lever to the N position.
- When directional selector switch is at F or R when engine is started
  If the directional selector switch is at F or R, the pilot lamp flashes, and at the same time, the central warning lamp lights up and the alarm buzzer sounds. In addition, “E00 SHIFT SW NEUT“ is displayed on the character display.
  In this condition, the engine will not start, so set the directional selector switch to N.



3. Press the selector switch on the side of the control lever to the desired position.



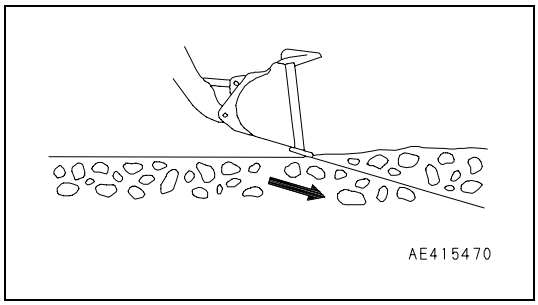
DIGGING AND LOADING ON LEVEL GROUND

- When digging and loading on level ground,set the bucket edge facing down slightly as follows and drive the machine forward. Always be careful not to load the bucket on one side and cause an unbalanced load. This operation should be carried out in 1st gear.

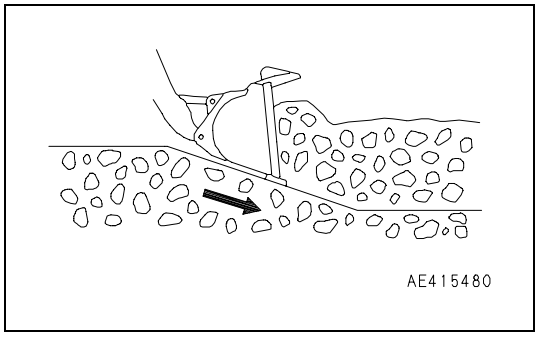
⚠ CAUTION

Do not set the bucket facing down more than 20 degrees.

1. Set the edge of the bucket facing slightly down.

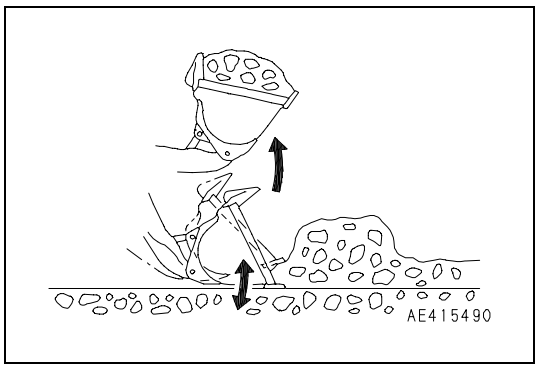


2. Drive the machine forward and operate the lift arm control lever forward to cut a thin layer of the surface each time when excavating the soil.



3. Operate the lift arm control lever slightly up and down to reduce the resistance when driving the machine forward.

   When digging with the bucket, avoid imposing the digging force onto only one side of the bucket.

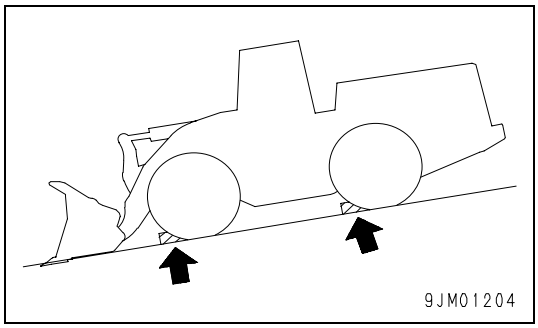


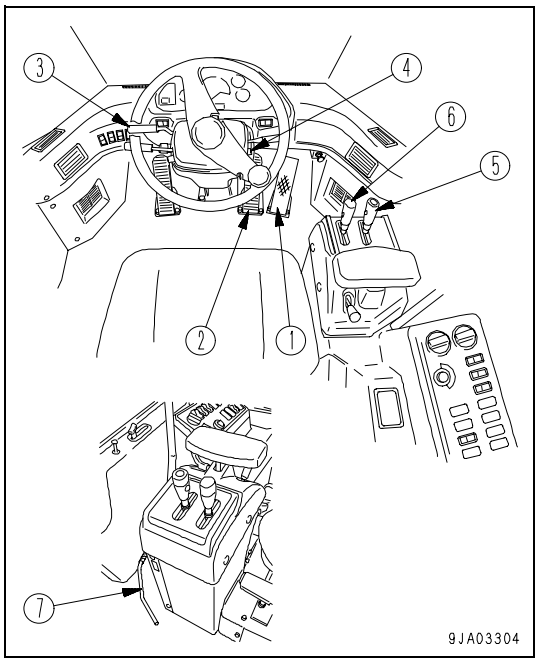
PARKING MACHINE

⚠ WARNING

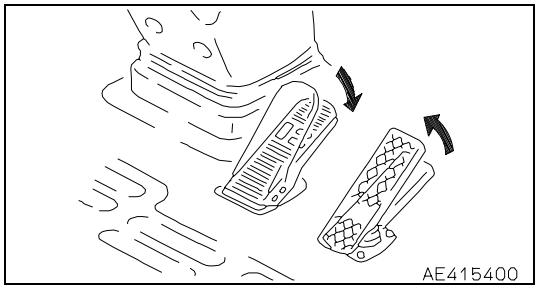
- **Avoid stopping suddenly. Give yourself ample room when stopping.**
- **Do not park the machine on slopes.**
- **If the machine has to be parked on a slope, set it facing directly down the slope, then dig the bucket into the ground and put blocks under the tires to prevent the machine from moving.**
- **If the control lever is touched by accident, the work equipment or the machine may move suddenly, and this may lead to a serious accident. Before leaving the operator's compartment, always set the safety lock lever securely to the LOCK position.**
- **Even if the parking brake switch is turned ON, there is danger until the parking brake pilot lamp lights up, so keep the brake pedal depressed.**

NOTICE
Never use the parking brake switch to brake the machine when traveling except in an emergency. Apply the parking brake only after the machine has stopped.

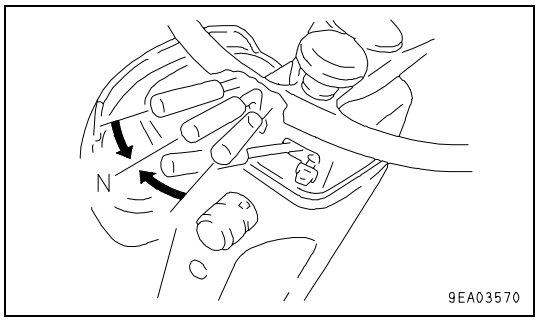




1. Release accelerator pedal (1), then depress brake pedal (2) to stop the machine.



2. Place directional lever (3) in N (neutral) position.



COLD WEATHER OPERATION

PRECAUTIONS FOR LOW TEMPERATURE

If the temperature becomes low, it becomes difficult to start the engine, and the coolant may freeze, so do as follows.

FUEL AND LUBRICANTS

Change to fuel and oil with low viscosity for all components. For details of the specified visicosity, see “LUBRICANTS, FUELS AND FILLING CAPACITIES (4-8)“.

COOLANT

⚠ WARNING

- **Antifreeze is toxic. Be careful not to get it into your eyes or on your skin. If it should get into your eyes or on your skin, wash it off with large quantities of fresh water and see a doctor at once.**
- **Antifreeze is toxic. Be extremely careful when handling it. When replacing coolant containing antifreeze or when handling coolant when repairing the radiator, contact your Komatsu distributor or ask your local antifreeze dealer. Be careful not to let the water flow into drainage ditches or spray on to the ground surface.**
- **Antifreeze is flammable, so do not bring any flame close. Do not smoke when handling antifreeze.**

NOTICE

- **Never use methanol, ethanol or propanol based antifreeze.**
- **Absolutely avoid using any water leak preventing agent irrespective of weather it is used independently or mixed with an antifreeze.**
- **Do not mix one antifreeze with a different brand.**

For details of the antifreeze mixture when changing the coolant, see “CLEAN INSIDE OF COOLING SYSTEM (4-21)“.
Use a Permanent Antifreeze (ethylene glycol mixed with corrosion inhibitor, antifoam agent, etc.) meeting the standard requirements as shown below. With permanent antifreeze, no change of coolant is required for a year. If it is doubtful that an available antifreeze meets the standard requirements, ask the supplier of that antifreeze for information.
Standard requirements for permanent antifreeze

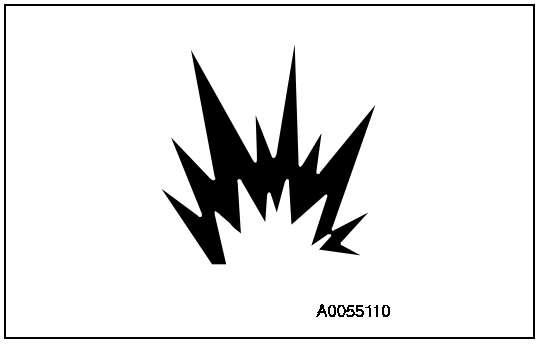
- SAE J1034
- FEDERAL STANDARD O-A-548D

REMARK

In areas where permanent antifreeze is not available, it is possible to use antifreeze whose main component is ethylene glycol and does not contain any corrosion inhibitor. (Such antifreeze can be used for the winter season only.) However, in such a case, the cooling water must be changed twice a year (spring and fall), so use permanent antifreeze as far as possible.

PRECAUTIONS FOR CHARGING BATTERY

When charging the battery, if the battery is not handled correctly, there is danger that the battery may explode. Always follow the instructions in “BATTERY (3-123)“ and the instruction manual accompanying the charger, and do as follows.



- Do not use or charge the battery if the battery electrolyte level is below the LOWER LEVEL line. This may cause an explosion. Always check the battery electrolyte level periodically and add distilled water to bring the electrolyte level to the UPPER LEVEL line.
- Set the voltage of the charger to match the voltage of the battery to be charged. If the voltage is not selected correctly, the charger may overheat and cause an explosion.
- Connect the positive (+) charger clip of the charger to the positive (+) terminal of the battery, then connect the negative (-) charger clip of the charger to the negative (-) terminal of the battery. Be sure to fix the clips securely.
- Set the charging current to 1/10 of the value of the rated battery capacity; when carrying out rapid charging, set it to less than the rated battery capacity.
  If the charger current is too high, the electrolyte will leak or dry up, and this may cause the battery to catch fire and explode.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery electrolyte and cause the battery to explode.

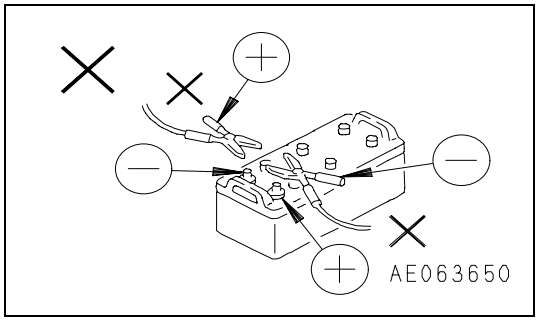
STARING ENGINE WITH BOOSTER CABLE

When starting the engine with a booster cable, do as follows:

PRECAUTIONS WHEN CONNECTING AND DISCONNECTING BOOSTER CABLE

⚠ WARNING

- **When connecting the cables, never contact the positive (+) and negative (-) terminals.**
- **When starting the engine with a booster cable, always wear safety glasses and rubber gloves.**
- **Be careful not to let the normal machine and problem machine contact each other. This prevents sparks from generating near the battery which could ignite the hydrogen gas given off by the battery.**
- **Make sure that there is no mistake in the booster cable connections. The final connection is to the engine block of the problem machine, but sparks will be generated when this is done, so connect to a place as far as possible from the battery.**
- **When disconnecting the booster cable, take care not to bring the clips in contact with each other or with the machine body.**



NOTICE

- **The size of the booster cable and clip should be suitable for the battery size.**
- **The battery of the normal machine must be the same capacity as that of the engine to be started.**
- **Check the cables and clips for damage or corrosion.**
- **Make sure that the cables and clips are firmly connected.**
- **Check that the safety lock levers and parking brake levers of both machines are in the LOCK position.**
- **Check that each lever is in the NEUTRAL position.**

OUTLINES OF SERVICE

OUTLINE OF OIL, FUEL, COOLANT

OIL

- Oil is used in the engine and work equipment under extremely severe conditions (high temperature, high pressure), and is deteriorates with use.
  Always use oil that matches the grade and temperature for use given in the Operation and Maintenance Manual.
  Even if the oil is not dirty, always change the oil after the specified interval.
- Oil corresponds to blood in the human body, so always be careful when handling it to prevent any impurities (water, metal particles, dirt, etc.) from getting in.
  The majority of problems with machine are caused by the entry of such impurities.
  Take particular care not to let any impurities get in when storing or adding oil.
- Never mix oils of different grades or brands.
- Always add the specified amount of oil.
  Having too much oil or too little oil are both causes of problems.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit. In such cases, please contact your Komatsu distributor.
- When changing the oil, always replace the related filters at the same time.
- We recommend you have an analysis made of the oil periodically to check the condition of the machine. For those who wish to use this service, please contact your Komatsu distributor.
- At the time of shipping from the factory, SAE1OWCD is used for hydraulic type of oil. When HO46-hydraulic oil is going to be used, change specified amount of oil (whole amount). The hydraulic oil that is not recommended by Komatsu can cause clogging of oil filter, so do not use it. The portion of the oil that remains in the piping or cylinders will not be a problem even though it will be mixed into new oil.

FUEL

- The fuel pump is a precision instrument, and if fuel containing water or dirt is used, it cannot work properly.
- Be extremely careful not to let impurities get in when storing or adding fuel.
- Always use the fuel specified in the Operation and Maintenance Manual.
  Fuel may congeal depending on the temperature when it is used (particularly in low temperature below -15°C (5°F)). It is necessary to change for the fuel that is suitable for the temperature.
- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank after completing the day‘s work.
- Before starting the engine, or when 10 minutes have passed after adding fuel, drain the sediment and water from the fuel tank.
- If the engine runs out of fuel, or if the filters have been replaced, it is necessary to bleed the air from the circuit.
- The engine mounted on this machine employs electronic control and a high-pressure fuel injection system 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 the durability, so do not use such fuel.

COOLANT

- River water contains large amounts of calcium and other impurities, so if it is used, scale will stick to the engine and radiator, and this will cause defective heat exchange and overheating.
  Do not use water that is not suitable for drinking.
- When using anti-freeze, always observe the precautions given in the Operation and Maintenance Manual.
- Komatsu machines are supplied with Komatsu original anti-freeze in the coolant when the machine is shipped. This anti-freeze is effective in preventing corrosion of the cooling system.
  The anti-freeze can be used continuously for two years or 4000 hours. Therefore, it can be used as it is even in hot areas.
- Anti-freeze is flammable, so be extremely careful not to expose it to flame or fire.
- The proportion of anti-freeze to water differs according to the ambient temperature.
  For details of the mixing proportions, see “CLEAN INSIDE OF COOLING SYSTEM (4-21)“.
- If the engine overheats, wait for the engine to cool before adding coolant.
- If the coolant level is low, it will cause overheating and will also cause problems with corrosion from the air in the coolant.

No.	Safety critical parts for periodic replacement	Q'ty	Replacement interval
1	Fuel hose (fuel tank - fuel strainer)	1	Every 2 years or every 4000 hours, whichever comes first
2	Fuel hose (fuel strainer - supply pump)	1	
3	Fuel return hose (supply pump - fuel tank)	1	
4	Fuel hose (supply pump - fuel filter)	1	
5	Fuel hose (fuel filter - supply pump)	1	
6	Fuel spill hose (unit injectior - fuel tank)	1	
7	Steering hose (pump - steering valve)	1	
8	Steering hose (steering valve - steering cylinder)	4	
9	Steering hose (steering valve - hydraulic tank)	2	
10	Brake hose (pump - accumulator charge valve)	2	
11	Brake hose (accumulator charge valve - check valve))	1	
12	Brake hose (check valve - tandem valve)	2	
13	Brake hose (check valve - single valve)	1	
14	Brake hose (check valve - accumulator P.P port)	1	
15	Brake hose (tandem valve - front brake)	2	
16	Brake hose (tandem valve - rear brake)	2	
17	Brake hose (single valve - tandem valve)	1	
18	Brake hose (tandem valve - drain block)	1	
19	Brake hose (single valve - drain block)	1	
20	Brake hose (drain block - hydraulic tank)	1	
21	Brake hose (brake accumulator - reduction valve for emergency parking brake cancel)	1	
22	Brake hose (transmission valve - reduction valve for emergency parking brake cancel)	1	
23	Brake hose (charge valve drain - hydraulic tank)	1	

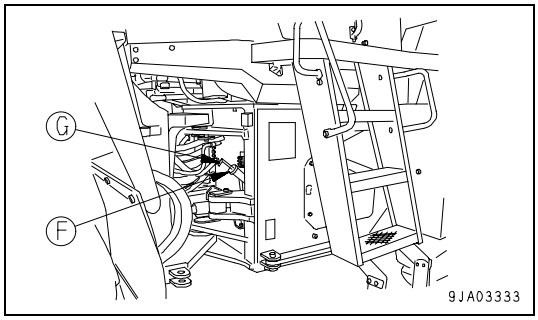
CHECK TRANSMISSION OIL LEVEL, ADD OIL

⚠ WARNING

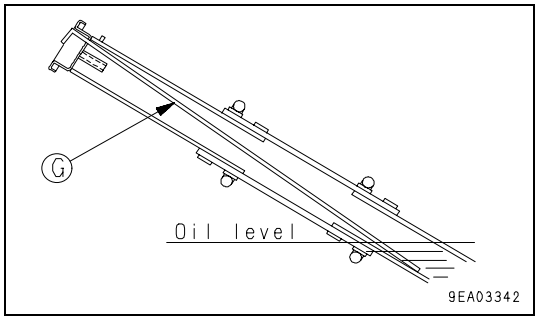
The parts and oil are at high temperature after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.

Carry out this procedure if there is any sign of oil on the transmission case, or if there is oil mixed with the cooling water.

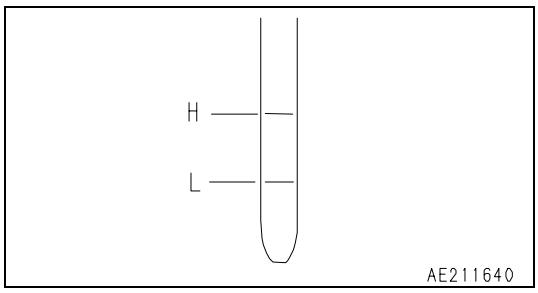
1. Start the engine and run it for at least 5 minutes.
2. Open the cap of oil filler port (F), remove dipstick (G), and wipe the oil off with a cloth.



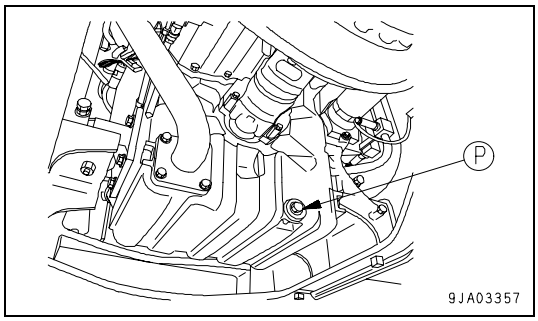
3. Insert dipstick (G) again from the top of the oil filler port diagonally as shown in the diagram, then pull it out again. When doing this, insert the dipstick so that the tip contacts the bottom of the dipstick guide.



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 engine oil through oil filler (F).



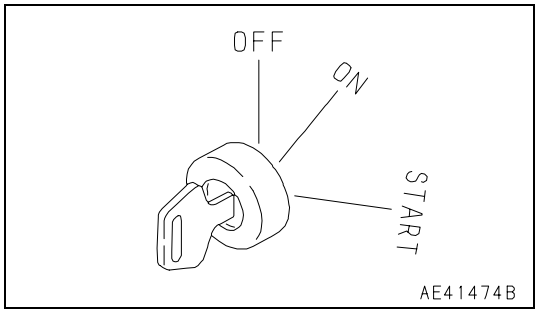
5. If the oil is above the H mark, drain the excess engine oil from drain plug(P), and check the oil level again.
6. If the oil level is correct, insert dipstick (G) in the dipstick guide, then tighten the cap



REPLACE SLOW BLOW FUSE

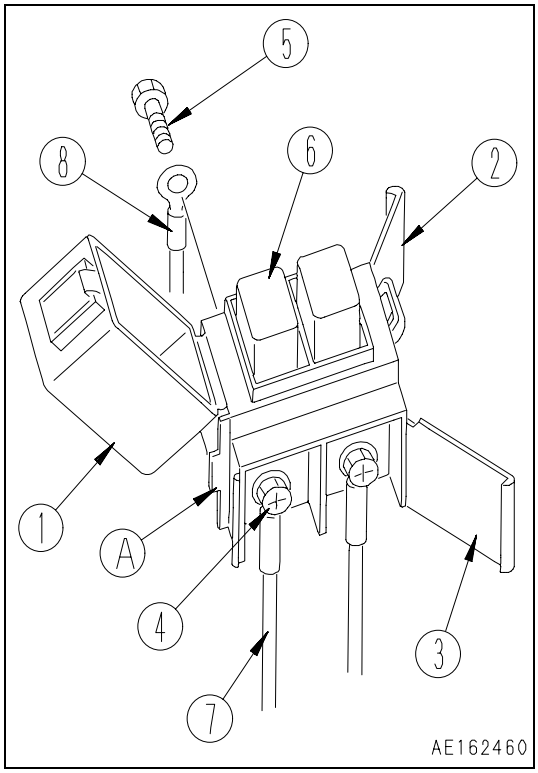
NOTICE

- **Always turn the power OFF when replacing the slow blow fuse (turn the starting switch to the OFF position).**
- **Always replace the slow blow fuse with a fuse of the same capacity.**



1. Turn the starting switch to the OFF position.
2. Remove the slow blow fuse box from the chassis.

3. Open covers (1), (2), and (3) of the slow blow fuse box. Covers (2) and (3) can be removed easily by using protrusion (A) on the body as a fulcrum and levering the catch of the cover with a flat-headed screwdriver to release it.
4. Loosen screws (4) and (5), and remove. When screws (4) and (5) are removed, slow blow fuse 6 will also come off together with electric wiring (7) and (8).
5. Using screws (4) and (5), install a new slow blow fuse together with electric wiring 7 and 8 to the slow blow fuse box, then close covers (1), (2), and (3).
6. Install the slow blow fuse box to the chassis.

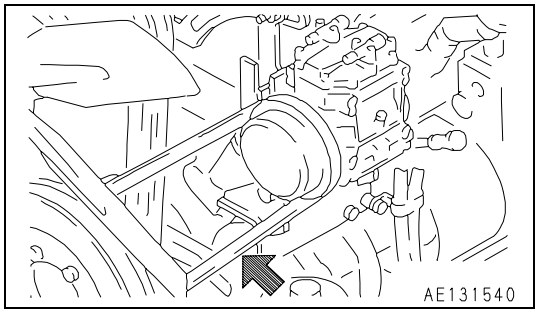


CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST

(If equipped)

CHECKING

The standard deflection between the air conditioner compressor pulley and crank pulley when pressed with a thumb (approx. 98N (10 kgf)) should be approx. 16 - 20 mm (0.6 - 0.8 in).
When a belt tension gauge is used, the standard tension is within a range of 353 - 530N (36 - 54 kgf).



CHECK WHEN CHANGING THE V-BELT

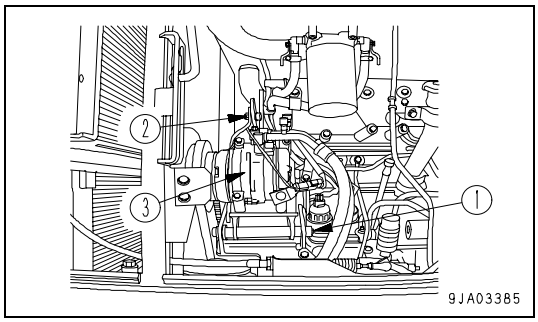
The standard deflection between the air conditioner compressor pulley and fan pulley when pressed with a thumb (approx. 98N (10 kgf)) should be approx. 12 - 17 mm (0.5 - 0.7 in).
When a belt tension gauge is used, the standard tension is within a range of 530 - 745N (54 - 76 kgf).

REMARK

When the belt has been replaced with a new part, a high tension is necessary, so the initial tension is in the value given above.

ADJUSTING

1. Loosen nuts (1) and (2), and move compressor (3) to adjust.
2. Tighten nuts (1) and (2) to hold compressor (3) in position.
3. Check each pulley for damage, wear of the V-groove, and wear of the V-belt. Be particularly careful to check that the V-belt is not in contact with the bottom of the V-groove.
4. Replace the V-belt if it has stretched, leaving no allowance for adjustment, or if the belt is cut or cracked.
   If the V-belt has been replaced with a new part, there will be initial elongation, so inspect and adjust it again after one-hour of operation.



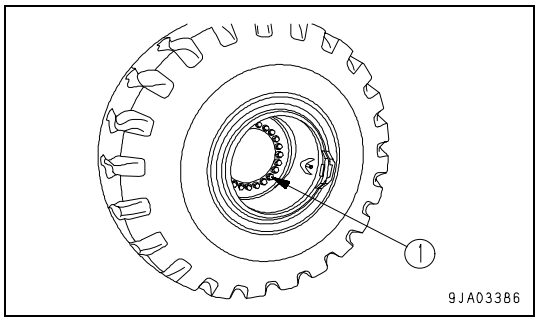
CHECK FOR LOOSE WHEEL HAB NUTS, TIGHTEN

If wheel hub nuts (1) are loose, tire wear will be increased and accidents may be caused.

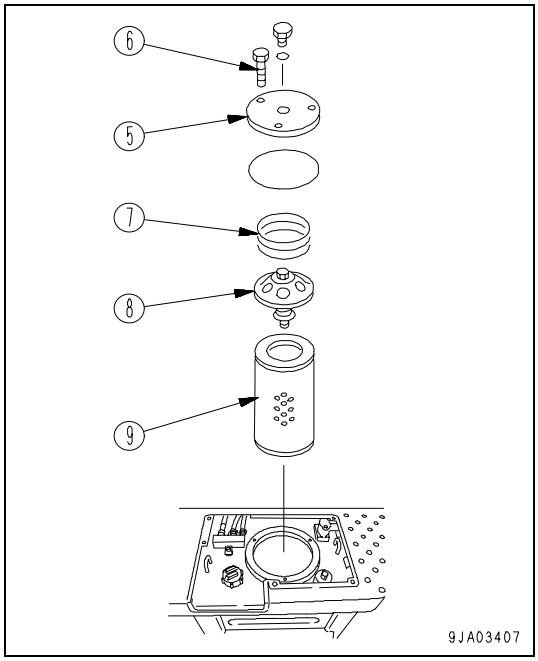
1. Check for loose nuts, and tighten if necessary.
   When checking for loose nuts, always turn the nuts in the direction of tightening to check.

Tightening torque: 825 to 1030 N²m
(84 to 105 kgf²m, 607.6 to 759.9 lbft))

2. If any stud bolt is broken,replace all the stud bolts for that wheel.



8. Remove mounting bolts (6) of filter cover (5) at the top of the tank, then remove the cover.
   When the cover is removed, the force of spring (7) may make the cover fly off, so keep the cover pushed down when removing the bolts.
9. Remove spring (7) and bypass valve (8), then remove element (9).
10. Check that there is no foreign material inside the tank, then clean it.
11. Install new element (9), then set bypass valve (8), spring (7), and cover (5) to the tank.
    If the O-ring of the cover is damaged or deteriorated, replace it.
12. When installing the cover bolts, push down the cover and tighten the bolts evenly.
13. Add engine oil through oil filler port (F) to the specified level, then install cap (F).
14. Check that the hydraulic oil is at the standard level. For details, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (4-39)“.

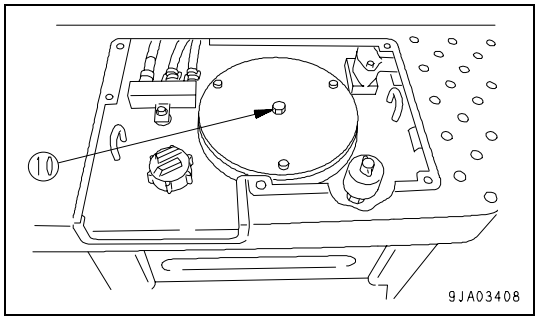


15. Run the engine at low idling,and extend and retract the steering, bucket, and lift arm cylinders 4 to 5 times. Be careful not to operate the cylinder to the end of its stroke (stop approx.100 mm (3.9 in) before the end of stroke).

NOTICE

If the engine is run immediately at high speed or the cylinder is operated to the end of its stroke,the air inside the cylinder will cause damage to the piston packing.

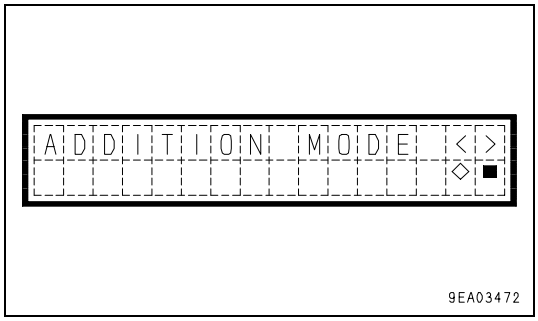
16. Next, operate the steering, bucket, and lift arm cylinders to the end of their stroke 3 to 4 times, then stop the engine and loosen bleed plug (10) to bleed the air from the hydraulic tank. After bleeding the air, tighten plug (10) again.
    Run the engine at low idling when bleeding the air.
17. Check that the hydraulic oil is at the standard level. For details, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (4-39)“.



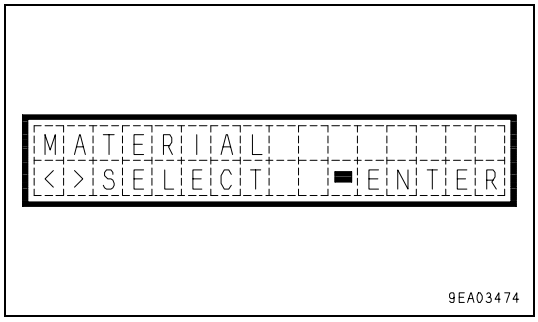
18. Next, increase the engine speed and repeat the procedure in Step 16 to bleed the air. Continue this operation until no more air comes out from plug (10).
19. After completing the air bleed operation, tighten plug (10).
    Tightening torque: 11.3 ± 1.5 N²m (1.15 ± 0.15 kgf²m, 8.3 ± 1.1 lbft)

20. Check that the hydraulic oil is at the standard level. For details, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (4-39)“.
21. Check that there is no leakage of oil from the filter cover mount.

4. If the display is “REMAINS MODE“, press the (>) or (<) of monitor panel mode selector switch 2 to display "ADDITION MODE".

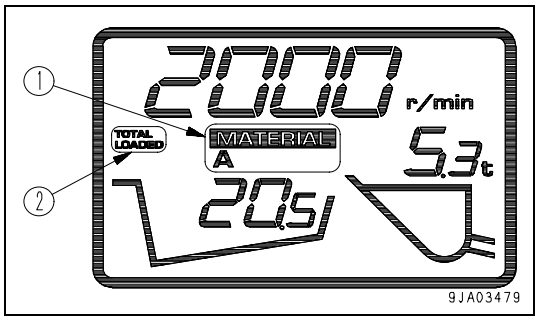


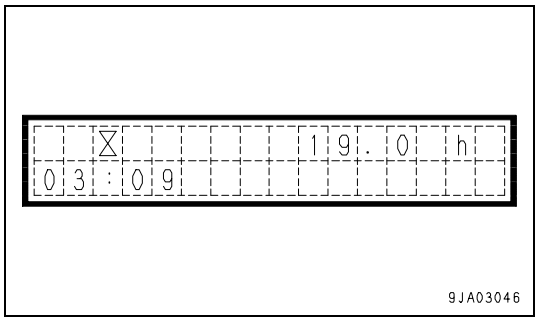
5. Press the (◇) of monitor panel selector switch 1 and display “MATERIAL < > SELECT".



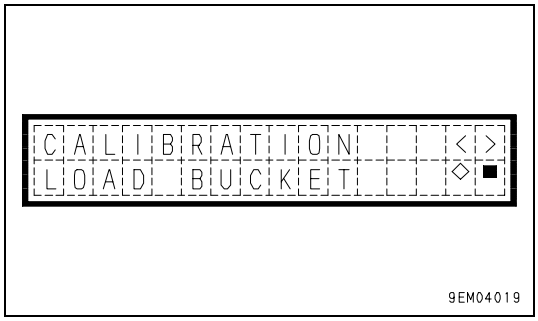
6. Check the display for the selected material on load meter display (1).
   The present selection display is A.
   In the case of the addition mode, “TOTAL LOADED“ is displayed on display (2).
7. If A is to remain selected, press the (■) of monitor panel mode selector switch 1. A is then selected.
   If A is to be changed to B to E, press the (>) or (<) of monitor panel mode selector switch 2 to select the type of material, then press the (■) of monitor panel mode selector switch 1.
8. This completes the setting of the addition mode.
   The character display returns to the normal service meter and time display.

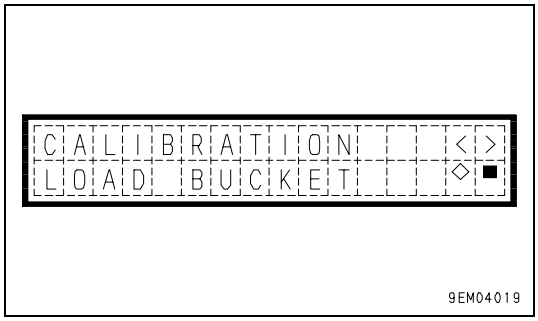
   Once the setting has been made, even if the starting switch is turned OFF and operations are stopped, the setting is retained. When operations are started again, there is no need to carry out the setting again. All further loads will be added to the total load recorded before operations were stopped.



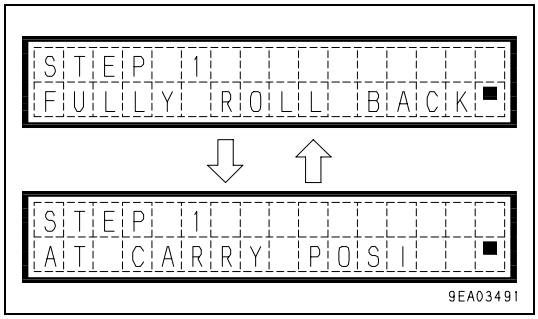


5. Press the (>) of monitor panel mode selector switch 2. The bottom line changes to "LOAD BUCKET", so press the (◇) of monitor panel mode selector switch 1.

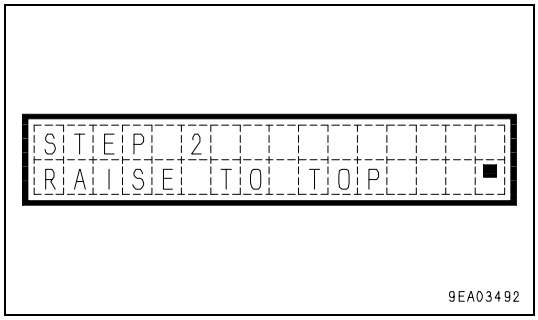


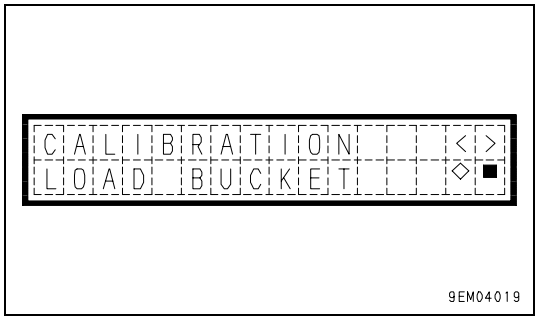


6. Press the (◇) of monitor panel selector switch 1. The display changes to “STEP 1“ on the top line, and “FULLY ROLL BACK“ and “AT CARRY POSI“ are displayed in turn for 3 seconds each on the bottom line.
7. Load the bucket with a load of a known amount, then follow the instructions on the screen, tilt the bucket back fully, and lower the lift arm to set to the travel posture.



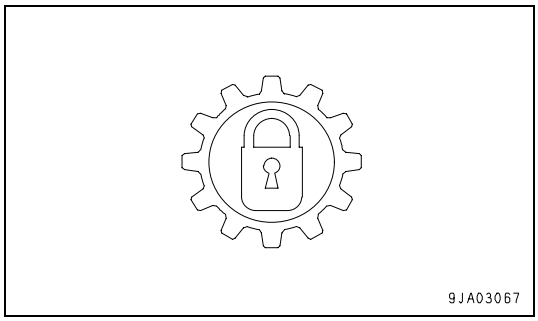
8. When the lift arm is lowered, the display changes to “STEP 2“ and “RAISE TO TOP“.
   This completes preparation for setting the calibration when loaded.
9. Follow the instructions on the screen and raise the lift arm fully.
   When raising the lift arm, carry out the operation as close to actual operation as possible.
10. When the setting of the loaded calibration is completed correctly, the buzzer gives short sounds, and the screen changes to the screen for inputting the target load.
11. If the setting of the loaded calibration is not completed correctly, the buzzer gives a long sound, and the display returns to “CALIBRATION“ on the top line and “LOAD BUCKET“ on the bottom line.
12. Repeat the procedure again from Step 6.





TORQUE CONVERTER LOCK-UP PILOT LAMP

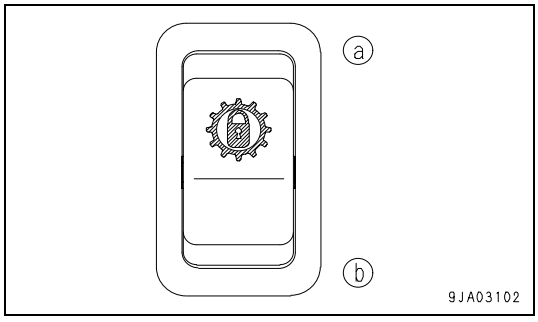
This monitor (2) lights up when the torque converter lock-up is engaged and the transmission actually enters direct drive.



For details of (3) and (4), see “SHIFT INDICATOR (3-27)“ and “ACTION CODE DISPLAY (3-9)“ in the section on the machine monitor in the OPERATION section.

METHOD OF OPERATION

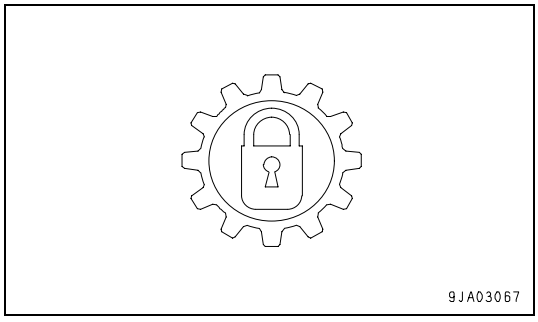
1. Press the top (a) of the torque converter lock-up switch to turn it ON.
   The pilot lamp inside the switch lights up.
2. When the actual speed range is 3rd or 4th in either FORWARD or REVERSE, the torque converter lock-up function is actuated according to the travel speed and sets to direct drive.



REMARK
When 4th is selected in auto-shift mode, the lock-up is not actuated in 3rd. The lock-up is actuated only in the selected 4th gear.

When the lock-up is actually actuated, the lock-up pilot lamp on the machine monitor lights up.

3. To cancel the lock-up, press the bottom (b) of the torque converter lock-up switch to turn it OFF.
   The lock-up is canceled.

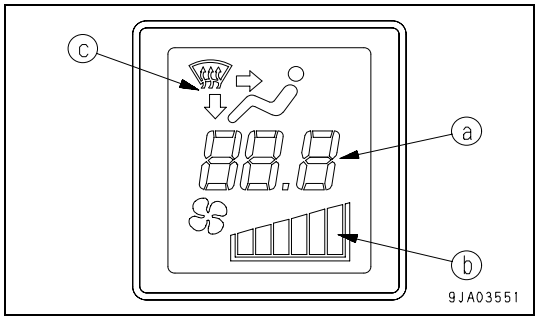


The travel speed for actuation and cancellation of the lock-up is as shown below.

Lock-upsSpeed range	FORWARD travel speed (km/h (MPH))		REVERSE travel speed (km/h (MPH))	
	Actuated	Canceled	Actuated	Canceled
3rd	11 to 14 (6.8 to 8.7)	10 to 12 (6.2 to 7.5)	16 (9.9)	13 (8.1)
4th	21 to 24 (13.0 to 14.9)	19 (11.0)	22 to 25 (13.7 to 15.5)	20 (12.4)

MONITOR PANEL

The monitor panel shows the temperature setting (a), air flow (b), and vent selection ©.



AIR CONDITIONER SWITCH

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

- When the auto switch or fan switch is turned ON and air conditioner switch (8) is pressed, the air conditioner is switched ON, the lamp at the top of the air conditioner switch lights up, and the air conditioner starts. When it is pressed again to the OFF position, the lamp at the top of the air conditioner switch goes out.
- The air conditioner cannot be operated while the fan is stopped.